

# **Robot-Assisted Laparoscopic Prostatectomy (RALP)**

## **FINAL REPORT**

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## Questions and answers for policy makers

### Clinical Need

1. What clinical need does RALP address?

Prostate cancer is the most common non-skin cancer and the third leading cause of cancer-related deaths in Canadian men. The introduction of prostate-specific antigen (PSA) testing has led to a sharp growth in the detection of early or localized prostate cancer and demand for curative treatments.

In Canada, an estimated 21,600 men were diagnosed with the disease in 2016, which represented 21% of new cancer cases among men over 2015. In Alberta, there were 2,247 new cases of prostate cancer in 2014, representing in an overall incidence of 139 cases per 100,000 men. The number increased with age. In men 85 years of age and older, the incidence was 569 cases per 100,000 men.

2. What publicly-funded and non-funded alternatives exist?

Currently, the funded treatment alternatives are radical prostatectomy (open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LRP) or robot assisted radical prostatectomy (RALP)), external beam radiotherapy (RT), brachytherapy (BT) and cryoablation. Active surveillance is also an option.

### Health Impact

3. Is RALP safe and effective? Assess the quality/uncertainty of the evidence and any gaps in the evidence

Overall, the quality of evidence of studies comparing RALP to LRP was very low to low, except for some RCTs that measured positive surgical margins, for which the quality was moderate. The quality of evidence of studies between RALP and ORP also ranged from very low to low. There were insufficient



numbers of studies involving radiation therapy or cryoablation to allow for quantitative pooling of results across studies. Based on a number of measures, RALP was at least as safe as ORP or LARP. In terms of blood loss, RALP performed significantly better than ORP. RALP showed some benefits over ORP in reducing transfusions, catheterization time, and the occurrence of bladder neck contractures. Although RALP patients experienced less urinary incontinence compared to either ORP or LARP at 1 month post-surgery, this difference became insignificant within 6 months. While perioperative outcomes were found to be comparable in RALP and LRP patients, LRP had slightly lower positive surgical margin rates in patients with pT3/pT4 tumors than RALP. There were no other significant differences in published outcomes between RALP and ORP, and RALP and LARP.

4. What does the evidence show with respect to other measures of quality, such as acceptability, appropriateness, and efficiency of RALP?

Based on the relative proportion of prostatectomies performed robotically in Alberta, RALP has become a part of local standard clinical practice.

5. What considerations are there with respect to the (potential or existing) inappropriate use of RALP?

This procedure has been performed in 3 centres in Alberta for a number of years, and is essentially a functional surgical program. There is no evidence to suggest that there is currently inappropriate use of RALP; neither does there appear to be any potential of inappropriate use.

### **Affordability and Sustainability**

6. What are the total and unit costs of providing RALP to the population for which it is indicated?

The population currently being treated is assumed to be the total eligible population for RALP. Over a 5 year period, RALP is estimated to have the highest total cost (\$65,096,949) and per patient cost (\$26,679) among the treatment options for prostate cancer. If the costs of the robotic system, service

contract fees and disposables are excluded, RALP remains more expensive than ORP, RT and BT.

Hospitals with higher caseloads have lower per case costs.

#### 7. What is the cost-effectiveness of RALP?

On average, RALP was estimated to have higher costs compared with ORP (\$8,541 per patient more) and a health gain of 0.19 QALYs in a time horizon of 9 years. This represents an incremental cost-effectiveness ratio of \$44,471/QALY. RT was the most costly treatment option for prostate cancer, and had an ICER of \$73,806 per QALY. The model resulted in BT as the most cost-effective intervention for prostate cancer, with the lowest cost (\$27,283 per patient) and highest QALYs gained (5.62).

#### 8. What is the budget impact of RALP?

Assuming an average fixed number of 488 RALP procedures in Alberta and 3 RALP centres, the estimated budget impact is \$62,909,664 over 5 years. If no new robots are purchased, the estimated budget impact is \$57,791,340.

#### 9. What technologies or services could be disinvested in?

While none of the interventions reviewed were clear candidates for disinvestment, given the cost-effectiveness of BT, it may important to ensure that patients are presented with this treatment, as well as the surgical options.

### **Relevant Social/Ethical/Legal Considerations**

#### 10. What relevant social, ethical, legal and policy considerations are relevant to answering the policy question?

Potential ethical issues relate to equity of access to robotic surgical procedures across a jurisdiction, such as a single province. In Canada, robotic surgical systems are usually located in densely populated



areas within teaching hospitals or academic centres that can more easily acquire the resources needed to support a robotic surgery program. These centres also have high surgical volumes, which are associated with better outcomes. This has important implications on community hospitals in less densely populated areas, where surgical volumes may not be sufficient to achieve optimal outcomes. Regarding social acceptability, no negative public comments or responses to media articles describing RALP for prostate cancer were found. No other social, legal or ethical issues associated with RALP were identified.

11. What are patient/public views with respect to RALP?

Regarding social acceptability, no negative public comments or responses to media articles describing RALP for prostate cancer were found. While in general, patients prefer minimally invasive surgical procedures to conventional open ones, no information on differences in patient preferences across minimally invasive techniques, such as LRP and RALP, could be found.

12. What are the view and values of industry with respect to RALP?

Robotic surgery has been seen as an expanding market. It is currently dominated by Intuitive Surgical Inc. However, with recent changes to the da Vinci® system, itself, including new models and growing clinical indications, the landscape of robotic surgery is rapidly evolving. Several robotic surgical platforms are currently under development by companies aiming to create competition. This includes Canadian, American and South Korean companies.

**Feasibility implementation**

13. What is the current policy and practice in other jurisdictions with respect to RALP?



In other provinces, no public funding for the purchase and/or operation of robotic surgical services is available and no specific physician fee code for RALP has been established. Centres with robotic surgery programs rely on support from philanthropic foundations.

14. How will resources (e.g. infrastructure, people, training, programs, existing services, etc.) be impacted by a policy decision?

If access to RALP remains the same, no change in resource requirements is anticipated.



## Executive summary

This report summarizes the findings and conclusions of a provincial review of robot-assisted laparoscopic prostatectomy (RALP) for the treatment of early-stage prostate cancer, conducted under the auspices of the Alberta Health Technologies Decision Process. This review includes an STE analysis (Social and System Demographics, Technology Effects and Effectiveness, and Economic Evaluation) prepared by the Health Technology & Policy Unit, University of Alberta.

*Conditions of interest and prevalence:* Prostate cancer is the most common non-skin cancer and the third leading cause of cancer-related deaths in Canadian men. An estimated 21,600 men were diagnosed with the disease in 2016, which represented 21% of new cancer cases among men over 2015. In Alberta, there were 2,247 new cases of prostate cancer in 2014, representing an overall incidence of 139 cases per 100,000 men. The number increased with age. In men 85 years of age and older, the incidence was 569 cases per 100,000 men. The introduction of prostate-specific antigen (PSA) testing has led to a sharp growth in the detection of early or localized prostate cancer and demand for curative treatments.

*Description of the technology:* The *da Vinci*<sup>®</sup> surgical system manufactured by Intuitive Surgical (Sunnyvale, CA, USA) is the only robot-assisted surgical system available in Canada.

It consists of a surgeon console, a patient-cart, interactive robotic arms, instrumentation, and a vision system. The surgeon sits a few feet away from the patient while performing surgery at the console, which features a 3D vision system equipped with a flexible endoscope and image processing equipment. These tools provide the surgeon with high definition and true-to-life views of anatomical structures. Visualization of the surgical field is also available to the entire operating team on a large monitor. During surgery, the physician remotely controls the robotic arms of the side-cart positioned next to the operating table. The equipment allows for motion scaling during the procedure, reducing tremors and improving movement precision. The robotic arms have EndoWrist instruments, which have a greater range of motion than the human hand and are able to reach confined spaces. RALP is one treatment option for prostate cancer. The other treatments that are available are open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LARP), radiation therapy, brachytherapy and cryoablation.

*RALP in Alberta:* RALP has been available at 3 Alberta hospitals for at least 5 years now (2 in Edmonton, 1 in Calgary). The initial purchase of all the robots was made possible through funding from philanthropic foundations. In January 2017, the robots in the 2 Edmonton hospitals were replaced with newer models, and these were paid for by AHS. Approximately 460 RALP procedures were performed in Alberta in 2016; this compares to approximately 230 open and laparoscopic procedures combined.

*Review methodologies:* A comprehensive literature search was conducted to identify relevant primary studies on RALP compared to open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LARP), radiation therapy or cryoablation. Grey literature (e.g., unpublished studies and HTA reports) was identified through searches of the websites of relevant associations, ministries of health, and HTA



agencies; dedicated grey literature databases; guidelines databases; and the internet. A manual search of the reference lists of relevant papers located through the electronic search was also conducted. The clinical review complied with internationally accepted methodological guidelines for systematic reviews. Search results were independently reviewed by 2 researchers. Selected studies were assessed for quality, and data were extracted by 2 researchers using standard data abstraction forms. The same approach was taken for published economic analyses identified through the searches.

Information was also obtained from published literature, government and manufacturer websites, and consultations with key individuals involved in the treatment of prostate cancer in Canada by telephone and e-mail. A clinical pathway was developed with input from the Expert Advisory Group.

Effectiveness was determined by undertaking meta-analysis of individual study variables where possible. Models were developed to undertake cost-effectiveness and budget impact analyses from both the societal and healthcare payer's perspectives. Costs associated with inpatient and outpatient visits for Alberta patients identified through relevant diagnostic (ICD 9 and ICD-10CA codes) and procedure (CCI codes) codes for RALP, ORP, and brachytherapy (BT) represented the actual costs incurred by the healthcare system and were obtained from administrative data provided by Alberta Health. Total costs assigned to a specific visit in the ambulatory and inpatient datasets were generated based on information from Alberta Health Services and a common costing framework. They included both direct patient care and non-patient costs (e.g., costs incurred through non-patient care activities (proportional share of finance, human resources, system supports, etc.), excluding physician fees. Physician costs were obtained from the practitioner claims dataset. For RT, costs were extracted from a high quality published study in Ontario (which took into account all costs, including those related to the linear accelerator and CT simulation), and converted to 2016 CDN dollars. Costs associated with the acquisition of the *da Vinci*<sup>®</sup> system, contract services and disposables were provided by AHS.

*Review findings:* The vast majority of studies and analyses involved surgical options for treatment, and overall, the evidence comparing RALP with BT or RT was limited.

- *Safety:* RALP is at least as safe as ORP or LRP. On some measures, such as blood loss, RALP performed significantly better than ORP
- *Clinical effectiveness:*
  - *Blood transfusions:* Rates with ORP were significantly higher than with RALP, but there was no statistically significant difference between LRP and RALP
  - *Estimated blood loss:* Amounts with both ORP and LRP were statistically significantly higher than with RALP.
  - *Conversions to ORP:* There was no statistically significant difference between LRP and RALP.
  - *Total Clavien-Dindo complications:* There were no statistically significant differences between LRP and RALP or ORP and RALP.
  - *Pain:* The limited and mixed evidence generally concluded that RALP is associated with less pain than either LARP or ORP.
  - *Urinary tract infection:* There were no statistically significant differences between LRP and RALP or ORP and RALP.



- *Bladder neck contracture*: Rates with ORP were significantly higher than with RALP, but there was no statistically significant difference between LRP and RALP.
- *Operative time*: Times for RALP were statistically significantly longer than for ORP. However, there was no statistically significant difference between LRP and RALP.
- *Length of hospital stay*: Stays were statistically significantly longer with ORP than with RALP. However, there was no statistically significant difference between LRP and RALP.
- *Catheterization time*: Times after ORP were statistically significantly higher than with RALP, but there was no statistically significant difference between LRP and RALP.
- *Return to urinary continence*: At 1 month after surgery, statistically significantly more RALP patients returned to urinary continence than LRP or ORP patients. However, there were no statistically significant differences between any groups after 6 months or 1 year. The limited evidence comparing RALP, BT and RT was inconclusive.
- *Return of potency*: At 6 months and 1 year after surgery, statistically significantly more patients returned to potency with RALP than with ORP, but there was no statistically significant difference between LRP and RALP. There were also no statistically significant differences when RALP, RT and BT were compared.
- *Positive surgical margins*: There was no statistically significant difference in rates for pT2 or pT3/pT4 tumors between ORP and RALP. However, there was a statistically significantly lower rate for pT3/pT4 tumors with LRP than with RALP.
- *Biochemical recurrence*: There were no statistically significant differences between LRP and RALP or ORP and RALP.
- *Health-related quality of life*: There was no clear evidence of statistically significant differences in quality of life one year post treatment across the interventions.
- *Recurrence*: There was no clear published evidence of statistically significant differences in local recurrence or metastasis across the interventions.
- *Survival*: There was no clear evidence of statistically significant differences in prostate cancer-free or overall survival across interventions.
- *Budget impact*: Assuming an average fixed number of 488 RALP procedures in Alberta and 3 functional RALP centres, the estimated budget impact is \$65,096,949 over 5 years. If no new robots are purchased, the estimated budget impact is \$56,323,143.
- *Cost-effectiveness*: On average, RALP was estimated to have higher costs compared with ORP (\$8,541 more per patient) and an incremental health gain of 0.19 QALYs in a time horizon of 9 years. This represents an incremental cost-effectiveness ratio of \$44,471/QALY. However, brachytherapy found to be the most cost-effective intervention for prostate cancer, with the lowest cost (\$27,283 per patient) and highest QALYs gained (5.62).
- *Access to RALP across Alberta and Canada*: As of July 2017, RALP is available in 20 centres across Canada, three of which are in Alberta. In all 20 centres, the robotic surgery programs were initially established with philanthropic funding. Currently, most centres continue to rely on charitable foundation support to maintain their programs. The exceptions are the University of Alberta Hospital and the Royal Alexandra Hospital. Although RALP is not available in the smaller cities in Alberta, analyses of administrative data from Alberta Health suggest that over 99% of all



radical prostatectomies (regardless of the type) take place at hospitals in Calgary or Edmonton, where the robotic surgical systems are located. According to local expert opinion, wait times for RALP are reasonable, given the current level of access to the robotic surgical system, and relatively stable. While there may be some opportunity to optimize scheduling of robotic services, the surgical system at the Royal Alexandra Hospital, where the largest volume of RALPs is performed, already operates five days per week during regular hours. Further, based on interviews conducted with administrators and urologists from robotic surgery centres in other provinces, this hospital achieves some of the shortest overall OR theater and skin-to-skin times for RALP in the country.

- *Ethical, legal and social issues:* Potential ethical issues relate to equity of access to robotic surgical procedures across a jurisdiction, such as a single province. In Canada, robotic surgical systems are usually located in densely populated areas within teaching hospitals or academic centres that can more easily acquire the resources needed to support a robotic surgery program. These centres also have high surgical volumes, which are associated with better outcomes. This has important implications on community hospitals in less densely populated areas, where surgical volumes may not be sufficient to achieve optimal outcomes. No other social, legal or ethical issues associated with RALP were identified.
- *Population dynamics, diffusion and demand:* The use of robot-assisted surgery has increased significantly since 2000, when the FDA first approved the *da Vinci*<sup>®</sup> Surgical System. From 2009 to 2015, the number of procedures performed globally rose by almost 14%, with the greatest growth seen in RALP for prostate cancer. In the US, between 2007 and 2009, rates more than doubled, and the number of hospitals using the *da Vinci*<sup>®</sup> surgical system grew from 800 to 1,400. Diffusion of robot-assisted surgery has been slower in Canada than in the US. Currently, there are a total of 20 Canadian centres located in British Columbia, Alberta, Ontario and Quebec. Between 2010 and 2015, the number of robot-assisted urological procedures performed annually more than doubled (from 1,000 to 2,438). Compared to the three other provinces, Alberta performs the highest proportion of RALP. According to the Canadian Institute for Health Information (CIHI), in 2013, the proportion of radical prostatectomies performed robotically in British Columbia, Ontario and Quebec was 6%, 18% and 22%, respectively. During the same year in Alberta, RALP represented 60% of radical prostatectomies. In Alberta, the *da Vinci*<sup>®</sup> system was first introduced for RALP in 2007, and until 2012, the number of procedures performed each year had continued to increase. However, since 2012, volumes have remained stable.

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## Abbreviations

AACHT = Alberta Advisory Committee on Health Technologies

ADT= Androgen deprivation therapy

AHS= Alberta Health Services

AHTDP = Alberta Health Technologies Decision Process

AMSTAR= Assessing the Methodological Quality of Systematic Reviews

AS= Active surveillance

ASA= American Society of Anesthesiologists

BCR= Biochemical recurrence

BCRFS= Biochemical recurrence-free survival

BIA= Budget impact analysis

BMI= Body mass index

BNC= Bladder neck contracture

BNS= bilateral nerve-sparing

BT= brachytherapy

CAD= Canadian dollar

CADTH= Canadian Agency for Drugs and Technologies in Health

CEA= Cost-effectiveness analysis



CHEERS= Consolidated health economic evaluation reporting standards

CI= Confidence interval

CRY= cryoablation

CT= Computerized tomography

CVA= Cerebrovascular accident

DM= Distant metastasis

DRE= Digital rectal exam

DVT= Deep vein thrombosis

EBL= Estimated blood loss

ED= Erectile dysfunction

EPIC= Expanded Prostate Cancer Index Composite

EQ-5D-5L= 5-level EuroQol 5-Dimension Questionnaire

ER= Emergency room

FDA = US Food and Drug Administration

GI= Gastro-intestinal

GU= Genito-urinary

HQO = Health Quality Ontario

HRQOL= Health-related quality of life



HR = Hazard ratio

HTA = Health technology assessment

ICER = Incremental cost-effectiveness ratio

ICU = Intensive care unit

IEV = Inferior epigastric vessel

IIEF-5 = the 5-item International Index of Erectile Function Questionnaire

KM = Kaplan-Meier

LRFS = Local recurrence-free survival

LRP = Laparoscopic radical prostatectomy

MCS = Mental Component Summary

MeSH = Medical Subject Headings

MI = Myocardial Infarction

MRI = Magnetic resonance imaging

NA = Not applicable

NED = No evidence of disease

NR = Not reported

NS = Nerve-sparing

OR = Operating room



ORP = Open radical prostatectomy

PCS = Physical Component Summary

PIN = Prostatic intraepithelial neoplasia

PDE-5 = Phosphodiesterase-5

PSA = Prostate-specific antigen

PSM = Positive surgical margin

QALY = Quality-adjusted life years

QOL= Quality of life

RAH = Royal Alexandra Hospital

RALP = Robot-assisted radical prostatectomy

RGH = Rockyview General Hospital

RPP = Radical perineal prostatectomy

RRP = Radical retropubic prostatectomy

RCT= Randomized controlled trial

RT= Radiotherapy

SD = Standard deviation

SF-12 = 12-Item Short Form Health Survey

SHIM = Sexual Health Inventory for Men





SR = Systematic review

SSI = Surgical site infection

UAH = University of Alberta Hospital

UCLA-PCI = UCLA Prostate Cancer Index

UNS = Unilateral nerve-sparing

UI = Urinary Incontinence

UTI = Urinary tract infection

WTP = Willingness to pay

## Glossary

**Administrative data:** information collected by organizations, governments, and other bodies for the function of record keeping. Administrative data are used primarily for management purposes (e.g., billing or reimbursement) rather than research.

**Adverse event:** an unwanted effect associated with the use of a treatment or intervention

**Brachytherapy (BT):** a type of radiation therapy that places radioactive pellets near or into the tumor

**Biochemical recurrence (BCR):** a rise in the blood level of PSA after prostate cancer patients have undergone curative treatment. It may indicate cancer recurrence.

**Bladder neck contracture (BNC):** a surgical complication from radical prostatectomy, in which the connection that is made between the bladder neck and the urethra after the prostate is removed becomes narrow from scarring.

**Budget impact analysis (BIA):** an assessment of the financial impact of introducing an intervention or service.

**Case-control study:** an observational study that compares individuals with a condition (cases) to those from a similar population without the condition (controls).

**Case report:** an account of one patient that typically describes their presentation, diagnosis, treatment and outcomes.

**Case series:** a study that reports on outcomes for a series of individual patients who have received an intervention (i.e., with no comparator group).

**Clinical practice guidelines:** statements consisting of recommendations for optimizing patient care that have been informed by systematic reviews of evidence and assessments of the benefits and harms of alternative care options.

**Cohort study:** an observational study where two or more groups of people with similar characteristics but exposed to different interventions (or an intervention versus no intervention) are followed over the same time and compared.

**Comorbidity:** diseases or conditions present in addition to the primary disease or condition being studied or treated.



**Confidence interval (CI):** the amount of uncertainty regarding the true effect of an intervention.

Typically, a 95% confidence interval (CI) is used, which indicates that the results are likely to be within this range approximately 95% of the time.

**Cost-effectiveness analysis (CEA):** a type of economic analysis that compares the relative costs and outcomes (e.g., cost per life-years saved) of different interventions, programs or scenarios. The outcomes of the options being compared must be the same.

**Cost-utility analysis (CUA):** a type of economic evaluation that compares the cost and benefits of different options (health program, intervention, etc.), where the benefits are expressed in terms of the amount of years lived in full health by the beneficiaries (quality-adjusted life years (QALYs)).

**Cryoablation:** a procedure that uses low temperatures to freeze and destroy tumor cells

**Decision analysis:** a transparent approach to decision-making under uncertainty.

**Decision model:** a framework used in economic evaluations for modelling alternative scenarios.

**Digital rectal exam (DRE):** an exam in which a physician inserts a gloved finger into the rectum to check for abnormalities in the prostate

**Economic evaluation:** a type of analysis that compares the costs and outcomes of different tests, interventions or scenarios.

**Etiology:** the cause(s) of a disease.

**Forest plot:** a type of graph that shows the results of a number of studies addressing the same question. Forest plots are often used to present the results of a meta-analysis.

**Gleason system score:** a system used to describe the degree of prostate cancer tissue based on how it looks under the microscope. A high score indicates the tissue is poorly differentiated and more likely to spread to other tissues.

**Incidence:** occurrence rate of new cases of a condition or disease in a population during a specific period of time (typically 1 year).

**Incremental cost-effectiveness ratio (ICER):** a ratio of the difference in costs of two interventions or scenarios to the change in the benefits of the two interventions or scenarios. A high ICER suggests that the intervention in question will result in higher costs to achieve the potential benefits. An intervention that offers both lower costs and more benefit is called the “dominant” technology.



**Hazard ratio (HR):** a measure of an effect of an intervention on an outcome of interest over time.

**Kappa statistic:** a measure of inter-rater agreement (e.g., agreement between reviewers) beyond chance. A value of 1 indicates perfect agreement.

**Laparoscopic radical prostatectomy (LRP):** a minimally invasive surgery in which a laparoscope is inserted through the abdominal walls to remove the prostate, regional tissues and lymph nodes

**Meta-analysis:** the use of statistical methods in a systematic review to combine results from different studies in order to estimate of the overall effect of an intervention.

**Monte Carlo simulation:** a technique that uses a random selection of possible variables to test the effects of these changes on the outputs of a decision model.

**Non-inferiority trial:** a type of clinical trial designed to test whether a new intervention or treatment is not worse than an existing intervention or treatment.

**Non-randomized controlled trial:** a study in which participants are not assigned by chance to different groups (e.g., researchers assign every second individual to the treatment group).

**Odds ratio:** a ratio of the likelihood of experiencing a specific outcome in one group (e.g., the study or treatment group) to the likelihood of experiencing that outcome in another group (e.g., the control group).

**Phase I trial:** the first phase of a clinical trial of a drug or treatment designed to assess safety and identify side-effects. Phase I trials typically involve a small number of healthy volunteers.

**Phase II trial:** the second phase of a clinical trial of a drug or treatment designed to see if the drug or treatment is effective and further assess its safety. Phase II trials involve patients with the condition of interest and are often randomized controlled trials.

**Prevalence:** the number of people in a population with a distinct condition or at a specific time. The number is typically represented as a ratio of the number of affected people to the total population.

**Prostate:** a gland part of the male reproductive system responsible for secreting fluid that nourishes and protects sperm

**Prostate-specific antigen (PSA):** a protein produced by prostate cells typically found elevated in prostate cancer



**Quality-adjusted life-year (QALY):** a measure of health improvement often used in economic analysis that combines length of life and quality of life (e.g., one year of a healthy normal life is assigned a higher value than one year of life in pain)

**Randomized controlled trial (RCT):** a study in which participants are assigned by chance (at random) into groups (typically a study group and a control group). The groups are managed in the same way except for their exposure to the intervention or risk factor being studied.

**Radical prostatectomy:** a surgical procedure in which the prostate gland and surrounding tissues are removed

**Registry:** a collection of health or demographic information about people with a specific condition or who have received a specific intervention.

**Risk ratio:** a ratio of the risk of a specific outcome in one group (e.g., the study or treatment group) to the risk the same outcome in another group (e.g., the control group). A risk ratio of 1 means the risk of experiencing a specific outcome is the same between groups.

**Sensitivity analysis:** a way to quantify the level of confidence that one can place in the conclusions reached by an economic evaluation based on how much the results would change if certain inputs or data were changed.

**Systematic review (SR):** a comprehensive, critical assessment and synthesis of the results of all studies addressing a particular research question

**TNM system:** a classification system used to describe the extent of tumor cancers. The T refers to the size and extent of the tumor. The N refers to the number of positive regional lymph nodes. The M refers to presence of metastasis.

**Utility:** a measure of preference for a specific health outcome

## Background

The Alberta Health Technologies Decision Process (AHTDP) is a means of generating high quality evidence reports to inform recommendations by the Alberta Advisory Committee on Health Technologies (AACHT) regarding the appropriateness of specific health technologies and services in Alberta.

Under the auspices of the AHTDP, the Health Technology & Policy Unit (HTPU) was asked to undertake a review of robot-assisted surgery (RAS) in Alberta. RAS involves the use of a robotic system, remotely controlled by a surgeon, to assist in various surgical procedures. In July 2016, robot-assisted radical prostatectomy (RALP) for localized prostate cancer was prioritized for review.

## Objectives

### Policy Question

The primary policy questions to be addressed in this review were:

1. Is the use of RALP for localized prostate cancer appropriate in Alberta's publicly funded healthcare system?
2. If yes, for which patients with localized prostate cancer?

### *Review guiding questions*

The following review guiding questions were provided in addition to the policy questions in order to guide the STEP analysis:

#### *Clinical Need*

1. What clinical need does RALP address? Describe the scope and severity of the condition RALP is intended to address (including, but not limited to, prevalence and incidence). How does RALP meet the identified clinical needs?
2. What publicly funded and non-funded alternative(s) exist?

*Health Impact*

3. Is RALP safe and effective? Assess the quality/uncertainty of the evidence and any gaps in the evidence.
4. What does the evidence show with respect to other measures of quality, such as acceptability, accessibility, appropriateness, and efficiency of RALP?
5. What considerations are there with respect to the (potential or existing) inappropriate use of RALP?

*Affordability and Sustainability*

6. What are the unit and total costs of providing RALP to the population for which it is indicated?
7. What is the cost-effectiveness of RALP?
8. What is the budget impact of RALP?
9. What technologies or services could be disinvested in?

*Relevant Social/Ethical/Legal Considerations*

10. What social, ethical, legal, and policy considerations are relevant to answering the policy question?
11. What are patient/public views and values with respect to RALP?
12. What are views and values of industry with respect to RALP?
13. What is the current policy and practice in other jurisdictions with respect to RALP?

*Implementation Feasibility*

14. How will resources (e.g. infrastructure, people, training, programs, existing services, etc.) be impacted by a policy decision?
15. What are potential approaches, facilitators, and barriers to implementing a policy decision?
16. Is implementation of a policy decision feasible?

**Research Questions**

- What is the burden of illness, patterns of care and capacity in Alberta as it relates to RALP for localized prostate cancer in Alberta?
- What is the safety and efficacy/effectiveness of RALP for localized prostate cancer?
- What is the cost-effectiveness of RALP for localized prostate cancer?
- What is the budget impact of the provision of RALP for localized prostate cancer in Alberta?

## Introduction

Prostate cancer is the most common non-skin cancer and the third leading cause of cancer-related deaths in Canadian men.<sup>1</sup> The introduction of prostate-specific antigen (PSA) testing has led to a sharp growth in the detection of early or localized prostate cancer and demand for curative treatments. Currently, there are a number of options for managing localized prostate cancer, ranging from active surveillance to radical prostatectomy (RP), a surgical procedure in which the prostate gland and surrounding tissues are removed. This surgery can be completed through either an open surgical approach (open radical prostatectomy or ORP) or a minimally invasive approach. The latter can be completed via conventional laparoscopic (LRP) or robot-assisted radical prostatectomy (RALP). The *da Vinci*<sup>®</sup> surgical system manufactured by Intuitive Surgical (Sunnyvale, CA, USA) is the only robot-assisted surgical system available in Canada.

The *da Vinci*<sup>®</sup> surgical system consists of a surgeon console, a patient-cart, interactive robotic arms, instrumentation, and a vision system. The surgeon sits a few feet away from the patient while performing surgery at the console, which features a 3D vision system equipped with a flexible endoscope and image processing equipment. These tools provide the surgeon with high definition and true-to-life views of anatomical structures. Visualization of the surgical field is also available to the entire operating team on a large monitor. During surgery, the physician remotely controls the robotic arms of the side-cart positioned next to the operating table.<sup>2</sup> The equipment allows for motion scaling during the procedure, reducing tremors and improving movement precision. The robotic arms have EndoWrist instruments, which have a greater range of motion than the human hand and are able to reach confined spaces.<sup>3</sup>

Proponents of the technology argue that robotic surgical systems allow surgeons to perform complex procedures with more flexibility, accuracy, and control than is possible through open surgery.<sup>2</sup> Further,





such systems provide a better work environment for surgeons by reducing the physical strain and fatigue associated with lengthy laparoscopic surgical procedures and the learning curve is short.<sup>4</sup>

Reported benefits to patients include reduced postoperative pain, shorter hospital stays, and reduced recovery times.<sup>5</sup>

## **Social systems and demographics (S)**

The prostate, a walnut-sized gland located just below the bladder and in front of the rectum, forms part of the male reproductive system and produces seminal liquid that transports sperm.

Prostate cancer starts in prostate cells. While typically, it is slow growing, it can spread (metastasize) to other parts of the body. More than 95% of all prostate cancers are adenocarcinomas.<sup>6</sup> According to recent published studies, the five-year survival rate for localized or regional prostate cancer is 100%.

The rate decreases to 30% once metastases are present (advanced disease).<sup>7</sup> The timing of when a localized cancer will metastasize and cause major problems is not yet well understood.

The majority of men with localized prostate cancer do not have symptoms. However, those with more advanced disease may experience difficulties in urinating, blood in urine and bone pain in areas where metastases have developed.<sup>7</sup>

### **Risk factors**

The main risk factor for prostate cancer is age. While risk starts to increase at age 50, most cases are diagnosed at age 65 or later.<sup>8</sup> Other risk factors include:

- Family history
- Race/ethnicity (increased risk in black men)
- Exposure to pesticides
- Agent orange<sup>7,9</sup>

The following factors have also been associated with increased risk, but the mechanisms are unclear:

- A diet high in saturated fats or red meats and/ or low in vegetables
- Hormones (insulin and insulin-like growth factor)
- Obesity
- Inflammation of the prostate <sup>7,9</sup>

### **Prevalence and incidence**

According to a study by the International Agency for Research on Cancer, more than 1.1 million cases of prostate cancer were recorded in 2012, accounting for 15% of new cancer cases in men worldwide.<sup>10</sup> In Canada, an estimated 21,600 men were diagnosed with the disease in 2016, which represented 21% of new cancer cases among men. In recent years, the incidence of prostate cancer has decreased by approximately 1.5% per year. Before then, it had peaked twice, to 187 and 177 cases per 100,000 men in 1993 and 2001, respectively. Both periods were associated with intensified PSA screening in Canada. While PSA allows for early detection of prostate cancer, the test remains controversial, since not all detected cancer requires treatment.<sup>1</sup>

In Alberta, there were 2,247 new cases of prostate cancer in 2014, representing in an overall incidence of 139 cases per 100,000 men. The number increased with age. In men 85 years of age and older, the incidence was 569 cases per 100,000 men.<sup>11</sup>

### **Burden of illness**

In 2012, prostate cancer was the fifth leading cause of cancer deaths in men globally. With a steadily increasing aging population, it has become a major health concern.<sup>10</sup> In Canada, approximately 4,000 men died from the disease in 2016, representing 10% of all cancer deaths in that time period.<sup>1</sup> By the



year 2032, it is estimated that the burden of prostate cancer will increase to 42,225 newly diagnosed cases per year.<sup>12</sup>

In general, the physical and psychological burden of advanced prostate cancer can be significant. Patients may experience sexual dysfunction, urinary incontinence, bowel changes, fatigue, and pain, which often lead to psychological distress.<sup>13</sup> Anxiety, depression, feelings of despair, isolation, and passive thoughts of suicide have been documented in men with the disease.<sup>14</sup>

The economic burden of prostate cancer in Canada is also substantial. In 2016, societal expenditures exceeded \$350 million.<sup>15,16</sup> This included direct healthcare costs (e.g. inpatient and outpatient visits, drug costs) and indirect costs (e.g. disability, lost productivity, lost life-years). In Alberta, the 2016 drug, hospital care, and mortality costs for prostate cancer were nearly \$14 million, according to estimates from the Public Health Agency of Canada.<sup>15,16</sup>

### **Current Management**

Locally, prostate cancer is managed according to clinical practice guidelines generated by Alberta Health Services (AHS).<sup>17</sup> Once patients undergo detection tests and prostate cancer is confirmed, they are grouped into three categories of low, intermediate and high risk. This stratification is based on the PSA level, Gleason score and tumour stage.<sup>17</sup>

The Gleason system scores tumour cells on a scale of 1 to 5. Prostate cancers usually have areas with different tumour cells, and the pathologist will assign two grades for the two areas that make up most of the cancer. The final Gleason score is the sum of both grades, with higher numbers representing cancer more likely to spread and cells poorly differentiated.



The tumour stage refers to the T part of the TNM system, which describes the size of the tumour and its spread to nearby tissues. It ranges from T1 to T4, with higher numbers describing larger tumours that have spread to other tissues.

The AHS prostate cancer guidelines define the risk categories as:

- Low: T1-T2a, Gleason score  $\leq 6$  and PSA  $< 10$ ng/ml
- Intermediate: T2b-T2c, Gleason score = 7 or PSA between 10-20 ng/ml
- High:  $\geq T3a$ , Gleason score  $\geq 8$  or PSA  $> 20$ ng/ml<sup>17</sup>

Current treatment options for low and intermediate risk prostate cancer are active surveillance, radical prostatectomy, radiotherapy, brachytherapy and cryoablation.<sup>17</sup>

- Active surveillance is conducted for select low risk cases and includes regular PSA assessments every 3 to 6 months, as well as an annual digital rectal exam (DRE).
- Radical prostatectomy is a procedure in which the entire prostate gland and surrounding tissues are surgically removed. Several techniques are available: 1) Open radical prostatectomy (ORP), where one main incision in the lower belly (retropubic approach) or perineum (perineal approach) is made to reach the prostate gland; 2) Laparoscopic radical prostatectomy (LRP), where several small incisions in the belly are made and special instruments manually inserted in order to view, reach and remove the prostate gland; or 3) Robot-assisted prostatectomy (RALP, ), where several small incisions in the belly are made and robotic arms that translate the surgeon's hand motion into fine, precise action are used to view, reach and remove the prostate.
- Radiotherapy (RT) is usually conducted via intensity modulated radiation therapy, an advanced mode of high-precision radiotherapy that uses computer-controlled linear accelerators to deliver precise radiation doses to a malignant tumor or specific areas within the tumor.



- Brachytherapy (BT) is a type of radiation therapy that places radioactive pellets or “seeds” near or directly into the tumour to delivery radiation internally. There are 2 main types: low-dose seed implant brachytherapy and high-dose rate brachytherapy (HDR).
- Cryoablation or cryosurgery is an alternative option for patients who decline or are not eligible for radical prostatectomy or radiotherapy. This approach uses low temperatures to freeze and destroy the tumour cells.

In the case of high risk prostate cancer, the treatment usually involves a multimodality approach, including RT and androgen deprivation therapy (ADT), or radical prostatectomy and post-operative RT with ADT.

- ADT or hormone therapy is used to block the production of testosterone and other male hormones, called androgens. Prostate cancer needs androgens to grow. Therefore, reducing the level of androgens in a man’s body can slow the growth of and possibly shrink the tumor. In patients who decline surgical and radiotherapy treatments, ADT may be used alone. However, the outcomes are usually less favourable.<sup>17</sup>

### Health Canada licensing

In 2000, the United States (US) Food and Drug Administration (FDA) approved the first *da Vinci*<sup>®</sup> System for urologic surgical, general laparoscopic, gynecologic laparoscopic, general thoracoscopic, thoracoscopically-assisted, and cardiotomy surgical procedures.<sup>18</sup>

The first and second generations of the system, the *da Vinci*<sup>®</sup> Surgical System and *da Vinci*<sup>®</sup> S Surgical System, were approved by Health Canada as Class IV devices in 2001 and 2006, respectively. In 2009, Health Canada approved the third generation system, the *da Vinci*<sup>®</sup> SI Surgical System. The fourth generation and latest system, the *da Vinci*<sup>®</sup> XI Surgical System, was licensed by Health Canada in 2016.

The main components of the system, comprising the surgeon control console, the vision cart, and the patient side cart with the robotic arms, are included in the licence. The licence also covers all of the system's compatible surgical instruments and accessories.<sup>19</sup>

### **Social, legal and ethical issues**

Potential ethical issues relate to equity of access to robotic surgical procedures across a jurisdiction, such as a single province. In Canada, robotic surgical systems are usually located in densely populated areas within teaching hospitals or academic centres that can more easily acquire the resources needed to support a robotic surgery program.<sup>4</sup> These centres also have high surgical volumes, which are associated with better outcomes. This has important implications on community hospitals in less densely populated areas, where surgical volumes may not be sufficient to achieve optimal outcomes.

Regarding social acceptability, no negative public comments or responses to media articles describing RALP for prostate cancer were found. A recent study of public perceptions of robotic surgery reported that a majority of respondents believe it is less painful, safer and faster and provides better results than alternative procedures.<sup>20</sup> However, the extent to which they would be willing to trade off certain publicly funded services to ensure access to robotic surgery, when resources are finite and already constrained, was not explored.

No other social, legal or ethical issues associated with RALP were identified.

### **Population dynamics, diffusion and demand**

The use of robot-assisted surgery has increased significantly since 2000, when the FDA first approved the *da Vinci*® Surgical System. From 2009 to 2015, the number of procedures performed globally rose by almost 14%, with the greatest growth seen in RALP for prostate cancer.<sup>21,22</sup>

In the US, between 2007 and 2009, rates more than doubled, and the number of hospitals using the *da Vinci*<sup>®</sup> surgical system grew from 800 to 1,400.<sup>23</sup>

The diffusion of robot-assisted surgery has been slower in Canada than in the US. Currently, there are a total of 24 clinically active *da Vinci*<sup>®</sup> Surgical Systems (31 including upgrades and systems used only in research) across the country, each of which is located in one of the following four provinces: British Columbia, Alberta, Ontario and Quebec. Between 2010 and 2015, the number of robot-assisted urological procedures performed annually more than doubled (from 1,000 to 2,438).<sup>22</sup>

Compared to the three other provinces, Alberta performs the highest proportion of radical prostatectomies using the robotic surgical system. According to the Canadian Institute for Health Information (CIHI), in 2013, the proportion of radical prostatectomies performed robotically in British Columbia, Ontario and Quebec was 6%, 18% and 22%, respectively. During the same year in Alberta, RALP represented 60% of radical prostatectomies.<sup>24</sup>

In Alberta, the *da Vinci*<sup>®</sup> system was first introduced for RALP in 2007, and until 2012, the number of procedures performed each year had continued to increase. However, since 2012, volumes have remained stable.<sup>25</sup>

### **Patterns of care**

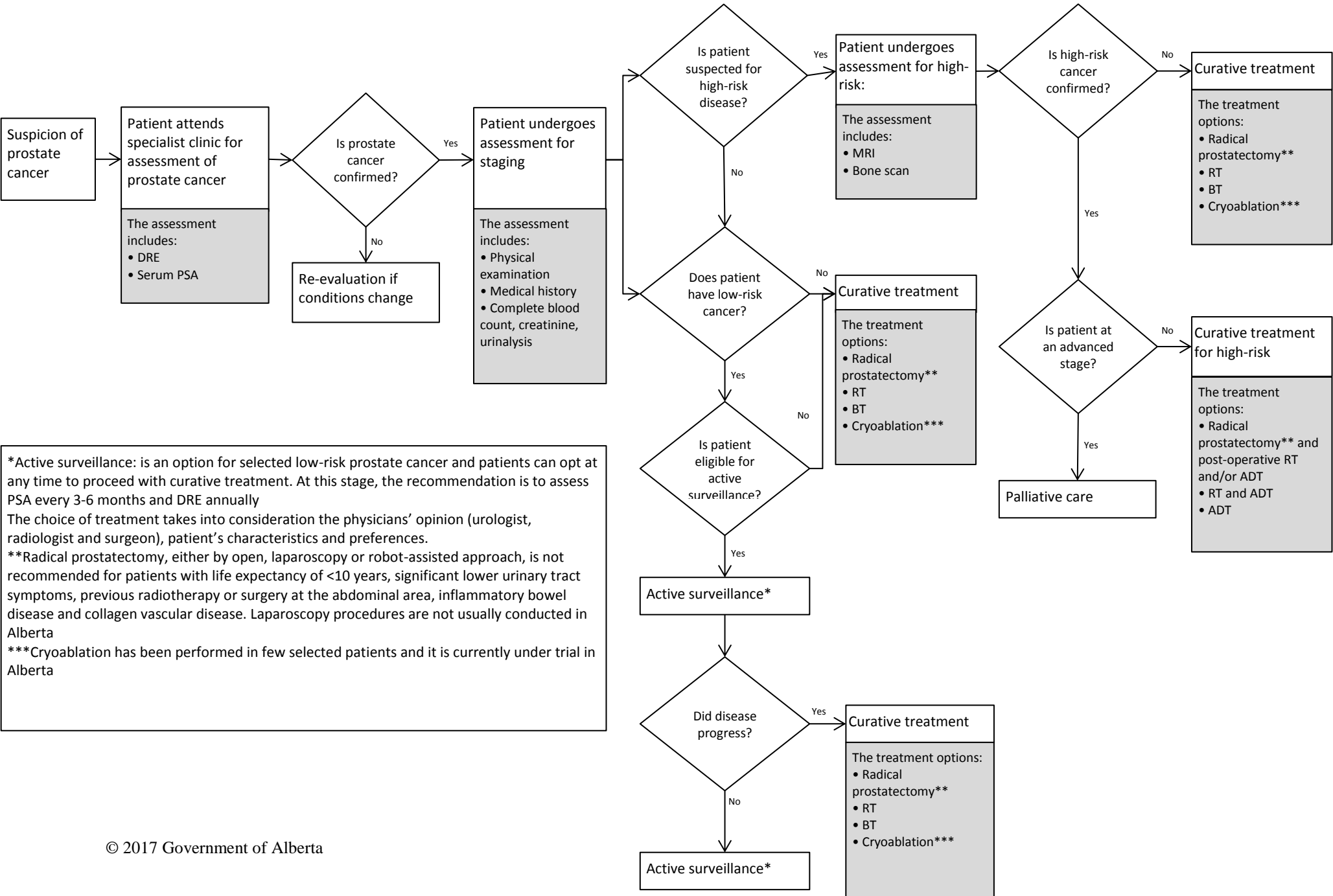
Localized prostate cancer is usually managed by urologists and/or oncologists. Before initiating any treatment, patients undergo a series of diagnostic tests, including a digital rectal exam and PSA serum levels, to confirm the diagnosis and determine the risk category of the prostate cancer. Once the risk assessment is conducted, the physician will offer different treatment options, taking into account a patient's life expectancy, comorbidities, sexual and urinary function. The treatment of choice will be based on these factors, as well as patient preferences. Figure 1 shows the treatment pathway as specified in the AHS Clinical Practice Guidelines.<sup>17</sup>



After the initial treatment, a patient may require further interventions to manage complications, such as erectile dysfunction and urinary incontinence, which may occur with radical prostatectomy, or gastrointestinal and genito-urinary toxicities, which may develop following radiation. In addition, each patient is continually followed with scheduled PSA tests to check for disease recurrence (Figure 1, Part 2).

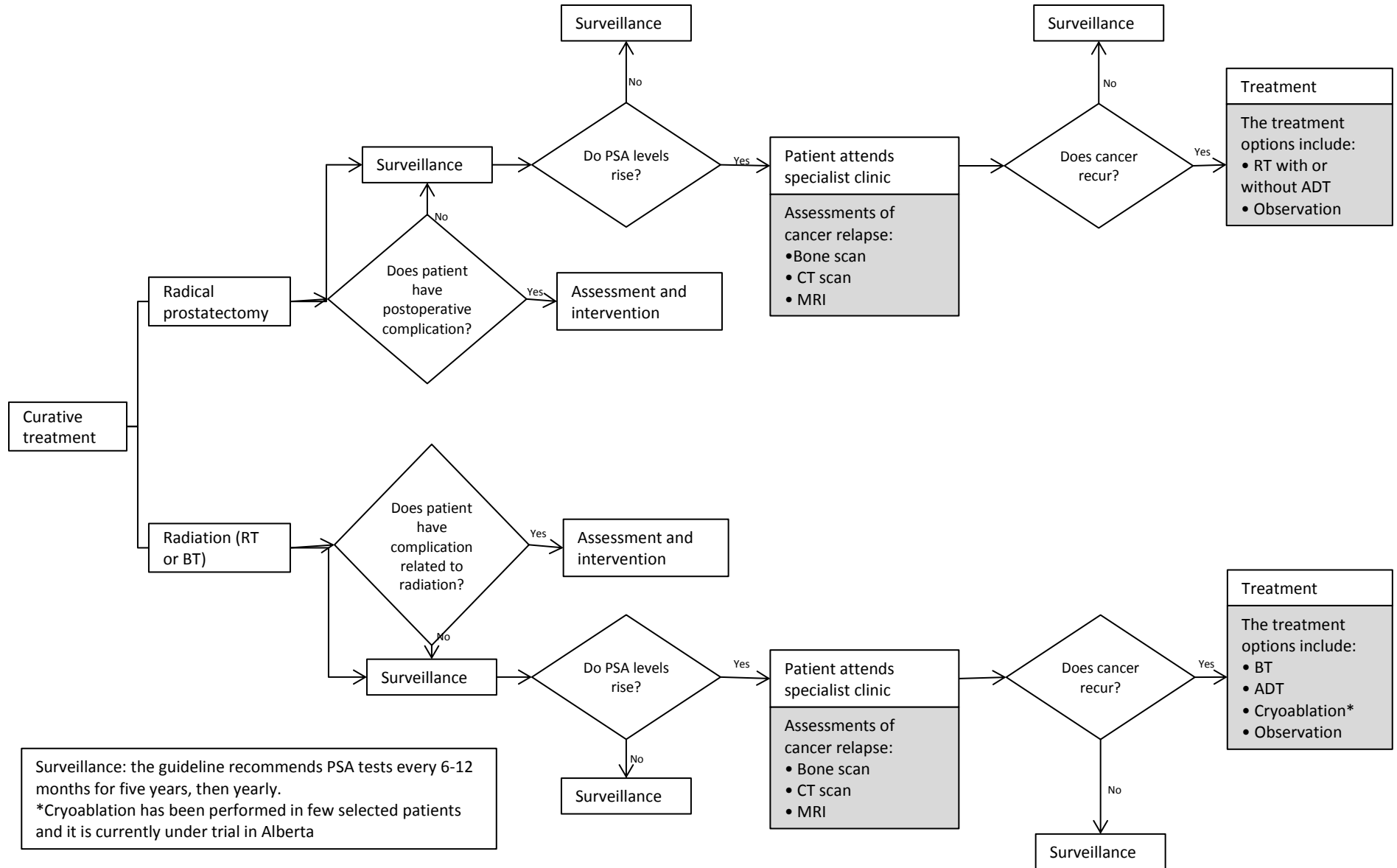


Figure 1. Patient flow diagram of treatment for prostate cancer  
 Part 1. Diagnosis of prostate cancer to treatment, surveillance, or palliative care



\*Active surveillance: is an option for selected low-risk prostate cancer and patients can opt at any time to proceed with curative treatment. At this stage, the recommendation is to assess PSA every 3-6 months and DRE annually  
 The choice of treatment takes into consideration the physicians' opinion (urologist, radiologist and surgeon), patient's characteristics and preferences.  
 \*\*Radical prostatectomy, either by open, laparoscopy or robot-assisted approach, is not recommended for patients with life expectancy of <10 years, significant lower urinary tract symptoms, previous radiotherapy or surgery at the abdominal area, inflammatory bowel disease and collagen vascular disease. Laparoscopy procedures are not usually conducted in Alberta  
 \*\*\*Cryoablation has been performed in few selected patients and it is currently under trial in Alberta

Part 2: Post-treatment follow-up for prostate cancer.



## Access to RALP

For patients with localized prostate cancer who select radical prostatectomy as their treatment, a robot-assisted procedure may be an option, depending on where they live. As of July 2017, RALP is available in 20 centres across Canada, three of which are in Alberta (Table 1). In all 20 centres, the robotic surgery programs were initially established with philanthropic funding (Personal communication: Danny Minogue, 13 July 2017). Currently, most centres continue to rely on charitable foundation support to maintain their programs. The exceptions are the University of Alberta Hospital and the Royal Alexandra Hospital. In January 2017, the original *da Vinci*<sup>®</sup> S Surgical System at each of these centres was replaced with the newer generation *da Vinci*<sup>®</sup> SI Surgical System using funds from the global budget, through which the costs of the maintenance service contract and reusable and disposable instruments are also being covered)<sup>26</sup>. RT, BT and open prostatectomy are all available in Edmonton and Calgary.

Table 1. Hospitals with da Vinci robots

| Hospital                               | City        | Province         |
|--|-------------|------------------|
| Vancouver General                      | Vancouver   | British Columbia |
| Royal Alexandra                        | Edmonton    | Alberta          |
| University of Alberta                  | Edmonton    | Alberta          |
| Rockyview General                      | Calgary     | Alberta          |
| St. Joseph's Healthcare                | Hamilton    | Ontario          |
| Humber River                           | Toronto     | Ontario          |
| St. Michael's                          | Toronto     | Ontario          |
| Toronto East General                   | Toronto     | Ontario          |
| Toronto General                        | Toronto     | Ontario          |
| University Hospital                    | London      | Ontario          |
| Victoria                               | London      | Ontario          |
| St. Joseph's Healthcare                | London      | Ontario          |
| Ottawa General                         | Ottawa      | Ontario          |
| Windsor                                | Windsor     | Ontario          |
| Glen – McGill University Health Centre | Montreal    | Quebec           |
| Hôpital du Sacré-Cœur                  | Montreal    | Quebec           |
| Jewish General                         | Montreal    | Quebec           |
| St. Luc                                | Montreal    | Quebec           |
| L'Hôtel-Dieu de Québec et CRCEO        | Quebec City | Quebec           |
| CHUS                                   | Sherbrooke  | Quebec           |

Although RALP is not available in the smaller cities in Alberta, analyses of administrative data from Alberta Health suggest that over 99% of all radical prostatectomies (regardless of the type) take place at hospitals in Calgary or Edmonton, where the robotic surgical systems are located (Table 2).

Table 2. Number and type of radical prostatectomies performed in Alberta hospitals between 2013 and 2016

| Hospital                       | City          | Type of Radical prostatectomy* | Number of procedures per year** |      |      |      |
|--------------------------------|---------------|--------------------------------|---------------------------------|------|------|------|
|                                |               |                                | 2013                            | 2014 | 2015 | 2016 |
| Canmore General Hospital       | Canmore       | LRP                            | 0                               | 0    | 0    | 1    |
| Chinook Regional Hospital      | Lethbridge    | ORP                            | 4                               | 10   | 6    | 1    |
| Queen Elizabeth II Hospital    | Grand Prairie | ORP                            | 0                               | 0    | 2    | 2    |
| Red Deer Regional Hospital     | Red Deer      | ORP                            | 7                               | 10   | 8    | 6    |
| Rockyview General Hospital     | Calgary       | ORP                            | 133                             | 153  | 123  | 169  |
|                                |               | LRP                            | 6                               | 14   | 5    | 1    |
|                                |               | RALP                           | 214                             | 184  | 170  | 191  |
| Royal Alexandra Hospital       | Edmonton      | ORP                            | 1                               | 1    | 2    |      |
|                                |               | LRP                            | 10                              | 12   | 11   | 8    |
|                                |               | RALP                           | 223                             | 191  | 206  | 203  |
| University of Alberta Hospital | Edmonton      | ORP                            | 55                              | 50   | 45   | 40   |
|                                |               | LRP                            | 5                               | 5    | 2    | 7    |
|                                |               | RALP                           | 69                              | 77   | 87   | 70   |

\*ORP = Open Radical Prostatectomy; LRP = Laparoscopic Radical Prostatectomy; RALP = Robot-Assisted Radical Prostatectomy

\*\*Procedures identified using the following CCI codes appearing in the Alberta Health Inpatient Dataset: 1QT91PK, 1QT91BQ, 1QT91DA, and 7SF14\*

According to local expert opinion, wait times for RALP are reasonable, given the current level of access to the robotic surgical system), and relatively stable (Personal communication: Eric Estey, 12 January 2017). While there may be some opportunity to optimize scheduling of robotic services, the surgical system at the Royal Alexandra Hospital, where the largest volume of RALPs is performed, already operates five days per week during regular hours. Further, based on interviews conducted with administrators and urologists from robotic surgery centres in other provinces, this hospital achieves



some of the shortest overall OR theater and skin-to-skin times per RALP in the country (See Appendix F for a list of centres who participated in interviews).<sup>27</sup>

If access decreases in order to accommodate growing interest in and demand from other surgical specialities to perform robot-assisted procedures, wait times for RALP could become unreasonable (Personal communication: Eric Estey, 12 January 2017). However, it may be possible to manage that demand at centres where the robotic surgical system is not being used to capacity (Personal communication, Kamil Pieszczyński, 30 January 2017). In addition, Intuitive Surgical Inc., the manufacturer of the *da Vinci*<sup>®</sup> Surgical System, has developed flowcharts/protocols to guide efforts by centres to improve OR efficiency during robotic surgery.<sup>28</sup>

Though RALP is publicly funded in Alberta, it has no fee code in the Schedule of Medical Benefits, which is used to remunerate physicians for their services. Therefore, when a RALP is performed, the physician submits a claim for a laparoscopic radical prostatectomy (Physician Claims Dataset, Alberta Health, 2015/2016). Through the jurisdictional scan conducted for the review, similar practices were found in other provinces. To date, no province has established a fee code for RALP. Instead, existing laparoscopic radical prostatectomy codes are used.

## **Health System Capacity**

### ***Workforce and infrastructural capacity***

Surgeon capacity to meet the current demand for RALP in Alberta already exists (Eric Estey, 12 January 2017). With over a decade of clinical experience across three centres, RALP has become well-established. The majority of urologists who perform radical prostatectomies have received training in robotic surgical techniques, either during their residencies (programs at both the University of Alberta and the University of Calgary include robotic surgery) or through fellowships (Personal Communication: Eric Hyndman, 8 February 2017). At minimum, they have completed the standard training offered by



Intuitive Surgical Inc. as part of the purchase arrangement for the robotic surgical system with Minogue Medical Inc., the Canadian distributor for *the da Vinci*® Surgical System. Importantly, the manufacturer, itself, does have credentialing requirements for the use of its robotic surgical systems. Individual hospitals are responsible for directing the training and credentialing of surgeons who perform robotic surgery (Personal communication: Danny Minogue, 9 December 2016).

With respect to future recruitment and retention of urologists in Alberta, access to robotic systems may soon become a factor. Robotic surgery training is now included in the American Urological Association core curriculum for urology residencies.<sup>29</sup> Additionally, interviews with urologists in Alberta, British Columbia, Ontario and Quebec with expertise in all three surgical procedures (ORP, LRP and RALP) revealed a common preference for RALP. Specifically, they mentioned “surgeon preservation” as one of the main advantages of RALP, indicating that while patients undergoing LRP and those receiving RALP may experience the same benefits of a shorter recovery (since they are both minimally invasive techniques), the demand on the surgeon during LRP is greater. Several urologists also stated that “a less skilled surgeon when given a robot can achieve the same outcomes as a highly skilled laparoscopic surgeon”. Urologists’ responses were consistent with findings from well-designed published studies comparing physical and cognitive ergonomics associated with robotic and traditional laparoscopic surgeries.<sup>30-33</sup> They demonstrated that physical workload and stress were statistically significantly higher for traditional laparoscopic surgery than for robotic surgery. Last, a published survey of approximately 1,200 surgeons practicing open, laparoscopic and robotic surgeries in the United States reported that robotic surgery was associated with the smallest proportion of physical symptoms and discomfort attributable to operating.<sup>34</sup>



Regarding non-physician OR staff capacity, with over 4,000 RALPs performed to date in Alberta, centres already comprise personnel who are trained and experienced in the procedure.<sup>25</sup> The number is sufficient to support existing demand for RALP (Personal communication: Mary Lou McKenzie, June 2, 2016). While theater and skin-to-skin times vary across centres, it is unlikely that differences are related to the robot, since the pattern is similar for open radical prostatectomies.<sup>27</sup>

With respect to equipment requirements for RALP, as mentioned previously, both the University of Alberta Hospital and the Royal Alexandra Hospital had new robotic surgical systems (*da Vinci*<sup>®</sup> S) installed in January 2017. Those systems are the same generation as the one located at the Rockyview Hospital. Therefore, it is anticipated that no additional upgrades will be needed in the foreseeable future.

### **New developments**

Several robotic surgical platforms are currently under development by companies aiming to create competition in the robotic surgery market, which at present, is dominated by Intuitive Surgical Inc. However, with recent changes to the *da Vinci*<sup>®</sup> system, itself, including new models and growing clinical indications, the landscape of robotic surgery is rapidly evolving.<sup>35</sup>

The Canadian company Titan Medical is developing the SPORT Surgical System, which it describes as a “versatile, single incision advanced robotic surgical system.”<sup>36</sup> Titan Medical claims the operating costs of the SPORT system will be comparable to those for laparoscopic surgery procedures and will cost less than the *da Vinci*<sup>®</sup> system.<sup>35,36</sup> The SPORT robot is not yet been approved for sale in any country by any regulatory body.<sup>36</sup>



Medtronic, the American medical device company headquartered in Ireland, plans to release its surgical robot in 2018. Medtronic's robot is being developed to perform surgeries in every area of surgery that robots are currently being employed, with a focus on colorectal, thoracic, and bariatric procedures.<sup>37</sup>

The American company TransEnterix is planning the release of a robotic surgery device called Alf-X. A single-site surgery robotic system, Alf-X is designed to be less expensive than the *da Vinci*<sup>®</sup> system.<sup>38</sup> Although it is not yet for sale in North America, Alf-X has received CE marking in Europe, confirming it meets the requirements needed to be sold in the European Union.<sup>39</sup> In 2015, Tranenterix acquired the surgical robot division of an Italian health care company that developed the Telelap ALD-X, an advanced robotic system for minimally invasive surgery which also earned a CE mark. It is not yet available in North America.<sup>39</sup>

Verb Surgical, founded by Google and Johnson & Johnson, is developing a surgical robotic system which will "involve machine learning, robotic surgery, instrumentation, advanced visualization, and data analytics."<sup>40</sup> The Verb Surgical system intends to improve patient outcomes, lower surgical costs, and progress hospital efficiency with regards to robotic surgery procedures.<sup>40</sup> Although the company predicted it would have a fully working prototype by the end of 2016, no information suggesting that this timeline was met could be found.<sup>41</sup>

A miniature robot intended for abdominal surgery is under development by the American company Virtual Incision Corporation.<sup>39</sup>

Samsung has created a surgical robotic system at the Samsung Advanced Institute of Technology in South Korea. Samsung's single-port system is a designed to reach various surgical sites in the abdominal cavity through a single incision in the body.<sup>42</sup> The system is not yet available for sale.



The South Korean company Meerecompany has developed a robotic surgery system called Revo I, which was set to be released on the Korean market by the end of 2016.<sup>43</sup> Meerecompany estimates that the Revo I system will be one third the price of the *da Vinci*<sup>®</sup> system surgical system.<sup>43</sup>

## Ongoing clinical trials

At present, there are 17 ongoing trials of robotic surgery in prostate cancer. A nineteenth trial was recently completed (Table 3).

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor   | No. of participants | Study design   | Title and purpose  | Primary and secondary outcomes measured  | Status and completion date  |
|-----------------------|---|---------------------|--|--|--|---|
| NCT03011606           | <ul style="list-style-type: none"> <li>United Kingdom</li> <li>Queen Mary University of London</li> </ul> | 24                  | <ul style="list-style-type: none"> <li>Intervention Model: Single group assignment</li> <li>Masking: Open label</li> </ul> | <ul style="list-style-type: none"> <li>Robotic surgery after focal ablation therapy</li> <li>To characterize the side effects of men who have undergone prior focal ablation therapy and understand why patients have experienced recurrent prostate cancer after focal therapy</li> </ul>   | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Safety profile of surgery</li> <li>Toxicity profile before and after surgery</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>Oncological outcomes up to 36 months</li> </ul>                                | <ul style="list-style-type: none"> <li>Recruiting</li> <li>February 2018</li> </ul> |
| NCT02977143           | <ul style="list-style-type: none"> <li>Seoul National University Hospital</li> <li>South Korea</li> </ul> | 49                  | <ul style="list-style-type: none"> <li>Intervention Model: Single group assignment</li> <li>Masking: Open label</li> </ul> | <ul style="list-style-type: none"> <li>Comparison of positive end-expiratory pressure (PEEP)-induced increase in central venous pressure and stroke volume variation to predict fluid responsiveness in RALP: A prospective clinical trial</li> <li>To evaluate the predictability of PEEP-induced increase in CVP as well as stroke volume variation in urologic robotic surgery with Steep Trendelenburg position</li> </ul> | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Fluid responsiveness 5 minutes after administration of 300 ml volulyte</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>Central venous pressure one hour after the initiation of pneumoperitoneum</li> </ul> | <ul style="list-style-type: none"> <li>Recruiting</li> <li>October 2017</li> </ul>  |
| NCT02114164           | <ul style="list-style-type: none"> <li>United States</li> </ul>   | 100                 | <ul style="list-style-type: none"> <li>Allocation: Randomized</li> </ul>   | <ul style="list-style-type: none"> <li>A comparative study of CO<sub>2</sub> exchange</li> </ul>   | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Intraoperative</li> </ul>   | <ul style="list-style-type: none"> <li>Recruiting</li> </ul>                        |

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor   | No. of participants | Study design  | Title and purpose  | Primary and secondary outcomes measured   | Status and completion date  |
|-----------------------|---|---------------------|---|--|---|---|
|                       | <ul style="list-style-type: none"> <li>Ohio Health</li> </ul>                                   |                     | <ul style="list-style-type: none"> <li>Intervention Model: Single group assignment</li> <li>Masking: Double blind</li> </ul>                            | <p>patterns between valve-free trocar (AirSeal®) versus standard trocar (Endopath®) during robotic prostatectomies</p> <ul style="list-style-type: none"> <li>To compare the maximum intraoperative pneumoperitoneal pressure (mmHg), smoke evacuation quality (categorical), and overall operative times (minutes) between the conventional and valve-less trocar groups</li> </ul> | <p>pneumoperitoneal pressure through day 1 post-op</p> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>Not provided</li> </ul>   | <ul style="list-style-type: none"> <li>February 2017</li> </ul>                     |
| NCT02812173           | <ul style="list-style-type: none"> <li>Germany</li> <li>St. Antonius Hospital Gronau</li> </ul> | 201                 | <ul style="list-style-type: none"> <li>Allocation: Randomized</li> <li>Intervention Model: Factorial assignment</li> <li>Masking: Open label</li> </ul> | <ul style="list-style-type: none"> <li>Prospective, randomized, three-arm, open controlled trial comparing the quality of micturition and patient comfort by various urinary drainage after RALP</li> <li>To determine if the postoperative quality of micturition and continence can be improved depending on the urinary drainage catheter and retention after RALP</li> </ul>     | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Urinary leakage measured by pad test in grams within day 2 or day 5</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>Pain related to urinary drainage up to 1 week</li> <li>Complications up to 1 month</li> <li>Residual urine measured by bladder scan in ml 3 times within day 2 or day 5</li> </ul> | <ul style="list-style-type: none"> <li>Recruiting</li> <li>June 2017</li> </ul>     |
| NCT02292914           | <ul style="list-style-type: none"> <li>Brazil</li> <li>Cancer Institute of São Paulo</li> </ul> | 1120                | <ul style="list-style-type: none"> <li>Allocation: Randomized</li> <li>Intervention Model: Parallel assignment</li> <li>Masking: Open label</li> </ul>  | <ul style="list-style-type: none"> <li>Prospective analysis of robot-assisted surgery</li> <li>To evaluate the safety and effectiveness of RAS in the treatment of digestive, urologic, gynecologic otolaryngologic and thoracic cancer</li> </ul>   | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Complications up to 30 days</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>ICU and hospital length of stay up to 2 days</li> </ul>  | <ul style="list-style-type: none"> <li>Recruiting</li> <li>November 2017</li> </ul> |
| NCT02458716           | <ul style="list-style-type: none"> <li>United States</li> <li>Rutgers, The State</li> </ul>     | 50                  | <ul style="list-style-type: none"> <li>Intervention Model: Single group assignment</li> <li>Masking: Open</li> </ul>                                    | <ul style="list-style-type: none"> <li>Feasibility of cytoreductive prostatectomy in men newly diagnosed with metastatic prostate</li> </ul>   | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>Safety and feasibility</li> </ul> <p><i>Secondary</i></p>  | <ul style="list-style-type: none"> <li>Recruiting</li> <li>August 2018</li> </ul>   |

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor  | No. of participants | Study design   | Title and purpose   | Primary and secondary outcomes measured  | Status and completion date  |
|-----------------------|--|---------------------|--|---|--|---|
|                       | University of New Jersey   |                     | label  | cancer<br><ul style="list-style-type: none"> <li>To study the side effects of cytoreductive prostatectomy in treating patients with newly diagnosed prostate cancer that has spread from the primary site to other places in the body</li> </ul>  | <ul style="list-style-type: none"> <li>Time to (PSA) nadir and castration resistance and subsequent standard systemic therapy, androgen deprivation</li> </ul>   |   |
| NCT02767921           | <ul style="list-style-type: none"> <li>United States</li> <li>University of Southern California</li> </ul> | 30                  | Intervention Model: Single group assignment<br><br>Masking: Open label   | <ul style="list-style-type: none"> <li>A Pilot study of neoadjuvant sEphB4-HSA in patients with genitourinary cancers</li> <li>To study the side effects of recombinant EphB4-HSA fusion protein before surgery in treating patients with transitional cell carcinoma of the bladder, prostate cancer, or kidney cancer</li> </ul>                  | <i>Primary</i> <ul style="list-style-type: none"> <li>Feasibility up to 30 days after the last dose of sEphB4-HAS</li> <li>Complications up to 90 days</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Pathologic response at time of surgery</li> <li>Radiologic response pp to 30 days</li> </ul>   | <ul style="list-style-type: none"> <li>Not yet recruiting</li> <li>June 2018</li> </ul> |
| NCT02687308           | <ul style="list-style-type: none"> <li>Brazil</li> <li>Rio de Janeiro State University</li> </ul>          | 240                 | <ul style="list-style-type: none"> <li>Allocation: Randomized</li> <li>Intervention Model: Parallel assignment</li> <li>Masking: Open label</li> </ul> | <ul style="list-style-type: none"> <li>Open retropubic radical prostatectomy with anterograde anatomical dissection technique (RRP2A), compared with Walsh open anatomical retrograde radical prostatectomy (RRP)</li> <li>To compare open anterograde anatomical radical retropubic prostatectomy with anatomical radical prostatectomy</li> </ul> | <i>Primary</i> <ul style="list-style-type: none"> <li>Surgical time</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>PSA up to 1 year.</li> <li>Time of urinary catheter up to 3 months</li> <li>Time of urethrovesical anastomosis day of surgery</li> <li>Hospital length of stay up to 1 month</li> <li>Positive surgical margins up to 3 months</li> <li>Urinary continence up to 1 year</li> <li>Erectile function up to 1 year</li> <li>Surgical complications up to 3 month</li> <li>Postoperative complications up to 1</li> </ul> | <ul style="list-style-type: none"> <li>Recruiting</li> <li>December 2018</li> </ul>     |

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor   | No. of participants | Study design   | Title and purpose   | Primary and secondary outcomes measured   | Status and completion date   |
|-----------------------|---|---------------------|--|---|---|--|
|                       |   |                     |  |   | year  |  |
| NCT02048150           | <ul style="list-style-type: none"> <li>United States</li> <li>City of Hope Medical Centre</li> </ul>          | 20                  | Intervention Model: Single group assignment<br><br>Masking: Open label         | <ul style="list-style-type: none"> <li>Intra-operative optical imaging utilizing anti-PSMA (Prostate Specific Membrane Antigen) fluorescent antibody during RALP</li> <li>To study best dose of anti-prostate specific membrane antigen (PSMA) monoclonal antibody MDX1201-A488 (MDX1201-A488) given before surgery to aid in visualization of the prostate</li> </ul>  | <i>Primary</i> <ul style="list-style-type: none"> <li>Imaging ability of anti-PSMA monoclonal antibody MDX1201-A488 up to 1 year</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Not provided</li> </ul>                           | <ul style="list-style-type: none"> <li>Recruiting</li> <li>January 2018</li> </ul>         |
| NCT02809495           | <ul style="list-style-type: none"> <li>Brazil</li> <li>University of São Paulo General Hospital</li> </ul>    | 100                 | Observational Model: Case Control<br><br>Time Perspective: Prospective         | <ul style="list-style-type: none"> <li>Digital Application usage for adherence of patients undergoing robotic assisted radical prostatectomy following oncological and postoperative functional outcomes</li> <li>To develop an application for smartphones facing the postoperative follow-up of patients undergoing robotic radical prostatectomy</li> <li>To evaluate the progress of the IPSS, ICIQ and IIEF-5 compared to preoperatively in patients undergoing robotic radical prostatectomy</li> </ul> | <i>Primary</i> <ul style="list-style-type: none"> <li>Evaluate if adherence of patients who use the application is greater after treatment up to 24 months</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Not provided</li> </ul> | <ul style="list-style-type: none"> <li>Not yet recruiting</li> <li>June 2018</li> </ul>    |
| NCT02946008           | <ul style="list-style-type: none"> <li>United States</li> <li>University of Michigan Cancer Center</li> </ul> | 38                  | Phase I Intervention Model: Single group assignment<br><br>Masking: Open label | <ul style="list-style-type: none"> <li>A Phase I trial of neoadjuvant stereotactic body radiotherapy prior to radical prostatectomy for high risk prostate cancer</li> <li>To assess the safety of neoadjuvant stereotactic body</li> </ul>   | <i>Primary</i> <ul style="list-style-type: none"> <li>Maximum Tolerated Dose (MTD) of Neoadjuvant SBRT up to 6 weeks</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Incidence of incontinence up to 1 year</li> </ul>             | <ul style="list-style-type: none"> <li>Not yet recruiting</li> <li>January 2023</li> </ul> |



**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor  | No. of participants | Study design  | Title and purpose  | Primary and secondary outcomes measured   | Status and completion date  |
|-----------------------|--|---------------------|---|--|---|---|
|                       |  |                     |   | radiation therapy (SBRT) before surgery in high risk prostate cancer patients  | <ul style="list-style-type: none"> <li>• Incidence of urinary structure up to 1 year</li> <li>• Incidence of urinary bother up to 1 year</li> <li>Rectal toxicity up to 1 year</li> <li>• Number of patients with positive surgical margins 4-10 weeks post radiation therapy</li> <li>• Number of patients with extracapsular extension 4-10 weeks post radiation therapy</li> </ul> |   |
| NCT03021200           | <ul style="list-style-type: none"> <li>• Brazil</li> <li>• Institute of Cancer of São Paulo</li> </ul>   | 270                 | <ul style="list-style-type: none"> <li>• Allocation: Non-randomized</li> <li>• Intervention Model: Parallel assignment</li> <li>• Masking: Open label</li> </ul>                | <ul style="list-style-type: none"> <li>• Use of laser fluorescence with SPY Elite, Pinpoint and Firefly robotic platform systems in cancer surgical treatment</li> <li>• To compare intraoperative perfusion mapping and identification of lymph node structures using different robotic platform systems</li> </ul> | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>• Intestinal anastomosis fistula up to 3 years</li> <li>• Positive lymph nodes up to 3 years</li> <li>• Lymph nodes detected by pathology up to 3 years</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>• Not provided</li> </ul>  | <ul style="list-style-type: none"> <li>• Recruiting</li> <li>• June 2020</li> </ul>   |
| NCT02526602           | <ul style="list-style-type: none"> <li>• Finland</li> <li>• Tampere University Hospital</li> </ul>       | 180                 | <ul style="list-style-type: none"> <li>• Allocation: Randomized</li> <li>• Intervention Model: Parallel assignment</li> <li>• Masking: Double blind</li> </ul>                  | <ul style="list-style-type: none"> <li>• Preservation of endopelvic fascia during radical prostatectomy: Effects on postoperative incontinence and impotence</li> <li>• To analyze post-surgery functional and oncological results</li> </ul>  | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>• Urinary incontinence up to 1 year</li> <li>• Erectile function up to 1 year</li> <li>• Positive surgical margins up to 1 year</li> </ul> <p><i>Secondary</i></p> <ul style="list-style-type: none"> <li>• Complications up to 1 year</li> </ul>  | <ul style="list-style-type: none"> <li>• Recruiting</li> <li>• June 2018</li> </ul>   |
| NCT02818816           | <ul style="list-style-type: none"> <li>• Canada</li> <li>• University Health Network, Toronto</li> </ul> | 26                  | <ul style="list-style-type: none"> <li>Phase IV</li> <li>• Allocation: Randomized</li> <li>• Intervention Model: Parallel assignment</li> <li>• Masking: Participant</li> </ul> | <ul style="list-style-type: none"> <li>• A prospective study to evaluate the effect of preoperative topical brimonidine tartrate 0.2% (Allergan, Irvine, CA) on intraocular pressure (IOP) of patients undergoing robot-assisted laparoscopic</li> </ul>   | <p><i>Primary</i></p> <ul style="list-style-type: none"> <li>• Changes in IOP during the course of the surgical procedure between eyes treated with medication and those with placebo with patients undergoing RALP with sTBURG</li> </ul>  | <ul style="list-style-type: none"> <li>• Recruiting</li> <li>• August 2017</li> </ul> |

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor   | No. of participants | Study design   | Title and purpose   | Primary and secondary outcomes measured   | Status and completion date  |
|-----------------------|---|---------------------|--|---|---|---|
|                       |   |                     |  | prostatectomy (RALP) <ul style="list-style-type: none"> <li>To evaluate the effect of pre-operative treatment with topical brimonidine tartrate on the IOP of patients undergoing RALP</li> </ul>   | preoperatively within 1-2 months, intraoperatively, and postoperatively within 1-2 months<br><br><i>Secondary</i> <ul style="list-style-type: none"> <li>Not provided</li> </ul>  |   |
| NCT02485665           | <ul style="list-style-type: none"> <li>South Korea</li> <li>Seoul National University Hospital</li> </ul> | 84                  | <ul style="list-style-type: none"> <li>Allocation: Randomized</li> <li>Intervention Model: Parallel assignment</li> <li>Masking: Open label</li> </ul>             | <ul style="list-style-type: none"> <li>Efficacy of personalized extracorporeal biofeedback device for pelvic floor muscle training on post-prostatectomy Incontinence</li> <li>To evaluate efficacy of postoperative pelvic floor muscle training using personalized extracorporeal biofeedback device among patients with post-prostatectomy incontinence</li> </ul>   | <i>Primary</i> <ul style="list-style-type: none"> <li>Recovery of urinary continence up to 1 month</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Recovery of urinary continence up to 3 months</li> </ul>  | <ul style="list-style-type: none"> <li>Recruiting</li> <li>July 2016</li> </ul>   |
| NCT01613651           | <ul style="list-style-type: none"> <li>United States</li> <li>City of Hope Medical Center</li> </ul>      | 312                 | Phase III <ul style="list-style-type: none"> <li>Allocation: Randomized</li> <li>Intervention Model: Parallel assignment</li> <li>Masking: Investigator</li> </ul> | <ul style="list-style-type: none"> <li>A prospective randomized trial of pelvic drain placement versus no pelvic drain placement after robotic assisted laparoscopic prostatectomy (RALP) in patients with prostate cancer</li> <li>To Compare RALP with pelvic drain placement to RALP without pelvic drain replacement in reducing adverse events after surgery in patients with prostate cancer</li> </ul> | <i>Primary</i> <ul style="list-style-type: none"> <li>Adverse events within 90 days</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Adverse events in patients with and without pelvic within 90 days</li> <li>Perioperative outcomes for patients with and without a pelvic drain to 12 months</li> <li>Incidence of early postoperative adverse events in patients with and without a pelvic drain who had an extended pelvic lymph node dissection during RALP within 90 days from prostatectomy</li> </ul> | <ul style="list-style-type: none"> <li>Recruiting</li> <li>August 2017</li> </ul> |

**Table 3. Ongoing or recently completed trials registered with ClinicalTrials.gov**

| Acronym (NCT number*) | Country sponsor   | No. of participants | Study design  | Title and purpose   | Primary and secondary outcomes measured   | Status and completion date   |
|-----------------------|---|---------------------|---|---|---|--|
| NCT03050996           | <ul style="list-style-type: none"> <li>Italy</li> <li>Istituto Auxologico Italiano</li> </ul> | 50                  | Observational Model: Case-Only<br><br>Time Perspective: Prospective | <ul style="list-style-type: none"> <li>Intraoperative evaluation of retrograde leak point pressure during robot assisted radical prostatectomy for proper autologous suburethral sling tensioning to improve early urinary continence recovery</li> <li>To evaluate impact of the use of a 6-branch retropubic suburethral autologous sling in association with intraoperative evaluation of the retrograde leak point pressure by means of retrograde perfusion sphincterometry for proper sling tensioning</li> </ul> | <i>Primary</i> <ul style="list-style-type: none"> <li>Impact of robot-assisted laparoscopic prostatectomy and autologous suburethral placement on sphincteric apparatus and early urinary continence recovery 10 and 30 days after catheter removal and 6 and 12 months post surgery</li> </ul> <i>Secondary</i> <ul style="list-style-type: none"> <li>Not provided</li> </ul> | <ul style="list-style-type: none"> <li>Recruiting</li> <li>June 107</li> </ul> |

- The unique identifier for the trial assigned by Clinicaltrials.gov.

### Health technology assessments and systematic reviews

Over the last decade, 20 systematic reviews (SRs) and six health technology assessments (HTAs) comparing RALP with ORP and/or LRP have been published. For this report, SRs and HTAs completed prior to 2007, when robotic surgery was still in the early stages of its diffusion, were not considered. Of the 20 SRs published after 2006, 11 were excluded from the analysis - nine did not present pooled estimates of outcomes<sup>44-52</sup> and two<sup>53,54</sup> were older versions of more recent SRs. The six included HTAs were from Australia<sup>55</sup>, Canada<sup>4,56</sup>, Ireland<sup>57</sup>, Scotland<sup>58</sup>, and the United Kingdom<sup>59</sup> and all incorporated quantitative meta-analyses of clinical trials.



The quality of both the remaining nine SRs selected for inclusion and the clinical effectiveness components of the six HTAs was assessed using the AMSTAR (A MeaSurement Tool to Assess systematic Reviews) Checklist.<sup>60</sup> It consists of eleven questions on the design of the review, the selection and extraction of studies, the search strategy, the inclusion of study lists, the assessment and reporting of scientific quality, the methods used to combine studies, the assessment of publication bias, and the statement of conflict of interest. Each question is assigned a score and the sum of all scores (maximum of 11) indicates the overall quality of the SR, which may be high (score of 9-11), moderate (score of 5-8) or low (score of 0-4). In general, the quality of the SRs and HTAs was moderate (Tables 4 and 5). The outcomes on which meta-analyses were performed varied across reviews. In some cases, summary estimates were presented despite significant heterogeneity across pooled studies (beyond what would typically be considered acceptable). Nonetheless, collectively, findings from the SRs and HTAs suggest the following:

- Blood loss and need for transfusion: RALP is superior to ORP
- Reduction in rates of positive surgical margins: RALP is superior to ORP for pT2 tumours
- Sexual and urinary functions: RALP appears to be superior to ORP, but the evidence is limited
- Length of hospital stay: RALP is superior to ORP
- Length of hospital stay: RALP may be superior to LRP, but the evidence is limited.
- Anastomotic leak: RALP may be superior to LRP, but the evidence is limited.

In addition to the safety and effectiveness of RALP, the HTAs included analyses of system-related implications. Some indicated that while its benefit to patients may be small, the differences in costs between RALP and standard surgical procedures (LRP and ORP) are relatively large. Its impact on other hospital services, such as reprocessing/sterilization, needs to be considered, as does the training of non-physician staff involved in the procedure and after care of patients. The cost-effectiveness of RALP





depends on its performance in terms of reducing cancer recurrence in the long term and on the number of procedures that can be performed annually with a single robotic surgical system. Based on one HTA, the number required is 200 (using cost-effectiveness thresholds commonly applied in the UK). Further, since large patient volumes are associated with better patient outcomes and OR efficiency, partnerships between hospitals have been proposed.

One of the HTAs reported that RALP may benefit surgeons by reducing the physical stress and fatigue associated with ORP and LRP. However, no 'value' was assigned to that benefit and it was not captured in the economic analysis.

**Table 4. Summary of findings from SRs and HTAs reporting statistically significant differences between RALP and ORP**

| Authors<br>(Publication Date)  | Outcome                   |                           |   |   |   |                           |   | Quality score<br>(AMSTAR<br>Rating) |
|--|---------------------------|---------------------------|---|---|---|---------------------------|---|-------------------------------------|
|  | Blood loss                | Transfusion<br>rate       | Positive surgical<br>margin status      | Sexual<br>function                      | Incontinence                            | Length of<br>stay         | OR time                                 |                                     |
| <i>Systematic reviews</i>  |                           |                           |   |   |   |                           |   |                                     |
| Parsons et al <sup>61</sup> (2008)   | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup> | No statistically significant difference | No statistically significant difference | No statistically significant difference | Not reported              | Not reported                            | Moderate                            |
| Ficarra et al (2012) <sup>62</sup>   | Not reported              | Not reported              | Not reported                            | Favours RALP <sup>b</sup>               | Not reported                            | Not reported              | Not reported                            | Moderate                            |
| Ficarra et al (2012) <sup>63</sup>   | Not reported              | Not reported              | Not reported                            | Not reported                            | Favours RALP <sup>b</sup>               | Not reported              | Not reported                            | Moderate                            |
| Novara et al (2012) <sup>64</sup>  | Favours RALP              | Favours RALP              | Not reported                            | Not reported                            | Not reported                            | Not reported              | No statistically significant difference | Moderate                            |
| Tewari et al (2012) <sup>65</sup>  | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup> | No statistically significant difference | Not reported                            | Not reported                            | Favours RALP <sup>c</sup> | Not reported                            | Moderate                            |
| Moran et al (2013) <sup>66</sup>   | Favours RALP <sup>b</sup> | Favours RALP              | Favours RALP (in pT2 only)              | Favours RALP <sup>b</sup>               | Not reported                            | Not reported              | Not reported                            | Moderate                            |
| de Carlo et al (2014) <sup>67</sup>  | Favours RALP              | Favours RALP              | No statistically significant difference | Not reported                            | Not reported                            | Favours RALP              | Not reported                            | Low                                 |
| Seo et al (2016) <sup>68</sup>   | Not reported              | Not reported              | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup>               | Favours RALP                            | Not reported              | Not reported                            | Moderate                            |
| <i>Health technology assessments</i>   |                           |                           |   |   |   |                           |   |                                     |
| Australian Safety and Efficacy Register of New Interventional Procedures – Surgical (2009) <sup>55</sup> | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup>               | Not reported                            | Not reported                            | Favours RALP <sup>c</sup> | Not reported                            | Moderate                            |
| Irish Health Information and Quality Authority (2011) <sup>57</sup>                                      | Favours RALP <sup>b</sup> | Favours RALP              | Favours RALP                            | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup> | Favours ORP <sup>b</sup>                | Moderate                            |
| Canadian Agency for Drugs and Technologies in Health(2011) <sup>4</sup>                                  | Favours RALP <sup>b</sup> | Favours RALP <sup>b</sup> | Favours RALP (in pT2 only)              | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup> | Favours ORP <sup>b</sup>                | Moderate                            |
| Health Quality Ontario (2016) <sup>56</sup>  | Favours RALP              | Favours RALP              | No statistically significant difference | Favours RALP                            | No statistically significant difference | Not reported              | Not reported                            | Moderate                            |

<sup>a</sup> Outcomes of patients undergoing ORP and LRP were not reported separately

<sup>b</sup> The I<sup>2</sup> statistic exceeded 60%, suggesting that the studies were likely too heterogeneous to have been pooled

<sup>c</sup> The value of the I<sup>2</sup> statistic was not reported

**Table 5. Summary of findings from SRs and HTAs reporting statistically significant differences between RALP and LRP**

| Authors (Publication Date)   | Outcome                                 |   |   |   |   |   |                           |                           |   | Quality score (AMSTAR Rating) |
|--|---|---|---|---|---|---|---------------------------|---------------------------|---|-------------------------------|
|  | Blood loss                              | Transfusion rate                        | Positive surgical margin status         | Incontinence                            | Length of stay                          | OR time                                 | Anastomotic leak          | Organ injury              | Period of catheterization               |                               |
| <i>Systematic reviews</i>  |   |   |   |   |   |   |                           |                           |   |                               |
| Ficarra et al (2012) <sup>63</sup>   | Not reported                            | Not reported                            | Not reported                            | Favours RALP                            | Not reported                            | Not reported                            | Not reported              | Not reported              | Not reported                            | Moderate                      |
| Novara et al (2012) <sup>64</sup>  | No statistically significant difference | Favours RALP <sup>b</sup>               | Not reported                            | Not reported                            | Not reported                            | No statistically significant difference | Not reported              | Not reported              | Not reported                            | Moderate                      |
| Tewari et al (2012) <sup>65</sup>  | Favours RALP <sup>c</sup>               | No statistically significant difference | No statistically significant difference | Not reported                            | Favours RALP <sup>c</sup>               | Not reported                            | Favours RALP <sup>c</sup> | Not reported              | Not reported                            | Moderate                      |
| <i>Health technology assessments</i>   |   |   |   |   |   |   |                           |                           |   |                               |
| Irish Health Information and Quality Authority (2011) <sup>57</sup>                                | No statistically significant difference | No statistically significant difference | No statistically significant difference | No statistically significant difference | Favours RALP <sup>b</sup>               | No statistically significant difference | Not reported              | Not reported              | Not reported                            | Moderate                      |
| Canadian Agency for Drugs and Technologies in Health(2011) <sup>4</sup>                            | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup>               | No statistically significant difference | No statistically significant difference | Favours RALP <sup>b</sup>               | Favours RALP <sup>b</sup>               | Not reported              | Not reported              | Not reported                            | Moderate                      |
| UK National Institute of Health Research Health Technology Assessment Program (2012) <sup>59</sup> | Not reported                            | No statistically significant difference | Favours RALP <sup>c</sup>               | No statistically significant difference | Not reported                            | Favours RALP <sup>c</sup>               | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup> | Favours RALP <sup>c</sup>               | Moderate                      |
| Health Quality Ontario (2016) <sup>56</sup>  | Not reported                            | Favours RALP                            | Favours LRP                             | Not reported                            | No statistically significant difference | Favours RALP <sup>b</sup>               | Not reported              | Not reported              | No statistically significant difference | Moderate                      |

<sup>a</sup> Outcomes of patients undergoing ORP and LRP were not reported separately

<sup>b</sup> The  $I^2$  statistic exceeded 60%, suggesting that the studies were likely too heterogeneous to have been pooled

<sup>c</sup> The value of the  $I^2$  statistic was not reported

## Guidelines

### *Alberta*

In 2005, AHS first published clinical practice guidelines for the treatment of prostate cancer in Alberta. In January 2017, AHS introduced guidelines specifically for the treatment of *localized* prostate cancer.<sup>17</sup> These guidelines are described in detail above (see Current Management). Recommendations around early diagnosis and screening are described in separate guidelines.

### *United States*

The National Comprehensive Cancer Network (NCCN) has published guidelines for the treatment of prostate cancer.<sup>69</sup> Similar to those issued by AHS, patients are stratified into risk levels by PSA level, Gleason score and tumour stage in order to determine the appropriate treatment pathway. However, the NCCN guidelines include 5 risk-levels (as opposed to 3 in the AHS guidelines):

- Very low: T1c, Gleason score  $\leq 6$  and PSA  $< 10$ ng/ml, fewer than 3 prostate biopsy cores positive and  $\leq 50\%$  cancer in each core, PSA density  $< 0.15$  ng/ml/g
- Low: T1-T2a, Gleason score  $\leq 6$  and PSA  $< 10$ ng/ml
- Intermediate: T2b-T2c, Gleason score = 7 or PSA between 10-20 ng/ml
- High: T3a, Gleason score 8-10 or PSA  $> 20$ ng/ml<sup>17</sup>
- Very high: T3b-T4, Primary Gleason pattern 5, or  $> 4$  cores with Gleason score 8-10

The NCCN guidelines also consider life expectancy for patients with very low to intermediate-risk disease. They recommend that patients in this risk category with a life expectancy of  $< 10$  years be monitored throughout the course of their disease, with the expectation to deliver palliative therapy should they develop symptoms. For patients with a life expectancy of 10-20 years and very low-risk disease, active surveillance is recommended. If their life expectancy is  $\geq 20$  years or  $\geq 10$  years but their

disease is low-risk, the following are options: active surveillance, EBRT, brachytherapy, or radical prostatectomy. For patients with intermediate-risk prostate cancer and a life expectancy of <10 years, observation or EBRT (with or without ADT or brachytherapy) is recommended. However, if life expectancy is  $\geq 10$  years, EBRT (with or without ADT or brachytherapy), brachytherapy, or radical prostatectomy are options. Active surveillance is not recommended for high or very high-risk patients, regardless of life expectancy. Comparing these guidelines to those of AHS, treatment options are broadly similar across risk groups. However, the NCCN guidelines take into account life expectancy with greater degree of granularity.

#### *United Kingdom*

In the United Kingdom, the National Institute for Health and Care Excellence (NICE) has published guidelines around the diagnosis and management of prostate cancer.<sup>70</sup> They utilize the same definitions for risk-stratification of patients as do the AHS guidelines. The treatment pathways for each risk category are also similar. Life expectancy is only mentioned in reference to low-risk patients, recommending that the decision to proceed from active surveillance to radical treatment should be made with consideration of the individual patient's personal preferences, comorbidities, and life expectancy.

## Methods

### Review of safety and effectiveness

A systematic review of the safety and effectiveness of RALP for localized prostate cancer was completed using internationally recognized published guidelines for systematic reviews in healthcare.<sup>71,72</sup>

### *Literature search*

A comprehensive literature search was conducted to identify relevant primary comparative studies on RALP. Structured search strategies were developed and applied to the following bibliographic databases: PubMed (MEDLINE and other sources), EMBASE, PROSPERO, Web of Science, Clinical Trials.gov, The Cochrane Library, CINAHL, and the Centre for Reviews and Dissemination (DARE, NHS EED, and HTA). The strategies combined relevant keywords with controlled vocabulary terms (Medical Subject Headings (MeSH) and EMTREE terms) such as, prostatic neoplasms, prostatectomy, and robotics. Keywords included prostate cancer, robot-assisted radical prostatectomy, robot-assisted laparoscopic prostatectomy, da Vinci<sup>®</sup>. Full details of the literature search are presented in Appendix A. Monthly update searches in PubMed and Google scholar alerts were also performed throughout the project to capture any additional studies published after the initial search period. All searches were limited to human studies reported in English. No study design filters were applied.

Grey literature (e.g., unpublished studies and HTA reports) was identified through searches of 1) the websites of relevant associations and HTA agencies, 2) dedicated grey literature databases (Grey Literature Collection, NHS Evidence, and the NLM Gateway), 3) guidelines databases, and 4) the internet (Google search engine).



For completeness, a manual search of the reference lists of relevant papers located through the electronic search was conducted.

Results from each of the searches were compiled and entered into a single Reference Manager® (v. 12) database, after which duplicate citations were removed.

Methods used to select studies were based on the PRISMA guidelines.<sup>73</sup> Two reviewers independently screened the titles and abstracts of all citations. They then met to compare results. Discrepancies were resolved through discussion, and no third party review was necessary. Citations that did not meet pre-defined inclusion criteria (Table 6) were excluded. Full papers corresponding to the remaining potentially relevant citations were retrieved and screened independently by two reviewers against the same inclusion criteria. Reviewers, once again, met to compare results, resolve any discrepancies, and agree on the final set of studies to include in the review. At both screening steps, consensus between reviewers was assessed using Kappa statistics.

### ***Data extraction***

Each reviewer extracted information from the included studies using a standard, pre-tested data extraction form and set of decision rules. The elements extracted were: study setting, design, and methods; sample size and baseline patient characteristics; details of the intervention and comparator; outcomes measured; and safety and efficacy/effectiveness findings. Reviewers compared results, and any disagreements were discussed and resolved between them.



**Table 6. Setting and PICOS elements of the clinical safety and effectiveness review protocol**

| Parameter    | Inclusion criteria   | Exclusion criteria  |
|--------------|--|---|
| Settings     | <ul style="list-style-type: none"> <li>• Publications in English</li> <li>• Any health care facility performing procedure</li> </ul>   |   |
| Participants | <ul style="list-style-type: none"> <li>• Adults (age&gt;18 years old) eligible for radical prostatectomy for localized prostate cancer</li> </ul>  | <ul style="list-style-type: none"> <li>• Animals</li> <li>• Cadavers</li> <li>• No patients (simulation studies)</li> </ul>   |
| Intervention | <ul style="list-style-type: none"> <li>• Robotic-assisted radical prostatectomy with the <i>da Vinci</i>® Surgical System</li> </ul>   | <ul style="list-style-type: none"> <li>• Other robotic systems</li> </ul>   |
| Comparator   | <ul style="list-style-type: none"> <li>• Open radical prostatectomy (ORP)</li> <li>• Laparoscopic radical prostatectomy (LRP)</li> <li>• Brachytherapy (BT)</li> <li>• Radiotherapy (RT)</li> <li>• Cryoablation</li> <li>• Active surveillance</li> </ul>   |   |
| Outcomes     | <ul style="list-style-type: none"> <li>• Complications/adverse events</li> <li>• Robotic device or system issues, malfunctions, or failures</li> <li>• Urinary tract infection (UTI)</li> <li>• Bladder neck contracture (BNC)</li> <li>• Conversion to open surgery</li> <li>• Blood transfusion</li> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Length of hospital stay</li> <li>• Catheterization time</li> <li>• Pain/ pain medication</li> <li>• Hospital readmission</li> <li>• Time to recovery and/or return to normal activity</li> <li>• Quality of life</li> <li>• Erectile/sexual function</li> <li>• Urinary function</li> <li>• Positive surgical margins</li> <li>• Biochemical recurrence</li> <li>• Further treatment</li> <li>• Recurrence and metastasis</li> <li>• Progression-free survival</li> <li>• Mortality</li> <li>• Overall survival</li> <li>• Prostate cancer specific survival</li> <li>• Learning curve</li> </ul> | <ul style="list-style-type: none"> <li>• Studies without any defined clinical outcomes</li> <li>• Studies with no relevant clinical outcomes</li> </ul>   |
| Study design | <ul style="list-style-type: none"> <li>• Randomized and non-randomized controlled trials</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul>  | <ul style="list-style-type: none"> <li>• Non-English language</li> <li>• Expert reviews</li> <li>• Editorials and opinion pieces</li> <li>• Case series</li> <li>• Case reports</li> <li>• Single arm trials</li> </ul> |



**Outcomes**

Specific outcomes of interest were:

*Intraoperative*

- Safety - any complications occurring during surgery
- Blood loss
- Intraoperative blood transfusions
- Conversions to open surgery
- Tumour margin status/positive surgical margins
- Operative time

*Post-operative*

- Pain
- Perioperative blood transfusions
- Postoperative complications
- Length of hospital stay

*Short term*

- Infection – readmission for infection
- Recovery time/return to normal activities
- Urinary function
- Sexual function
- Biochemical recurrence
- Health-related quality of life

*Long term*

- Urinary function
- Sexual function
- Progression free survival
- Overall survival
- Health-related quality of life

***Quality assessment***

Only comparative studies were included in the review. The methodological quality of non-randomized studies (i.e., internal and external validity) was evaluated using the Downs and Black checklist.<sup>74</sup> The Downs and Black checklist is a validated tool that examines and scores studies in five domains: 1) study quality (10 items) – the overall quality of the study; 2) external validity (3 items) – to assess generalizability of findings from the study; 3) study bias (7 items) – to identify bias in the intervention and outcome measure(s); 4) confounding and selection bias (6 items) – to determine bias from sampling or assignment of patients to treatment or intervention groups; and power of the study (1 items) – to determine if findings are due to chance. Each item is scored as either ‘1’ if the condition is met or ‘0’ if it is not met or is impossible to determine. A total score of 26 is possible (if all conditions are met).

To critically appraise any randomized studies, the Cochrane Collaboration risk of bias tool (ROB) was used.<sup>72</sup> The ROB tool assesses generation of the allocation sequence, concealment of the allocated intervention before and during enrollment, blinding of participants, providers, and outcome assessors, completeness of outcome data, possibility of selective outcome reporting, and any other potential sources of bias.

The GRADEpro tool (Grading of Recommendations Assessment, Development and Evaluation) was used to assess the overall quality of the body of evidence for key outcomes.<sup>75</sup> Up to seven outcomes are recommended by the GRADE Working Group. The quality of evidence is rated for each outcome across studies in a meta-analysis. A GRADE rating is applied for each outcome, and the quality may differ between outcomes. The quality of the meta-analyses are rated over 7 domains: study design, risk of bias, inconsistency, indirectness, imprecision and other factors including publication bias, a large effect size, a dose response gradient and other plausible confounding.

***Data analysis and synthesis***

Data extracted from included studies were tabulated to identify trends or patterns in the results across studies and facilitate qualitative comparative analyses. All studies were included in the tables. Key characteristics of included studies, their quality, potential sources of bias, and findings were synthesized narratively.

The main clinical outcomes were entered into the Cochrane Review Manager 5.3 program for quantitative analysis. Meta-analyses were conducted using a random-effects model.<sup>76</sup> Studies reporting continuous data were pooled using the mean difference (MD) between surgical groups, and those reporting categorical data were pooled using risk ratios (RR). All studies were sub-grouped into RCTs, prospective studies and retrospective studies to account for heterogeneity, which was assessed using the  $I^2$  statistic. When  $I^2$  was equal to or greater than 50%, heterogeneity was considered too substantial and summary estimates were not calculated.

For all meta-analyses, the following factors were considered when excluding multiple studies from the same centers: study design, study size and/or date (the most recent); and single surgeon studies (excluded if others had 1>surgeon).

**Review of published economic studies*****Study identification***

A comprehensive search for economic studies of treatments for localized prostate cancer was conducted as part of the search to identify studies for the overall review. It included the following bibliographic databases: PubMed (MEDLINE and other sources), EMBASE, PROSPERO, Web of Science, Clinical Trials.gov, The Cochrane Library, CINAHL, the Centre for Reviews and Dissemination (DARE, NHS



EED, and HTA), and EconLit, as well as grey literature sources. The search was limited to studies appearing in English. As with the review of clinical safety and effectiveness, monthly update searches were performed using PubMed and Google scholar alerts and reference lists of relevant papers were scanned to identify studies that may have been missed through the electronic searches. Economic studies identified were grouped into two categories: (a) full economic evaluations of treatments for localized prostate cancer, and (b) cost studies of treatments for localized prostate cancer.

### ***Study selection***

Two reviewers independently screened the titles and abstracts of the search results. Any study presenting an economic component of the treatment for localized prostate cancer was retrieved and included in the review (cost analyses, cost-benefit analyses, cost-effectiveness analyses, and cost-utility analyses).

### ***Data extraction***

From the selected studies, relevant data were extracted. These included elements such as study information (first author, publication year, country and link to full citation), purpose of the study, study design, included costs, measured outcomes, and overall findings. The perspective of the evaluation (payer or societal), the time horizon for economic evaluations and currencies were also recorded.

### ***Quality assessment***

The quality of included full economic evaluations was assessed using the 24-item checklist of the Consolidated Health Economic Evaluation Reporting Standards (CHEERS), developed to update and consolidate previous health economic evaluation guidelines into a single standard.<sup>77,78</sup> The CHEERS checklist contains questions on different aspects of economic evaluations, such as perspective; time horizon; choice of health outcomes; measurement of effectiveness; measurement and valuation of preference-based outcomes; estimation of resources and costs; choice of model; analytic methods;

study parameters; incremental costs and outcomes; characterizing uncertainty; characterizing heterogeneity; and study findings, limitations, and generalizability. For each item, a rating of 'fairly reported', 'partially reported', 'not reported' and 'not applicable' is assigned. Although the CHEERS is not a formal scoring instrument, previous publications have considered a study to be of 'good quality' if 'fairly reported' is assigned to more than 75% of the items, of 'acceptable quality' if 'fairly reported' is assigned to more than 50% of the items, and of 'poor quality' if 'fairly reported' is assigned to less than 50% of the items.<sup>79-81</sup>

### ***Data analysis and synthesis***

#### **Development of an economic model for Alberta**

An Alberta- specific budget impact analysis (BIA) and cost-effectiveness analysis (CEA) of RALP compared to ORP, radiotherapy (RT) and brachytherapy (BT) for the management of localized prostate cancer were conducted. Since annual rates of LRP in Alberta are very small, it was not included.

#### **Budget impact analysis**

Methods used for the budget impact analysis (BIA) complied with Canadian and internationally accepted published guidelines for conducting BIAs.<sup>82-84</sup> The cost per patient and total cost of providing curative treatment for localized prostate cancer in men using surgical (ORP and RALP) and non-surgical (RT and BT) modalities in Alberta were calculated for a 5 year period.

### ***Scenario***

Three scenarios corresponding to different funding options for RALP using the *da Vinci*<sup>®</sup> robotic surgical system were examined in the BIA. The first, 'all cost' scenario, included the purchase of the *da Vinci*<sup>®</sup> system, service contract and cost of disposables. The second included only the service contract and cost



of disposables, and the third scenario included only the cost of disposables. In all three scenarios, costs associated with adverse events and cancer recurrence were taken into account.

Since it was assumed that a higher caseload would lead to a reduction in per case costs, the BIA also included an analysis of the per patient cost of RALP at each of the three centres in which the procedure is currently performed in Alberta.

### ***Patient population***

Estimates of the proportion of patients receiving the different treatment modalities were derived from Alberta Health administrative data and personal communications with relevant clinical and administrative staff within Alberta Health Services (AHS) officials.<sup>85,86</sup> In 2014, the number of patients who underwent RT, RALP, ORP, and BT were 611, 488, 241, and 79, respectively. Following consultation with local clinical specialists, it was assumed that these numbers would remain constant for the time horizon of the BIA.

### ***Technology mix***

The BIA was based upon an early prostate cancer treatment clinical pathway constructed using data on local treatment patterns, information from published clinical practice guidelines, and interviews with members of the Expert Advisory Group.

### ***Time horizon***

In accordance with published methodological guidelines for BIAs, a 5 year time horizon was used.<sup>82-84</sup>

***Perspective***

For the BIA, a healthcare payer perspective was adopted. Costs included the early prostate cancer curative treatment and procedures associated with adverse events/ toxicity and cancer recurrence management. All costs were reported in 2016 Canadian dollars.

***Discounting***

In accordance with published BIA guidelines, no discounting was applied.<sup>82-84</sup>

***Model Description***

Using a multiple cohort approach, the BIA assumed that a fixed number of the four modalities of treatment for prostate cancer were conducted every year over a five year period. A proportion of patients undergoing treatment would develop adverse events associated with surgical (RAR and ORP) and radiation procedures (RT and BT). Further, the cancer could also relapse during this period. Data from published literature and Alberta health administrative database were used to determine these proportions.

***Input data***

Tables 7 and 8 include the parameters used in the BIA. Costs associated with inpatient and outpatient (including ER) visits for Alberta patients identified through relevant diagnostic (ICD 9 and ICD-10CA codes) and procedure (CCI codes) codes for RALP, ORP, and BT represented the actual costs incurred by the healthcare system and were obtained from administrative data provided by Alberta Health. Total costs assigned to a specific visit in the ambulatory (outpatient) and inpatient datasets are generated based on information submitted by Alberta Health Services and a common costing framework. They include both direct patient care and non-patient costs (i.e., the costs incurred through non-patient care activities (proportional share of finance, human resources, system supports, etc.), except for physician



fees. Physician costs were obtained from the practitioner claims dataset. For RT, the administrative datasets did not contain comparable information. Therefore, costs were extracted from a published study in Ontario and converted to 2016 Cdn dollar values.<sup>87</sup> That study took into account all fixed and variable direct and indirect costs, including those related to the linear accelerator and CT simulation. Costs associated with the acquisition of the *da Vinci*<sup>®</sup> system, contract services and disposables were provided by AHS.<sup>88</sup>

### **Cost-effectiveness analysis**

Methods used for the cost-effectiveness analysis (CEA) complied with Canadian and international published guidelines for conducting CEAs.<sup>82,89</sup>

A probabilistic state-transition Markov model was constructed using Microsoft Excel 2013 software. Markov models are often used to simulate the progression of a disease over a stated period of time. A disease is divided into discrete states (Markov states', representing different health conditions). Its progression through these states over a fixed period of time is called the Markov cycle. During each cycle, a patient can transit from one Markov state to another Markov state. Transition between states depends on the clinical prognosis (or natural history) of the disease. Death is an absorbing state in the model out of which it is impossible to move. The probability that a patient will move between states within a cycle is termed a 'transitional probability'. Given the slow progression of prostate cancer, a Markov state-transition model was regarded as the most appropriate method for estimating longer term costs and health outcomes of competing strategies.



***Target population***

The target population was the same as that described for the BIA - a hypothetical cohort of men with localized prostate cancer and a mean age of 60 years, which was based on analyses of Alberta Health administrative data.

***Comparators***

The treatment of interest was RALP. Comparators comprised options (other than RALP) outlined in the AHS guidelines described above, namely ORP, RT and BT.<sup>17</sup>

***Perspective***

The cost-effectiveness of RALP was estimated from a healthcare payer (Alberta Health) perspective. The same costs as those listed above for the BIA were included. They related to the localized cancer treatment, any adverse events, and any local and distant cancer recurrences. All costs were reported in 2016 Canadian dollars.

***Time horizon***

The Markov model was developed under semi-annual cycles and a 9 year time horizon, the anticipated lifespan of the robotic surgical system.<sup>90</sup> A lifetime horizon was not analyzed because differences in long-term functional and oncological outcomes are unlikely to be attributable to the choice of treatment for prostate cancer. In addition, only 5 years of local follow up data were available from the Edmonton prostatectomy registry. Although such data were extrapolated to achieve a time horizon of 9 years for the model, further extrapolation beyond that period would have introduced too much uncertainty into the model outputs.

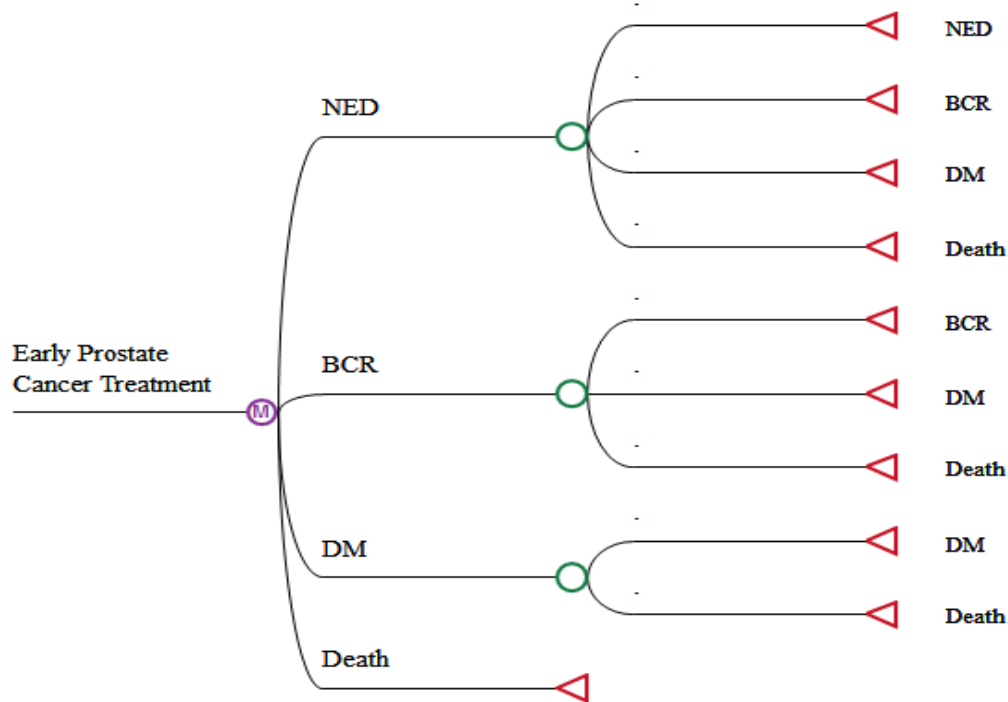
A sensitivity analysis using varying time horizons of 1, 2, 5 and 7 years was also performed.

***Modelling***

The Markov model is presented in Figure 2. The model included no evidence of disease (NED), biochemical recurrence (BCR), distant metastasis (DM) and death as possible health states, based on clinical pathways, published literature and input from clinical experts in Alberta. Further, the model anticipated that patients undergoing a surgical intervention, either RALP or ORP, could develop the following adverse events: bladder neck contracture (BNC), urinary incontinence (UI), erectile dysfunction (ED), urinary tract infection (UTI) or UI and ED combined. It was assumed that these events would occur in the first Markov cycle and not in subsequent years after surgery. Patients receiving RT or BT could develop ED or gastro-intestinal (GI) or genito-urinary (GU) toxicities, which could persist up to 4 years after treatment.<sup>91</sup>

Adverse events caused by the various treatments were followed up in the model for definitive curative treatment or for persisting disability as per the evidence around these conditions.<sup>59,91-93</sup>

Figure 2. Schematic diagram of Markov Model



**Model outcomes**

Mean costs and QALYs gained through the different prostate cancer treatments were considered.

Incremental costs, QALYs and incremental cost-effectiveness ratios (ICERs) were calculated.

**Input data**

Input parameters for the cost-effectiveness models are also presented in Table 7 and Table 8. As for the BIA, actual costs associated with inpatient and outpatient visits for localized cancer treatment (except RT), adverse events and recurrence were obtained from administrative data provided by Alberta Health (inpatient, outpatient, and practitioner claims datasets). For RT, costs were from published study conducted in Ontario were used.<sup>87</sup> Experts from AHS provided information on the costs of the *da Vinci*<sup>®</sup> system, service contract and disposables.<sup>88</sup>

Probabilities of experiencing different health outcomes were taken from the results of meta-analyses presented in the T section of this report, supplementary published literature and expert opinion, where no published values could be found. The exception was that for BCR. Local data from the Edmonton Prostatectomy Registry were used.

Utility values used to calculate QALYs were obtained from published literature. The disutility values associated with RALP and ORP in the first year were estimated based on pain scores from a recent RCT.<sup>94</sup> These pain scores were converted using the following coefficient of the Canadian algorithm of the EQ-5D-5L:<sup>56</sup>

Disutility = Canadian coefficient for the EQ-5D-5L pain and discomfort domain \* (RCT pain score/ 2.5)

### ***Discounting***

In accordance with economic guidelines, a discount rate of 5% was applied to the future costs and effects.<sup>82</sup>

A sensitivity analysis was also carried out using discount rates of 0% and 3%.

### ***Uncertainty***

The impact of uncertainties in model parameters was explored through one way and probabilistic sensitivity analyses. Sensitivity analysis involves a series of calculations in which model input parameters are varied systematically over maximum credible ranges in order to determine their influence upon outputs of the model. In one way sensitivity analysis, one input parameter is varied at a time. For this report, individual parameters were varied across the ranges indicated in Tables 7 and 8. Two additional BCR scenarios were considered: 1) if BCR were the same for ORP and RALP and 2) if BCR were based on results of the meta-analysis, rather than local data. In probabilistic sensitivity analysis, distributions for multiple input parameters in the model are specified and Monte Carlo simulation is



used to simultaneously sample from these distributions, allowing for the joint effect of parameter uncertainty to be assessed. Thus, it provides a realistic representation of overall sampling uncertainty. For this report, a Monte Carlo simulation with 10,000 iterations was used to conduct the probabilistic sensitivity analysis.

### ***Model validation***

The model structure was reviewed by local clinical experts and internal consistency was examined by sensitivity analysis.

**Table 7. Model input parameters for costs**

| Description                           | Cost (CDN\$) | Range* (CDN\$)  | Source (Calculated from)  |
|---------------------------------------|--------------|-----------------|---|
| <i>Prostate cancer treatment</i>      |              |                 |   |
| Cost of RALP procedure per patient**  | 20,614       | 18,552 – 22,675 | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> <li>• AHS<sup>88,95</sup></li> </ul>   |
| Cost of ORP procedure per patient     | 10,005       | 9,005 – 11,006  | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of RT procedure per patient      | 13,603       | 12,243 – 14,964 | <ul style="list-style-type: none"> <li>• Yong et al 2016<sup>87</sup></li> </ul>  |
| Cost of BT procedure per patient      | 4,798        | 4,318 – 5,278   | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| <i>Prostate cancer post-treatment</i> |              |                 |   |
| Annual cost of NED per patient        | 221          | 199 - 243       | <ul style="list-style-type: none"> <li>• Includes costs of quarterly PSA testing and physician's fee</li> <li>• AHS lab bulletin</li> <li>• Alberta Health administrative data</li> </ul> |
| Annual cost of BCR per patient        | 15,602       | 14,042 – 17,162 | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of metastasis per patient        | 9,965        | 8,969 – 10,962  | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of BNC per patient               | 5,671        | 5,104-6,238     | <ul style="list-style-type: none"> <li>• Includes treatment by endoscopic bladder neck incision</li> <li>• Alberta Health administrative data</li> </ul>                                  |
| Cost of ED per patient                | 431          | 388 - 475       | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of UI per patient                | 1,077        | 969 – 1,185     | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of UTI per patient               | 964          | 867 – 1,060     | <ul style="list-style-type: none"> <li>• Alberta Health administrative data</li> </ul>  |
| Cost of GI toxicity                   | 538          | 484 - 592       | <ul style="list-style-type: none"> <li>• Yong 2012<sup>87</sup></li> </ul>  |
| Cost of GU toxicity                   | 538          | 484 - 592       | <ul style="list-style-type: none"> <li>• Yong 2012<sup>87</sup></li> </ul>  |

\*The range represents the 95% confidence interval when available. Otherwise an arbitrary range of  $\pm 10\%$  was assigned<sup>96</sup>

\*\*Cost of robot system purchase (US\$2,032,000), service contract (US\$210,000) and disposables (\$2,5000 per patient) are included in the cost of RALP procedure per patient. The values were converted from US\$ to 2016 Canadian dollars using health care consumer price index<sup>95</sup>

AHS= Alberta Health Services; BCR= Biochemical Recurrence; BNC= Bladder Neck Contracture; BT= Brachytherapy; ED= Erectile Dysfunction; GI= Gastro-intestinal; GU= Genito-urinary; NED= No Evidence of Disease; ORP= Open Radical Prostatectomy; PSA= Prostate-specific Antigen; RALP= Robot-assisted; Radical Prostatectomy; RT= Radiotherapy; UI= Urinary Incontinence; UTI= Urinary Tract Infection

**Table 8. Model input parameters for probabilities and utility**

| Description                                      | Value | Range*        | Source<br>(Calculated from)  |
|--|-------|---------------|--|
| <i>Cancer relapse</i>                            |       |               |  |
| Probability of BCR 1 year after RARP             | 0.060 | 0.054 – 0.066 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 2 year after RARP             | 0.080 | 0.072 – 0.088 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 3 year after RARP             | 0.110 | 0.099 – 0.121 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 4 year after RARP             | 0.130 | 0.117 – 0.143 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 5 year after RARP             | 0.150 | 0.135 – 0.165 | • Data from Edmonton Prostatectomy Registry<br>• Probabilities from 5 to 9 years were extrapolated |
| Probability of BCR 1 year after ORP              | 0.070 | 0.063 – 0.077 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 2 years after ORP             | 0.110 | 0.099 – 0.121 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 3 years after ORP             | 0.140 | 0.126 – 0.154 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 4 years after ORP             | 0.170 | 0.153 – 0.187 | • Data from Edmonton Prostatectomy Registry  |
| Probability of BCR 5 years after ORP             | 0.200 | 0.180 – 0.220 | • Data from Edmonton Prostatectomy Registry<br>• Probabilities from 5 to 9 years were extrapolated |
| Probability of BCR 6 months after RT             | 0.028 | 0.026 – 0.031 | • Donnelly 2010 <sup>97</sup>  |
| Probability of BCR 6 months after BT             | 0.004 | 0.003 – 0.006 | • Morris 2009 <sup>98</sup>  |
| Probability of metastasis 1 year after treatment | 0.05  | SE 0.019      | • Horwitz 2005 <sup>99</sup>   |
| <i>Adverse events</i>                            |       |               |  |
| Probability of BNC after RARP                    | 0.020 | 0.018 – 0.022 | • T section, page 100-101  |
| Probability of ED after RARP                     | 0.360 | 0.324 – 0.396 | • T section, page 119-120  |
| Probability of UI after RARP                     | 0.110 | 0.099 – 0.121 | • T section, page 115  |
| Probability of ED and UI after RARP              | 0.050 | 0.045 – 0.055 | • Local expert opinion   |
| Probability of UTI after RARP                    | 0.010 | 0.009 – 0.011 | • T section, page 100-101  |
| Probability of BNC after ORP                     | 0.050 | 0.045- 0.055  | • T section, page 100-101  |
| Probability of ED after ORP                      | 0.670 | 0.603 – 0.737 | • T section, page 119-120  |
| Probability of UI after ORP                      | 0.120 | 0.108 – 0.132 | • T section, page 115  |
| Probability of ED and UI after ORP               | 0.068 | 0.061 – 0.075 | • Local expert opinion   |
| Probability of UTI after ORP                     | 0.030 | 0.027 – 0.033 | • T section, page 100-101  |
| Probability of GI toxicity after RT              | 0.139 | 0.077 – 0.229 | • Hummel 2003 <sup>100</sup>   |

**Table 8. Model input parameters for probabilities and utility**

| Description                             | Value   | Range*        | Source<br>(Calculated from)                  |
|---|---------|---------------|--|
| Probability of GU toxicity after RT     | 0.181   | 0.086 – 0.205 | • Hummel 2003 <sup>100</sup>                 |
| Probability of ED after RT              | 0.267   | 0.252 – 0.302 | • Hummel 2003 <sup>100</sup>                 |
| Probability of GI toxicity after BT     | 0.077   | 0.069 – 0.085 | • Keyes 2012 <sup>93</sup>                   |
| Probability of GU toxicity after BT     | 0.237   | 0.213- 0.260  | • Keyes 2014 <sup>92</sup>                   |
| Probability of ED after BT              | 0.237   | 0.213 -0.260  | • Keyes 2015 <sup>101</sup>                  |
| <b>Mortality</b>                        |         |               |  |
| Background mortality at 60 years of age | 0.00789 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 61 years of age | 0.00867 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 62 years of age | 0.00953 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 63 years of age | 0.01047 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 64 years of age | 0.01151 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 65 years of age | 0.01265 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 66 years of age | 0.01391 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 67 years of age | 0.01530 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| Background mortality at 68 years of age | 0.01683 | Fixed         | • LifeTables_AB <sup>102</sup>               |
| <b>Utilities</b>                        |         |               |  |
| NED 1 year after RARP                   | 0.898   | Calculated**  | • Calculated<br>• Yaxley 2016 <sup>94</sup>  |
| NED 1 year after ORP                    | 0.900   | Calculated**  | • Calculated<br>• Yaxley 2016 <sup>103</sup> |
| NED from 2 to 10 years after treatment  | 0.910   | 0.884 – 0.936 | • Krahn 2009 <sup>104</sup>                  |
| NED after BT or RT                      | 0.910   | 0.884 – 0.936 | • Krahn 2009 <sup>104</sup>                  |
| BCR                                     | 0.840   | SE 0.031      | • Cooperberg 2012 <sup>105</sup>             |
| BCR with hormone therapy                | 0.780   | SE 0.031      | • Cooperberg 2012 <sup>105</sup>             |
| Metastasis                              | 0.450   | SE 0.015      | • Cooperberg 2012 <sup>105</sup>             |
| BNC                                     | 0.720   | 0.648 – 0.792 | • Volk 2004 <sup>106</sup>                   |
| UTI                                     | 0.860   | 0.774 – 0.946 | • Shimizu 2008 <sup>107</sup>                |
| ED                                      | 0.840   | 0.756 – 0.924 | • Volk 2004 <sup>106</sup>                   |
| UI                                      | 0.830   | 0.747 – 0.913 | • Volk 2004 <sup>106</sup>                   |
| ED and UI combined                      | 0.830   | 0.747 – 0.913 | • Calculated<br>• Volk 2004 <sup>106</sup>   |
| Disutility of GI toxicity               | 0.090   | 0.081 – 0.099 | • Krahn 2003 <sup>108</sup>                  |
| Disutility of GU toxicity               | 0.050   | 0.045 – 0.055 | • Krahn 2003 <sup>108</sup>                  |

\*The range represents the 95% confidence interval when available. Otherwise an arbitrary range of  $\pm 10\%$  was assigned<sup>96</sup>

\*\* The range for utilities of NED 1 year after RALP and ORP vary according to the utility values for NED from 2 to 10 years after treatment

AHS= Alberta Health Services; BCR= Biochemical Recurrence; BNC= Bladder Neck Contracture; BT= Brachytherapy; ED= Erectile Dysfunction; GI= Gastro-intestinal; GU= Genito-urinary; NED= No Evidence of Disease; ORP= Open Radical Prostatectomy; PSA=



**Table 8. Model input parameters for probabilities and utility**

| Description | Value | Range* | Source<br>(Calculated from) |
|-------------|-------|--------|-----------------------------|
|-------------|-------|--------|-----------------------------|

Prostate-specific Antigen; RALP= Robot-assisted; Radical Prostatectomy; RT= Radiotherapy; UI= Urinary Incontinence; UTI= Urinary Tract Infection

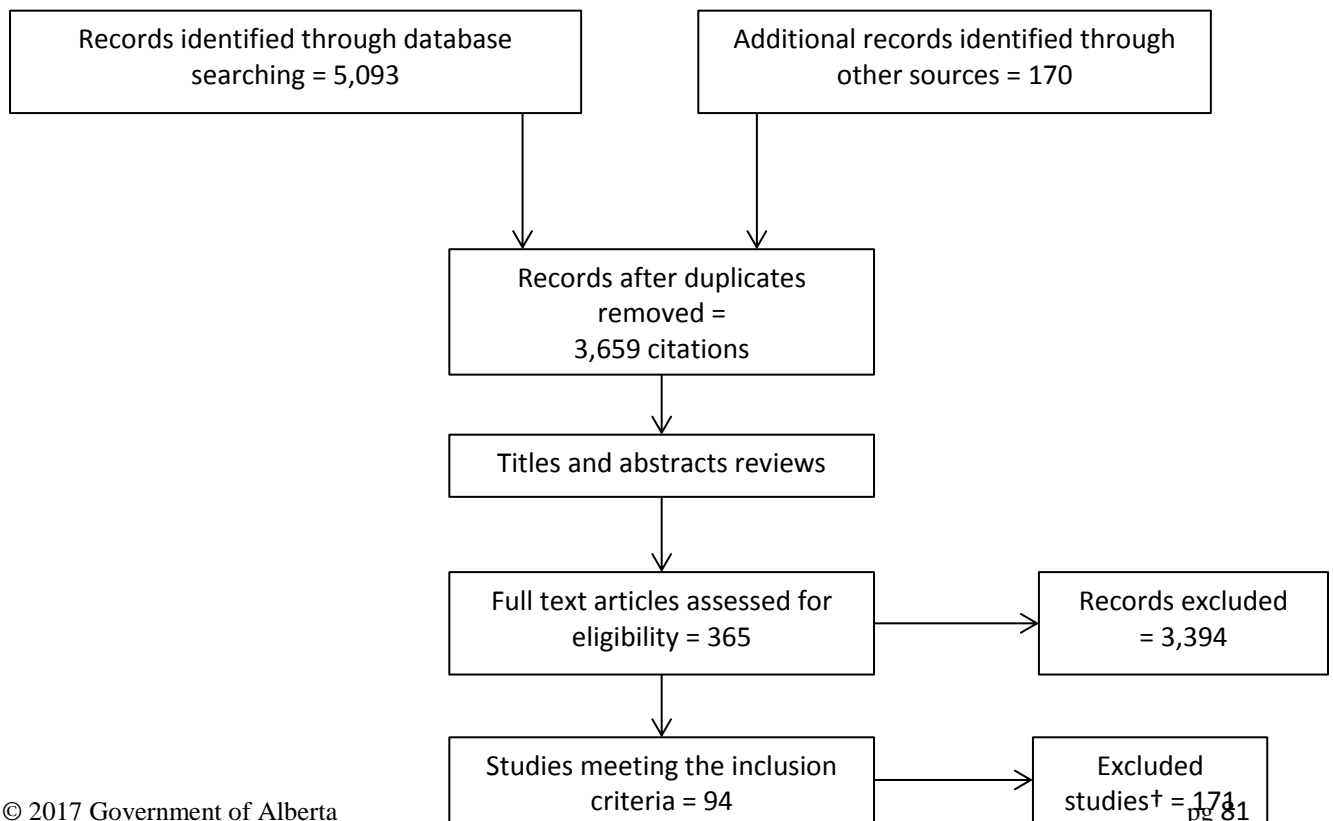
## Technology effects and effectiveness (T)

### Results

#### *Results of literature search*

A total of 3,659 discrete citations were identified through the literature searches, and 265 full text articles were retrieved for further consideration. Of these, 94 met the inclusion criteria for the review. The literature search results are described using the Preferred Reporting Items for Systematic Reviews and meta-analysis (PRISMA)<sup>73</sup> flow diagram show in Figure 3. A summary of included studies is presented in Appendix B. Excluded studies and reasons for their exclusion are listed in Appendix C.

Figure 3. PRISMA Diagram. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram of literature search and study selection for the clinical effectiveness review



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†Reasons for exclusion of studies: not available in English; population not relevant or unclear ; reference; patients already included in another study; review; outcome not relevant or unclear; intervention not relevant or unclear; comparator not relevant; noncomparison studies; protocol.

### ***Overall description of included studies***

Collectively, the 94 studies included 148,987 patients who received the following treatment for localized prostate cancer: RALP - 67,682, ORP - 70,014, LRP - 10,959, BT - 147, RT - 96, active surveillance – 50, and cryoablation - 39. Studies were conducted between 1999 and 2017 (one is ongoing but presented early results<sup>94</sup>) in the USA (42), across Europe (29), Asia (13), Australia (4), Canada (2) and Brazil (1). Two collected data from multiple centres in different countries. All studies were comparative, including 3 randomized controlled trials<sup>103,109,110</sup>, 32 prospective cohorts<sup>111-141</sup>, and 59 retrospective cohorts<sup>8,142-199</sup>. Of these, 26 and 74 compared RALP with LRP and ORP, respectively (Note: several studies involved more than one comparator). Only a few studies addressed BT (N = 3), RT (N = 1), cryoablation (N = 1) or active surveillance (N = 1).

### ***Patient characteristics***

Table 9 summarizes inclusion and exclusion criteria for patient selection across studies. Many reported the use of clinical practice guidelines to identify eligible patients rather than explicitly stating inclusion and exclusion criteria. Characteristics of participants in each study are presented in Table 10. Apart from two published as conference abstracts, all studies provided information on patient age.<sup>141,163</sup> Studies comparing RALP with other surgical procedures reported median or mean ages ranging from 58 to 70 years for RALP, 58 to 67 years for LRP, and 59 to 70 years for ORP. In studies involving non-surgical comparators, the mean age for RALP was 60 years, whereas the mean age for cryoablation was 72 years and for BT, it varied from 64 to 67 years. The single study involving RT recruited an older population compared to other studies (median age was 76 years (75-78) for RALP and 80 years (77-82) for radiotherapy).<sup>199</sup> Three studies excluded patients over 70 and 75 years<sup>110,112,119</sup>. An additional three



only included patients over 65 years of age, since they were based on a single American administrative database limited to patients in that age group.<sup>160,166,167</sup>

Where reported, patients who received surgical treatment had a high mean or median BMI, ranging from 23 to 30 kg/m<sup>2</sup>. Two studies limited inclusion of patients based on BMI: one only included patients with BMI lower than 25 kg/m<sup>2</sup>, while the other only included patients with BMI greater than 30kg/m<sup>2</sup> since it was compared surgical procedures in obese patients.<sup>140,145</sup>

Four studies focussed on RALP in patients with high-risk prostate cancer, which was defined as a Gleason score  $\geq 8$ , PSA > 20ng/ml or cT3-cT4 clinical tumor stage.<sup>149,164,200</sup> One study also considered patients with cT2c tumors as high-risk.<sup>174</sup> Further, one study assessed biochemical recurrence in patients with intermediate to high-risk prostate cancer.<sup>169</sup> Otherwise, the majority of studies only included patients with localized prostate cancer (cT1-cT2). The overall baseline proportion of cT1-cT2 tumors was similar in RALP (93%), LRP (98%), and ORP (91%). However, 65% of LRP patients had cT1 tumors, while for RALP and ORP, the proportions were 53% and 48%, respectively. Eighteen studies also reported a trend in which patients with more advanced clinical stages underwent ORP.<sup>118,119,122,127-129,131,133,134,142,146,154,162,165,166,186,192,197</sup> Studies comparing RALP to brachytherapy or active surveillance only included patients with localized tumors.<sup>141</sup> In the single study involving cryoablation, 95% of patients had cT1-cT2 tumors.<sup>116</sup> Only one study, which compared RT to RALP, included patients with more advanced tumors, and there was no difference in tumor stage between treatment groups.<sup>199</sup>

In addition to the studies investigating patients with intermediate and/or high-risk prostate cancer, five studies limited inclusion to patients with preoperative baseline PSA levels equal to and/or lower than 20ng/ml or 10ng/ml.<sup>103,110,112,119,124</sup> In general, levels were similar between surgical treatment groups, with mean or median values ranging from 2ng/ml to 19ng/ml. These values were comparable to those



in studies of RALP versus BT. However, in the studies of RALP versus RT and RALP versus cryoablation, levels fell at the higher end of this range (16ng/ml and 12 ng/ml, respectively).

Most studies provided information on preoperative Gleason score, reporting the mean or median score or the number of patients with scores above or below specific cut-off points (e.g.  $\leq 6$ , 7,  $\geq 8$ ). Three studies included only patients with a Gleason score lower than 7.<sup>110,112,124</sup> Where reported, 45% of RALP and ORP patients had a Gleason score equal to or greater than 6, compared to 51% of LRP patients. The proportion of patients with a Gleason score equal to or greater than 6 who received cryoablation, BT or RT were 51%, 77% and 38%, respectively.

Twenty studies excluded patients undertaking neoadjuvant therapy, either as radiotherapy, hormone therapy or a combination of both.<sup>109,110,112,121,128,142,145,152,153,158,160,163,164,168,169,171,173,174,192,200</sup> Few indicated the proportion of patients using neoadjuvant therapy before a surgical procedure. Where reported, across those that compared RALP to ORP, less than 10% of patients received neoadjuvant therapy, except in one study, where the proportion of ORP patients who underwent neoadjuvant therapy was 17%, compared to 9% of RALP patients.<sup>127</sup> Only one study of RALP versus LRP described the use of neoadjuvant therapy, reporting the same proportion of patients in each treatment group (38%).<sup>156</sup>

Only eight studies provided information on the Charlson comorbidity index, reporting no differences between comparison groups.<sup>124,135,139,140,161,166,167,181</sup>

Most studies did not state the proportion of patients with urinary and sexual function intact at baseline. However, four studies excluded patients who were incontinent or impotent before the surgical procedure.<sup>110,112,124,144</sup>

### *Histopathological findings*



Most studies comparing RALP with LRP or ORP presented histopathological findings (Table 11). The majority of patients had pT2 tumors, with proportions of approximately 73%, 71% and 70% for RALP, LRP and ORP, respectively.

The postoperative Gleason score was similar for RALP and ORP patients. Approximately 66% to 67% of patients had scores  $\geq 7$ . For LRP patients, the proportion was lower (60%).

The majority of studies found that only 1% to 2% of patients had prostate cancer with lymph node involvement. However, six studies reported both lymph node involvement in over 10% of patients and higher rates for ORP patients compared to RALP.<sup>126,149,162,164,169,174</sup> In four of these studies, differences were statistically significant.

Histopathological findings are not applicable for studies comparing RALP with nonsurgical interventions.

#### *Characteristics of procedure/ treatment*

Table 12 shows the characteristics of surgical and non-surgical procedures. To account for the learning curve of a surgeon's initial experiences with the robotic surgical system, four studies excluded RALP surgeons' earlier prostatectomies.<sup>119,171,192,198</sup> One study only included surgeries performed by surgeons who completed their training within the past decade.<sup>152</sup> The number of surgeons who participated varied widely. In some studies, a single surgeon performed all of the procedures, whereas in others, particularly those that included multiple centers, several surgeons were involved.

In 31 studies, prostatectomies were performed by surgeons who were inexperienced with robotic technology.<sup>111,113-116,120,125,127,128,130,131,136,139,140,142,143,152,154,155,165,169,172,173,175,179,182,188,190,193,194,196</sup> However, they were "experienced" in performing open and/or laparoscopic surgery. Where reported, surgeon experience with RALP ranged from 20 to over 300 procedures alone or in combination with other types



of surgery. Thus, the definition of “experienced” varied. Three studies did not provide the number of procedures surgeons had performed prior to the study but described them as “experienced”.<sup>121,164,180</sup>

The extraperitoneal Walsh technique (or a modified version of it) was used to perform the majority of ORPs. In studies comparing RALP with ORP, the majority of RALPs involved the Vattikuti technique. In studies comparing RALP with LRP, the majority of RALPs involved the Montsouris, Montsouris II or a modified version of these techniques, which were also used to perform the LRPs. Further, in half of these studies, the same surgeons performed the robotic and laparoscopic surgeries. Of the studies that compared RALP with ORP, 20 involved the same surgeons for both surgeries.<sup>124,125,127,131,136,142,164,171,173,175,177-179,185,188,190,192,193,198</sup>

Four studies included only patients who underwent nerve-sparing surgery.<sup>110,112,114,124</sup> Few described their criteria for nerve-sparing prostatectomy, with some simply indicating that it was performed when “oncologically appropriate” or at the “surgeon’s discretion”.<sup>103,117,153,193,200</sup> Those that reported explicit criteria mentioned sexual function at baseline, localized prostate cancer, low Gleason score (<7) and PSA value (i.e. <10ng/ml or <20ng/ml). In five studies, a statistically significantly greater number of patients in the RALP group underwent nerve-sparing prostatectomy compared to the LRP group.<sup>111,143,150,151,159</sup> Among studies of RALP versus ORP, the majority reported that RALP was associated with a higher rate of nerve-sparing. Across all prostatectomies, the proportion involving bilateral nerve-sparing surgery was higher than that involving unilateral nerve-sparing surgery.

Table 12 summarizes the criteria and proportion of patients who underwent lymph node (LN) dissection.<sup>115,126,133,149,158,164,175,180,186,189,196</sup> Criteria ranged from surgeon’s preference to the Partin Tables and Roach formula. The Partin Tables use clinical features of prostate cancer, including the Gleason score, serum PSA and clinical stage, to predict whether the tumor is likely to be confined to the prostate. The Roach formula defines the risk of pelvic LN as follows: (% pelvic LN risk = prostate-specific antigen



[PSA] x 2/3 + (Gleason – 6) x 10). The mean or median number of lymph nodes removed varied across studies, from 3 to 18. Where reported, the proportion of patients with lymph node dissection was similar between RALP and LRP patients but higher in ORP patients. In nine studies, a statistically significantly greater number of ORP patients had a lymph node dissection compared RALP patients.<sup>119,127,131,165,166,172,174,192,193</sup>

The single study of cryoablation was conducted with a transperineal technique with Cryocare CS system.<sup>116</sup>

Two of the three studies involving BT reported different treatment doses (125 Gy and 145 Gy) and the single study involving radiotherapy used daily doses greater than 180 cGy.<sup>116,141,199</sup>

#### *Functional and health-related quality of life outcomes*

Thirty-seven studies assessed urinary function as a continuous variable and urinary continence as a dichotomous variable (continent vs incontinent) (Table 13). Measures of urinary incontinence included: additional surgery necessary to regain continence<sup>130</sup>; pad use, varying from strictly pad free to 0 or 1 security pad per day<sup>103,109,111,113,115,117,119,120,122,124,127,136,139,143,144,150,159,165,168,177,179,183,187,188,193,196,198</sup>; urinary leakage<sup>119,123,126,135</sup>; and/or a combination of pad use and leakage.<sup>110,112,119,125,155,171,196</sup> Four studies provided data on urinary function measured through the UCLA-PCI, EPIC, AUA-SI and IPSS questionnaires.<sup>103,113,115,116</sup>

Thirty studies reported on sexual function and/or potency after prostate cancer treatment.<sup>103,109-113,115-117,119,120,122,124-127,135,136,139,143,150,155,159,165,171,183,188,193,196</sup>. Seventeen of the studies defined potency as a dichotomous outcome, asking patients their ability to achieve erections satisfactory for intercourse with or without oral medication.<sup>110-112,117,119,120,125-127,136,139,143,150,165,171,183,196</sup> Other studies measured sexual



function through questions on sexual intercourse over the last 4 weeks<sup>113,115</sup>, erections enough for intercourse half of the time<sup>103,119</sup> and various cut-off scores on validated function questionnaires (IIEF-5 and SHIM).<sup>109,110,119,122,124,135,155,188</sup> Six studies assessed sexual function as a continuous measure using validated questionnaires (EPIC, IIEF, UCLA-PCI and EORTC-QLC-PR25).<sup>103,113,115,116,159,201</sup>

Most studies only measured sexual function and potency in patients who underwent bilateral nerve-sparing as they are more likely to regain this function after surgery.<sup>110-113,115,124,135,143,171,188</sup> Six studies reported rates based on the total sample size, diluting their results.<sup>103,117,119,120,159,183</sup>

Eleven studies assessed health-related quality of life after prostate cancer treatment.<sup>103,113,115-118,121,123,137,185,201</sup>. Measures included: generic questionnaires (SF-12, SF-36)<sup>103,113,137</sup>, disease-specific instruments (KHQ, EORTC-QLQ-PR25 and EORTC-QLC-C30)<sup>123</sup> and quality of life items contained in EPIC, UCLA-PCI and ICIQ-SF.<sup>115-118,121,185</sup>

### *Oncological outcomes*

Thirty-five studies reported on biochemical recurrence.<sup>109-112,117,118,125,126,128,129,139,141,143,149,150,152,154,155,159,164,165,168,169,171,173,174,176,182,187,188,193,196-199</sup> Twenty-seven of them provided the definition of recurrence at various PSA cut-off values of  $\geq 0.1$  ng/ml<sup>176</sup>,  $> 0.1$  ng/ml<sup>143,188,198</sup>,  $\geq 0.2$  ng/ml<sup>117,125,126,129,139,150,164,168,169,171,174,197</sup>,  $> 0.2$  ng/ml<sup>109-112,118,128,154,155,165,199</sup> and  $> 0.4$  ng/ml<sup>196</sup>. Further, the definition ranged from a single to 2 consecutive PSA measures and, in the case of two studies, only 2 to 3 months after surgery.<sup>129,168</sup> Four studies also considered biochemical recurrence once patients started or received further treatment.<sup>129,169,174,176</sup> One study comparing radiotherapy to RALP defined biochemical recurrence in radiotherapy as PSA values  $\geq 2$  ng/ml above the nadir level.<sup>199</sup>

### *Surgeon's experience (learning curve)*





An assessment of the impact of the learning curve was conducted on key outcomes described in the overall quality assessment. Based on comparative studies of RALP and ORP, there was insufficient information to evaluate the effect of surgeon experience on biochemical recurrence. However, no differences in rates of blood transfusion, complications, potency at 1 year, urinary continence at 1 year, and positive margins in pT2 and pT3 tumors between RALP and ORP groups were reported.

Few LRP studies assessed the learning curve and there was high heterogeneity among them. Thus, it was not possible to assess the effect of surgeon experience on biochemical recurrence and sexual potency. However, no evidence suggesting that surgeon experience is a predictor of positive surgical margins in pT2 and pT3 tumors was found. Also, there were no differences in urinary continence rates at 12 months between patients whose prostatectomies were performed by inexperienced robotic surgeons in the initial stages of the RALP learning curve and those whose LRPs were performed by experienced surgeons. However, when outcomes were assessed for surgeons beyond the learning curve, higher rates of continence at 12 months were reported for patients who underwent RALP, compared to those who received LRP.

One study comparing surgeons with initial experience on RALP to those with initial experience on LRP reported that the latter was associated with higher blood transfusion rates.<sup>142</sup> Other studies reported rates ranging from 0% to 6% for surgeons at initial stages and beyond the learning curve for RALP.<sup>110,111,113,143,153-155</sup>

### ***Overall quality of included studies***

The following seven key outcomes were selected for assessing the quality of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach: prostate cancer recurrence, biochemical recurrence, urinary function, sexual function at 12 months, positive surgical



margins (analyzed in pT2 and pT3, pT4 tumors), postoperative or post-treatment complications and blood transfusion. Further details are reported in Appendix D.

The quality of evidence from studies comparing RALP to LRP was very low to low, with the exception of the randomized controlled trials assessing positive surgical margins and urinary continence at 12 months, which were of moderate quality. The quality of evidence from studies comparing RALP to ORP was also very low to low. The quality of evidence was not assessed for outcomes related to rates of positive surgical margins and blood transfusions in studies comparing RALP with RT, cryoablation, BT or active surveillance, since they were not applicable. Moreover, none of the studies comparing RALP with cryoablation or active surveillance assessed the outcomes of interest.

The single comparative study of RALP versus RT provided very low quality evidence for local recurrence, biochemical recurrence and post-treatment complications. In the study that compared RALP to BT, the quality of evidence for post-treatment complications was also very low.

Further details of the quality results from the Downs and Black checklist for nonrandomized studies and the Cochrane risk of bias tool are presented in Appendix D.

### *Bias*

#### Reporting bias

All included studies described the objectives and hypothesis of interest. However, 11 did not provide the inclusion, exclusion criteria and description of the surgical procedure, such as the criteria for lymph node dissection and nerve-sparing technique. Additionally, six studies did not define how the outcomes were measured in the methods section and ten studies did not report the actual p-value. Five studies did not describe or only partially described confounding variables (e.g. age, BMI and cancer's clinical stage).

Consequently, it was not possible to verify that patient characteristics were similar between groups or discard the possibility of confounders masking the results.

Twelve of the included studies did not present estimates of data variability (e.g., ranges and confidence intervals). Others reported medians and ranges, precluding a meta-analysis of some of the outcomes of interest.

#### Selection bias

Two RCTs evaluated RALP relative to LRP, while one RCT compared RALP with ORP. All RCTs provided a clear description of the random sequence generation, but did not provide sufficient information to determine whether allocation concealment was adequate.

Of the nonrandomized trials, twenty-six recruited patients at different time periods, since they compared outcomes from their initial robotic surgical experience to those of a historical 'control' group of patients. Twelve of the studies did not provide any description of the recruitment period. However, most mentioned that patients with more complex cases were selected to comprise the control group (i.e. open) because surgeons were still at the beginning of the learning curve for robotic surgery.

In studies that included multiple centres, it is possible that clinical pathways, treatments, follow-up care, and the measurement of outcomes may have differed across centres and affected the results. Further, in the population-based studies, no information on whether intervention and control groups were recruited from the same hospitals was provided.

#### Performance and observer bias

Across studies, physicians who administered treatment (whether it was surgical or non-surgical) were not blinded. The RCTs of RALP versus LRP did not state whether patients, outcome assessors and/or



data analysts were blinded. In the RCT comparing RALP with ORP, the outcome assessor, but not the patients, was blinded.

Apart from one observational study reporting an attempt to blind those measuring the outcomes, none them provided any statement about blinding patients and personnel responsible for analyzing and measuring the data. This could be an issue with subjective measures, mainly urinary, sexual function and health-related quality of life outcomes, which in some cases were assessed through interviews.

#### Attrition bias

Given the nature of the surgical and non-surgical treatments included in the review, the risks of noncompliance and misclassification were low.

In one RCT, no patients were lost to follow up. However, in the remaining two RCTs, several patients were lost and the number differed between treatment groups. They were subsequently excluded from the final analyses. No information on reasons for their discontinuation or the extent to which the characteristics of these patients differed from those who completed the trials were provided.

Therefore, it was not possible to assess the effect of the losses on trial results.

In four of the observational studies, 25% to 50% of patients were lost to follow up and excluded from the final analysis. Twenty-eight studies did not provide any description of patients lost to follow up.

#### External validity

Most studies reported their experience with prostate cancer treatment in their clinical practice. They often analyzed data from all patients recruited during a selected period of time, with little inclusion and exclusion criteria.

Six studies reported results from analyses of population-based databases in the US or Australia.



The RCTs included only patients who were less than 70 years old with low PSA levels ( $\leq 20$ ng/ml), and clinically localized cancer (cT1-cT2) and had not received neoadjuvant therapy. These characteristics may limit the generalizability of the results among older patients and those with higher PSA levels in broader patient population.

Other sources of bias

Recovery of erectile function comprises an important functional outcome after prostatectomy and is possible with surgeries that involve nerve-sparing techniques. Six studies, including one of the RCTs, measured erectile function in all patients, including those who did not undergo a nerve-sparing surgery. This may have diluted the results, biasing them towards whichever treatment had higher rates of nerve-sparing.

Sixteen studies reported that treatment choice was made by the patient, usually after counselling with a physician. Two studies stated that the surgeon, alone, determined the type of surgical procedure. This may have biased the results towards the treatment with which the physician was most comfortable.

Two studies stated that the choice of treatment was determined using patient characteristics, such as clinical stage, tumor and Gleason score. One of the studies reported that, initially, RALP was offered for less complex cases, which may have biased the results in favor of RALP.

Two studies reported that treatment choice was based on economic reasons. In one study, the majority of the RALPs were conducted in private hospitals, while the LRPs were performed in the public sector.

Forty-three studies did not apply any technique to control for possible known confounders. In eight studies, the statistical analyses were inappropriate and the length of follow-up was shorter for patients who underwent RALP. However, in general, studies included short-follow up periods.

## Funding sources

Seventy studies did not report the funding source. In thirty-four studies, the authors declared no conflict of interest. Nine studies stated that they did not receive funding, while fourteen received support from non-profit organizations, government organizations, academic organizations, disease foundations and/or patient groups.

## ***Safety: procedure related complications and adverse events***

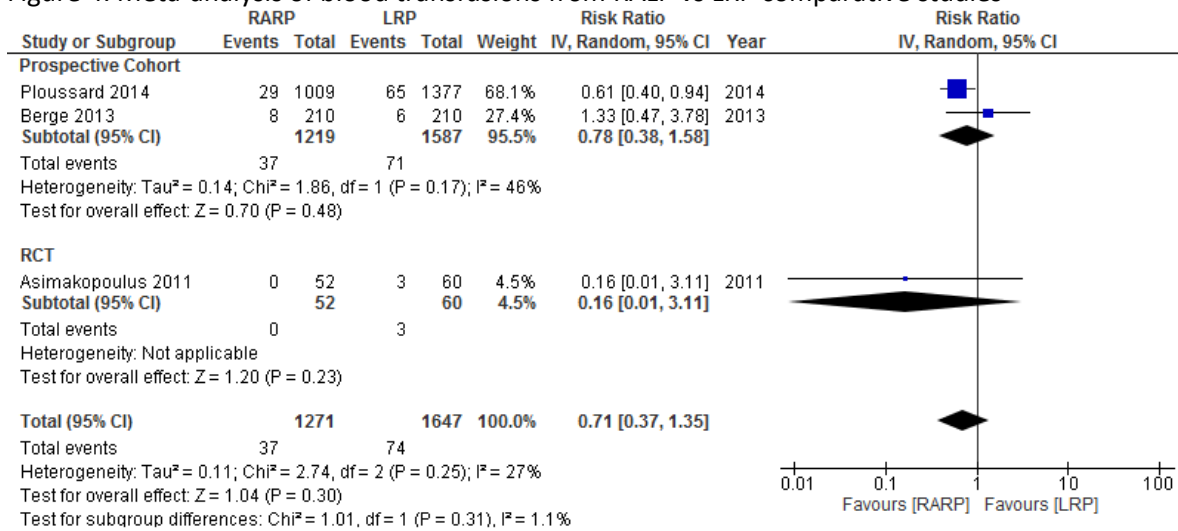
### *Perioperative complications*

Table 14 summarizes rates of complications, blood transfusion, conversion to ORP and equipment failure reported in studies.

### Blood transfusion

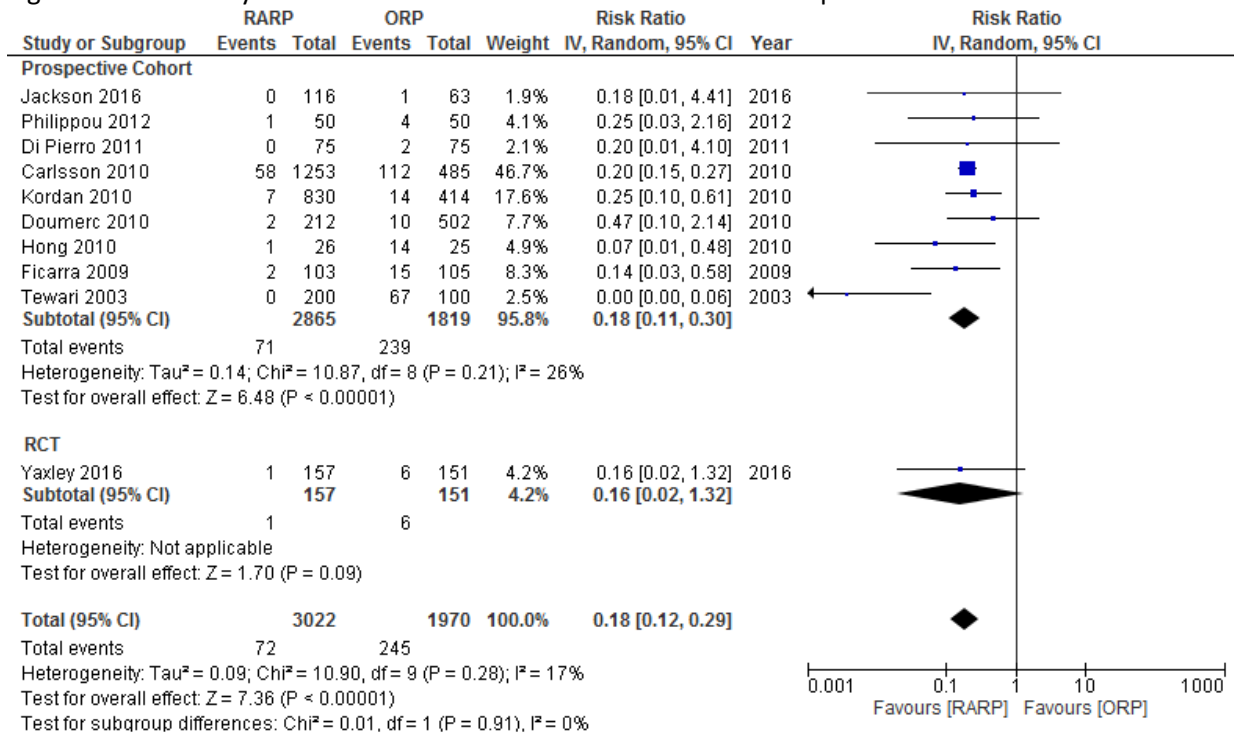
Twelve studies comparing RALP with LRP reported the proportion of patients requiring blood transfusions, which ranged from 0 to 8.9% of RALP patients and 0 to 17.5% of LRP patients.<sup>110,111,113,142,143,150,153-156,158,159</sup> None of the studies reported a statistically significant difference between groups. A meta-analysis of transfusion rates from the three prospective studies also found no statistically significant difference between RALP and LRP (Figure 4).<sup>110,111,113</sup>

Figure 4. Meta-analysis of blood transfusions from RALP vs LRP comparative studies



Thirty-three comparative studies of RALP and ORP reported the proportion of patients who received transfusions, which varied from 0 to 20% of RALP patients and 0 to 90% of ORP patients.<sup>103,117,125,126,129-133,135,138-140,142,153,154,165,166,171,172,174,175,179-181,187,188,190,193,195-198</sup> In seventeen studies, the proportion was statistically significantly higher in the ORP group.<sup>129,130,132,133,135,139,140,166,174,175,181,187,188,193,195-197</sup> Similar findings emerged from a meta-analysis of 10 prospective studies (Figure 5)<sup>103,117,125,126,130-133,135,139</sup>

Figure 5. Meta-analysis of blood transfusions from RALP vs ORP comparative studies



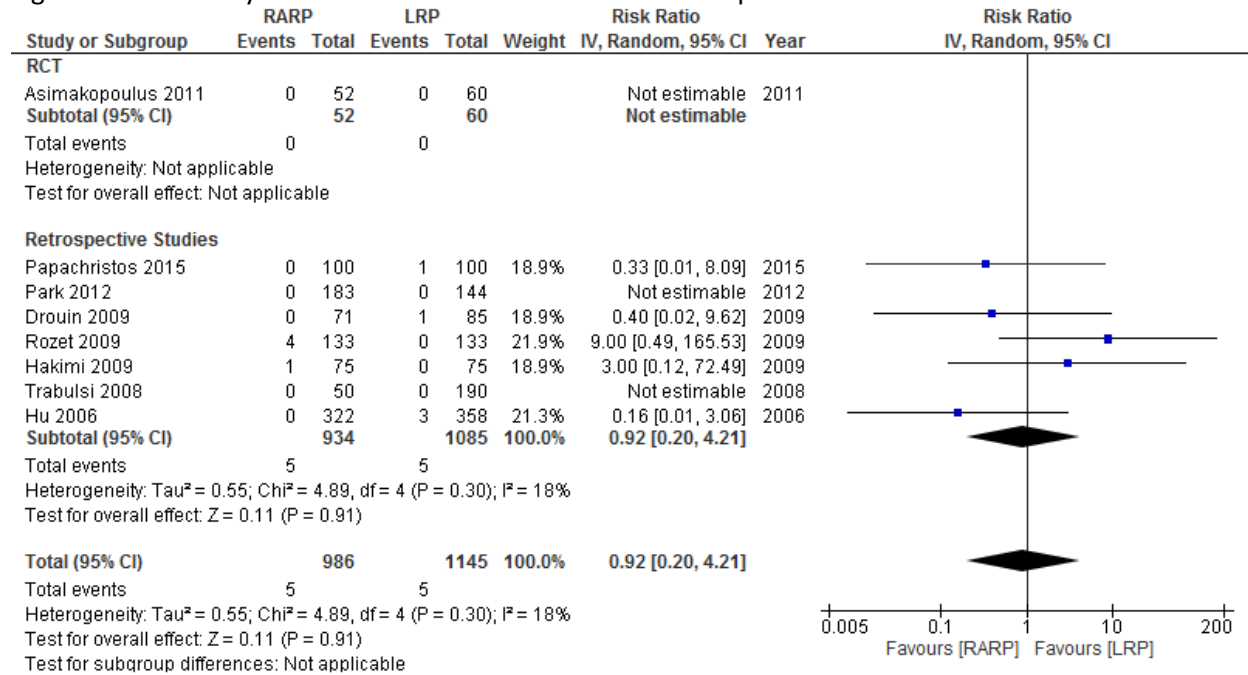
As mentioned previously, transfusions were not an applicable outcome for studies comparing RALP with BT, radiotherapy, cryoablation, or active surveillance.

### Conversion

Eight studies of RALP versus LRP indicated the number of patients whose surgery was converted to ORP<sup>110,143,150,154-158</sup>, three of which reported zero.<sup>110,150,157</sup> In two studies, conversions from RALP to ORP occurred in 1.3%<sup>155</sup> and 3.0%<sup>156</sup> of patients. In the remaining three studies, conversion rates from LRP to ORP were 0.84%<sup>158</sup>, 1%<sup>143</sup>, and 1.1%<sup>154</sup> of patients. None of the studies found a statistically significant difference in conversions between RALP and LRP patients. A meta-analysis of seven retrospective studies also revealed no statistically significant difference in the number of conversions between surgical treatment groups (Figure 6).<sup>143,150,154-158</sup>



Figure 6. Meta-analysis of conversions from RALP vs LRP comparative studies



Conversion is not an applicable outcome for studies comparing RALP with ORP, BT, RT, cryoablation, or active surveillance.

### Equipment failure

Two studies comparing RALP with LRP provided information on robotic equipment failures. In one study, there was one case (1.3%)<sup>155</sup>. In another study, the equipment failed during two cases (0.6%)<sup>158</sup>.

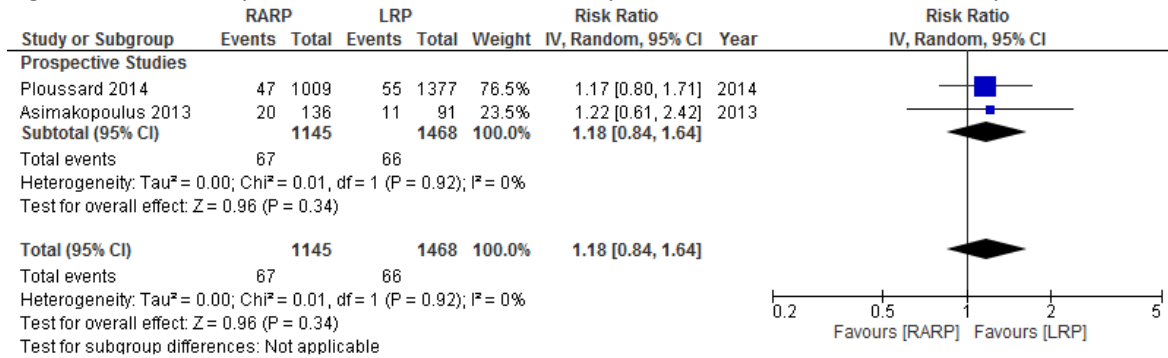
Equipment failure is not an applicable outcome for studies comparing RALP with ORP, BT, RT, cryoablation, or active surveillance.

### Complications

Eleven studies comparing RALP with LRP reported surgical complications using the Clavien-Dindo classification system.<sup>109-112,142,143,150,154-156,158</sup> In eight of the studies, the number of patients who experienced any grade of Clavien-Dindo complication ranged from 4.6 to 15.4% of RALP patients and 4.0

to 27.6% of LRP patients. None of the differences between treatment groups achieved statistical significance. A meta-analysis of two prospective studies also found no significant differences between RALP and LRP (Figure 7).<sup>111,112</sup>

Figure 7. Meta-analysis of total Clavien-Dindo complications from RALP vs LRP comparative studies

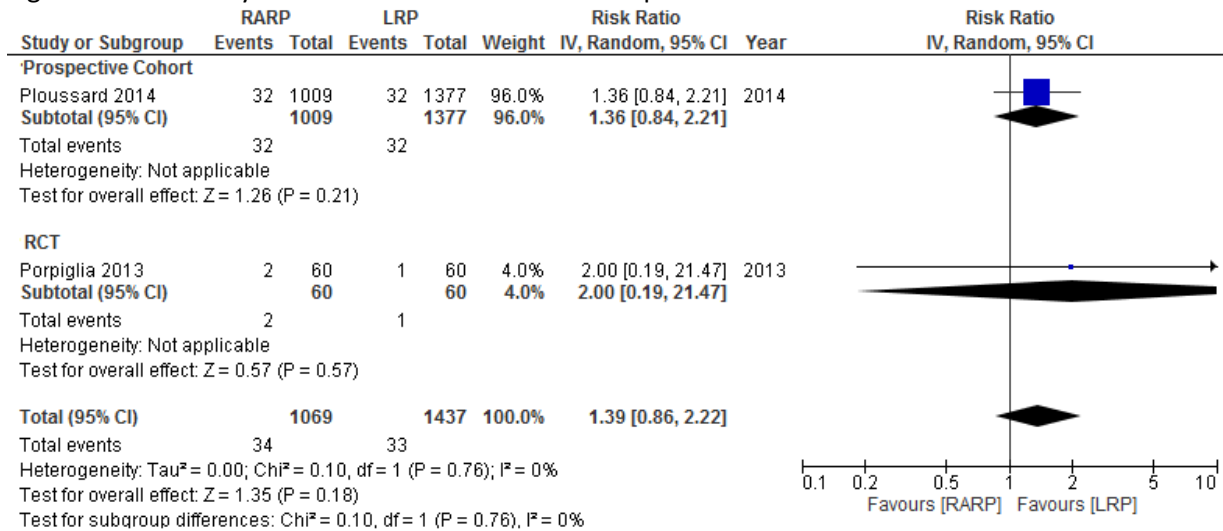


Across the studies, 0 to 3.3% of RALP patients and 0 to 9.0% of LRP patients experienced a Clavien-Dindo 1 complication. Clavien-Dindo 2 complications occurred in 1.4 to 13.5% of RALP patients and 0 to 20.1% of LRP patients. Zero to 7% of RALP patients and 0 to 9.7% of LRP patients experienced a Clavien-Dindo 3 complication. Finally, Clavien-Dindo 4 complications occurred in 0 to 3.0% of RALP patients and 0 to 2.3% to of LRP patients. Two studies reported a single grade 5 Clavien-Dindo complication (i.e. death) - one in an RALP patient<sup>111</sup> and the other in an LRP patient<sup>142</sup>. None of the studies found a statistically significant difference in the number of complications reported by grade.

Ten studies reported complications not classified by Clavien-Dindo grades.<sup>109,111,143,144,150,154-156,158,159</sup>

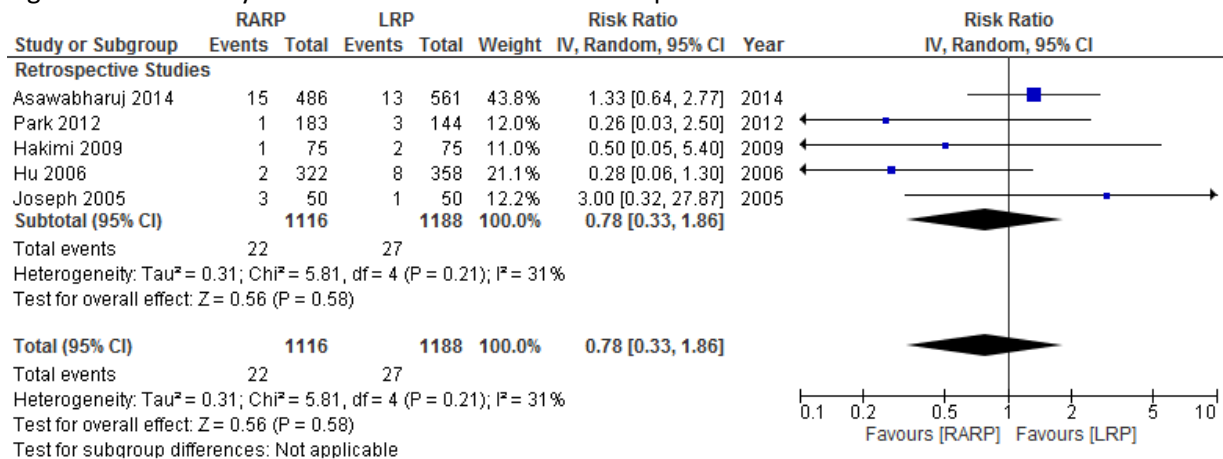
These complications included urinary tract infection (UTI), bladder neck contracture (BNC), bowel injury, myocardial infarction (MI), wound infection, cerebrovascular accident (CVA), anastomosis leakage, and anastomosis stenosis. Nine of the studies recorded UTIs rates, which ranged from 0 to 4.5% of RALP patients and 0 to 4% of LRP patients.<sup>109,111,143,144,150,154-156,158</sup> However, none found a statistically significant difference between RALP and LRP patients. A meta-analysis of two prospective studies supported this finding (Figure 8).<sup>109,111</sup>

Figure 8. Meta-analysis of UTIs from RALP vs LRP comparative studies



Five retrospective studies reported BNCs, with rates ranging from 0.5 to 6% of RALP patients and 2 to 2.7% of LRP patients.<sup>144,150,155,158,159</sup> Again, no studies found statistically significant differences in BNCs between groups. A meta-analysis of the 5 studies also revealed no significant difference between groups (Figure 9).

Figure 9. Meta-analysis of BNCs from RALP vs LRP comparative studies



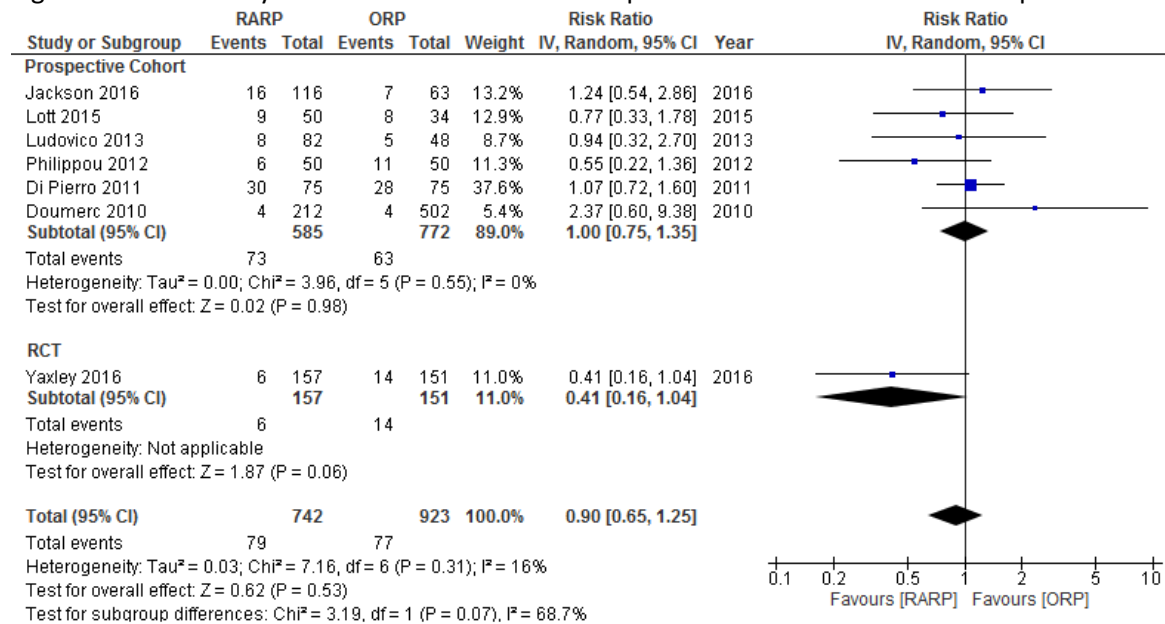
In one study, a statistically significantly higher number of cases of anastomosis leakage (134 vs. 23 cases) and anastomosis stenosis (23 vs. 7 cases) occurred in LRP patients.<sup>111</sup> A second study also found a statistically significantly higher rate of anastomosis leakage in LRP patients (11.7 vs. 8.0%), but no

significant differences for anastomosis stenosis (2.4 vs. 3.1%).<sup>144</sup> Rates of other reported complications (i.e. bowel injury, MI, CVA) did not statistically significantly differ between RALP and LRP patients.

Nineteen studies comparing RALP with ORP reported Clavien-Dindo complications.<sup>103,117,120,124-</sup>

<sup>127,130,131,135,142,154,165,175,178-180,188,198</sup> The number of patients who experienced any grade of complication ranged from 1.9% to 41.3% of RALP patients and 0.8% to 90.0% of ORP patients. Only one study found a statistically significant difference between the groups, reporting a higher rate of complications in RALP patients.<sup>165</sup> A meta-analysis of 7 prospective studies revealed no significant differences between the groups (Figure 10).<sup>103,117,120,124-126,131</sup>

Figure 10. Meta-analysis of total Clavien-Dindo complications from RALP vs ORP comparative studies

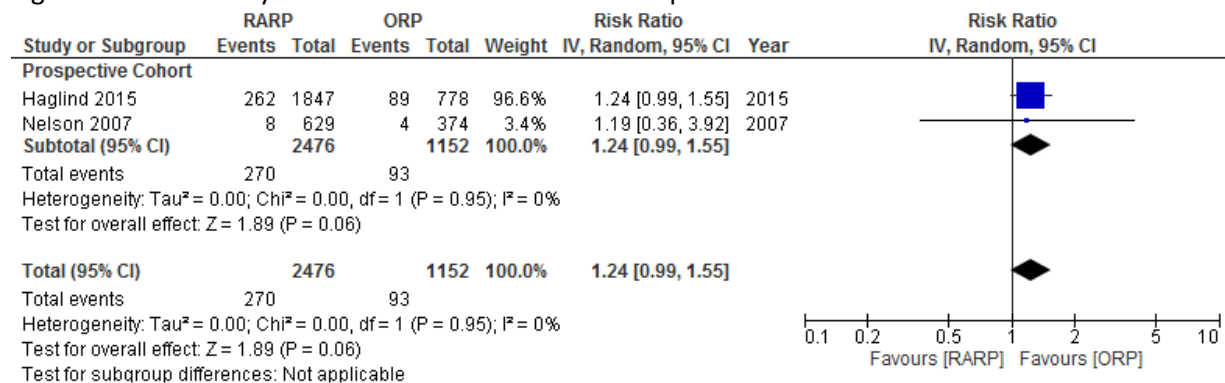


Across the studies, 0 to 16% of RALP patients and 0 to 16.1% of ORP patients experienced a Clavien-Dindo 1 complication. Clavien-Dindo 2 complications occurred in 1.4 to 10.1% of RALP patients and 3.0 to 56.0% of ORP patients. Clavien-Dindo 3 complications occurred in 0.4 to 21.1% of RALP patients and 0 to 31.6% of LRP patients. Clavien-Dindo 4 complications occurred in 0 to 0.6% of RALP patients and 0

to 8.0% of LRP patients. Seven studies reported zero Clavien-Dindo 5 complications in both RALP and LRP patients. Two studies reported 1 Clavien-Dindo 5 complication (0.2%) in ORP patients.<sup>130,131</sup>

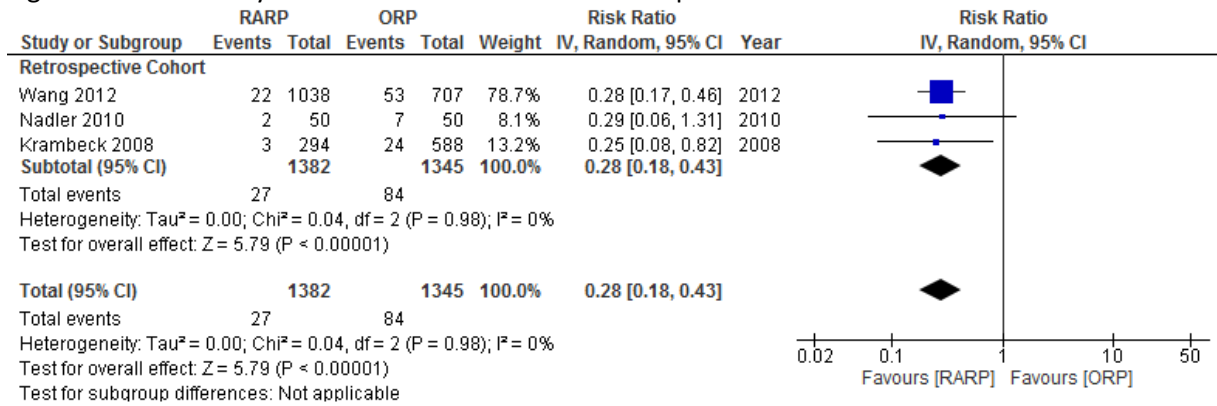
Twenty-one studies also provided information on a range of complications not classified by Clavien-Dindo grades.<sup>119,123,125,126,129,130,135,138-140,154,166,170,172,175,181,182,186,188,193,196</sup> They included: UTI, BNC, infection, and bleeding, as well as cardiovascular (e.g. pulmonary embolism), gastrointestinal (e.g. ileus), genitourinary (e.g. urinary leak), respiratory (e.g. respiratory distress), renal (e.g. acute renal failure), neuropathy, and psychological (e.g. depression) complications. Three studies found a statistically significantly higher number of total complications in ORP patients compared to RALP patients.<sup>139,181,186</sup> Across these studies, any type of complication occurred in 2.2 to 9.7% of RALP patients and 5.8 to 19.0% of ORP patients. Six studies reported UTIs in 0.2 to 14.2% of RALP patients and 0.9 to 11.4% of ORP, but none of the differences between groups were statistically significant.<sup>119,138,154,175,186,196</sup> A meta-analysis of two prospective cohort studies also found no significant difference (Figure 11).<sup>119,138</sup>

Figure 11. Meta-analysis of UTIs from RALP vs ORP comparative studies



Seven studies reported BNCs in 0.2 to 4.0% of RALP patients and 2.6 to 14% of ORP patients.<sup>125,126,129,130,182,188,196</sup> Four of these studies found a statistically significantly higher rate of BNCs in ORP patients.<sup>126,130,182,196</sup> This finding was consistent with those from a meta-analysis of 3 retrospective cohort studies (Figure 12).<sup>182,188,196</sup>

Figure 12. Meta-analysis of BNCs from RALP vs ORP comparative studies



One study reported total Clavien-Dindo complications in studies comparing RALP with BT<sup>141</sup>. A Clavien-Dindo complication of any grade occurred in 6.5% of RALP patients and 3.1% of BT patients. However, whether this difference reached statistical significance was not reported.

One study comparing RALP and radiotherapy provided information on complications not classified using the Clavien-Dindo system.<sup>199</sup> A complication (rectal injury) was reported in 1 RALP patient (2.3%), while 77 (80.2%) radiotherapy patients experienced a complication (bladder obstruction, radiation cystitis, or radiation proctitis). The statistical significance of this difference was not reported.

No studies comparing RALP with cryoablation or active surveillance reported on complications.

*Perioperative outcomes*

Estimated blood loss

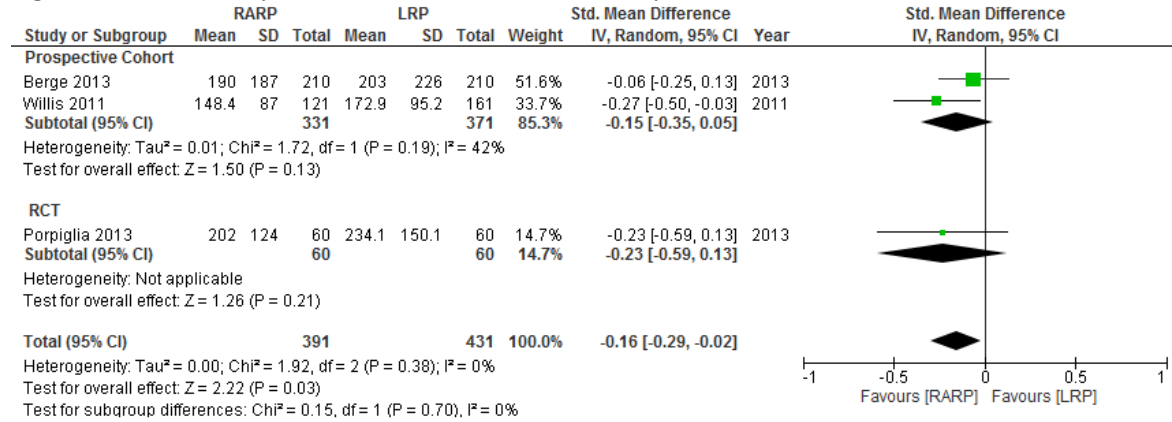
Fifteen studies comparing RALP and LRP assessed estimated blood loss (EBL) (Table 15).<sup>109,111,113,115,142-</sup>

<sup>144,150,151,154-159</sup> Across the studies, median EBL ranged from 200 to 350 ml in RALP and 150 to 400 ml in LRP. The average EBL ranged from 148.4 to 609 ml in RALP patients and 172.9 to 800.3 ml in LRP patients. In seven, average EBL was statistically significantly higher in LRP patients.<sup>111,113,115,142,144,155,159</sup>

Six studies reported no statistically significant difference between RALP and LRP

patients.<sup>109,110,143,150,156,157</sup> A meta-analysis of the reported EBL from three prospective studies demonstrated a slight but still statistically significant difference between the procedures, favoring RALP over LRP (**Figure 13**).<sup>109,113,115</sup>

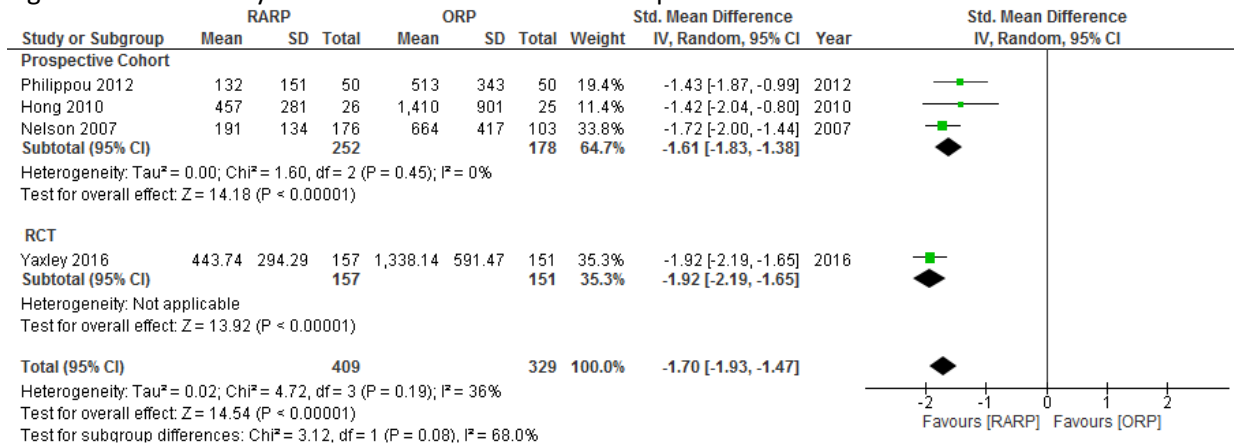
Figure 13. Meta-analysis of EBL from RALP vs LRP comparative studies



Thirty-two comparative studies of RALP and ORP recorded EBL (Table 15).<sup>103,119,120,122,124,125,131-133,135-</sup>

<sup>140,142,154,165,171,174,177,178,180,182,184,185,188,189,193,195,197,198</sup> Across studies, median EBL ranged from 103 to 642 ml in RALP patients and 487.35 to 1103 ml in ORP patients. Mean EBL ranged from 100 to 300 ml for RALP patients and 410.3 to 1540 ml for ORP. In 27 studies, EBL was statistically significantly higher in ORP patients.<sup>103,119,120,122,124,125,131-133,135-140,142,165,171,174,177,178,180,182,185,188,189,193,195,197,198</sup> One study reported that EBL was statistically significantly greater in ORP patients until the loss exceeded 1000 ml.<sup>131</sup> A meta-analysis of four prospective studies also demonstrated that ORP was associated with higher EBL (Figure 14).<sup>103,125,132,138</sup>

Figure 14. Meta-analysis of EBL from RALP vs ORP comparative studies



EBL is not an applicable outcome for studies comparing RALP with BT, RT, cryoablation, or active surveillance.

**Efficacy/effectiveness**

*Perioperative outcomes*

Details on perioperative outcomes, including operative time, length of hospital stay, catheterization time, pain and readmission rates, are presented in Table 15.

**Operative time**

Operative time was reported in 14 studies comparing RALP with LRP.<sup>109,111,113,115,142-144,150,151,154-156,158,159</sup>

However, only two studies provided detailed definitions of operative time for RALP and included docking and undocking.<sup>158,159</sup> Another three defined operative time for both procedures as “skin-to-skin”

time.<sup>109,150,155</sup> One study defined operative time as “operating room time”.<sup>115</sup> Median operative times

ranged from 120 to 250 minutes for RALP patients and 150 to 290 minutes for LRP patients. Mean

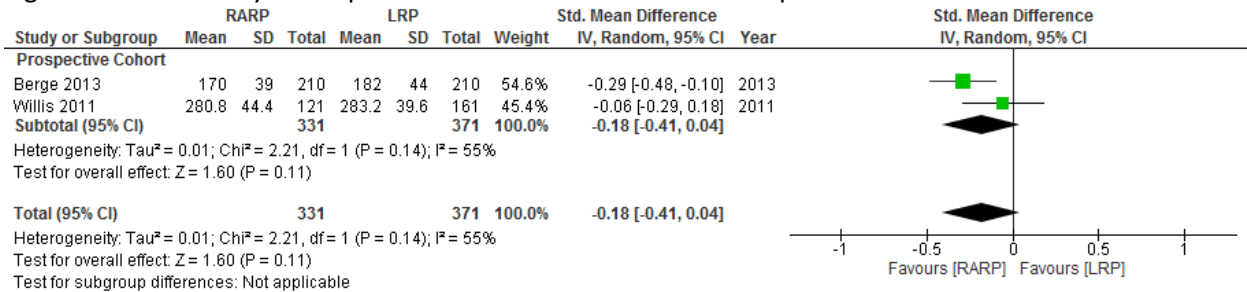
operative times ranged from 128.9 to 280.8 for RALP patients and 138.1 to 283.2 for LRP patients. Five

studies found no statistically significant difference between RALP and LRP operative times<sup>109,115,143,156,159</sup>,



while six found LRP operative times to be statistically significantly longer.<sup>111,142,144,150,151,155</sup> A meta-analysis of mean operative times from two prospective cohorts revealed no statistically significant difference between operative times (Figure 15).<sup>113,115</sup>

Figure 15. Meta-analysis of operative time from RALP vs LRP comparative studies

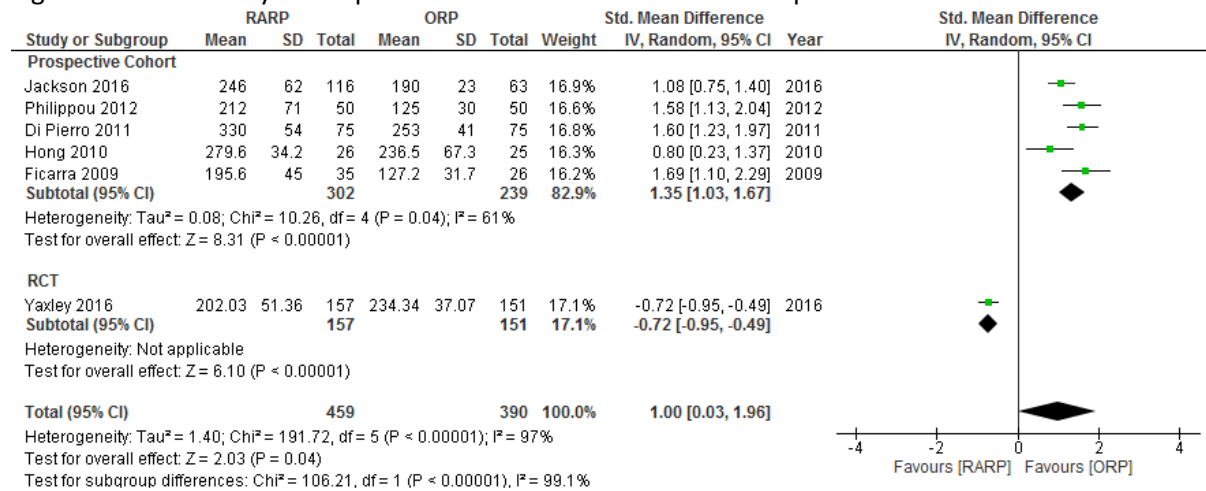


Thirty-one studies comparing RALP and ORP reported operative time.<sup>103,117,119,120,124-</sup>

<sup>126,131,132,135,139,140,142,154,165,171,175,177-180,182,187-189,193,195-198,202</sup> The majority of the studies did not provide a clear definition. Four defined it as the time between the first incision/dissection and final closure. One study provided a definition for RALP operative time only (“console time”). Another three studies provided two values for operative time, “skin-to-skin” or “surgery” time and “operating room” or “door-to-door” time.<sup>103,119,165</sup> Reported median times ranged from 168 to 341 minutes for RALP and 103 to 236 minutes for ORP. Mean operative times ranged from 114.23 to 294.79 minutes for RALP patients and 125 to 280.37 minutes for ORP patients. Twenty-three studies showed that RALP operative times were statistically significantly longer than ORP operative times.<sup>103,117,119,120,124-</sup>

<sup>126,131,132,135,136,140,154,165,171,179,180,182,188,189,195-197</sup> These results were consistent with those of a meta-analysis of mean operative times from five prospective studies (Figure 16).<sup>117,126,132,135</sup> The three studies that provided two values for operative time were not included in the meta-analysis, since two were retrospective cohort studies and one did not provide a mean value.

Figure 16. Meta-analysis of operative time from RALP vs ORP comparative studies



Operative time is not an applicable outcome for studies comparing RALP with BT, RT, cryoablation, or active surveillance.

**Length of hospital stay**

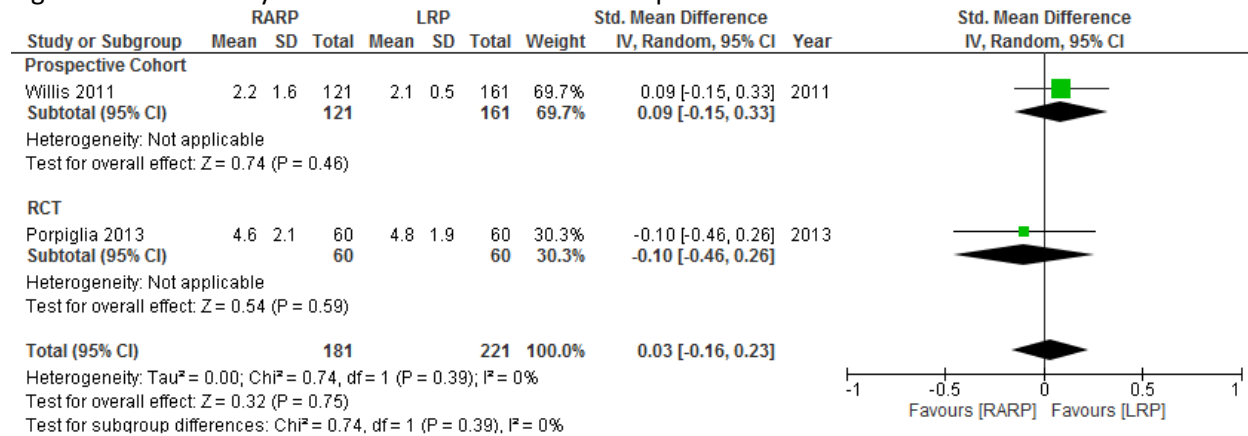
Twelve comparative studies of RALP and LRP reported length of hospital stay (LOS).<sup>109,111,115,142-</sup>

<sup>144,150,151,153-156</sup> Median LOS ranged from 1 to 7 days for RALP patients and 2 to 7 days for LRP patients.

The average LOS ranged from 1.6 to 7.0 days for RALP patients and 1.8 to 8.6 days for LRP patients. The majority of studies did not report a statistically significant difference in LOS between RALP and LRP patients. A meta-analysis of mean LOS from two prospective studies also found no statistically significant difference (Figure 17).



Figure 17. Meta-analysis of LOS from RALP vs LRP comparative studies



Thirty-three studies comparing RALP with ORP reported LOS.<sup>103,117,119,120,124,125,135,136,138-</sup>

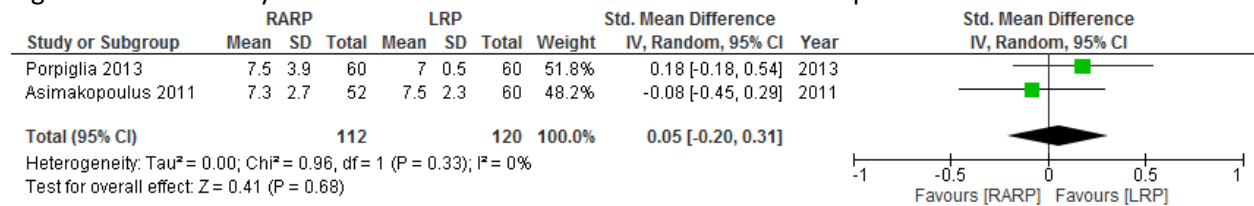
<sup>140,142,154,161,165,166,172,174,175,179-181,184,185,187,188,190,193,195,196,198,203,204</sup> The median LOS ranged from 1 to 6 days in RALP patients and 1.09 to 6 days in ORP patients. The mean LOS ranged from 1.02 to 8.58 days in RALP patients and 1.23 to 11.74 days in ORP patients. Twenty-one studies reported a statistically significantly longer LOS in ORP patients compared to RALP patients.<sup>103,119,120,124,125,131,135,136,139,142,161,165,166,174,175,180,185,187,190,193,198</sup>

Length of hospital stay is not an applicable outcome for studies comparing RALP with BT, RT, or cryoablation, which are outpatient treatments.

#### Catheterization time

Seven studies of RALP and LRP reported catheterization time.<sup>109-111,142,150,154,156</sup> Mean catheterization times ranged from 6.8 to 9.2 days in RALP patients and 7.0 to 9.0 days in LRP patients. In two studies, catheterization times were statistically significantly longer in LRP patients compared to RALP patients.<sup>142,150</sup> In a third study, catheterization times were statistically significantly longer in RALP patients.<sup>111</sup> A meta-analysis of two prospective studies found no statistically significant difference between RALP and LRP (Figure 18).<sup>109,110</sup>

Figure 18. Meta-analysis of catheterization time from RALP vs LRP comparative studies



Seventeen studies comparing RALP with ORP reported catheterization

time.<sup>103,123,124,131,135,136,139,140,142,165,175,179,180,187,190,193,198</sup> Median catheterization time across studies ranged

from 3 to 12 days in RALP patients and 7 to 14 days in ORP patients. Average time ranged from 6.2 to 12

in RALP patients and 7.5 to 18 days in ORP patients. Twelve studies found that catheterization times

were statistically significantly longer in ORP patients than in RALP

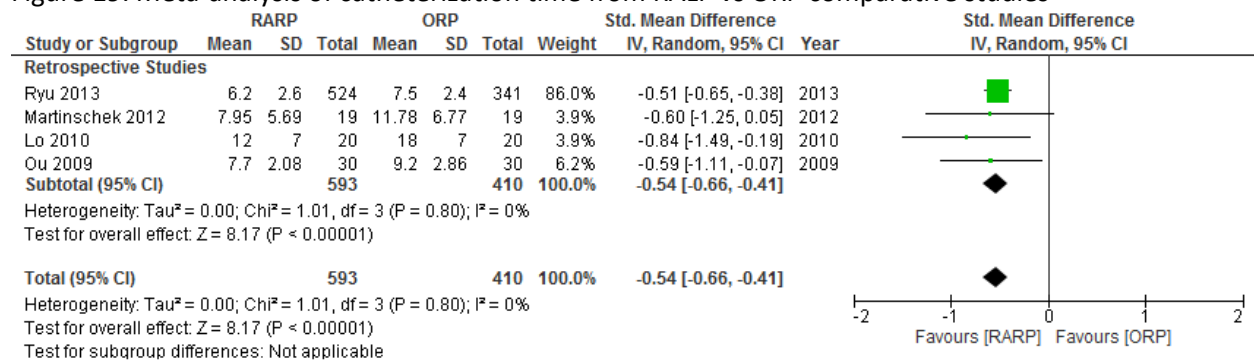
patients.<sup>124,131,135,136,139,142,175,179,180,187,190,193</sup> In one study, catheterization time was only statistically

significantly longer in ORP patients with catheters inserted for 11 days or longer.<sup>165</sup> A meta-analysis of 4

retrospective studies also found a statistically significant difference, favouring RALP over ORP (Figure

19).<sup>175,180,187,193</sup>

Figure 19. Meta-analysis of catheterization time from RALP vs ORP comparative studies



No studies comparing RALP with BT, RT, or cryoablation reported catheterization time, and it is not an applicable outcome for active surveillance.



## Pain

One study comparing RALP with LRP collected information on pain immediately or 1 day post-surgery using a numerical rating scale, where higher scores represented worse pain.<sup>150</sup> A statistically significant difference between groups was found, with a median score of 4 (0-10) for RALP patients and 5 (1-10) for LRP patients (p=0.016).

Pain was assessed in five studies comparing RALP with ORP. Two prospective cohort studies reported pain scores within the first 24 hours of surgery using a numerical rating scale, where higher scores represented worse pain.<sup>139,140</sup> Pain scores were statistically significantly higher in ORP patients compared to RALP patients. One RCT also reported pain at 24 hours post-surgery, as well as at 1, 6, and 12 weeks.<sup>103</sup> It measured pain at rest, during activities, and worst pain. Pain during activities and worst pain were statistically significantly lower in RALP patients at 24 hours (5.83 vs. 4.6; 6.45 vs. 5.3) and 1-week post surgery (3.19 vs 2.51; 3.50 vs. 2.37). An additional two prospective cohort studies reported the number of patients who experienced pain.<sup>119,125</sup> One measured pain in the wound, abdominal pain, pain in the lower abdomen and upper abdomen, and chest pain at 3 months post-surgery.<sup>119</sup> Higher rates of ORP patients experienced pain at the wound site (6.6% vs. 2.4%). Higher proportions of RALP patients experienced pain in the lower abdomen (8.4% vs. 7.8%), upper abdomen (3.2% vs. 2.7%), and overall abdominal pain (0.5% vs. 0.3%). A similar proportion of patients reported chest pain in both groups (0.1%). The second study reported persistent pain in 1 LRP patient, but none in RALP patients.<sup>125</sup>

No studies comparing RALP with BT, RT, cryoablation, or active surveillance reported on pain.

## Readmission rate

Five studies compared readmission rates at 30 or 90 days after RALP and ORP.<sup>103,119,138,161,166</sup> One RCT and two prospective studies reported rates ranging from 5.1% to 9.3% and 4.8% to 7.9% for RALP and



ORP, respectively.<sup>103,119,138</sup> Two population-based studies also reported low readmission rates for both procedures, ranging from 2.7% to 5.9%.<sup>161,166</sup> No statistically significant differences were reported.

No studies comparing RALP with LRP, BT, RT, cryoablation or active surveillance reported readmission rates.

### *Functional and Health-related quality of life outcomes*

#### Urinary function/continence (1 month)

Two randomized controlled trials measured return of urinary continence 1 month after RALP and LRP.<sup>109,110</sup> For LRP, a urinary continence rate of 33% was reported, whereas the rates for RALP were 44% and 55%. A meta-analysis of both studies found that patients undergoing RALP were more likely to regain urinary continence at 1 month compared to LRP (Figure 20).

Four studies comparing RALP and ORP measured urinary continence at 1 month. Rates varied widely, from 28% to 71% of RALP patients and from 9% to 65% of ORP patients.<sup>120,123,171,177</sup> A meta-analysis of two prospective studies found that RALP patients were more likely to regain urinary continence at 1 month compared to ORP patients (Figure 21).<sup>120,123</sup>

No studies comparing RALP with nonsurgical treatments for prostate cancer provided information on urinary continence at 1 month. However, one study assessed the urinary function scores of surgical and nonsurgical approaches at 1 month, and the results were inconclusive. They favored RALP when measured with UCLA-PCI, but favored cryoablation and brachytherapy when measured with the AUA-SI<sup>116</sup> (Table 13).

Figure 20. Meta-analysis of return of urinary continence at 1 month from RALP vs LRP comparative studies

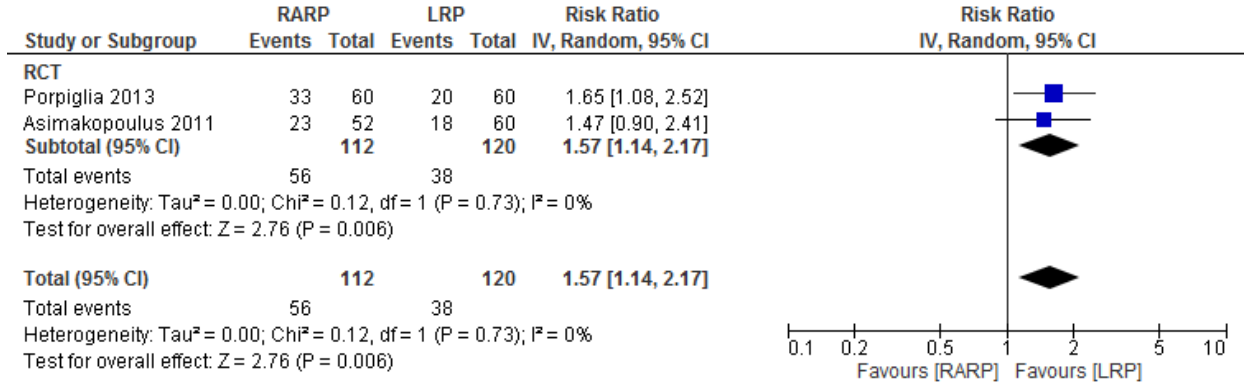
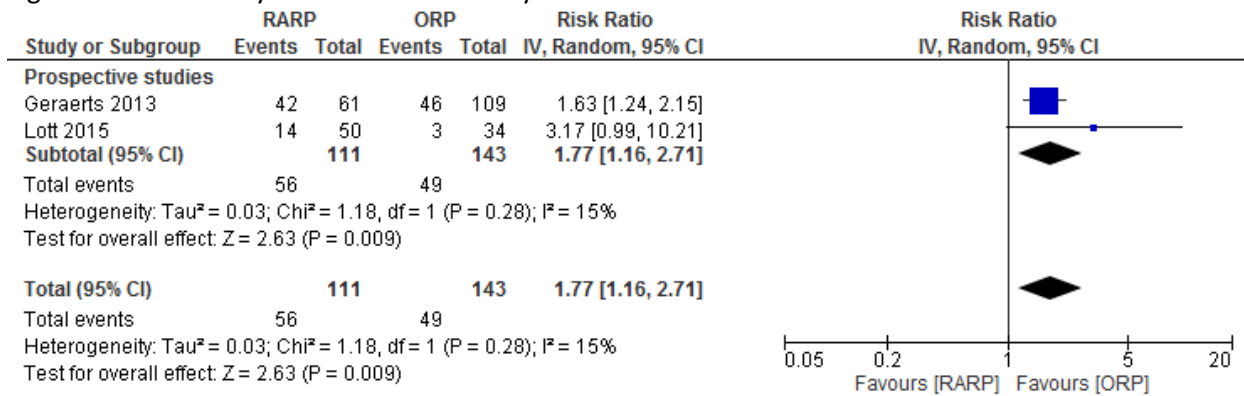


Figure 21. Meta-analysis of return of urinary continence at 1 month from RALP vs ORP studies



Urinary function/ continence (3 months)

Seven studies on RALP and LRP provided assessed return of continence at 3 months.<sup>109,110,113,115,150,155,159</sup>

They all reported higher rates for RALP patients, which ranged from 41% to 90%, compared to LRP patients, which ranged from 36% to 92%. Only two studies showed a statistically significant difference between RALP and LRP patients.<sup>109,150</sup> Four prospective studies were included in a meta-analysis, which demonstrated that RALP was associated with a slight, but statistically significant, improvement in rates of urinary continence compared to LRP (Figure 22).<sup>109,110,113,115</sup>

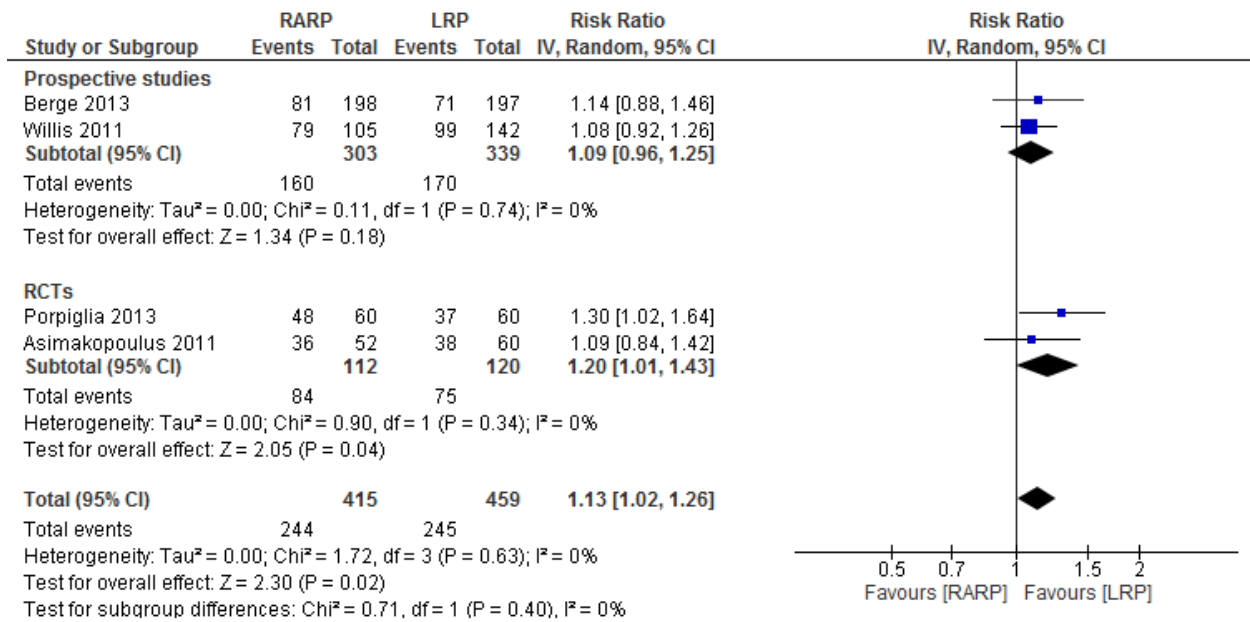
Eleven studies reported rates of urinary continence 3 months after RALP and

ORP.<sup>103,120,122,123,125,126,136,171,177,193,198</sup> They ranged from 49% to 95% of RALP patients and 37% to 88% of

ORP patients (Table 13). The majority of studies reported higher rates of continence in RALP patients, but only three reported statistically significant differences.<sup>126,177,193</sup>

There were no comparative studies assessing urinary function at 3 months in patients receiving RT. One study comparing RALP with BT and cryoablation reported inconclusive results.<sup>116</sup>

Figure 22. Meta-analysis of return of urinary continence at 3 months from RALP vs LRP comparative studies

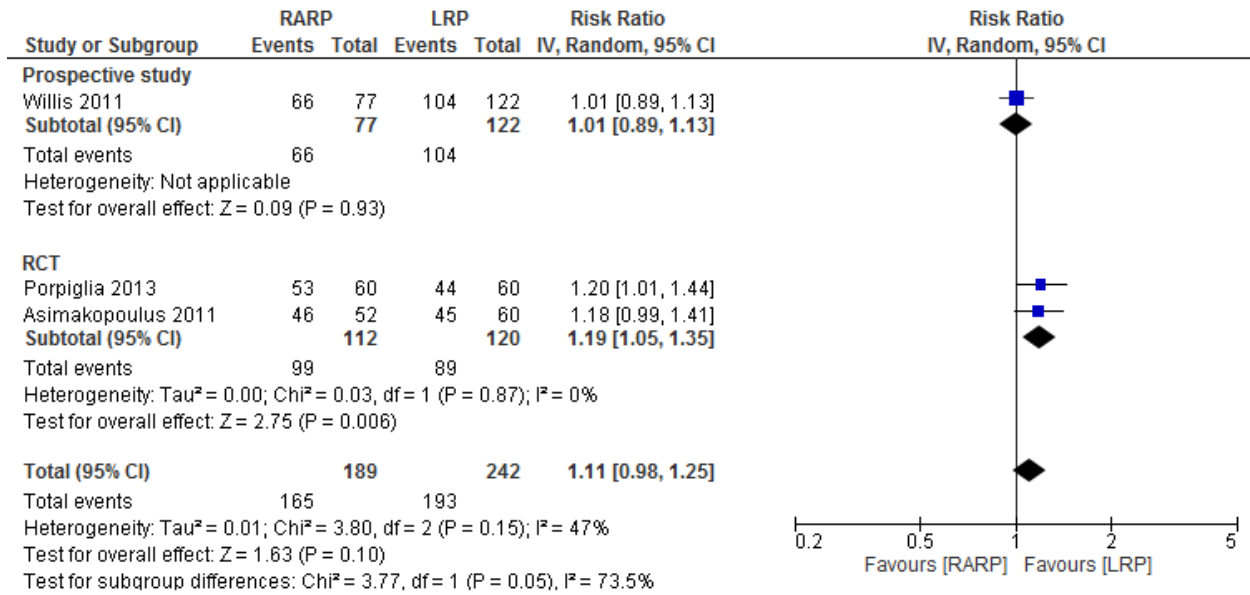


### Urinary function/ continence (6 months)

At 6 months, seven studies compared urinary continence between RALP and LRP, with rates ranging from 68% to 88% and 39% to 85%, respectively.<sup>109,110,115,144,150,155</sup> The studies had mixed results, from no statistically significant difference to a risk ratio of 1.74 (95%CI: 1.54, 1.97). A meta-analysis of two randomized controlled trials and one prospective cohort study showed no statistically significant difference between RALP and LRP (Figure 23).<sup>109,110,115</sup>



Figure 23. Meta-analysis of return of urinary continence at 6 months from RALP vs LRP comparative studies



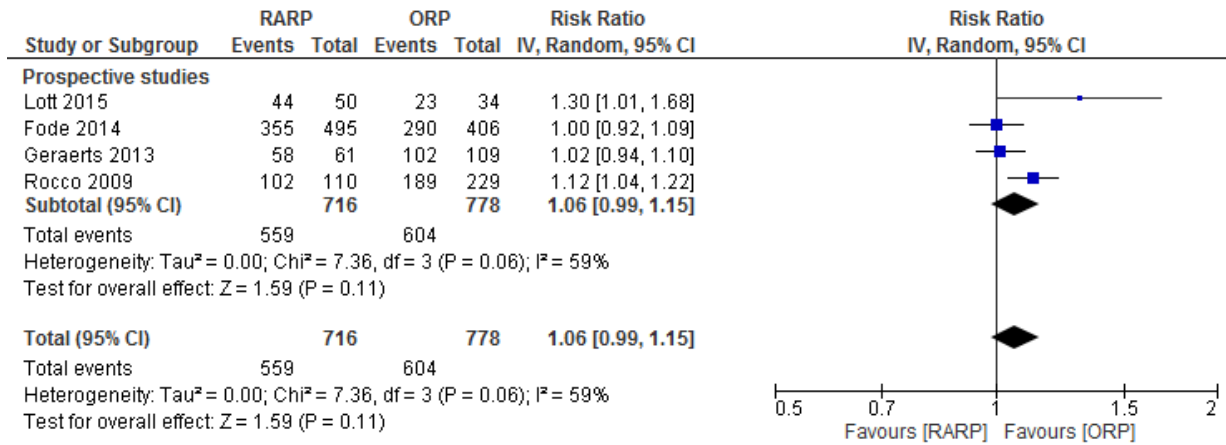
Eight studies of RALP vs ORP reported continence at 6 months. Urinary continence rates ranged from 68% to 97% 6 months after surgery.<sup>120,122,123,136,165,171,177,193</sup> Four retrospective studies also reported no

statistically significant differences in rates between both surgical procedures at 6 months.<sup>165,171,177,193</sup>

Further, the other four prospective studies were included in a meta-analysis, which found no statistically significant differences in return of urinary continence at 6 months between RALP and ORP (Figure

24).<sup>120,122,123,136</sup>

Figure 24. Meta-analysis of return of urinary continence at 6 months from RALP vs ORP comparative studies

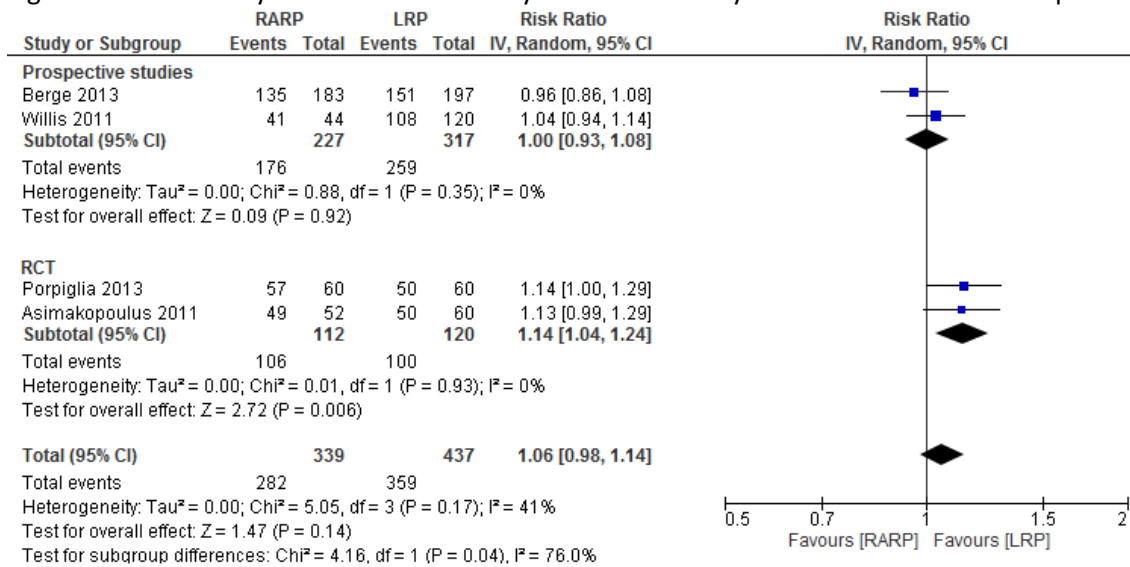


For nonsurgical treatments, no studies reported urinary function scores or continence rates for radiotherapy and active surveillance. One study provided inconclusive information on urinary function for RALP, cryoablation and BT at 6 months (Table 13).<sup>116</sup>

Urinary function/ continence (1 year)

Eight studies comparing RALP and LRP provided information on continence rates at 1 year.<sup>109,110,113,115,143,144,150,155</sup> Rates ranged from 74% to 95% of RALP patients and 64% to 90% of LRP patients. The retrospective studies had mixed results, with two reporting statistically significantly higher rates for RALP and two reporting no differences between RALP and LRP.<sup>143,144,150,155</sup> However, a meta-analysis with two prospective studies and two randomized controlled trials found that RALP was not associated with higher rates (Figure 25).<sup>109,110,113,115</sup>

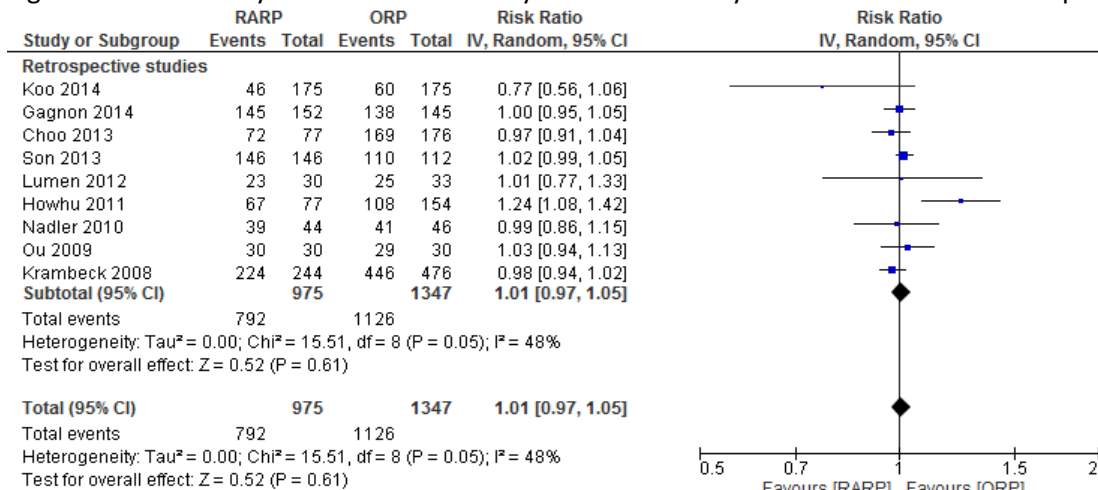
Figure 25. Meta-analysis of return of urinary continence at 1 year from RALP vs LRP comparative studies



Seventeen studies compared urinary continence at 1 year between RALP and ORP.<sup>119,120,122-</sup>

<sup>124,126,135,136,165,168,171,177,179,183,188,193,196</sup> Eight prospective studies reported similar rates for RALP and ORP, though the overall rate varied from 26% to 100%.<sup>119,120,122-124,126,135,136</sup> Additionally, a meta-analysis of retrospective studies showed no statistically significant differences in urinary continence rates 1 year after RALP and ORP (Figure 26)<sup>165,168,171,177,179,183,188,193,196</sup>.

Figure 26. Meta-analysis of return of urinary continence at 1 year from RALP vs ORP comparative studies





No studies reported on urinary function or continence at 1 year for RT, cryoablation, BT or active surveillance.

#### Urinary function/ continence (after 1 year)

Two studies comparing RALP and LRP assessed urinary continence at 1 year and found that most patients had regained continence by this time point. At 15 months, there were no statistically significant differences in rates between procedures.<sup>112,113</sup>

Similarly, two studies found no statistically significant differences in urinary continence rates between RALP and ORP at 2 and 5 years.<sup>117,171</sup> In contrast, one study reported that within the first 15 months of follow-up, more patients in the ORP group (2.2%) required surgery for urinary incontinence than in the RALP group (0.5%).<sup>130</sup>

None of the studies contained information on long-term urinary function for nonsurgical procedures.

#### Sexual function/ potency (1 month)

Three studies comparing RALP with LRP assessed potency at 1 month, the results of which favored RALP. However, potency rates after both procedures varied widely, ranging from 20% to 43% of RALP patients and 2% to 29% of LRP patients.<sup>109-111</sup>

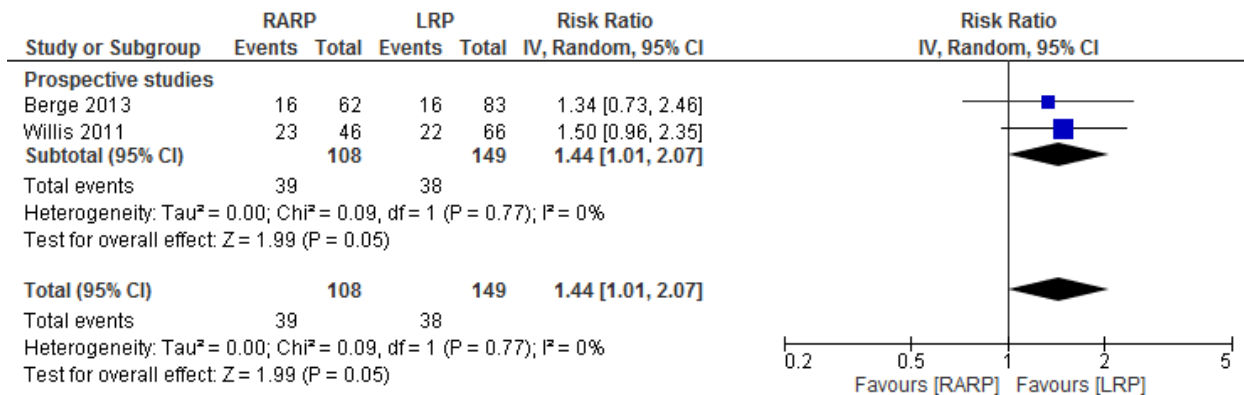
Only one study reported potency rates 1 month after RALP and ORP, which were 38% and 55%, respectively. This difference was not statistically significant.<sup>171</sup>

One study measured sexual function for RALP, BT and cryoablation at 1 month. Sexual function returned to baseline levels at 1 month in 56% of BT patients, 13% of cryoablation patients, and 19% of RALP patients. The study did not report whether differences were statistically significant.<sup>116</sup>

Sexual function/ potency (3 months)

Six studies compared potency between RALP and LRP, with rates ranging from 7% to 63% of RALP patients and 6% to 40% of LRP patients.<sup>109,110,113,115,150,155</sup> One RCT reported no statistically significant difference between surgical groups.<sup>109</sup> However, a second RCT found statistically significantly higher potency rates in RALP patients.<sup>110</sup> Based on a meta-analysis of prospective studies, RALP was associated with a marginally statistically significant improvement in recovery of potency compared to LRP at 3 months (i.e., a greater number of RALP patients had regained potency at 3 months of follow-up)(Figure 27).

Figure 27. Meta-analysis of return of potency at 3 months from RALP vs LRP comparative studies



Four studies comparing RALP and ORP measured potency at 3 months in patients who underwent a nerve-sparing procedure. RALP patients experienced earlier recovery of potency, with rates ranging from 17% to 68%, compared with 5% to 59% of ORP patients.<sup>122,125,126,171</sup>

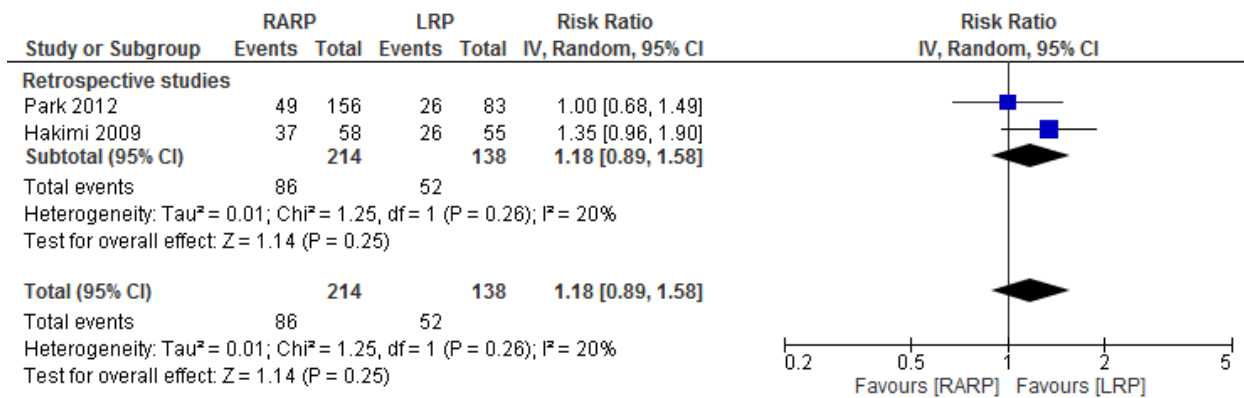
One study compared RALP with nonsurgical treatments and showed that 35% of patients who underwent RALP returned to their baseline sexual function at 3 months. The rate was higher for patients who received BT (63%), but lower than RALP for of patients who had cryoablation (18%).<sup>116</sup>

Sexual function/ potency (6 months)

Five studies measured potency rates in preoperative potent patients 6 months after LRP and RALP, which varied from 22% to 75%.<sup>109,110,115,150,155</sup> The results of one RCT and one prospective cohort demonstrated no statistically significant differences between surgical groups at 6 months.<sup>109,115</sup>

However, one RCT reported superior results for RALP.<sup>110</sup> A meta-analysis of retrospective studies found no statistically significant differences in potency rates at 6 months (Figure 28).

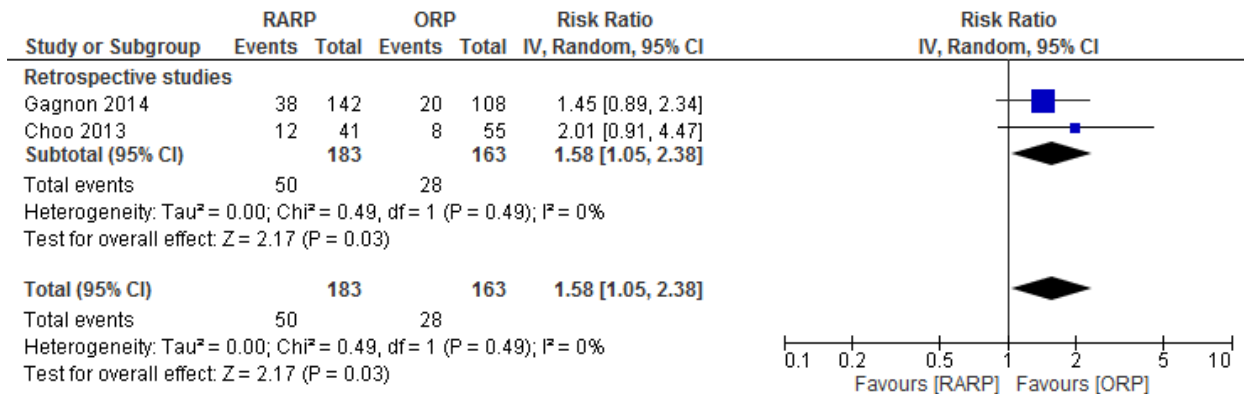
Figure 28. Meta-analysis of return of potency at 6 months from RALP vs LRP comparative studies



A total of four studies measured potency in patients who underwent RALP or ORP.<sup>122,127,165,171</sup> The rates at 6 months ranged from 26% to 33% for RALP patients and 7% to 19% for ORP patients. A meta-analysis of two retrospective studies found a slight, but statistically significant improvement in sexual function in RALP when compared to ORP (Figure 29).

One study measured sexual function 6 months after non-surgical treatments. Approximately 43% of patients who received RALP or cryoablation returned to their baseline sexual function, compared to 72% of BT patients.<sup>116</sup>

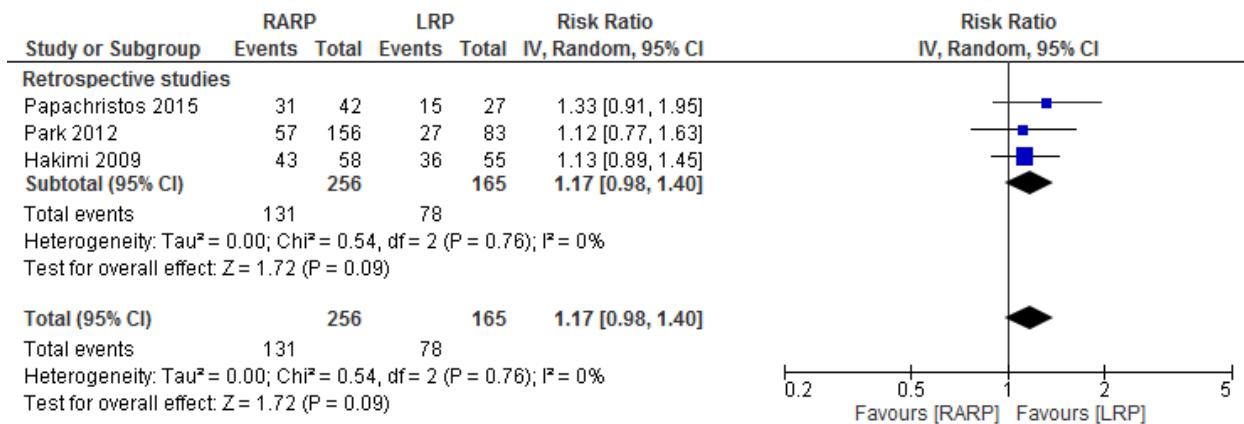
Figure 29. Meta-analysis of return of potency at 6 months from RALP vs ORP comparative studies



Sexual function/ potency (1 year)

Seven studies compared potency rates at 1 year between RALP and LRP.<sup>109,110,113,115,143,150,155</sup> Two RCTs and two prospective studies reported higher potency rates in RALP patients (58% to 88%) compared to LRP patients (32% to 67%).<sup>109,110,113,115</sup> However, a meta-analysis of three retrospective studies found no statistically significant differences in potency rates 1 year after RALP and LRP (Figure 30).

Figure 30. Meta-analysis of return of potency at 1 year from RALP vs LRP comparative studies

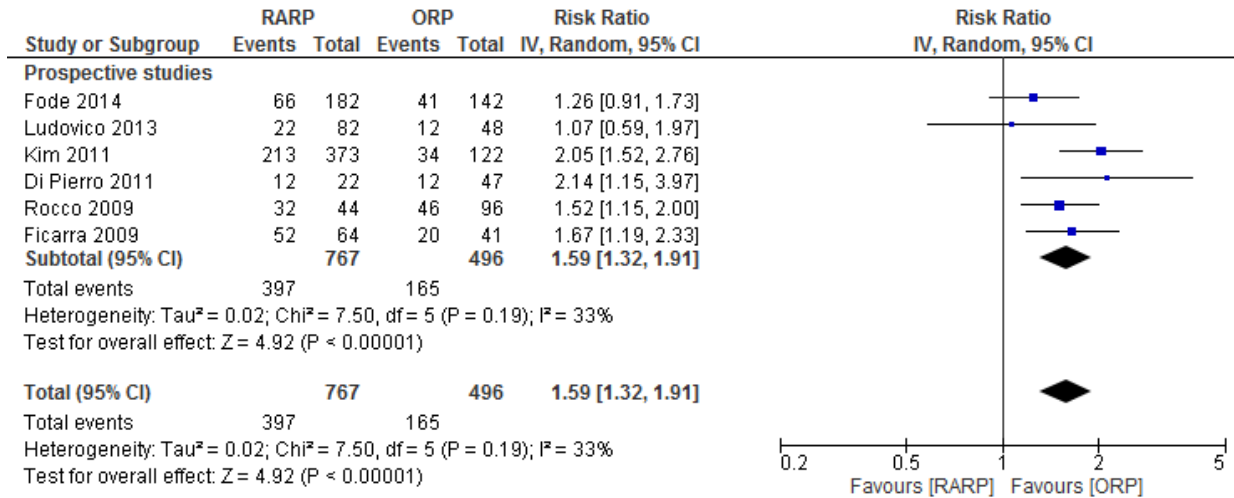


Eleven studies comparing RALP and ORP assessed potency at 1 year post-

surgery.<sup>122,124,126,127,135,136,165,171,188,193,196</sup> Rates ranged from 27% to 88% in RALP patients and from 0% to 63% in ORP patients. Five retrospective studies found higher potency rates for RALP when compared to

open surgery.<sup>165,171,188,193,196</sup> Further, a meta-analysis of prospective studies reported a higher likelihood of regaining sexual function after RALP compared to ORP at 1 year (Figure 31).

Figure 31. Meta-analysis of return of potency at 1 year from RALP vs ORP comparative studies



**Sexual function/ potency (after 1 year)**

In one study, no statistically significant differences in potency rates for RALP (49%) and LRP (47%) after 3 years were found.<sup>113</sup> However, another study reported that 69% of patients who underwent RALP regained potency at 2 years, compared to 55% of patients who had LRP.<sup>111</sup>

Two studies measured sexual function in patients who underwent nerve-sparing technique and found no statistically significant differences in potency rates 2 years after RALP and ORP. Reported rates for RALP were 46% and 56% and those for ORP were 51% and 65%.<sup>171,188</sup>

One study provided information on sexual function scores in patients with more than one year of follow up. Scores were similar for RALP, brachytherapy and active surveillance.

**Health-related quality of life**





One study measured health-related quality of life through a generic instrument (SF-12). Though actual scores were not reported, it was stated that no statistically significant differences in physical and mental health at 3, 12 and 36 months between RALP and LRP groups were found.<sup>113</sup> A second study found no differences between surgical groups in terms of concern related to urinary function at 3, 6 and 12 months. However, the same study showed that patients undergoing LRP with bilateral nerve sparing had more problems with sexual function at 3 and 6 months, compared to patients in the RALP group. At 12 months, both groups had similar scores (i.e., no statistically significant difference was found).<sup>115</sup>

The results of one RCT demonstrated no statistically significant differences in physical and mental functioning between RAPR and ORP patients 12 weeks after the procedure.<sup>103</sup> Further, four nonrandomized studies reported that RALP was not associated with better health-related quality of life, when compared to ORP in the short (6 months) and long-term (1-5 years).<sup>117,118,121,185</sup> At 1, 3 and 6 months, one study reported no differences in quality of life domains related to urinary, sexual and bowel function between cryoablation and RALP groups.<sup>116</sup>

Two studies assessed quality of life in patients undergoing BT<sup>201,205</sup>. One found no differences in health-related quality of life between patients who received RALP and those who received cryoablation. However, the study did not indicate whether the outcome was measured within the same time-period for both groups. The second study reported greater improvements in quality of life related to sexual function among patients who underwent BT, compared to those who underwent RALP at 6 months. Similar scores were reported for quality of life related to urinary function at 6 months.<sup>116</sup>

#### Return to work

Only one study measured time to return to work.<sup>103</sup> Both RALP and ORP had a similar length of time away from work (around 42.7 days) among patients who had been working full or part-time before surgery.

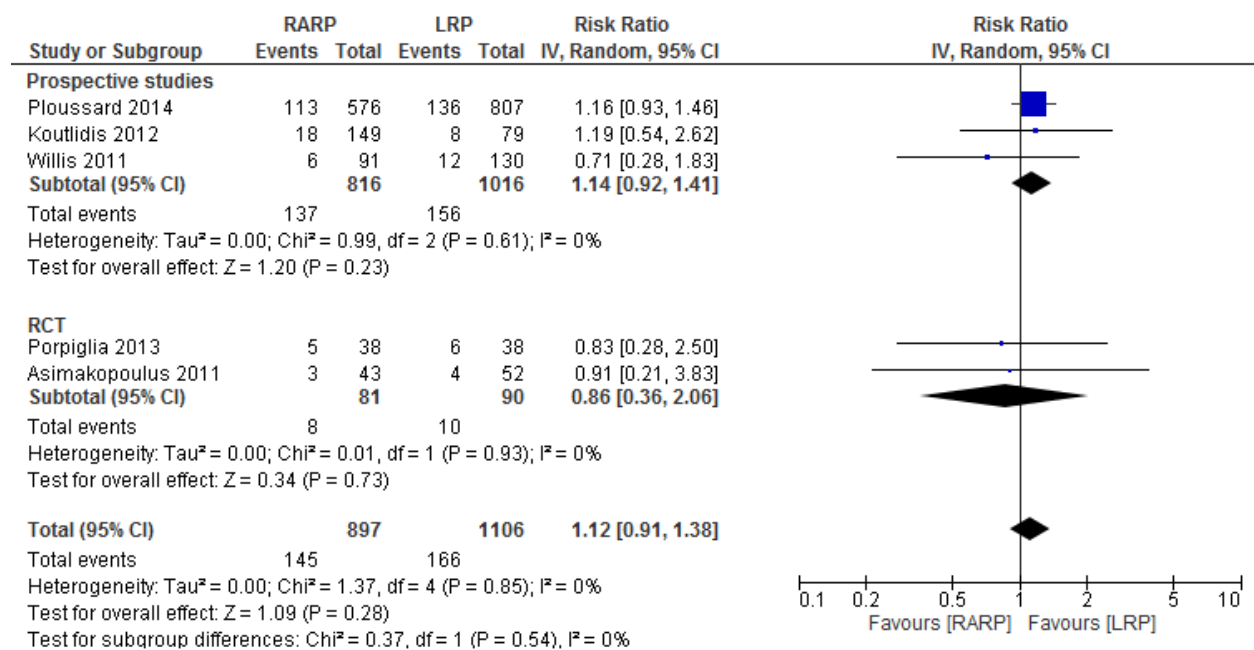
*Oncological outcomes*

Table 11 summarizes the main histopathological findings and Table 16 describes the oncological outcomes, including positive surgical margins, recurrence and metastasis.

Positive surgical margins in pT2 tumors

Seventeen studies comparing RALP and LRP provided information on positive surgical margins in pT2 tumors, with rates ranging from 3% to 29%.<sup>109-111,114,115,142,143,145,149-152,154-157,200</sup> A meta-analysis of prospective studies and RCTs showed no statistically significant difference in rates between RALP and LRP groups (Figure 32). Across retrospective studies, rates in pT2 tumors were also similar between surgical groups.<sup>142,143,145,149-151,154-157,200</sup>

Figure 32. Meta-analysis of positive surgical margins in pT2 tumors of RALP vs LRP comparative studies

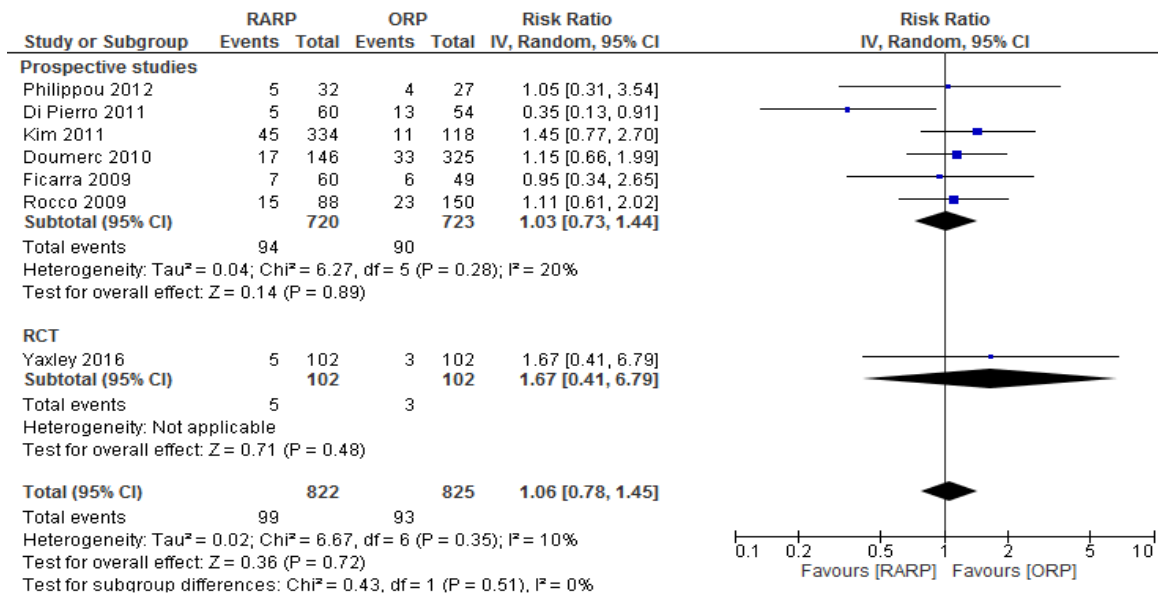


Twenty-five clinical studies compared positive surgical margin rates in pT2 tumors after RALP and ORP.<sup>8,103,125-127,131,135,136,145,149,154,165,168,169,173,176,179,180,191-194,198,200,206</sup> With two exceptions<sup>191,207</sup>, all of the

retrospective studies reported similar surgical margin rates after RALP and ORP. Additionally, a meta-analysis of data from prospective studies and a single RCT found no statistically significant difference in positive surgical margins in pT2 tumors between RALP and ORP groups (Figure

33).<sup>142,145,149,154,165,168,169,173,176,188,191-194,198,200</sup> However, one Australian and two American population-based studies reported that RALP was associated with lower rates, which ranged from 8% to 15% for RALP and from 15% to 24% for ORP.<sup>118,161,167</sup>

Figure 33. Meta-analysis of positive surgical margins in pT2 tumors of RALP vs ORP comparative studies

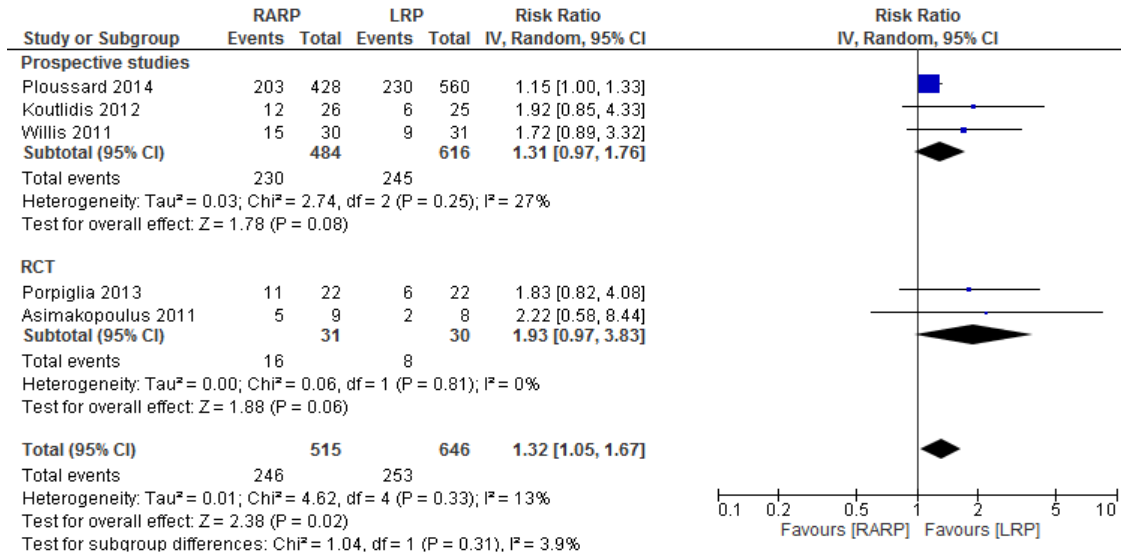


Positive surgical margins in pT3 and pT4 tumors

Seventeen studies of RALP versus LRP provided information on positive surgical margin rates in pT3 and pT4 tumors.<sup>109-111,114,115,142,143,145,149-152,154-157,200</sup> The rates ranged from 13% to 82% for RALP and 17% to 54% for LRP. While the majority of retrospective studies reported higher positive margin rates for RALP, the differences between RALP and LRP were not statistically significantly different, except in one study.<sup>142,143,145,154,155,200</sup>

A meta-analysis of RCTs and prospective studies found that RALP was marginally associated with a higher likelihood of positive margins compared to LRP (Figure 34).

Figure 34. Meta-analysis of positive surgical margins in pT3 and pT4 tumors of RALP vs LRP comparative studies

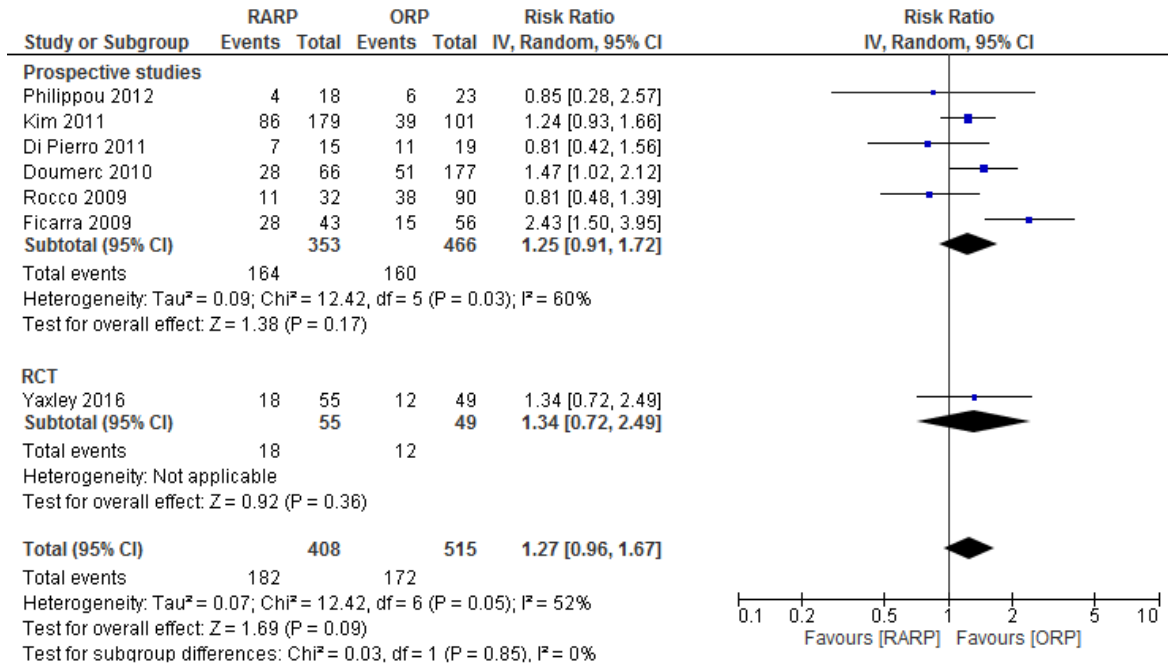


Twenty-five studies compared positive surgical margin rates in pT3 and pT4 tumors between RALP and ORP.<sup>8,103,125-127,131,135,136,142,145,149,154,165,168,169,173,176,179,180,191-194,198,200</sup> Across both surgical procedures, rates varied widely, from 9% to 87%. Based on a meta-analysis of prospective studies and a single RCT, there were no statistically significant difference in positive surgical margin rates after RALP and ORP (Figure 35). Additionally, the results of all but two of the retrospective studies showed that rates were similar across surgical groups. The remaining two studies both reported statistically significantly higher positive surgical margin rates for RALP.<sup>8,142,145,149,154,165,168,169,173,176,179,180,188,191-194,198,200</sup>

Three population-based studies that compared positive surgical margins in pT3 tumors between RALP and ORP patients presented conflicting results.<sup>118,161,167</sup> While two studies found no statistically

significant differences in rates, which ranged from 42% to 50%, one reported that RALP was associated with statistically significantly lower rates (29%), compared to ORP (37%).

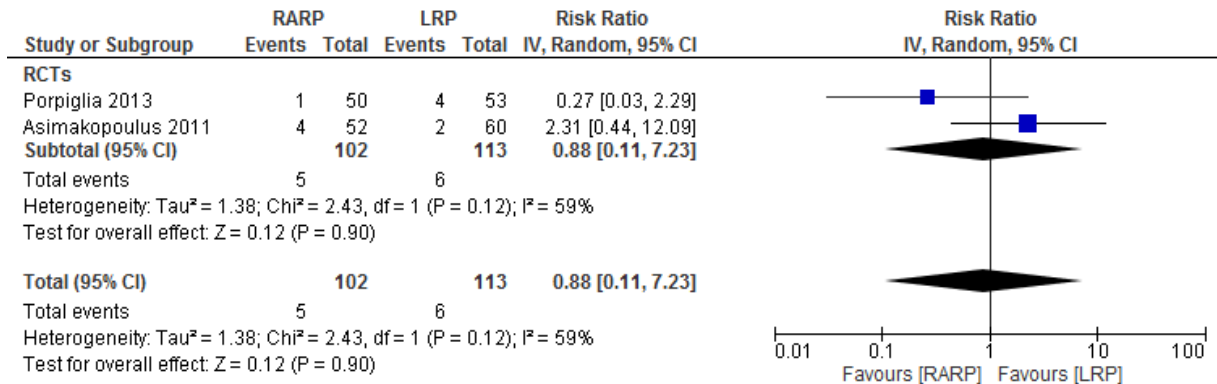
Figure 35. Meta-analysis of positive surgical margins in pT3 and pT4 tumors of RALP vs ORP comparative studies



**Biochemical recurrence (1 year)**

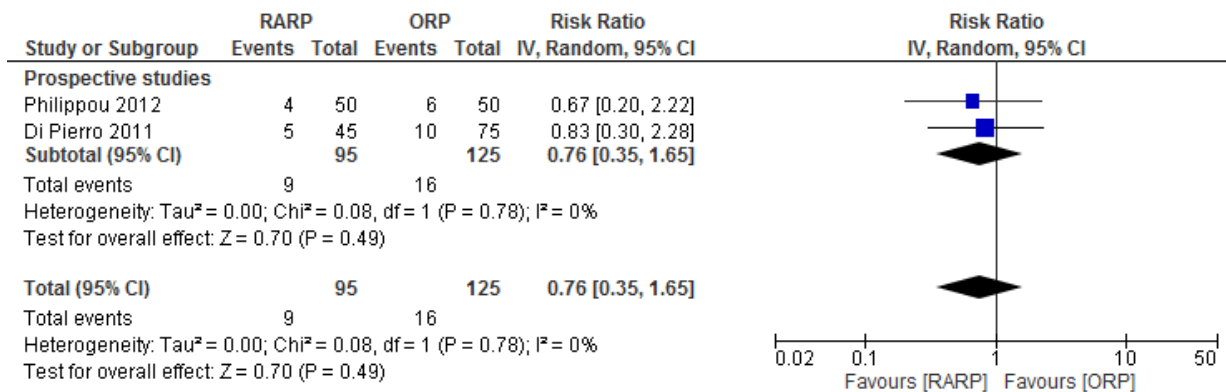
Four studies reported biochemical recurrence after RALP and LRP, which ranged from 2% to 17%.<sup>109,110,143,150</sup> Retrospective studies found no association between RALP and a lower likelihood of biochemical recurrence at 1 year.<sup>143,150</sup> Further, a meta-analysis based on RCTs found no statistically significant difference between surgical procedures (Figure 36).

Figure 36. Meta-analysis of biochemical recurrence rate at 1 year of RALP vs LRP comparison studies



Seven studies comparing RALP and ORP reported biochemical recurrence rates, which ranged from 4% to 20% at 1 year.<sup>118,125,126,165,193,196,197</sup> Across the four retrospective studies, biochemical recurrence rates were similar after RALP and ORP, and ranged from 4% to 20% for RALP and 7% to 20% for ORP.<sup>165,193,196,197</sup> A meta-analysis of prospective studies found no statistically significant differences in biochemical recurrence rates between RALP and ORP (Figure 37).

Figure 37. Meta-analysis of biochemical recurrence rate at 1 year of RALP vs ORP comparison studies



In the single study comparing RALP to RT, no statistically significant differences in biochemical recurrence rates at one year follow up were reported.<sup>199</sup>

Only one of three studies involving BT reported on biochemical recurrence. It demonstrated that RALP was associated with higher rates of recurrence compared to brachytherapy.<sup>141</sup> However, the data from



this study were extracted from a conference abstract that provided no information on length of follow up and patient characteristics.

Biochemical recurrence (after 1 year) and biochemical recurrence-free survival

Two studies comparing RALP and LRP reported biochemical recurrence rates at 1.5 and 4 years.<sup>112,154</sup>

Both studies showed similar rates of recurrence for RALP and LRP of 4% and 0% at 1.5 years and 9% and 11% at 4 years, respectively.

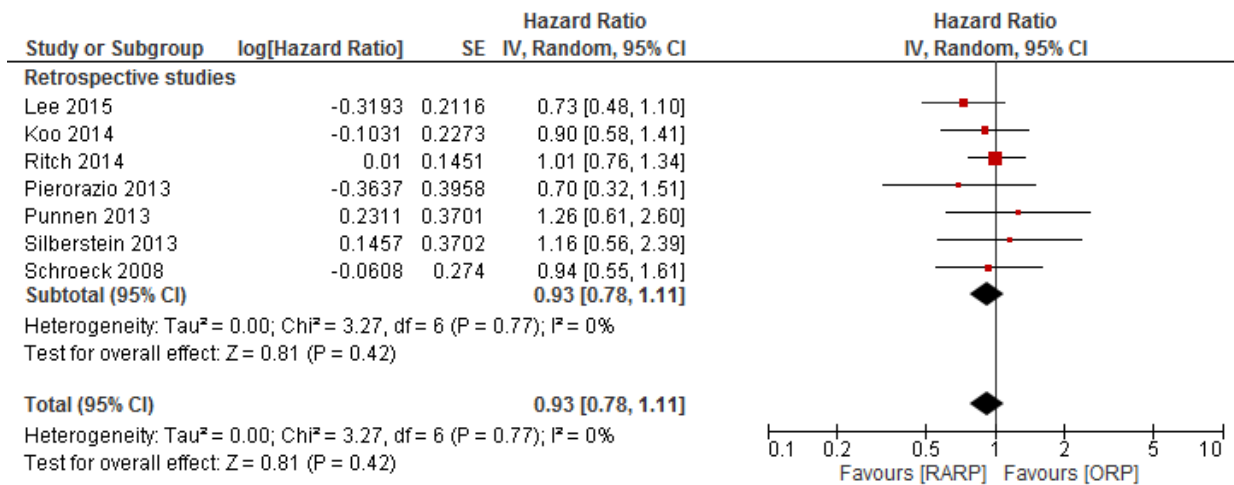
Four studies, in which follow-up ranged from 13 to 48 months, analyzed the biochemical recurrence free survival rates between RALP and LRP.<sup>111,150,152,154</sup> None found statistically significant differences in rates between surgical groups. Rates ranged from 87% to 94% in RALP patients and 82% to 88% in LRP patients. One study that included patients with high risk prostate cancer reported low biochemical recurrence free survival rates for both RALP (68%) and LRP (41%).<sup>149</sup>

Two studies provided biochemical recurrence rates at 2 years after RALP and ORP, while two other studies followed patients for 5 years.<sup>117,168,171,188</sup> No statistically significant differences were found at any of these time points.

Fifteen studies analyzed the biochemical recurrence free survival rate between RALP and ORP.<sup>117,128,129,149,152,154,164,168,169,171,173,174,176,196,197</sup> Based on follow up data ranging from 1 to 5 years, no statistically significant differences between both treatments were found. One study reported that lower rates were associated with RALP (81%), but the ORP group a greater number of patients with higher clinical tumor stages<sup>129</sup>. Further, a meta-analysis of retrospective studies found no statistically significant significances between RALP and ORP (Figure 38).

One population-based study reported statistically significantly higher biochemical recurrence rates at 1.5 years for ORP patients, but found no differences between RALP and ORP patients after conducting a survival analysis.<sup>118</sup>

Figure 38. Meta-analysis of biochemical recurrence free survival hazard ratio of RALP vs ORP comparative studies



**Local recurrence**

Only one study assessed local recurrence rates between RALP and LRP. Rates were similar after 3 years of follow up<sup>145</sup>.

Based on digital rectal exam or pelvic lesion identified by MRI in conjunction with continuous increase of PSA levels, one study reported similar rates of prostate cancer recurrence between RALP and ORP after 16 months of follow-up.<sup>196</sup> Another study found similar disease-free recurrence rates at 3 years for the two surgical procedures<sup>145</sup>.

None of the comparative studies of cryoablation, radiotherapy and brachytherapy assessed local recurrence.



## Metastasis

In one observational study, a single patient developed metastasis 16 months after RALP, while there were no metastases among patients who underwent ORP.<sup>196</sup> Another study involving patients who received RALP or ORP reported no statistically significant differences in metastasis free survival rates during 5 years of follow up<sup>168</sup>.

In the single RT study, six patients developed bone metastasis 1 year after radiotherapy, compared to no patients who underwent RALP. However, the difference was not statistically significant<sup>199</sup>.

There were no reports on development of metastasis after LRP, cryoablation, BT or active surveillance.

## Further treatment

One RCT and one observational study reported no statistically significant differences in need for further treatment, either by androgen deprivation or radiation therapy after one year, between RALP and LRP patients.<sup>109</sup> The results were similar in one observational study that followed patients for 3 years after RALP or LRP.<sup>113</sup> However, in a study that included patients with high risk prostate cancer, the results favored RALP. The proportion of patients who went on to receive external beam radiotherapy was 15% for LRP compared to 4% of RALP<sup>149</sup>.

Two observational studies provided information on need for further treatment after RALP and ORP. After 1 year, one study showed that approximately 13% of RALP and ORP patients underwent radiotherapy.<sup>123</sup> The other study, based on propensity score matching cohorts, reported that 14% of patients following RALP required further treatment, compared to 22% of ORP patients. However, this difference was not statistically significant.

In contrast, two studies involving US administrative databases reported that after propensity score matching, there was a statistically significant difference of 1.4% to 1.7% between RALP and ORP at 6



months.<sup>160,161</sup> Further, one population-based study reported a marginally lower need for further treatment following RALP compared to ORP at 5 years (HR: 0.8, 95%CI: 0.7-0.9).<sup>160</sup>

### *Mortality/ Survival outcomes*

#### Prostate cancer specific survival

None of the studies assessed prostate cancer specific survival rates of patients undergoing LRP, radiotherapy or cryoablation.

Two observational studies, which used propensity score matching, reported no statistically significant differences in prostate cancer specific survival rates between RALP and ORP after following patients for 4 to 5 years.<sup>164,168</sup> One population-based study from the US also found that RALP was not associated with higher prostate cancer survival rates compared to ORP (HR: 0.9, 95% CI: 0.5, 1.4) at a median of 6 years of follow up<sup>160</sup> (Table 16).

#### Overall survival

Two observational studies, in which the cohorts were followed for the same period of time or controlled for time, found that RALP was not associated with longer survival compared to LRP after approximately 3 years of follow up<sup>113,145</sup>.

After propensity score matching, two studies compared overall survival rates at 5 years and found no statistically significant differences between RALP and ORP. While robotic surgery was associated with rates of 93% and 96%, those for ORP were 92% and 95%.<sup>164,168</sup> In addition, one population-based study stated that there were no statistically significant differences in survival at 6 years after both surgical procedures<sup>160</sup>.

None of the studies assessed overall survival in patients undergoing RT, cryoablation, BT or active surveillance.

## Mortality

Table 16 summarizes the mortality and cause of death in each study. Where reported, there were no statistically significant differences in the number of deaths between RALP and LRP patients.

Similarly, RALP was not associated with higher or lower mortality rates compared to ORP. However, one population based study found that the 30 day mortality rate was slightly, but statistically significantly, higher (0.1%) for ORP than for RALP.<sup>161</sup>

None of the studies assessing nonsurgical approaches reported mortality.

## Edmonton prostatectomy registry

While a local registry of patients who underwent prostatectomy in Edmonton over the past decade exists, it was not accessible at the level of detail required to be able to include it in the clinical review.

However, data from it were used in scenarios comprising the cost-effectiveness analysis

## **Conclusions**

RALP is superior to ORP in reducing blood loss, transfusions, catheterization time, and the occurrence of BNCs. Perioperative outcomes are comparable between RALP and LRP, but LRP appears to be superior for patients with pT3/pT4 tumors. Nevertheless, given the lack of studies on metastasis, local recurrence, 5+ year survival, and nonsurgical interventions, it is not possible to provide definitive statements on the overall comparative effectiveness of RALP.

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective   | Inclusion criteria  | Exclusion criteria   | Comments   |
|---|---|---|--|--|
| <b>RALP vs. LRP</b>   |   |   |  |  |
| Akand et al. (2015) <sup>142</sup><br>Turkey  | To compare the outcomes of ORP, LRP, and RALP performed by the same surgeon.  | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>ORP performed between 1999 and 2003</li> <li>LRP performed between 2004 and 2010</li> <li>RALP performed between 2010 and 2012</li> </ul>   | <ul style="list-style-type: none"> <li>History of neo-adjuvant therapy</li> <li>Adjuvant therapy before PSA relapse</li> </ul>   |  |
| Papachristos et al. (2015) <sup>143</sup><br>Australia  | To compare the perioperative, pathological, oncological, and functional outcomes as well as short-term complications of LRP and RALP.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>LRP performed between September 2007 and January 2011</li> <li>RALP performed between April 2008 and January 2011</li> </ul>  | None   | All robotic cases were performed in the private sector while the majority of laparoscopic cases were performed at a public hospital. |
| Asawabharuj et al. (2014) <sup>144</sup><br>Thailand  | To compare urinary continence rate at six and twelve months post-operation and oncological outcomes in RALP and LRP performed in Siriraj Hospital.                                    | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>LRP or RALP performed between 2005 and 2010</li> </ul>  | <ul style="list-style-type: none"> <li>&lt; 12 months follow-up</li> <li>History of urinary incontinence</li> </ul>  |  |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA   | To compare the short-term oncologic outcomes of RALP, LRP, and ORP in obese patients utilizing propensity score matching to control for potential preoperative confounding variables. | <ul style="list-style-type: none"> <li>LRP, ORP, or RALP performed</li> <li>BMI <math>\geq 30</math> kg/m<sup>2</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Largely incomplete preoperative data sets</li> <li>Neo-adjuvant therapy</li> </ul>  |  |
| Ploussard et al. (2014) <sup>111</sup><br>France  | To compare the operative, functional, and oncologic outcomes between pure LRP and RALP.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>LRP or RALP performed between July 2001 and December 2011</li> <li>Note: while the first RALP was performed in 2001, the institution began performing them routinely in 2006.</li> </ul>  | <ul style="list-style-type: none"> <li>None</li> <li>Note: two analyses were done. The first included all LRP and RALP patients. The second excluded the first 100 cases of each procedure to account for the learning curve.</li> </ul> | There was no statistically significant difference in preoperative potency or continence between LRP and RALP patients.               |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | To investigate whether radical prostatectomy modality and volume affect PSM rates.  | <ul style="list-style-type: none"> <li>LRP, RALP, or ORP performed between January 2000 and October 2011</li> <li>Note: the actual years are not specified; however it is indicated that the ORP cohort was operated on 2 years earlier than the LRP cohort, which was operated on 2 years earlier than the RALP cohort.</li> </ul> | NR   |  |
| Tozawa et al. (2014) <sup>147</sup>   | To compare the surgical outcomes of LRP and RALP,   | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer</li> <li>LRP or RALP performed between</li> </ul>   | NR   |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria   | Exclusion criteria  | Comments   |
|---|--|--|---|--|
| Japan   | including the frequency and location of PSMs.  | January 1999 and September 2012  |   |  |
| Asimakopoulus et al. (2013) <sup>112</sup><br>Italy | To compare the pentafecta rates between LRP and RALP and to identify prognostic factors predicting the pentafecta for each technique.<br><br>Note: pentafecta rates include early complications, PSMs, potency, continence, and PSA progression after surgery. | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer (cT1-cT2)</li> <li>Aged ≤ 70 years</li> <li>PSA ≤ 10 ng/mL</li> <li>Biopsy Gleason score ≤ 7</li> <li>Fully continent, potent, and candidates for bilateral nerve-sparing LRP or RALP</li> <li>LRP or RALP performed between January 2008 and December 2010</li> </ul> | <ul style="list-style-type: none"> <li>Any grade of incontinence</li> <li>Erectile dysfunction (defined as 3-5 on potency scale)</li> <li>History of neo-adjuvant treatment for prostate cancer</li> <li>Clinical or magnetic resonance imaging suspicion for locally advanced disease</li> <li>PSA ≥ 10 ng/mL</li> <li>Age ≥ 70 years</li> <li>Biopsy Gleason score &gt; 7</li> <li>Undergoing minimal or unilateral or non-nerve-sparing surgery</li> </ul> |  |
| Berge et al. (2013) <sup>113</sup><br>Norway        | To compare QOL outcomes after conversion from LRP to RALP as the routine procedure for surgical treatment of localized cancer of the prostate.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>Last 210 LRP performed between May 2006 and November 2007</li> <li>First 210 RALP performed between November 2007 and December 2008</li> </ul>   | <ul style="list-style-type: none"> <li>Androgen deprivation therapy within 36 months of the operation were excluded from the QOL analysis</li> <li>Died within 36 months of the operation</li> </ul>  | There was no statistically significant difference in preoperative potency between LRP and RALP patients. |
| Harty et al. (2013) <sup>200</sup><br>USA           | To compare PSM rates for patients with high risk prostate cancer who underwent ORP, RALP, or LRP at a single institution.  | <ul style="list-style-type: none"> <li>LRP, RALP, or ORP performed between January 2000 and March 2010</li> <li>High-risk prostate cancer</li> <li>PSA ≥ 20 ng/mL</li> <li>Gleason Score ≥ 8</li> <li>Clinical stage ≥ pT3</li> </ul>  | <ul style="list-style-type: none"> <li>Neo-adjuvant hormonal therapy</li> <li>Perineal prostatectomy</li> </ul>   |  |
| Pierorazio et al. (2013) <sup>149</sup><br>USA      | To analyze pathological and short-term oncological outcomes in men undergoing open and minimally-invasive radical prostatectomy for high-risk prostate cancer in a contemporaneous series.   | <ul style="list-style-type: none"> <li>ORP, RALP, or LRP performed between 2002 and 2011</li> <li>High-risk prostate cancer</li> <li>PSA &gt; 20 ng/mL</li> <li>Clinical stage T2c or T3</li> <li>Gleason Score 8 – 10</li> </ul>  | NR  |  |
| Porpiglia et al. (2013) <sup>109</sup><br>Italy     | To compare RALP and LRP in terms of the functional, perioperative, and oncologic outcomes.   | <ul style="list-style-type: none"> <li>Organ-confined prostate cancer</li> <li>LRP or RALP performed between January 2010 and January 2012</li> </ul>  | <ul style="list-style-type: none"> <li>Previous radiation therapy</li> <li>Hormonal therapy</li> <li>Transurethral resection of the prostate</li> </ul>   |  |
| Koutlidis et al. (2012) <sup>114</sup>              | To compare PSM rates after robot-assisted and pure   | <ul style="list-style-type: none"> <li>LRP or RALP performed between March 2004 and January 2009 by a single</li> </ul>  | NR  |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria  | Exclusion criteria   | Comments   |
|---|--|---|--|--|
| France  | laparoscopic radical prostatectomy when neurovascular bundles are preserved, and to identify parameters affecting surgical margin status.                                  | surgeon   |  |  |
| Park et al. (2012) <sup>150</sup><br>South Korea    | To compare oncological and functional outcomes of pure LRP and RALP performed by a single surgeon.   | <ul style="list-style-type: none"> <li>• Biopsy-proven, localized, or locally advanced prostate cancer</li> <li>• LRP performed by a single surgeon between October 2007 and May 2011</li> <li>• RALP performed by a single surgeon between January 2008 and May 2011</li> </ul>  | <ul style="list-style-type: none"> <li>• Lost to follow-up</li> </ul>  |  |
| Asimakopoulus et al. (2011) <sup>110</sup><br>Italy | To provide the first prospective randomized comparison on the functional and oncological outcomes of LRP and RALP for the treatment of clinical localized prostate cancer. | <ul style="list-style-type: none"> <li>• Aged ≤ 70 years</li> <li>• Clinically organ confined disease (cT1-cT2)</li> <li>• Gleason score ≤ 7</li> <li>• PSA ≤ 10 ng/mL</li> <li>• Normal preoperative continence</li> <li>• IEF-6 score ≥ 17</li> <li>• Normal IPSS</li> <li>• LRP or RALP performed October 2007 and October 2008</li> </ul> | <ul style="list-style-type: none"> <li>• IIEF-6 score &lt; 17 (preoperative incontinence or moderate-to-severe erectile dysfunction)</li> <li>• Neo-adjuvant therapy</li> <li>• Any previous prostatic, urethral, or bladder neck surgery</li> <li>• Positive MRI for extracapsular extension</li> <li>• No bilateral nerve-sparing</li> </ul> |  |
| Kasraeian et al. (2011) <sup>151</sup><br>France    | To review and compare the rate, location and size of PSMs after pure LRP and RALP.   | <ul style="list-style-type: none"> <li>• Final 200 LRP performed between May 2007 and January 2008</li> <li>• Final 200 RALP performed between July 2005 and January 2008</li> </ul>  | NR   |  |
| Magheli et al. (2011) <sup>152</sup><br>USA         | To investigate a single institution experience with ORP, LRP, and RALP with respect to pathological and biochemical outcomes.  | <ul style="list-style-type: none"> <li>• Clinically localized adenocarcinoma of the prostate</li> <li>• RALP performed between 2003 and 2008</li> <li>• LRP or ORP performed between 2000 and 2008</li> <li>• Surgery performed by a surgeon who completed their urological surgical training within the past decade</li> </ul>               | <ul style="list-style-type: none"> <li>• Neo-adjuvant hormonal therapy</li> <li>• Clinical stage T1a or T1b</li> <li>• Incomplete preoperative data</li> </ul>   |  |
| Willis et al. (2011) <sup>115</sup><br>USA          | To compare perioperative, oncological, and functional outcomes of LRP and RALP with emphasis on health-related   | <ul style="list-style-type: none"> <li>• Clinically localized (up to stage cT2) prostate cancer</li> <li>• LRP or RALP between 2003 and 2007</li> </ul>   | <ul style="list-style-type: none"> <li>• Missing EPIC data</li> </ul>  | Choice of surgical method was primarily based on patient preference. |

Table 9. Inclusion and exclusion criteria of participants

| Study  | Objective  | Inclusion criteria   | Exclusion criteria   | Comments   |
|--|--|--|--|--|
|  | quality of life data.  |  |  |  |
| Bolenz et al. (2010)<br><sup>153</sup><br>USA    | To compare costs associated with RALP, LRP, and ORP.   | <ul style="list-style-type: none"> <li>• Biopsy-proven prostate cancer</li> <li>• LRP or ORP performed between September 2003 and April as a primary surgical approach with curative intent</li> <li>• RALP performed between January 2006 and April 2008 as a primary surgical approach with curative intent</li> </ul> | <ul style="list-style-type: none"> <li>• Neoadjuvant therapy</li> </ul>  |  |
| Drouin et al. (2009)<br><sup>154</sup><br>France | To determine the cancer control afforded by radical prostatectomy in patients who underwent either an open, laparoscopic, or robotic procedure for localized prostate cancer.  | <ul style="list-style-type: none"> <li>• Localized prostate cancer</li> <li>• RALP or LRP performed between January 2000 and August 2004</li> </ul>  | <ul style="list-style-type: none"> <li>• Lymph node involvement found during pre-operative work-up</li> <li>• Clinical signs of non-localized disease</li> </ul> |  |
| Hakimi et al. (2009)<br><sup>155</sup><br>USA    | To directly compare the perioperative, operative, oncologic, and functional outcomes of a matched cohort of LRP and RALP patients with a minimal follow-up of 12 months by a single surgeon.                               | <ul style="list-style-type: none"> <li>• Final 75 LRP performed by single surgeon</li> <li>• Initial 75 RALP performed by a single surgeon</li> <li>• 12-month functional outcomes available</li> </ul>  | NR   | There was no statistically significant difference in preoperative potency between LRP and RALP patients. |
| Rozet et al. (2009)<br><sup>156</sup><br>France  | To compare a single institution's experience with radical prostatectomy using a pure laparoscopic technique vs. a robotically assisted technique with regard to preoperative, intraoperative, or postoperative parameters. | <ul style="list-style-type: none"> <li>• LRP or RALP performed between May 2003 and May 2005</li> </ul>  | NR   |  |
| Trabulsi et al. (2008)<br><sup>157</sup><br>USA  | To evaluate the benefit of robotic assistance to improve cancer control in a center with an established laparoscopic radical prostatectomy program.  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• LRP performed between March 2000 and December 2005</li> <li>• RALP performed between October 2005 and August 2006</li> </ul>  | <ul style="list-style-type: none"> <li>• Conversion to radical retropubic prostatectomy</li> </ul>   |  |
| Ball et al. (2006)<br><sup>116</sup><br>USA      | To evaluate the short-term QOL changes from baseline of five surgical approaches for localized prostate carcinoma delivered at   | <ul style="list-style-type: none"> <li>• Newly diagnosed localized prostate cancer</li> <li>• Completion of a baseline questionnaire and at least one follow-up questionnaire</li> </ul>   | NR   |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria  | Exclusion criteria  | Comments  |
|---|--|---|---|---|
|   | a single institution.  | <ul style="list-style-type: none"> <li>LRP, RALP, ORP, BT, or CRY performed between January 2000 and April 2005</li> </ul>  |   |   |
| Hu et al. (2006) <sup>158</sup><br>USA        | To retrospectively review a single institution's complications of 2 minimally invasive approaches for LRP and RALP.  | <ul style="list-style-type: none"> <li>LRP performed between October 2000 and January 2005</li> <li>RALP performed between June 2003 to June 2004</li> <li>Consent provided to enroll in a database</li> </ul>  | <ul style="list-style-type: none"> <li>Consent not provided for enrollment in a database</li> <li>Neo-adjuvant hormonal therapy</li> </ul>  | Approximately 13% of patients treated by the 3 surgeons did not provide consent for the database. |
| Joseph et al. (2005) <sup>159</sup><br>USA    | To compare the operative, pathological, and functional outcomes of LRP and RALP.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>LRP or RALP performed</li> </ul>  | NR  |   |
| <b>RALP vs. ORP</b>                           |  |   |   |   |
| Hu et al (2017) <sup>160</sup><br>USA         | To compare all cause and cancer-specific mortality rates between RALP and ORP  | <ul style="list-style-type: none"> <li>Enrolled in Medicare part A and B or in an HMO in the year prior to the surgery</li> <li>Prostate cancer was primary cancer</li> <li>Detailed hospitalization record</li> <li>Age ≥66 years</li> </ul>             | <ul style="list-style-type: none"> <li>Prior radiation or ADT therapy</li> </ul>  |   |
| Jackson et al. (2016) <sup>117</sup><br>USA   | To undertake a prospective/retrospective comparison of longer-term oncologic and quality of life outcomes in RALP or ORP patients.                           | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer</li> <li>RALP or ORP performed in 2004 at a single institution</li> </ul>   | NR  | Choice of surgical method was based on patient preference after counselling on both options.      |
| Ong et al. (2016) <sup>118</sup><br>Australia | To compare the oncological and health-related quality of life outcomes between patients undergoing RALP and ORP  | <ul style="list-style-type: none"> <li>Biopsy confirmed prostate cancer</li> <li>Prostatectomy as the primary treatment within 12-months of diagnosis</li> </ul>  | NR  |   |
| Pearce et al. (2016) <sup>161</sup><br>USA    | To compare rates of PSMs, use of postoperative radiation therapy, and perioperative outcomes between RALP and ORP in a contemporary population based cohort. | <ul style="list-style-type: none"> <li>Adenocarcinoma of the prostate</li> <li>Diagnosed between January 2010 and December 2011</li> <li>Non-metastatic disease</li> <li>No nodal involvement (AJCC stage cM0 and cN0/cNx)</li> <li>Primary RP</li> </ul> | <ul style="list-style-type: none"> <li>Laparoscopic (non-robotic) RP</li> <li>Laparoscopic or robotic RP converted to open RP</li> <li>RP after hormone therapy</li> <li>Salvage RP after radiation</li> <li>RP after with unknown approach</li> <li>pT4 disease</li> </ul> |   |
| Suardi et al. (2016) <sup>162</sup><br>Italy  | To analyze the rate of PSMs according to preoperative risk groups in a large cohort of patients treated with RALP and ORP in a single institution with       | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP performed between 2006 and 2014</li> <li>ORP performed between 1992 and 2014</li> </ul>  | <ul style="list-style-type: none"> <li>Unknown biopsy Gleason score, clinical tumor stage, PSM status, or tumor volume</li> </ul>   |   |



Table 9. Inclusion and exclusion criteria of participants

| Study  | Objective  | Inclusion criteria   | Exclusion criteria  | Comments   |
|--|--|--|---|--|
|  | standardized surgical technique and pathological examination.  |  |   |  |
| Yaxley et al. (2016) <sup>103</sup><br>Australia | To compare assess clinical and quality of life outcomes in ORP compared with RALP.   | <ul style="list-style-type: none"> <li>Newly diagnosed with clinically localized prostate cancer</li> <li>Able to read and speak English</li> <li>No previous history of head injury, dementia, or psychiatric illness</li> <li>No other concurrent cancer</li> <li>Estimated life expectancy of <math>\geq 10</math> years</li> <li>Aged between 35 and 70 years</li> </ul> | <ul style="list-style-type: none"> <li>Evidence of non-localized prostate cancer clinically</li> <li>PSA &gt; 20 ng/mL</li> <li>Previous laparoscopic hernia repair</li> <li>Previous pelvic radiotherapy or major pelvic surgery</li> <li>Another malignancy within the past 5 years with the exception of non-melanoma skin cancer</li> </ul> | Eighteen patients (12 ORP and 6 RALP) withdrew from the study after randomization but prior to surgery completion. |
| Akand et al. (2015) <sup>142</sup><br>Turkey     | To compare the outcomes of ORP, LRP, and RALP performed by the same surgeon.   | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>ORP performed between 1999 and 2003</li> <li>LRP performed between 2004 and 2010</li> <li>RALP performed between 2010 and 2012</li> </ul>  | <ul style="list-style-type: none"> <li>History of neo-adjuvant therapy</li> <li>Adjuvant therapy before PSA relapse</li> </ul>  |  |
| Antonelli et al. (2015) <sup>163</sup><br>Italy  | To analyze the risk of PSM after radical prostatectomy in patients undergoing RALP compared with those undergoing ORP.                           | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP or ORP performed since 2008 at a single institution</li> </ul>  | <ul style="list-style-type: none"> <li>Neo-adjuvant hormonal therapy</li> <li>Incomplete information on margin status</li> </ul>  |  |
| Haglund et al (2015) <sup>119</sup><br>Sweden    | To compare the functional outcomes at 12 months of patients who underwent RALP and ORP   | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>Able to read and speak Swedish</li> <li>Age &lt;75 years</li> <li>no signs of distant metastasis</li> <li>PSA &lt;20ng/ml</li> <li>Operated by a surgeon with experience of <math>\geq 100</math> procedures</li> </ul>  | <ul style="list-style-type: none"> <li>&gt;cT3 tumors</li> </ul>  | Choice of surgical method was based on the patient's residence   |
| Lee et al. (2015) <sup>164</sup><br>South Korea  | To evaluate and compare oncologic outcomes, including surgical margin status and BCRFS, in high-risk prostate cancer who underwent RALP vs. ORP. | <ul style="list-style-type: none"> <li>High-risk prostate cancer</li> <li>Clinical stage <math>\geq T3a</math></li> <li>Biopsy Gleason score 8 – 10</li> <li>PSA &gt; 20 ng/mL</li> <li>RALP or ORP performed between 2007 and 2013</li> </ul>   | <ul style="list-style-type: none"> <li>Metastatic disease at presentation</li> <li>Adjuvant therapy or neo-adjuvant therapy</li> </ul>  | Choice of surgical method was determined jointly between the patient and the surgeon.                              |
| Lott et al. (2015) <sup>120</sup><br>Brazil      | To assess comparative results of RALP performed by surgeons without any experience in laparoscopic prostatectomy and                             | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP or ORP performed between June 2012 and September 2013</li> </ul>  | <ul style="list-style-type: none"> <li>First 10 RALP cases performed with proctor's assistance</li> </ul>   |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective   | Inclusion criteria  | Exclusion criteria  | Comments  |
|---|---|---|---|---|
|   | ORP performed by surgeons with > 10 years of experience.  |   |   |   |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | To compare the short-term oncologic outcomes of RALP, LRP, and ORP in obese patients utilizing propensity score matching to control for potential preoperative confounding variables.   | <ul style="list-style-type: none"> <li>• LRP, ORP, or RALP performed</li> <li>• BMI <math>\geq</math> 30 kg/m<sup>2</sup></li> </ul>  | <ul style="list-style-type: none"> <li>• Largely incomplete preoperative data sets</li> <li>• Neo-adjuvant therapy</li> </ul>   |   |
| Davison et al. (2014) <sup>121</sup><br>Canada        | To measure and compare the impact of RALP and ORP surgical procedures on patient sexual and urinary function, and determine the impact of these outcomes on decision regret.  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer (TMN stages T1 or T2)</li> <li>• RALP or ORP performed between November 2007 and June 2009</li> </ul> | <ul style="list-style-type: none"> <li>• Previous treatment for prostate cancer</li> <li>• History of neo-adjuvant or adjuvant hormonal treatment</li> </ul>  |   |
| Fode et al. (2014) <sup>122</sup><br>Denmark          | To compare oncological and functional outcomes between RALP and ORP during the initial phase with RALP at a large university hospital.  | <ul style="list-style-type: none"> <li>• Biopsy-proven, localized prostate cancer</li> <li>• RALP or ORP performed between April 2008 and May 2012</li> </ul>                       | NR  | Initially RALP was offered to patients with the least serious disease. This approach was gradually changed and with the majority of data collection there was no specific indication for either method. Choice of surgical method was then based on either patient preference or availability of surgical time slots. |
| Gagnon et al. (2014) <sup>165</sup><br>Canada         | To examine the patient outcomes and financial consequences of introducing a da Vinci robotics system into an experienced academic urology centre by comparing consecutive RALP and ORP cases performed by 2 experienced surgeons. | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP performed</li> </ul>  | NR  |   |
| Gandaglia et al (2014) <sup>166</sup><br>USA          | To compare the outcomes of patients undergoing RALP or ORP in the post dissemination era  | <ul style="list-style-type: none"> <li>• Histologically confirmed prostate cancer</li> <li>• Age <math>\geq</math>65 years</li> </ul>   | <ul style="list-style-type: none"> <li>• Age &gt;80 years</li> <li>• Metastatic disease</li> <li>• Unknown tumor stage</li> <li>• Unknown tumor grade</li> <li>• Unknown pelvic lymph node dissection status</li> </ul> |   |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria  | Exclusion criteria   | Comments   |
|---|--|---|--|--|
| Hu et al (2014) <sup>167</sup><br>USA   | To compare the positive surgical margin rates and use of additional cancer therapy following RALP or ORP   | <ul style="list-style-type: none"> <li>• Age ≥66 years</li> <li>• Histologically confirmed nonmetastatic prostate cancer</li> </ul>   | <ul style="list-style-type: none"> <li>• Age &gt;80 years</li> <li>• Unknown clinical and pathological stage</li> <li>• Unknown Gleason grade</li> <li>• Unknown PSA at diagnosis</li> <li>• Positive lymph nodes</li> <li>• Missing physician identifier</li> <li>• pT3b and pT4 tumors</li> </ul>                |  |
| Koo et al. (2014) <sup>168</sup><br>South Korea   | To compare the oncological outcomes of RALP with those of ORP in contemporary Korean prostate cancer patients.                                   | <ul style="list-style-type: none"> <li>• Localized and locally advanced prostate cancer without distant metastases who either desired surgical treatment or were determined to be reasonable surgical candidates because of otherwise favourable clinical characteristics</li> <li>• ORP performed between 1992 and 2008</li> <li>• RALP performed between 2005 and 2008</li> </ul> | <ul style="list-style-type: none"> <li>• Neo-adjuvant hormonal therapy</li> <li>• Incomplete preoperative information including preoperative PSA, biopsy Gleason score and clinical tumor stage</li> <li>• RALP and ORP cases completed before each surgeon had carried out &gt;100 cases per procedure</li> </ul> | Choice of surgical method was based on the surgeon's discretion and on the patient's preference.   |
| Ritch et al (2014) <sup>169</sup><br>USA  | To compare the 5 year biochemical recurrence free survival rates between patients with D'Amico intermediate or high risk undergoing RALP and ORP | <ul style="list-style-type: none"> <li>• ≥cT2b tumor</li> <li>• Gleason score ≥7</li> <li>• PSA&gt;10 ng/ml</li> </ul>  | <ul style="list-style-type: none"> <li>• Neoadjuvant therapy</li> <li>• Salvage prostatectomy after primary radiotherapy</li> <li>• Less than 3 years of follow up data</li> </ul>   |  |
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | To investigate and compare POI after RALP vs. ORP.   | <ul style="list-style-type: none"> <li>• Localized or locally advanced prostate cancer</li> <li>• RALP performed between October 2010 and September 2012</li> <li>• ORP performed between March 2008 and May 2012</li> </ul>  | NR   |  |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | To investigate whether radical prostatectomy modality and volume affect PSM rates.   | <ul style="list-style-type: none"> <li>• LRP, RALP, or ORP performed between January 2000 and October 2011</li> <li>• Note: the actual years are not specified; however it is indicated that the ORP cohort was operated on 2 years earlier than the LRP cohort, which was operated on 2 years earlier than the RALP cohort.</li> </ul>   | NR   | There were small, statistically significant differences in age and baseline PSA among the group. On average, ORP patients were also higher risk in terms of postoperative Gleason score, clinical stage, pathologic stage, and D'Amico risk. |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | To compare the impact of prostate volume on oncological and functional outcomes of   | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer (cT1-cT2)</li> <li>• Patients with a follow up of at least 24</li> </ul>  | <ul style="list-style-type: none"> <li>• Patients operated at the beginning of the learning curve (First 100 ORP and 25 RALP)</li> </ul>   | Choice of surgical method was based on patient preference  |

Table 9. Inclusion and exclusion criteria of participants

| Study  | Objective   | Inclusion criteria  | Exclusion criteria   | Comments   |
|--|---|---|--|--|
|  | patients undergoing RALP and ORP.   | months postoperative  | • Neoadjuvant therapy  |  |
| Froehner et al. (2013) <sup>172</sup><br>Germany | To compare the complication rates of RALP and ORP during the introduction and subsequent routine use of a da Vinci robotic device while open surgery remained the standard approach.  | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• ORP performed between January 2006 and June 2012 at a single institution</li> <li>• RALP performed between March 2006 and June 2012</li> </ul>  | NR   |  |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium | To compare functional outcomes (urinary incontinence, voiding symptoms, and quality of life) after ORP and RALP.  | <ul style="list-style-type: none"> <li>• Localized or locally advanced prostate cancer</li> <li>• RALP or ORP performed between September 2009 and July 2011</li> </ul>   | <ul style="list-style-type: none"> <li>• Cognitive problems</li> <li>• Non-Dutch speaking</li> <li>• Simultaneously planned for a salvage procedure or other surgery in the pelvic region</li> </ul>   | Choice of surgical method primarily based on patient preference. Patients had no choice of method only when their medical condition did not permit one or the other technique. There was no statistically significant difference in preoperative continence between LRP and RALP patients. |
| Harty et al. (2013) <sup>200</sup><br>USA        | To compare PSM rates for patients with high-risk prostate cancer who underwent ORP, RALP, or LRP at a single institution.   | <ul style="list-style-type: none"> <li>• LRP, RALP, or ORP performed between January 2000 and March 2010</li> <li>• High-risk prostate cancer</li> <li>• PSA <math>\geq</math> 20 ng/mL</li> <li>• Gleason Score <math>\geq</math> 8</li> <li>• Clinical stage <math>\geq</math> pT3</li> </ul>   | <ul style="list-style-type: none"> <li>• Neo-adjuvant hormonal therapy</li> <li>• Perineal prostatectomy</li> </ul>  |  |
| Ludovico et al. (2013) <sup>124</sup><br>Italy   | To compare the potency recovery rate of a contemporary series of patients with clinically localized prostate cancer treated by BNS RALP or ORP, and secondarily, the urinary continence recovery evaluation and the oncological efficacy. | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer (clinical stage &lt;cT2b)</li> <li>• PSA &lt; 10 ng/mL</li> <li>• Gleason score &lt; 7</li> <li>• Life expectancy &gt; 10 years</li> <li>• Preoperative IIEF score &gt; 25, and an EHS of 4</li> <li>• Stable relationship (with same partner for <math>\geq</math> 6 months)</li> <li>• BNS-RALP or BNS-ORP performed by a single surgeon between January 2004 and December 2008, after a learning curve of at least 50 cases</li> </ul> | <ul style="list-style-type: none"> <li>• Presence of other neoplastic, lower urinary tract or major concomitant diseases</li> <li>• Previous abdominal surgery</li> <li>• Urinary incontinence or erectile dysfunction</li> <li>• Use of PDE5 inhibitors and/or intracorporeal injections (5 <math>\mu</math>g/week) of alprostadil (PGE 1)</li> </ul> |  |
| Masterson et al (2013) <sup>173</sup><br>USA     | To compare the positive surgical margins and oncological outcomes of patients   | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> </ul>  | <ul style="list-style-type: none"> <li>• Neoadjuvant therapy</li> <li>• Adjuvant therapy</li> <li>• Radical perineal prostatectomy</li> </ul>  |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria  | Exclusion criteria  | Comments   |
|---|--|---|---|--|
|   | undergoing RALP or ORP performed by a single-surgeon.  |   | <ul style="list-style-type: none"> <li>Laparoscopic radical prostatectomy</li> </ul>  |  |
| Pierorazio et al. (2013) <sup>149</sup><br>USA  | To analyze pathological and short-term oncological outcomes in men undergoing open and minimally-invasive radical prostatectomy for high-risk prostate cancer in a contemporaneous series. | <ul style="list-style-type: none"> <li>ORP, RALP, or LRP performed between 2002 and 2011</li> <li>High-risk prostate cancer</li> <li>PSA &gt; 20 ng/mL</li> <li>Clinical stage T2c or T3</li> <li>Gleason Score 8 – 10</li> </ul>   | NR  |  |
| Punnen et al. (2013) <sup>174</sup><br>USA      | To compare oncological outcomes in high-risk patients who underwent RALP and ORP at a single institution.  | <ul style="list-style-type: none"> <li>High-risk prostate cancer</li> <li>Clinical stage ≥ T3a</li> <li>Biopsy Gleason 8 – 10</li> <li>Serum PSA &gt; 20 ng/mL</li> <li>RALP or ORP performed between 2002 and 2011 at a single institution</li> </ul>                                    | <ul style="list-style-type: none"> <li>Metastatic disease via imaging at presentation</li> <li>Neo-adjuvant treatments before surgery</li> <li>Follow-up &lt; 6 months</li> <li>&lt; 2 PSA tests post-surgery</li> </ul>  |  |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | To compare the complications of ORP with those of RALP performed by a single surgeon for the treatment of prostate cancer.   | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP or ORP performed between July 2007 and August 2012</li> </ul>  | NR  | In Korea, ORP is covered by national insurance but RALP is not. Choice of surgical method was made on the basis of counseling with patients, considering the severity and extent of their disease and their characteristics. |
| Silberstein et al. (2013) <sup>176</sup><br>USA | To compare the positive surgical margin rates and the BCRFS rates of patients undergoing radical prostatectomy stratified by surgical approach in a contemporary cohort of patients.       | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>RALP or ORP performed between January 2007 and December 2010 by surgeons performing the highest volume of each surgery type</li> </ul>  | <ul style="list-style-type: none"> <li>LRP without robotic assistance</li> <li>RALP or ORP performed by surgeons not performing the highest volume of each surgery type</li> <li>Salvage RP</li> <li>Cases of non-predominant surgery type performed by the surgeons included in the study</li> <li>Radiographic or biopsy-proven metastatic disease preoperatively</li> <li>No BCR and using adjuvant therapy</li> </ul> |  |
| Son et al. (2013) <sup>177</sup><br>South Korea | To evaluate the recovery of continence after RALP and ORP.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>RALP performed by a single surgeon between July 2008 and June 2009, after the initial 100 cases of RALP were performed</li> <li>ORP performed by a single surgeon between September 2006 and October</li> </ul> | <ul style="list-style-type: none"> <li>Missing data</li> </ul>  |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective   | Inclusion criteria   | Exclusion criteria   | Comments |
|---|---|--|--|----------|
|   |   | 2007, just before the introduction of da Vinci   |  |          |
| Bae et al (2012) <sup>178</sup><br>South Korea      | To evaluate the impact of obesity on perioperative outcomes of patients undergoing RALP or ORP  | NR   | NR   |          |
| Hong et al. (2012) <sup>8</sup><br>USA              | To compare RALP with conventional ORP and evaluate their effects on surgical pathology specimens.   | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP performed between August 2007 and March 2010</li> </ul>  | NR   |          |
| Lumen et al. (2012) <sup>179</sup><br>Belgium       | To evaluate the introduction of RALP in a low- to mid-volume center   | NR   | NR   |          |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | To determine whether previous transurethral resection of the prostate (TURP) compromises the surgical outcome and pathologic findings in patients who underwent either RALP or ORP after TURP.  | <ul style="list-style-type: none"> <li>• Localized prostate cancer</li> <li>• RALP or ORP between July 2008 and July 2010</li> <li>• Previous TURP</li> </ul>  | NR   |          |
| Philippou et al. (2012) <sup>125</sup><br>UK        | To compare prospectively the safety and efficacy of the first 50 ORP procedures and first 50 RALP procedures performed by the same surgeon in the same institution.   | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• ORP performed by a single surgeon between October 2007 and December 2008</li> <li>• RALP performed by a single surgeon between November 2008 and January 2010</li> </ul> | <ul style="list-style-type: none"> <li>• Mentored RALP cases performed before November 2008</li> </ul>                                   |          |
| Trinh et al. (2012) <sup>181</sup><br>USA           | To assess the rate of RALP utilization and re-examine the difference in perioperative complication rates between RALP and ORP in light of RALP's supplanting LRP as the most common minimally invasive radical prostatectomy technique. | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP performed between October 2008 and December 2009</li> </ul>  | <ul style="list-style-type: none"> <li>• Minimally invasive modifier code without robot-assisted modifier (i.e. LRP patients)</li> </ul> |          |
| Wang et al. (2012) <sup>182</sup><br>USA            | To compare the bladder neck contracture rates of patients undergoing RALP and ORP.  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> </ul>   | <ul style="list-style-type: none"> <li>• Neoadjuvant radiation therapy</li> </ul>  |          |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria  | Exclusion criteria   | Comments   |
|---|--|---|--|--|
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | To compare perioperative, oncologic, and functional outcomes from two consecutive series of patients with localized prostate cancer treated by ORP or RALP in a single hospital with a limited caseload.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>RALP or ORP performed between November 2007 and December 2009</li> </ul>  | NR   | Of the patients who underwent surgery during this time period, the first half were recruited to the ORP group and the second half were recruited to the RALP group. There was no statistically significant difference in preoperative potency or continence between LRP and RALP patients. |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark         | To evaluate the cost-effectiveness and cost utility comparing robot-assisted laparoscopic prostatectomy vs. retropubic radical prostatectomy.  | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer (cT1-T2)</li> </ul>   | <ul style="list-style-type: none"> <li>cT3 disease</li> </ul>  |  |
| Kim et al. (2011) <sup>127</sup><br>South Korea       | To compare the functional outcomes of patients undergoing RALP and ORP   | NR  | NR   | Choice of surgical method was based on patient preference after counselling on both options  |
| Magheli et al. (2011) <sup>152</sup><br>USA           | To investigate a single institution experience with ORP, LRP, and RALP with respect to pathological and biochemical outcomes.  | <ul style="list-style-type: none"> <li>Clinically localized adenocarcinoma of the prostate</li> <li>RALP performed between 2003 and 2008</li> <li>LRP or ORP performed between 2000 and 2008</li> <li>Surgery performed by a surgeon who completed their urological surgical training within the past decade</li> </ul> | <ul style="list-style-type: none"> <li>Neo-adjuvant hormonal therapy</li> <li>Clinical stage T1a or T1b</li> <li>Incomplete preoperative data</li> </ul> |  |
| Minniti et al. (2011) <sup>184</sup><br>Italy         | To evaluate the effectiveness of RALP vs. ORP for the treatment of early prostate cancer, providing a guide as well as a technical support based on a careful economic comparative evaluation of the surgical techniques used in the treatment of the prostate tumour. | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP or ORP performed</li> </ul>  | <ul style="list-style-type: none"> <li>Large primary tumour invading other organs by direct extension before surgery (Clinical stage T4)</li> </ul>      |  |
| Mirza et al. (2011) <sup>185</sup>                    | To compare PSM rates, EBL, and QOL outcomes among perineal   | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer</li> <li>Perineal ORP, retropubic ORP, or RALP</li> </ul>   | <ul style="list-style-type: none"> <li>Adjuvant therapy</li> <li>Salvage prostatectomy</li> </ul>  | Choice of surgical method was made by the surgeon after counselling with   |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria   | Exclusion criteria   | Comments   |
|---|--|--|--|--|
| USA   | ORP, retropubic ORP, and RALP.   | performed between March 2005 and February 2009   |  | the patient on the risks and benefits of each procedure as well as both patient and tumour characteristics. Perineal ORP was favoured in patients with morbid obesity, intra-abdominal mesh, renal transplant, or history of extensive abdominal or intraperitoneal surgeries. |
| Tollefson et al. (2011) <sup>186</sup><br>USA     | To determine the incidence and morbidity of SSIs during prostatectomy, and determine the association with surgical approach.   | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP between 2003 and 2008 at a single institution</li> <li>• Follow-up <math>\geq</math> 30 days</li> </ul>  | <ul style="list-style-type: none"> <li>• Inadequate follow-up</li> <li>• Refusal for use of medical records for study</li> </ul>   |  |
| Barocas et al. (2010) <sup>128</sup><br>USA       | To compare BCRFS of patients who underwent ORP versus RALP in a concurrent series at a single institution.   | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP or ORP performed between June 2003 and January 2008 at a single institution</li> </ul>   | <ul style="list-style-type: none"> <li>• Prior hormonal or radiation therapy, including immediate adjuvant radiation or hormonal therapy</li> <li>• Missing data</li> <li>• Lymph node involvement</li> </ul>  | Choice of surgical method was made by the patient and surgeon.   |
| Bolenz et al. (2010) <sup>153</sup><br>USA        | To compare costs associated with RALP, LRP, and ORP.   | <ul style="list-style-type: none"> <li>• Biopsy-proven prostate cancer</li> <li>• LRP or ORP performed between September 2003 and April as a primary surgical approach with curative intent</li> <li>• RALP performed between January 2006 and April 2008 as a primary surgical approach with curative intent</li> </ul> | <ul style="list-style-type: none"> <li>• Neoadjuvant therapy</li> </ul>  | The age difference between RALP (61) and ORP (61) patients vs. LRP patients (59) was statistically significant.  |
| Breyer et al. (2010) <sup>129</sup><br>USA        | To evaluate the incidence and risk factors for BNC in men treated with RALP and ORP.   | <ul style="list-style-type: none"> <li>• Biopsy-confirmed prostate cancer</li> <li>• RALP or ORP performed between 2002 and 2008</li> <li>• Follow-up <math>\geq</math> 12 months</li> </ul>   | NR   |  |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden   | To quantify complications to surgery in patients treated with RALP and ORP at a single institution.  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP or ORP performed between January 2002 and August 2007</li> </ul>   | NR   | Choice of surgical method depended on the treating physician.  |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | To critically analyze the learning curve for one experience open surgeon converting to robotic surgery for radical prostatectomy by comparing clinical, pathological and | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP or ORP performed between February 2006 and December 2008 by a single surgeon</li> </ul>  | <ul style="list-style-type: none"> <li>• Factors considered to increase surgical difficulty (e.g. morbid obesity; prostate size &gt; 100 mL; large middle lobe, TURP; history of laparoscopic hernia mesh repair; multiple abdominal operations; and high-volume tumours)</li> </ul> | Choice of surgical method was based on surgeon preference, taking into consideration the patient and tumour characteristics.   |



Table 9. Inclusion and exclusion criteria of participants

| Study  | Objective   | Inclusion criteria   | Exclusion criteria  | Comments   |
|--|---|--|---|--|
|  | functional outcomes.  |  |   |  |
| Hong et al. (2010) <sup>132</sup><br>South Korea | To evaluate the incidence and grade of VGE during RALP compared with those during ORP using TOE.  | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• ASA physical status I or II</li> <li>• RALP or ORP performed between March 2007 and November 2007</li> </ul>   | <ul style="list-style-type: none"> <li>• TOE insertion failure</li> </ul> | Choice of surgical method was based primarily on patient preference.   |
| Kordan et al. (2010) <sup>133</sup><br>USA       | To determine whether there is a difference in transfusion rate between RALP and ORP in a large series from a referral centre with a high volume of both RALP and ORP.                           | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP and ORP performed between June 2003 and July 2006</li> </ul>   | NR  | Choice of surgical method was based on patient preference after a discussion with the surgeon about the benefits and risks of each approach. |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong     | To compare the short-term outcome of patients undergoing RALP vs. ORP.  | <ul style="list-style-type: none"> <li>• RALP performed after da Vinci system upgrade in 2008</li> <li>• Last ORP cases performed before introduction of the da Vinci system in 2005</li> </ul>  | NR  |  |
| Nadler et al. (2010) <sup>188</sup><br>USA       | To review a single surgeon's experience during the transition from ORP to RALP and its effect on patient outcomes over a 2-year follow-up period.   | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer (cT1-T2c)</li> <li>• Last 50 consecutive ORP cases performed between July 2002 and February 2006</li> <li>• First 50 consecutive RALP cases performed between October 2005 and October 2006</li> </ul> | NR  | Beginning in October 2005, patients were given the option of RALP.   |
| Truesdale et al. (2010) <sup>189</sup><br>USA    | To evaluate and compare lymph node yield from contemporary ORP with the yield from RALP performed by high-volume surgeons at an academic institution.   | <ul style="list-style-type: none"> <li>• Histologically proven, clinically localized prostate cancer</li> <li>• ORP performed by one of four high-volume surgeons between January 2005 and November 2009</li> <li>• RALP performed by a single high-volume surgeon</li> </ul>        | NR  |  |
| Uvin et al. (2010) <sup>190</sup><br>Belgium     | To compare the perioperative biochemical data, the postoperative need for help with hygiene and mobility, and the duration of bladder catheterization, hospitalization and ICU stay of patients | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP performed between January 2008 and November 2008</li> <li>• ORP performed between January 2004 and January 2008</li> </ul>  | <ul style="list-style-type: none"> <li>• Lymphadenectomy</li> </ul>       |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective   | Inclusion criteria   | Exclusion criteria   | Comments  |
|---|---|--|--|---|
|   | undergoing ORP vs. RALP performed by an experienced open, yet inexperienced laparoscopic, surgical team, in a peripheral low-volume urological centre.  |  |  |   |
| Williams et al. (2010) <sup>134</sup><br>USA  | To evaluate whether the surgical approach in the hands of experienced RALP and ORP surgeons influenced the odds of PSM, adjusting for known preoperative predictors of PSM, year of diagnosis to adjust for a possible learning curve, patient age, BMI, and nerve sparing. | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer</li> <li>RALP or ORP performed between 2005 and 2008</li> <li>Complete information on baseline patient and tumour characteristics</li> </ul> | NR   | Choice of surgical method was made based on the surgeon the patients were referred to.  |
| Coronato et al. (2009) <sup>191</sup><br>USA  | To compare the marginal status and pathological characteristics of patients undergoing RALP and ORP (RRP and RPP)   | NR   | NR   | RPP was performed in one centre, while RRP and RALP were performed in another centre. Both centres assessed margins differently |
| Drouin et al. (2009) <sup>154</sup><br>France | To determine the cancer control afforded by radical prostatectomy in patients who underwent either an open, laparoscopic, or robotic procedure for localized prostate cancer.   | <ul style="list-style-type: none"> <li>Localized prostate cancer</li> <li>RALP or LRP performed between January 2000 and August 2004</li> </ul>  | <ul style="list-style-type: none"> <li>Lymph node involvement found during pre-operative work-up</li> <li>Clinical signs of non-localized disease</li> </ul> |   |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | To compare the functional results of two contemporary series of patients with clinically localized prostate cancer treated by either RALP or ORP at a single institution.   | <ul style="list-style-type: none"> <li>Clinically localized prostate cancer</li> <li>RALP or ORP performed between February 2006 and April 2007</li> </ul>   | NR   | Choice of surgical method was made between the patients and physicians.   |
| Laurila et al. (2009) <sup>192</sup><br>USA   | To assess the efficacy of RALP by comparing apical and overall margin status for RALP with ORP in a group of contemporary patients.   | <ul style="list-style-type: none"> <li>Prostate cancer</li> <li>RALP performed during a 9 month period in 2006</li> <li>ORP performed the year before introduction of RALP</li> </ul>                                    | <ul style="list-style-type: none"> <li>First 20 cases of RALP</li> <li>Neoadjuvant therapy</li> </ul>  |   |
| Ou et al. (2009) <sup>193</sup>               | To compare perioperative  | <ul style="list-style-type: none"> <li>Prostate cancer</li> </ul>  | NR   | Choice of surgical method was based   |

Table 9. Inclusion and exclusion criteria of participants

| Study  | Objective   | Inclusion criteria   | Exclusion criteria  | Comments   |
|--|---|--|---|--|
| Taiwan                                       | outcomes between patients undergoing RALP and patients undergoing ORP performed by a single surgeon in Taiwan.  | <ul style="list-style-type: none"> <li>• RALP or ORP performed between April 2004 and April 2007</li> </ul>  |   | on patient preference after a discussion with the attending surgeon about the benefits and risks of each approach.   |
| Rocco et al. (2009) <sup>136</sup><br>Italy  | To compare the early oncological, perioperative and functional outcomes of RALP vs. ORP in a laparoscopically naïve centre, as robotic assistance aids the laparoscopically naïve surgeon in minimally invasive prostate surgery, by offering magnification and superior dexterity. | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP performed between November 1, 2006 and December 31, 2007</li> <li>• ORP performed between May 20, 2004 and February 28, 2007</li> </ul> | NR  | Choice of surgical method between November 1, 2006 and February 28, 2007 was based on patient preference after a discussion with the attending surgeon on benefits, risks, and alternatives. |
| White et al. (2009) <sup>194</sup><br>USA    | To compare the incidence of PSMs obtained with RALP, during the initiation of a robotics program, with that from a similarly matched cohort of ORP cases as performed by a single surgeon.  | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP performed between December 2005 and March 2008</li> </ul>  | NR  |  |
| Chan et al. (2008) <sup>195</sup><br>USA     | To evaluate the outcomes based on gland size between RALP and ORP, as larger prostates might increase the difficulty of radical prostatectomy.  | <ul style="list-style-type: none"> <li>• Clinically localized carcinoma of the prostate</li> <li>• RALP or ORP performed between May 2003 and August 2006</li> </ul>   | NR  | Choice of surgical method was based on patient preference after a discussion with the attending surgeon on benefits, risks, and alternatives.  |
| Krambeck et al. (2008) <sup>196</sup><br>USA | To assess the perioperative complications and early oncological results in a comparative study matching ORP and RALP groups.  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP or ORP performed between August 2002 and December 2005</li> </ul>  | NR  |  |
| Schroeck et al. (2008) <sup>197</sup><br>USA | To compare PSAR rates in patients undergoing RALP or ORP.   | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• RALP or ORP performed between August 2003 and January 2007 at a single institution</li> </ul>  | <ul style="list-style-type: none"> <li>• Conversion to ORP</li> </ul> | Choice of surgical method was made by the patient and attending urologist.   |
| Miller et al. (2007) <sup>137</sup><br>USA   | To assess the potential for RALP to decrease short-term morbidity in comparison to ORP using a validated HRQOL  | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer (cT1-T2)</li> <li>• ORP performed between July 2002 and January 2005</li> </ul>  | NR  |  |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria   | Exclusion criteria   | Comments   |
|---|--|--|--|--|
|   | instrument.  | <ul style="list-style-type: none"> <li>• RALP performed between February 2005 and August 2006</li> </ul>   |  |  |
| Nelson et al. (2007) <sup>138</sup><br>USA          | To examine differences in length of stay between a prospectively evaluated cohort of patients who underwent ORP and RALP.  | <ul style="list-style-type: none"> <li>• RALP or ORP performed between January 2003 and March 2006</li> </ul>  | NR   | Choice of surgical method was based on patient preference after a discussion with the surgeon about the benefits and risks of each approach.   |
| Ball et al. (2006) <sup>116</sup><br>USA            | To evaluate the short-term QOL changes from baseline of five surgical approaches for localized prostate carcinoma delivered at a single institution.                         | <ul style="list-style-type: none"> <li>• Newly diagnosed localized prostate cancer</li> <li>• Completion of a baseline questionnaire and at least one follow-up questionnaire</li> <li>• LRP, RALP, ORP, BT, or EBRT performed between January 2000 and April 2005</li> </ul>                          | NR   |  |
| Ahlering et al. (2004) <sup>198</sup><br>USA        | To compare internally the ORP and RALP results of a fellowship-trained oncologic surgeon with 18 years of experience who had recently learned the RALP approach.             | <ul style="list-style-type: none"> <li>• Prostate cancer</li> <li>• Last 60 cases of ORP performed between 2001 and 2002</li> <li>• 60 cases of RALP performed after the surgeon's first 45 RALP procedures</li> </ul>   | NR   |  |
| Tewari et al. (2003) <sup>139</sup><br>USA          | To compare surgical, oncological, and functional outcomes ORP and the robotically assisted Vattikuti Institute prostatectomy in the management of localized prostate cancer. | <ul style="list-style-type: none"> <li>• Localized prostate cancer</li> <li>• Surgical candidates</li> </ul>   | NR   | Choice of surgical method was offered to all patients with a 10-year life expectancy and Gleason score $\geq 6$ .  |
| Menon et al. (2002) <sup>140</sup><br>USA           | To prospectively compare RALP and ORP.   | <ul style="list-style-type: none"> <li>• Clinically localized prostate cancer</li> <li>• RALP or ORP performed between March 26, 2001 and August 10, 2001</li> <li>• Medically fit to undergo surgery</li> <li>• Weight &lt; 250 lb</li> <li>• Waist size &lt; 45 in</li> <li>• BMI &lt; 35</li> </ul> | NR   | Choice of surgical method was nonrandomized, but not described any further.  |
| <b>RALP vs. BT</b>                                  |  |  |  |  |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | To evaluate the QOL of patients with low-risk localized prostate cancer undergoing RALP, BT or in active surveillance  | <ul style="list-style-type: none"> <li>• PSA &lt; 10ng/ml</li> <li>• cT1-cT2a tumors</li> <li>• Gleason score <math>\leq 6</math></li> <li>• Positive biopsy core <math>\leq 2</math></li> <li>• At least 1 year of follow up</li> </ul>   | <ul style="list-style-type: none"> <li>• Patients treated with external beam radiation therapy</li> <li>• No baseline and follow up questionnaire</li> </ul> | Choice of treatment was based on clinical characteristics of the patients (age, PSA levels, size of the prostate, Gleason score, voiding complaints and level of anxiety)<br>Sexual function was determined in all |

Table 9. Inclusion and exclusion criteria of participants

| Study   | Objective  | Inclusion criteria   | Exclusion criteria   | Comments   |
|---|--|--|--|--|
|   |  |  |  | patients, regardless of pre-treatment potency status.  |
| Baena et al. (2013) <sup>141</sup><br>Spain         | To present a comparative study and survival analysis of a consecutive series of 160 prostate BT and 153 RALP using the Da Vinci Surgical System.     | <ul style="list-style-type: none"> <li>• Low-risk localized prostate cancer</li> <li>• RALP or BT performed</li> </ul>   | NR   |  |
| Ball et al. (2006) <sup>116</sup><br>USA            | To evaluate the short-term QOL changes from baseline of five surgical approaches for localized prostate carcinoma delivered at a single institution. | <ul style="list-style-type: none"> <li>• Newly diagnosed localized prostate cancer</li> <li>• Completion of a baseline questionnaire and at least one follow-up questionnaire</li> <li>• LRP, RALP, ORP, BT, or CRY performed between January 2000 and April 2005</li> </ul> | NR   |  |
| <b>RALP vs. Radiotherapy</b>                        |  |  |  |  |
| Hung et al. (2015) <sup>199</sup><br>Taiwan         | To compare RALP and RT and to clarify whether there is any benefit between the procedures regarding oncologic control and functional outcome.        | <ul style="list-style-type: none"> <li>• RALP or RT performed between June 2007 and December 2013</li> <li>• &gt; 1 year follow-up</li> </ul>  | NR   |  |
| <b>RALP vs. Cryoablation</b>                        |  |  |  |  |
| Ball et al. (2006) <sup>116</sup><br>USA            | To evaluate the short-term QOL changes from baseline of five surgical approaches for localized prostate carcinoma delivered at a single institution. | <ul style="list-style-type: none"> <li>• Newly diagnosed localized prostate cancer</li> <li>• Completion of a baseline questionnaire and at least one follow-up questionnaire</li> <li>• RALP or CRY performed between January 2000 and April 2005</li> </ul>                | NR   |  |
| <b>RALP vs. Active Surveillance</b>                 |  |  |  |  |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | To evaluate the QOL of patients with low-risk localized prostate cancer undergoing RALP, BT or in AS   | <ul style="list-style-type: none"> <li>• PSA&lt; 10ng/ml</li> <li>• cT1-cT2a tumors</li> <li>• Gleason score≤6</li> <li>• Positive biopsy core ≤2</li> <li>• At least 1 year of follow up</li> </ul>   | <ul style="list-style-type: none"> <li>• Patients treated with external beam radiation therapy</li> <li>• No baseline and follow up questionnaire</li> </ul> | Choice of treatment was based on clinical characteristics of the patients (age, PSA levels, size of the prostate, Gleason score, voiding complaints and level of anxiety)<br>Sexual function was determined in all patients, regardless of pre-treatment potency status. |

AS= Active Surveillance; BCR = Biochemical Recurrence; BCRFS = Biochemical Recurrence-Free Survival; BMI = Body Mass Index; BNC = Bladder Neck Contracture; BNS = Bilateral Nerve Sparing; ; BT = Brachytherapy; CRY= cryoablation; EBL = Estimated Blood Loss; EBRT = External Beam Radiotherapy; EHS = Erection Hardness Score; EPIC= Expanded Prostate Cancer Index Composite; HRQOL = Health-Related Quality of Life; IIEF = International Index of Erectile Function; IPSS= International Prostate Symptom Score; LRP = Laparoscopic Radical Prostatectomy; NR = Not Reported; PDE5 = Phosphodiesterase type 5; POI = Post-operative Infection; PSA= Prostate-Specific Antigen; PSM = Positive Surgical Margin; ORP= Open Radical Prostatectomy; PSAR = PSA Recurrence; QOL = Quality of Life; RALP= Robot-assisted Radical Prostatectomy; RPP= Radical Perineal Prostatectomy; RRP= Radical Retropubic Prostatectomy; RT= Radiotherapy; SSI = Surgical Site Infection; TOE = Transoesophageal



Table 9. Inclusion and exclusion criteria of participants

| Study | Objective | Inclusion criteria | Exclusion criteria | Comments |
|-------|-----------|--------------------|--------------------|----------|
|-------|-----------|--------------------|--------------------|----------|

Echocardiography; TURP = Transurethral Resection of the Prostate; VGE = Venous Gas Embolism



Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)          | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---------------------------------|---|--|--|---------------------------------------|--|---|--|---|
| <b>RALP vs. LRP</b>                                  |                       |  |   |                                 |   |  |  |                                       |  |   |  |   |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br>LRP: 308  | RALP: 60.3±NR<br>LRP: 62.7±NR<br>P=NR                      | RALP: 26.9±NR<br>LRP: 26.1±NR<br>P=NR                                   | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: 8.3±NR<br>LRP: 10.5±NR<br>P=NR                       | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: NR<br>LRP: NR                            | RALP:<br>- cT1a: 0 (0.0)<br>- cT1b: 3 (3.8)<br>- cT1c: 63 (79.7)<br>- cT2a: 9 (11.4)<br>- cT2b: 3 (3.8)<br>- cT2c: 1 (1.3)<br>- cT3a: 0 (0.0)<br><br>LRP:<br>- cT1a: 4 (1.3)<br>- cT1b: 6 (1.9)<br>- cT1c: 175 (56.8)<br>- cT2a: 63 (20.5)<br>- cT2b: 52 (16.9)<br>- cT2c: 6 (1.9)<br>- cT3a: 2 (0.6)<br><br>P=NR | RALP: 6.2±NR<br>LRP: 6.3±NR<br>P=NR  | RALP: 39.8±NR<br>LRP: 37.1±NR<br>P=NR                               |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br>LRP: 100 | RALP: 60.5 (45-75)<br>LRP: 62.5 (45-72)<br>P=0.06          | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR             | RALP:<br>- Low: 28 (28.0)<br>- Intermediate: 59 (59.0)<br>- High: 11 (11.0)<br><br>LRP (n=98):<br>- Low: 33 (33.0) [33.7%]<br>- Intermediate: 48 (48.0) [49.0%] | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR   | RALP:<br>- ≤6: 30 (30.0)<br>- 7: 59 (59.0)<br>- ≥8: 11 (11.0)<br><br>LRP (n=98):<br>- ≤6: 38 (38.0) [38.8%]<br>- 7: 45 (45.0) [45.9%]<br>- ≥8: 15 (15.0) | RALP: NR<br>LRP: NR   |

Table 10. Characteristics of Participants

| Study  | Sample size                 | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)                    | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)                       | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------------|---|---|---------------------------------|--|--|---|--|--|---|---|---|
|  |                             |   |   |                                 | - High: 17 (17.0) [17.3%]<br><br>*P=0.18 |  |   |  |  |   | [15.3%]<br><br>*P=0.36  |   |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand  | RALP: 486<br><br>LRP: 561   | RALP: 67.0±7.6<br><br>LRP: 67.0±7.4<br><br>P=0.95                 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR                  | RALP: NR<br><br>LRP: NR  | RALP: 18.7±26.9<br><br>LRP: 16.8±19.8<br><br>P=0.52         | RALP: 43 (8.8)<br><br>LRP: 65 (11.6)<br><br>P=0.18 | RALP: NR<br><br>LRP: NR                    | RALP: NR<br><br>LRP: NR   | RALP (n=457):<br>- ≤6: 197 (40.5) [43.1%]<br>- 7: 181 (37.2) [39.6%]<br>- ≥8: 79 (16.3) [17.3%]<br><br>LRP (n=536):<br>- ≤6: 230 (41.0) [42.9%]<br>- 7: 203 (36.2) [37.9%]<br>- ≥8: 103 (18.4) [19.2%]<br><br>*P=0.71 | RALP: NR<br><br>LRP: NR   |
| Busch et al (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br><br>LRP: 194   | RALP: 62.4 (58.0-66.7)<br><br>LRP: 62.3 (58.1-66.4)<br><br>P=0.54 | RALP: ≥30: 194 (100.0) ++<br><br>LRP: ≥30: 194 (100.0) ++<br><br>P=NA   | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR                  | RALP: NR<br><br>LRP: NR  | RALP: 5.7 (4.4-8.3)<br><br>LRP: 5.9 (4.4-8.6)<br><br>P=0.59 | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA      | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1: 147 (75.8)<br>- cT2: 47 (24.2)<br><br>LRP:<br>- cT1: 147 (75.8)<br>- cT2: 47 (24.2)<br><br>P=1.00 | RALP:<br>- ≤6: 77 (39.7)<br>- 7: 93 (47.9)<br>- ≥8: 24 (12.4)<br><br>LRP:<br>- ≤6: 94 (48.5)<br>- 7: 78 (40.2)<br>- ≥8: 22 (11.3)<br><br>P=0.22   | RALP: NR<br><br>LRP: NR   |
| Ploussard et al (2014) <sup>111</sup><br>France      | RALP: 1009<br><br>LRP: 1377 | RALP: 62.7±NR<br><br>LRP: 62.7±NR                                 | RALP: 26.5±NR<br><br>LRP: 26.6±NR                                       | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR                  | RALP: NR<br><br>LRP: NR  | RALP: 9.2±NR<br><br>LRP: 9.8±NR                             | RALP: NR<br><br>LRP: NR                            | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1c: 825 (81.8)   | RALP:<br>- 6: 606 (60.1)<br>- 7: 333 (33.0)   | RALP: NR<br><br>LRP: NR   |





Table 10. Characteristics of Participants

| Study  | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD          | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                             | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-------------------------|---|---|---------------------------------|--|--|---|------------------------------|--|---|---|---|
|  |                         | P=1.00  | P=0.65  |                                 |  |  | P=0.12  |                              |  | - cT2a, cT2b: 158 (15.6)<br>- cT2c, cT3: 26 (2.6)<br><br>LRP:<br>- cT1c: 1115 (81.0)<br>- cT2a, cT2b: 223 (16.2)<br>- cT2c, cT3: 39 (2.8)<br><br>P=0.87                                 | - ≥8: 70 (6.9)<br><br>LRP:<br>- 6: 905 (65.7)<br>- 7: 405 (29.4)<br>- ≥8: 67 (4.9)<br><br>P<0.001 |   |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP (n=7683): 60.8±6.9<br><br>LRP (n=4906): 62.3±6.2<br><br>P=NR | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR         | RALP (n=4951):<br>- Low: 2381 (30.9)<br>- Intermediate: 2031 (26.4)<br>- High: 539 (7.0)<br><br>LRP (n=4460):<br>- Low: 2181 (44.3)<br>- Intermediate: 1729 (35.2)<br>- High: 550 (11.2)<br><br>P=NR | RALP: NR<br><br>LRP: NR  | RALP (n=7650): 5.4 [3.7]<br><br>LRP (n=4907): 7.2 [4.6]<br><br>P=NR | RALP: NR<br><br>LRP: NR      | RALP: NR<br><br>LRP: NR                    | RALP (n=5016):<br>- cT1: 3660 (47.6)<br>- cT2: 1307 (17.0)<br>- cT3- cT4: 49 (0.6)<br><br>LRP (n=4467):<br>- cT1: 2576 (52.4)<br>- cT2: 1824 (37.1)<br>- cT3- cT4: 67 (1.4)<br><br>P=NR | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   |
| Tozawa et al (2014) <sup>147</sup><br>Japan  | RALP: 157<br>LRP: 551   | RALP: 67.0 (41 -78)<br>LRP: 67.4 (47-82)                          | RALP: 23.5 (15.0-31.0)  | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR          | RALP: NR<br>LRP: NR                        | RALP:<br>- cT1c: 36 (22.9)  | RALP:<br>- ≤6: 44 (28.0)<br>- 7: 72 (45.9)  | RALP: NR<br>LRP: NR   |

Table 10. Characteristics of Participants

| Study  | Sample size              | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|--------------------------|--|---|---------------------------------|-------------------------|--|---|---|--|---|---|---|
|  |                          | P=0.21   | LRP:<br>23.0 (14.0-34.0)<br><br>P=0.44                                  |                                 |                         |  |   |   |  | - cT2a: 49 (31.2)<br>- cT2b: 19 (12.1)<br>- cT2c: 46 (29.3)<br>- cT3a: 5 (3.2)<br>- cT3b: 2 (1.3)<br><br>LRP:<br>- cT1c: 204 (37.0)<br>- cT2a: 193 (35.0)<br>- cT2b: 73 (13.2)<br>- cT2c: 69 (12.5)<br>- cT3a: 7 (1.3)<br>- cT3b: 5 (0.9)<br><br>P<0.05 | - ≥8: 41 (26.1)<br><br>LRP:<br>- ≤6: 259 (47.0)<br>- 7: 187 (33.9)<br>- ≥8: 105 (19.1)<br><br>P<0.05                                      |   |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy | RALP: 136<br><br>LRP: 91 | RALP: 60.0±5.5<br><br>LRP: 63.0±4.9<br><br>P<0.001         | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR  | RALP: 6.4 (5.0-7.5)<br><br>LRP: 6.0 (4.8-7.2)<br><br>P=0.24 | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1c, cT2: 136 (100.0)<br><br>LRP:<br>- cT1c, cT2: 91 (100.0)<br><br>P=NA  | RALP:<br>- ≤5: 2 (1.5)<br>- 6: 93 (68.4)<br>- 7: 41 (30.1)<br><br>LRP:<br>- ≤5: 5 (5.5)<br>- 6: 73 (80.2)<br>- 7: 13 (14.3)<br><br>P=0.01 | RALP: NR<br><br>LRP: NR   |
| Berge et al (2013) <sup>113</sup>                  | RALP: 210                | RALP: 61.7 (40-76)†  | RALP: 26.5 (19.8-   | RALP: NR                        | RALP: NR                | RALP: NR   | RALP: 9.0 (2.3-40.0)†                                       | RALP: NR                                      | RALP: NR                                   | RALP: NR  | RALP: NR  | RALP: 35.1 (15-84)†   |

Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD       | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD          | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|--|---|---------------------------------|---|--|---|---|--|--|---|---|
| Norway  | LRP: 210              | LRP: 61.7 (42-76) <sup>†</sup><br><br>P=0.90               | 35.8) <sup>†</sup><br><br>LRP:<br>25.5 (19.7-35.1) <sup>†</sup><br><br>P=0.02 | LRP: NR                         | LRP: NR   | LRP: NR  | LRP:<br>8.6 (2.3-28.0) <sup>†</sup><br><br>P=0.40                   | LRP: NR                                   | LRP: NR                                    | LRP: NR  | LRP: NR   | LRP:<br>36.6 (13-106) <sup>†</sup><br><br>P=0.60                    |
| Harty et al (2013) <sup>200</sup><br>USA      | RALP: 152<br>LRP: 140 | RALP: 61.3±6.0<br>LRP: 59.9±6.9<br><br>P=NR                | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR             | RALP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 152 (100.0)<br><br>LRP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 140 (100.0)<br><br>P=NA | RALP: NR<br>LRP: NR  | RALP: 6.0 (NR)<br>LRP: 5.2 (NR)<br><br>P=NR                         | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br>LRP: NR                        | RALP:<br>- cT1: 91 (59.9)<br>- cT2: 61 (40.1)<br><br>LRP:<br>- cT1: 96 (68.6)<br>- cT2: 44 (31.4)<br><br>P=NR  | RALP:<br>- 6: 52 (34.2)<br>- 7: 67 (44.1)<br>- ≥8: 33 (21.7)<br><br>LRP:<br>- 6: 55 (39.2)<br>- 7: 57 (40.7)<br>- ≥8: 28 (20.0)<br><br>P=NR   | RALP:<br>47.5±14.5<br><br>LRP: 44.5±14.4<br><br>P=NR                |
| Pierorazio et al (2013) <sup>149</sup><br>USA | RALP: 105<br>LRP: 65  | RALP: 62.0 (41-76)<br>LRP: 60.0 (43-74)<br><br>P=0.60      | RALP:<br>27.3 (21.8-38.5)<br><br>LRP:<br>26.9 (18.5-34.0)<br><br>P=0.80       | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP:<br>6.4 (2.4-45.0)<br><br>LRP:<br>6.7 (1.6-50.0)<br><br>P=0.01 | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR                        | RALP (n=97):<br>- cT1c, cT2a: 75 (71.4) [77.3%]<br>- cT2b: 13 (12.4) [13.4%]<br>- cT2c, cT3a: 9 (8.6) [9.3%]<br><br>LRP (n=62):<br>- cT1c, cT2a: 38 (58.5) [61.3%]<br>- cT2b: 9 (13.9) [14.5%] | RALP (n=104):<br>- ≤6: 31 (29.5) [29.8%]<br>- 7: 37 (35.2) [35.6%]<br>- 8: 23 (21.9) [22.1%]<br>- ≥9: 13 (12.4) [12.5%]<br><br>LRP:<br>- ≤6: 20 (30.8)<br>- 7: 25 (38.5)<br>- 8: 14 (21.5)<br>- ≥9: 6 (9.2) | RALP: NR<br>LRP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size               | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD                 | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|---------------------------|--|---|---|--|--|---|---|--|--|---|---|
|   |                           |  |   |   |  |  |   |   |  | - cT2c, cT3a:<br>15 (23.1)<br>[24.2%]<br><br>*P=0.02   | *P=0.23   |   |
| Porpiglia et al (2013) <sup>109</sup><br>Italy  | RALP: 60<br><br>LRP: 60   | RALP: 63.9±6.7<br><br>LRP: 64.7±5.9<br><br>P=0.60          | RALP: 26.2±2.5<br><br>LRP: 26.8±2.9<br><br>P=0.30                       | RALP: 2 (1-3)<br><br>LRP: 2 (1-3)<br><br>P=0.58 | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR  | RALP: 6.0 (1.0-33.7)<br><br>LRP: 6.9 (2.4-39.0)<br><br>P=0.11 | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1, cT2: 60 (100.0)<br><br>LRP:<br>- cT1, cT2: 60 (100.0)<br><br>P=NA                                | RALP:<br>- ≤6: 25 (41.7)<br>- 7: 32 (53.3)<br>- ≥8: 3 (5.0)<br><br>LRP:<br>- ≤6: 35 (58.3)<br>- 7: 20 (33.3)<br>- ≥8: 5 (8.3)<br><br>P=0.09 | RALP: 34.0 (17.4-74.2)<br><br>LRP: 36.0 (16.6-97.0)<br><br>P=0.65   |
| Koutlidis et al (2012) <sup>114</sup><br>France | RALP: 175<br><br>LRP: 104 | RALP: 59.2±5.4<br><br>LRP: 59.5±5.9<br><br>P=0.58          | RALP: 26.7±3.4<br><br>LRP: 26.7±3.4<br><br>P=0.80                       | RALP: NR<br><br>LRP: NR                         | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR  | RALP: 7.1±4.2<br><br>LRP: 7.2±3.2<br><br>P=0.85               | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1: 121 (69.1)<br>- cT2: 54 (30.9)<br><br>LRP:<br>- cT1: 72 (69.2)<br>- cT2: 32 (30.8)<br><br>P=0.98 | RALP:<br>- ≤6: 134 (76.6)<br>- ≥7: 41 (23.4)<br><br>LRP:<br>- ≤6: 81 (77.9)<br>- ≥7: 23 (22.1)<br><br>P=0.80                                | RALP: 52.1 ± 23.7<br><br>LRP: 55.8 ± 24.9<br><br>P=0.20             |
| Park et al (2012) <sup>150</sup><br>South Korea | RALP: 183<br><br>LRP: 144 | RALP: 63.0 (44-75)<br><br>LRP: 67.0 (38-77)<br><br>P<0.001 | RALP: 24.7 (16.4-39.4)<br><br>LRP: 24.2 (17.2-31.4)<br><br>P=0.03       | RALP: 2 (1-3)<br><br>LRP: 2 (1-3)<br><br>P=0.12 | RALP:<br>- Low: 47 (25.7)<br>- Intermediate: 31 (16.9)<br>- High: 105 (57.4)<br><br>LRP:<br>- Low: 44 (30.6)<br>- Intermediate: 25 | RALP: NR<br><br>LRP: NR  | RALP: 5.0 (0.1-51.5)<br><br>LRP: 5.8 (0.1-41.3)<br><br>P=0.63 | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 54 (29.5)<br>- cT2a, cT2b: 38 (20.8)<br>- cT2c: 41 (22.4)              | RALP:<br>- ≤6: 87 (47.5)<br>- 3+4: 43 (23.5)<br>- 4+3: 19 (10.4)<br>- ≥8: 34 (18.6)<br><br>LRP:<br>- ≤6: 74 (51.4)<br>- 3+4: 28 (19.4)      | RALP: 30.3 (15.5-82.8)<br><br>LRP: 28.8 (12.0-74.0)<br><br>P=0.20   |

Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)                     | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---------------------------------|---|--|--|---|--|---|--|---|
|  |                       |  |   |                                 | (17.4)<br>- High: 75 (52.1)<br><br>P=0.57 |  |  |   |  | - cT3a: 40 (21.9)<br>- cT3b: 10 (5.5)<br>- cT4: 0 (0.0)<br><br>LRP:<br>- cT1a, cT1b: 2 (1.4)<br>- cT1c: 48 (33.3)<br>- cT2a, cT2b: 32 (22.2)<br>- cT2c: 20 (13.9)<br>- cT3a: 33 (22.9)<br>- cT3b: 9 (6.3)<br>- cT4: 0 (0.0)<br><br>P=0.59 | - 4+3: 16 (11.1)<br>- ≥8: 26 (18.1)<br><br>P=0.82  |   |
| Asimakopoulus et al (2011) <sup>110</sup><br>Italy | RALP: 52<br>LRP: 60   | RALP: 59.6±5.4<br>LRP: 61.1±5.1<br><br>P=0.13              | RALP: 25.8±2.6<br>LRP: 26.3±2.2<br><br>P=0.30                           | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR  | RALP: 8.9 (5.8-9.2)<br>LRP: 7.4 (1.5-9.2)<br><br>P=0.30    | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br>LRP: NR                        | RALP:<br>- cT1: 14 (26.9)<br>- cT2: 38 (73.1)<br><br>LRP:<br>- cT1: 25 (41.7)<br>- cT2: 35 (58.3)<br><br>P=0.10   | RALP:<br>- 5: 1 (1.9)<br>- 6: 45 (86.5)<br>- 7: 6 (11.5)<br><br>LRP:<br>- 5: 2 (3.3)<br>- 6: 45 (75.0)<br>- 7: 13 (21.7)<br><br>P=0.30 | RALP: NR<br>LRP: NR   |
| Kasraeian et al (2011) <sup>151</sup><br>France    | RALP: 200<br>LRP: 200 | RALP: 60.8 (44-73)<br>LRP: 61.9 (45-75)                    | RALP: 24.9 (19.1-34.0)  | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR  | RALP: 6.4 (2.1-19.8)<br>LRP:                               | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR                        | RALP:<br>- cT1: 131 (65.5)<br>- cT2: 68 (34.0)  | RALP: 6 (NR)<br>LRP: 6 (NR)  | RALP: 50 (27-122)<br>LRP:   |



Table 10. Characteristics of Participants

| Study                                      | Sample size               | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|---------------------------|--|---|---------------------------------|-------------------------|--|---|---|--|--|--|---|
|  |                           | P=0.07   | LRP:<br>25.7 (19.1-56.3)<br><br>P=0.003                                 |                                 |                         |  | 6.8 (2.7-48.8)<br><br>P<0.001                               |   |  | - cT3: 1 (0.5)<br><br>LRP:<br>- cT1: 134 (67.0)<br>- cT2: 66 (33.0)<br>- cT3: 0 (0.0)<br><br>p=0.59  | P=0.32   | 55 (21-136)<br><br>P<0.001  |
| Magheli et al (2011) <sup>152</sup><br>USA | RALP: 522<br><br>LRP: 522 | RALP: 59.0 (35-77)<br><br>LRP: 59.0 (40-77)<br><br>P=NR    | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR  | RALP: 4.8 (0.2-37.9)<br><br>LRP: 4.8 (0.3-26.0)<br><br>P=NR | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1: 417 (79.9)<br>- cT2: 105 (20.1)<br><br>LRP:<br>- cT1: 414 (79.3)<br>- cT2: 108 (20.7)<br><br>P=NR                            | RALP:<br>- ≤6: 394 (75.5)<br>- 7: 114 (21.8)<br>- ≥8: 14 (2.7)<br><br>LRP:<br>- ≤6: 390 (74.7)<br>- 7: 114 (21.8)<br>- ≥8: 18 (3.4)<br><br>P=NR    | RALP: NR<br><br>LRP: NR   |
| Willis et al (2011) <sup>115</sup><br>USA  | RALP: 121<br><br>LRP: 161 | RALP: 58.1±6.3<br><br>LRP: 58.0±6.7<br><br>P=0.90          | RALP: 26.7±3.3<br><br>LRP: 27.0±3.4<br><br>P=0.75                       | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR  | RALP: 5.0±2.2<br><br>LRP: 5.7±2.9<br><br>P=0.04             | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                    | RALP:<br>- cT1c: 99 (81.8)<br>- cT2a: 22 (18.2)<br>- cT2b: 0 (0.0)<br><br>LRP:<br>- cT1c: 128 (79.5)<br>- cT2a: 29 (18.0)<br>- cT2b: 4 (2.5) | RALP:<br>- 6: 97 (80.2)<br>- 7: 22 (18.2)<br>- ≥8: 2 (1.6)<br><br>LRP (n=160):<br>- 6: 115 (71.4)<br>- 7: 41 (25.5)<br>- ≥8: 4 (2.5)<br><br>P=0.12 | RALP: 41.5±15.2<br><br>LRP: 35.2±10.1<br><br>P=0.01                 |



Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                   | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                            | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  |
|--|-----------------------|---|---|---------------------------------|--|--|---|---|--|---|---|--|
|  |                       |   |   |                                 |  |  |   |   |  | P=0.36  |   |  |
| Bolenz et al (2010) <sup>153</sup><br>USA    | RALP: 262<br>LRP: 220 | RALP: 61.0 (57-66)<br>LRP: 59.0 (54-63)<br><br>P=NR                           | RALP: 28.0 (25.0-30.0)<br><br>LRP (n=211): 27.0 (26.0-30.0)<br><br>P=NR                   | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP(n=260): 5.3 (4.2-7.0)<br><br>LRP (n=211): 5.0 (4.1-6.5)<br><br>P=NR              | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br>LRP: NR                        | RALP: NR<br>LRP: NR   | RALP:<br>- ≤6: 128 (48.9)<br>- 7: 118 (45.0)<br>- ≥8: 16 (6.1)<br><br>LRP (n=215):<br>- ≤6: 120 (54.5) [55.8%]<br>- 7: 77 (35.0) [35.8%]<br>- ≥8: 18 (8.2) [8.4%]<br><br>*P=NR  | RALP (n=257): 46 (36-58)<br><br>LRP (n=211): 46 (40-59)<br><br>*P=NR |
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br>LRP: 85   | RALP: 60.4 (46-70) <sup>†</sup><br>LRP: 61.8 (39-73) <sup>†</sup><br><br>P=NR | RALP: 22.6 (22.0-25.0) <sup>†</sup><br><br>LRP: 23.0 (22.0-25.2) <sup>†</sup><br><br>P=NR | RALP: NR<br>LRP: NR             | RALP:<br>- Low: 30 (42.2)<br>- Intermediate: 33 (46.5)<br>- High: 8 (11.3)<br><br>LRP:<br>- Low: 37 (43.5)<br>- Intermediate: 36 (42.4)<br>- High: 12 (14.1)<br><br>P=NR | RALP: NR<br>LRP: NR  | RALP: 7.8 (3.0-24.0) <sup>†</sup><br><br>LRP: 8.9 (3.4-37.0) <sup>†</sup><br><br>P=NR | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR                        | RALP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 50 (70.4)<br>- cT2a, cT2b: 17 (24.0)<br>- cT2c: 4 (5.6)<br><br>LRP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 55 (64.7)<br>- cT2a, cT2b: 22 (25.9)<br>- cT2c: 8 (9.4)<br><br>P=NR | RALP: 6.2 (6-7) <sup>†</sup><br>- ≤5: 4 (5.6)<br>- 6: 56 (78.9)<br>- 7: 11 (15.5)<br>- ≥8: 0 (0.0)<br><br>LRP: 6.2 (3-8) <sup>†</sup><br>- ≤5: 2 (2.4)<br>- 6: 60 (70.6)<br>- 7: 21 (24.7)<br>- ≥8: 2 (2.4)<br><br>P=NR | RALP: NR<br>LRP: NR  |

Table 10. Characteristics of Participants

| Study                                       | Sample size               | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD  | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD          | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%)                | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|---------------------------|---|---|--|---|--|---|------------------------------|---|---|--|---|
| Hakimi et al (2009) <sup>155</sup><br>USA   | RALP: 75<br><br>LRP: 75   | RALP: 59.8 (42-71)†<br><br>LRP: 59.6 (43-72)†<br><br>P=0.88 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: 8.4±NR<br><br>LRP: 7.5±NR<br><br>P=0.22                       | RALP: NR<br><br>LRP: NR      | RALP: NR<br><br>LRP: NR                                   | RALP: NR<br><br>LRP: NR   | RALP:<br>- ≤6: 34 (45.3)<br>- 7: 40 (53.3)<br>- ≥8: 1 (1.3)<br><br>LRP:<br>- ≤6: 44 (58.7)<br>- 7: 28 (37.3)<br>- ≥8: 3 (4.0)<br><br>P=0.10                                | RALP: NR<br><br>LRP: NR   |
| Rozet et al (2009) <sup>156</sup><br>France | RALP: 133<br><br>LRP: 133 | RALP: 62.0(49-76)<br><br>LRP: 62.5(47-74)<br><br>P=0.46     | RALP:<br>24.8 (18.8-35.5)<br><br>LRP:<br>25.3 (19.3-32.7)<br><br>P=0.31 | RALP:<br>- 1: 57 (42.9)<br>- 2: 74 (55.6)<br>- 3: 2 (1.5)<br><br>LRP:<br>- 1: 57 (42.9)<br>- 2: 74 (55.6)<br>- 3: 2 (1.5)<br><br>P= 1.00 | RALP:<br>- Low: 80 (60.2)<br>- Intermediate: 49 (36.8)<br>- High: 4 (3.0)<br><br>LRP:<br>- Low: 80 (60.2)<br>- Intermediate: 49 (36.8)<br>- High: 4 (3.0)<br><br>P=1.00 | RALP: NR<br><br>LRP: NR  | RALP:<br>7.6 (0.9-38.0)<br><br>LRP:<br>7.8 (3.2-19.0)<br><br>P=0.81 | RALP: NR<br><br>LRP: NR      | RALP:<br>51 (38.3)<br><br>LRP:<br>51 (38.3)<br><br>P=1.00 | RALP:<br>- cT1b: 0 (0.0)<br>- cT1c: 76 (57.1)<br>- cT2a: 51 (38.4)<br>- cT2b: 6 (4.5)<br>- cT3a: 0 (0.0)<br><br>LRP:<br>- cT1b: 1 (0.8)<br>- cT1c: 90 (67.7)<br>- cT2a: 39 (29.3)<br>- cT2b: 2 (1.5)<br>- cT3a: 1 (0.8)<br><br>P=NR | RALP: 6.3 (4.0-9.0)†<br>- ≤6: 101 (75.9)<br>- 7: 29 (21.8)<br>- ≥8: 3 (2.3)<br><br>LRP: 6.3 (4.0-9.0)†<br>- ≤6: 93 (69.9)<br>- 7: 37 (27.8)<br>- ≥8: 3 (2.3)<br><br>P=0.32 | RALP: NR<br><br>LRP: NR   |
| Trabulsi et al (2008) <sup>157</sup><br>USA | RALP: 50<br><br>LRP: 190  | RALP: 57.7 (37-70)†<br><br>LRP: 58.6 (43-74)†               | RALP:<br>28.4 (20.4-36.6)†<br><br>LRP:                                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP:<br>5.5 (1.1-21.1)†<br><br>LRP:<br>6.5 (0.4-46)†               | RALP: NR<br><br>LRP: NR      | RALP: NR<br><br>LRP: NR                                   | RALP:<br>- cT1c: 41 (82.0)<br>- cT2a: 9 (18.0)  | RALP:<br>- ≤6: 36 (72.0)<br>- 3+4: 8 (16.0)<br>- 4+3: 4 (8.0)<br>- ≥8: 2 (4.0)   | RALP: NR<br><br>LRP: NR   |





Table 10. Characteristics of Participants

| Study                                   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD               | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%)    | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|---|---|---------------------------------|---|--|--|---|---|---|---|---|
|   |                       | P=0.44  | 26.8 (18.8-51.8) <sup>†</sup><br><br>P=0.04   |                                 |   |  | P=0.10   |   |   | LRP (n=185):<br>- cT1c: 145 (76.3)<br>- cT2a: 40 (21.1)<br><br>P≥0.05   | LRP (n=176):<br>- ≤6: 136 (71.6)<br>- 3+4: 31 (16.3)<br>- 4+3: 6 (3.2)<br>- ≥8: 3 (1.6)<br><br>P≥0.05   |   |
| Ball et al (2006) <sup>116</sup><br>USA | RALP: 82<br>LRP: 124  | RALP: 60±7<br>LRP: 61±7<br><br>P=NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR             | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: 6.0±2.4<br>LRP: 7.2±7.1<br><br>P=NR  | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR                           | RALP:<br>- cT1: 66 (80.5)<br>- cT2: 15 (18.3)<br>- cT3: 1 (1.2)<br><br>LRP:<br>- cT1: 100 (80.6)<br>- cT2: 24 (19.4)<br>- cT3: 0 (0.0)<br><br>P=NR  | RALP:<br>- ≤6: 59 (71.9)<br>- 7: 15 (18.3)<br>- ≥8: 8 (9.8)<br><br>LRP:<br>- ≤6: 94 (75.8)<br>- 7: 22 (17.7)<br>- ≥8: 8 (6.5)<br><br>P=NR   | RALP: NR<br>LRP: NR   |
| Hu et al (2006) <sup>158</sup><br>USA   | RALP: 322<br>LRP: 358 | RALP: 62.1 (41-84) <sup>†</sup><br>LRP: 63.7 (40-83) <sup>†</sup><br><br>P=NR | RALP: 27.5 (17.8-51.5) <sup>†</sup><br>LRP: 27.4 (17.9-43.8) <sup>†</sup><br><br>P=NR | RALP: NR<br>LRP: NR             | RALP (n=308):<br>- Low: 174 (54.0) [56.5%]<br>- Intermediate: 113 (35.1) [36.7%]<br>- High: 21 (6.5) [6.8%]<br><br>LRP (n=357):<br>- Low: 191 (53.4) [53.5%]<br>- Intermediate: 127 (35.5) [35.6%]<br>- High: 39 (10.9) [10.9%] | RALP: NR<br>LRP: NR  | RALP (n=321):<br>- 0-4: 66 (20.5) [20.6%]<br>- >4-10: 213 (66.1) [66.4%]<br>- >10: 42 (13.0) [13.1%]<br><br>LRP:<br>- 0-4: 55 (15.4) [15.4%]<br>- >4-10: 247 (69.0) [69.0%]<br>- >10: 56 (15.6) [15.6%]<br><br>*P=NR | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br><br>P=NA | RALP: 37 (11.5)<br>LRP: 39 (10.9)<br><br>P=NR | RALP (n=310):<br>- cT1a: 1 (0.3) [0.3%]<br>- cT1b: 0 (0.0) [0.0%]<br>- cT1c: 231 (71.7) [74.5%]<br>- cT2a: 59 (18.3) [19.0%]<br>- cT2b: 11 (3.4) [3.5%]<br>- cT2c: 7 (2.2) [2.3%]<br>- cT3a: 1 (0.3) [0.3%] | RALP (n=309):<br>6.0 (4-9) [1.6%]<br>- ≤5: 5 (1.5) [1.6%]<br>- 6-7: 289 (89.7) [93.5%]<br>- ≥8: 15 (4.7) [4.9%]<br><br>LRP (n=349):<br>6.0 (4-10) [2.5%]<br>- ≤5: 9 (2.5) [2.5%]<br>- 6-7: 322 (89.9) [90.2%] | RALP: NR<br>LRP: NR   |

Table 10. Characteristics of Participants

| Study                                     | Sample size                 | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)      | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------------|--|---|---------------------------------|-------------------------|--|--|-----------------------------------|--|--|---|---|
|   |                             |  |   |                                 | *P=NR                   |  | n (%)  |                                   |  | - cT3b: 0 (0.0)<br>[0.0%]<br><br>LRP:<br>- cT1a: 6 (1.7)<br>- cT1b: 2 (0.6)<br>- cT1c: 261 (72.9)<br>- cT2a: 72 (20.1)<br>- cT2b: 4 (1.1)<br>- cT2c: 10 (2.8)<br>- cT3a: 1 (0.3)<br>- cT3b: 2 (0.6)<br><br>*P=NR | - ≥8: 26 (7.3)<br>[7.3%]<br><br>*P=NR                                 |   |
| Joseph et al (2005) <sup>159</sup><br>USA | RALP: 50<br><br>LRP: 50     | RALP: 59.6±NR<br><br>LRP: 61.8±NR<br><br>P=0.06            | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR         | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR  | RALP: 6.0±NR<br><br>LRP: 7.3±NR<br><br>P=0.06              | RALP: NR<br><br>LRP: NR           | RALP: NR<br><br>LRP: NR                        | RALP:<br>- cT1c: 43 (86.0)<br>- cT2a: 6 (12.0)<br>- cT2b: 1 (2.0)<br><br>LRP:<br>- cT1c: 34 (68.0)<br>- cT2a: 14 (28.0)<br>- cT2b: 2 (4.0)<br><br>P=NR   | RALP: 6.0±NR<br><br>LRP: 6.0±NR<br><br>P=0.13                         | RALP: 53.0±NR<br><br>LRP: 51±NR<br><br>P=0.29                       |
| <b>RALP vs. ORP</b>                       |                             |  |   |                                 |                         |  |  |                                   |  |  |   |   |
| Hu et al (2017) <sup>160</sup><br>USA     | RALP: 4164<br><br>ORP: 4164 | RALP: 70.0±3.2<br><br>ORP: 70.0±3.1                        | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                    | RALP: 0 (0.0)<br><br>ORP: 0 (0.0) | RALP: NR<br><br>ORP: NR                        | RALP (n=4125):<br>- cT1: 93 (2.2)<br>- cT2: 3091   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size                | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                           | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|----------------------------|--|---|---------------------------------|--|--|--|------------------------------|--|--|--|---|
|   |                            | P=NR   |   |                                 |  |  |  | P=NA                         |  | (74.2)<br>- cT3: 891 (21.4)<br>- cT4: 50 (1.2)<br><br>ORP (4132):<br>- cT1: 90 (2.2)<br>- cT2: 3087 (74.1)<br>- cT3: 917 (22.0)<br>- cT4: 38 (0.9)<br><br>P=NR |  |   |
| Jackson et al. (2016) <sup>117</sup><br>USA   | RALP: 116<br><br>ORP: 63   | RALP: 58.6±5.8<br><br>ORP: 60.4±6.4<br><br>p=0.07          | RALP: 27.5±4.1<br><br>ORP: 27.8±4.8<br><br>p=0.75                       | RALP: NR<br><br>ORP: NR         | RALP:<br>- Low: 70 (60.3)<br>- Intermediate: 42 (36.2)<br>- High: 4 (3.4)<br><br>ORP:<br>- Low: 30 (47.6)<br>- Intermediate: 26 (41.3)<br>- High: 7 (11.1)<br><br>p=0.07 | RALP: NR<br><br>ORP: NR  | RALP:<br>5.2 [4.1-6.5]<br><br>ORP:<br>5.5 [4.5-6.5]<br><br>P=0.30                    | RALP: NR<br><br>ORP: NR      | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   |
| Ong et al. (2016) <sup>118</sup><br>Australia | RALP: 885<br><br>ORP: 1117 | RALP: 62.1±6.7<br><br>ORP: 62.3± 6.7<br><br>P=0.40         | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP (n=874):<br>5.5 [4.3-7.8]<br><br>ORP (n=1102):<br>6.1 [4.6-8.5]<br><br>*p<0.001 | RALP: NR<br><br>ORP: NR      | RALP: NR<br><br>ORP: NR                        | RALP (n=641):<br>- cT1, cT2a: 484 (54.7)<br>- cT2b, cT2c: 134 (15.1)<br>- cT3, cT4: 23 (2.6)   | RALP (n=884):<br>- ≤6: 279 (31.5)<br>- 7: 477 (53.9)<br>- ≥8: 128 (14.5)<br><br>ORP (n=1113):<br>- ≤6: 289 (25.9)<br>- 7: 632 (56.6) | RALP: NR<br><br>ORP: NR   |



Table 10. Characteristics of Participants

| Study                                      | Sample size                           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD   | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|---------------------------------------|---|---|---------------------------------|--|--|---|------------------------------|--|---|--|---|
|  |                                       |   |   |                                 |  |  |   |                              |  | ORP (n=814):<br>- cT1, cT2a:<br>621 (55.6)<br>- cT2b, cT2c:<br>138 (12.4)<br>- cT3, cT4: 55 (4.9)<br><br>P=0.02   | - ≥8: 192 (17.2)<br><br>P=0.02   |   |
| Pearce et al. (2016) <sup>161</sup><br>USA | RALP:<br>73,131<br><br>ORP:<br>23,804 | RALP:<br>- unmatched:<br>61.0±7.2<br>- matched:<br>61.2±7.1<br><br>ORP:<br>- unmatched:<br>62.5±8.2<br>- matched:<br>61.1±7.2<br><br>P=NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP:<br>- Low<br>- unmatched:<br>19,888 (28.5)<br>- matched: 3,940 (29.6)<br>- Intermediate<br>- unmatched:<br>32,153 (46.0)<br>- matched: 6,845 (51.3)<br>- High<br>- unmatched:<br>17,779 (25.5)<br>- matched: 2,546 (19.1)<br><br>ORP:<br>- Low<br>- unmatched: 4,857 (21.5)<br>- matched: 3,878 (29.1)<br>- Intermediate<br>- unmatched: 9,448 (41.9) | RALP:<br>- 0<br>- unmatched:<br>60,552 (82.8)<br>- matched:<br>10,993 (82.5)<br><br>- 1<br>- unmatched:<br>11,248 (15.4)<br>- matched:<br>2,014 (15.1)<br><br>- >1<br>- unmatched:<br>1,331 (1.8)<br>- matched:<br>324 (2.4)<br><br>ORP:<br>- 0<br>- unmatched:<br>19,151 (80.5)<br>- matched: | RALP:<br>- mean<br>- unmatched:<br>7.9 ± 10.2<br>- matched: 8.7 ± 11.5<br>- <10<br>- unmatched:<br>55,243 (85.5)<br>- matched:<br>11,019 (82.6)<br>- 10-20<br>- unmatched:<br>6,157 (9.5)<br>- matched:<br>1,475 (11.1)<br>- >20<br>- unmatched:<br>3,199 (5.0)<br>- matched: 837 (6.3)<br><br>ORP:<br>- mean<br>- unmatched:<br>9.0 ± 12.3 | RALP: NR<br><br>ORP: NR      | RALP: NR<br><br>ORP: NR                    | RALP:<br>- cT1<br>- unmatched:<br>51,531 (73.4)<br>- matched:<br>9,188 (68.9)<br>- cT2<br>- unmatched:<br>17,542 (25.0)<br>- matched:<br>3,823 (28.7)<br>- cT3/4<br>- unmatched:<br>1,152 (1.6)<br>- matched:<br>320 (2.4)<br><br>ORP:<br>- cT1<br>- unmatched:<br>14,264 (65.4)<br>- matched:<br>9,184 (68.9)<br>- cT2<br>- unmatched:<br>6,893 (31.6) | RALP:<br>- 6<br>- unmatched:<br>30,622 (47.3)<br>- matched:<br>5,839 (43.8)<br>- 7<br>- unmatched:<br>27,675 (42.8)<br>- matched:<br>5,795 (43.5)<br>- 8-10<br>- unmatched:<br>6,380 (9.9)<br>- matched:<br>1,697 (12.7)<br><br>ORP:<br>- 6<br>- unmatched:<br>8,617 (45.4)<br>- matched:<br>5,811 (43.6)<br>- 7<br>- unmatched:<br>7,981 (42.0) | RALP: NR<br><br>ORP: NR   |

Table 10. Characteristics of Participants

| Study  | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD               | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD   | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-------------------------|--|---|---------------------------------|---|--|--|------------------------------|--|---|---|---|
|  |                         |  |   |                                 | - matched: 6,884 (51.6)<br>- High<br>- unmatched: 8,243 (36.6)<br>- matched: 2,569 (19.3)<br><br>P=NR   | 10,964 (82.2)<br>- 1<br>- unmatched: 3,936 (16.5)<br>- matched: 2,065 (15.5)<br>- >1<br>- unmatched: 717 (3.0)<br>- matched: 302 (2.3)<br><br>P=NR | - matched: 8.6 ± 11.2<br>- <10<br>- unmatched: 15,559 (81.3)<br>- matched: 10,953 (82.2)<br>- 10-20<br>- unmatched: 2,172 (11.3)<br>- matched: 1,507 (11.3)<br>- >20<br>- unmatched: 1,422 (7.4)<br>- matched: 871 (6.5)<br><br>P=NR |                              |  | - matched: 3,815 (28.6)<br>- cT3/4<br>- unmatched: 650 (3.0)<br>- matched: 332 (2.5)<br><br>P=NR  | - matched: 5,813 (43.6)<br>- 8-10<br>- unmatched: 2,403 (12.6)<br>- matched: 1,707 (12.8)<br><br>P=NR   |   |
| Suardi et al. (2016) <sup>162</sup><br>Italy | RALP: 1790<br>ORP: 4404 | RALP:<br>63.2 [57.9-68.1]<br><br>ORP:<br>66.2 [60.9-70.7]<br><br>P<0.001 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 681 (38.0)<br>- Intermediate: 698 (39.0)<br>- High: 411 (23.0)<br><br>ORP:<br>- Low: 1127 (25.6)<br>- Intermediate: 1751 (39.8)<br>- High: 1526 (34.7)<br><br>P<0.001 | RALP: NR<br>ORP: NR  | RALP:<br>6.0 [4.6-8.3]<br><br>ORP:<br>7.2 [5.1-11.8]<br><br>P<0.001  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1: 1226 (68.5)<br>- cT2: 508 (28.4)<br>- cT3: 56 (3.1)<br><br>ORP:<br>- cT1: 2236 (50.8)<br>- cT2: 1499 (34.0)<br>- cT3: 669 (15.2)<br><br>P<0.001 | RALP:<br>- ≤6: 1168 (65.2)<br>- 7: 533 (29.8)<br>- ≥8: 89 (5.0)<br><br>ORP:<br>- ≤6: 2629 (59.7)<br>- 7: 1251 (28.4)<br>- ≥8: 524 (11.9)<br><br>P<0.001 | RALP:<br>45 [33-60.5]<br><br>ORP:<br>45 [33-61]<br><br>P=0.90       |

Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|---|---|---------------------------------|-----------------------|--|---|---|--|--|--|---|
| Yaxley et al. (2016) <sup>103</sup><br>Australia | RALP: 163<br>ORP: 163 | RALP (n=159):<br>60.4 ± 5.8<br><br>ORP (n=158):<br>59.6 ± 6.6 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP (n=157):<br>7.4 ± 4.1<br><br>ORP (n=151):<br>7.6 ± 4.1<br><br>p=0.77 | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP (n=130):<br>- ≤6: 23 (14.6) [17.7%]<br>- 3+4: 58 (36.9) [44.6%]<br>- 4+3: 29 (18.5) [22.3%]<br>- 8: 12 (7.6) [9.2%]<br>- 4+5: 8 (5.1) [6.2%]<br>- 5+4: 0 (0.0) [0.0%]<br><br>ORP (n=135):<br>- ≤6: 20 (13.2) [14.8%]<br>- 3+4: 68 (45.0) [50.4%]<br>- 4+3: 24 (15.9) [17.8%]<br>- 8: 9 (6.0) [6.7%]<br>- 4+5: 11 (7.3) [8.1%]<br>- 5+4: 3 (2.0) [2.2%]<br><br>*p=0.43 | RALP: NR<br>ORP: NR   |
| Akand et al. (2015) <sup>142</sup><br>Turkey     | RALP: 79<br>ORP: 50   | RALP:<br>60.3±NR<br><br>ORP:<br>63.8±NR                       | RALP:<br>26.9±NR<br><br>ORP:<br>25.4±NR                                 | RALP: NR<br>ORP: NR             | RALP: NR<br>LRP: NR   | RALP: NR<br>ORP: NR  | RALP:<br>8.3±NR<br><br>ORP:<br>7.3±NR                                     | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1a: 0 (0.0)<br>- cT1b: 3 (3.8)<br>- cT1c: 63 (79.7)<br>- cT2a: 9 (11.4) | RALP:<br>6.2±NR<br><br>ORP:<br>5.9±NR  | RALP:<br>39.8±NR<br><br>ORP:<br>38.4±NR                             |



Table 10. Characteristics of Participants

| Study   | Sample size            | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD               | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|------------------------|--|--|---|-----------------------|--|--|------------------------------|--|---|--|---|
|   |                        | P=NR   | P=NR   |   |                       |  | P=NR   |                              |  | - cT2b: 3 (3.8)<br>- cT2c: 1 (1.3)<br>- cT3a: 0 (0.0)<br><br>ORP:<br>- cT1a: 0 (0.0)<br>- cT1b: 0 (0.0)<br>- cT1c: 38 (76.0)<br>- cT2a: 7 (14.0)<br>- cT2b: 4 (8.0)<br>- cT2c: 1 (2.0)<br>- cT3a: 0 (0.0)<br><br>P=NR | P=NR   | P=NR  |
| Antonelli et al. (2015) <sup>163</sup><br>Italy | RALP: 291<br>LRP: 285  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR          | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA      | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   |
| Haglund et al (2015) <sup>119</sup><br>Sweden   | RALP: 1847<br>ORP: 778 | RALP: 63 [58-66]<br>ORP: 63 [59-67]<br><br>P=0.03          | RALP (n=1815): 25.9 [24.1-28.0]<br>ORP (n=766): 26.2 [24.5-28.1]<br><br>P=0.03 | RALP (n=1802):<br>- 1: 1113 (60.3)<br>- 2: 646 (35.0)<br>- 3: 43 (2.3)<br><br>ORP (n=741):<br>- 1: 508 (65.3)<br>- 2: 218 (28.0)<br>- 3: 15 (1.9) | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP (n=1842): 6.1 [4.5-8.9]<br>ORP (n=774): 6.2 [4.5-9.0]<br><br>P=0.73 | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP (n=1808):<br>- cT1: 1099 (59.5)<br>- cT2: 652 (35.3)<br>- cT3: 57 (3.1)<br><br>ORP (n=739):<br>- cT1: 494 (63.5)<br>- cT2: 218 (28.0)<br>- cT3: 27 (3.5)   | RALP (n=1834):<br>- ≤7: 1732 (93.8)<br>- ≥8: 102 (5.5)<br><br>ORP (n=761):<br>- ≤7: 716 (92.0)<br>- ≥8: 45 (5.8)<br><br>P=0.70 | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)          | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|--|---|---------------------------------|---|--|--|---------------------------------------|--|--|--|---|
|   |                       |  |   | P=0.01                          |   |  |  |                                       |  | P=0.01   |  |   |
| Lee et al. (2015) <sup>164</sup><br>South Korea       | RALP: 99<br>ORP: 99   | RALP: 66.4±NR<br>ORP: 66.5±NR<br>P=0.92                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 99 (100.0)<br><br>ORP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 99 (100.0)<br><br>P=NA       | RALP: NR<br>ORP: NR  | RALP: 17.7±NR<br>ORP: 16.0±NR<br>P=0.47                    | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 35 (35.4)<br>- cT2: 30 (30.3)<br>- cT3: 34 (34.3)<br><br>ORP:<br>- cT1: 35 (35.4)<br>- cT2: 34 (34.3)<br>- cT3: 30 (30.3)<br><br>P=0.78  | RALP:<br>- 6: 4 (4.0)<br>- 7: 19 (19.2)<br>- ≥8: 76 (76.8)<br><br>ORP:<br>- 6: 5 (5.1)<br>- 7: 16 (16.2)<br>- ≥8: 78 (78.8)<br><br>P=0.82    | RALP: 35.7±NR<br>ORP: 34.1±NR<br>P=0.42                             |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | RALP: 60.4 [41-69]<br>ORP: 60.6 [52-69]<br>P=0.72          | RALP: 23.7 [18.0-28.0]<br>ORP: 27.6 [23.0-34.0]<br>P=0.01               | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 22 (44.0)<br>- Intermediate: 25 (50.0)<br>- High: 3 (6.0)<br><br>ORP:<br>- Low: 19 (38.2)<br>- Intermediate: 19 (38.2)<br>- High: 12 (23.5)<br><br>P=0.06 | RALP: NR<br>ORP: NR  | RALP: 8.3 [1.0-20.7]<br>ORP: 7.5 [3.9-22.0]<br>P=0.55      | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1c: 31 (62.0)<br>- cT2a: 12 (24.0)<br>- cT2b: 7 (14.0)<br>- cT2c: 0 (0.0)<br><br>ORP:<br>- cT1c: 18 (52.9)<br>- cT2a: 9 (26.5)<br>- cT2b: 6 (17.6)<br>- cT2c: 1 (2.9)<br><br>P=0.58 | RALP:<br>- ≤6: 28 (56.0)<br>- 7: 21 (42.0)<br>- ≥8: 1 (2.0)<br><br>ORP:<br>- ≤6: 16 (47.1)<br>- 7: 12 (35.3)<br>- ≥8: 6 (17.6)<br><br>P=0.24 | RALP: 35.5 [12-68]<br>ORP: 36.8 [11-65]<br>P=0.89                   |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | RALP: 62.4 [58.0-66.7]<br>ORP:                             | RALP: ≥30: 194 (100.0)++  | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 5.7 [4.4-8.3]<br>ORP: 5.7 [4.1-                      | RALP: 0 (0.0)<br>ORP: 0 (0.0)         | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 147 (75.8)<br>- cT2: 47 (24.2)   | RALP:<br>- ≤6: 77 (39.7)<br>- 7: 93 (47.9)<br>- ≥8: 24 (12.4)  | RALP: NR<br>ORP: NR   |





Table 10. Characteristics of Participants

| Study  | Sample size               | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)                  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|---------------------------|--|---|---------------------------------|--|--|--|---|--|---|---|---|
|  |                           | 61.5 [56.9-66.4]<br><br>P=0.35                             | ORP:<br>- ≥30: 194 (100.0)++<br><br>P=NA                                |                                 |  |  | 7.3]<br><br>P=0.24   | P=NA  |  | ORP:<br>- cT1: 142 (73.2)<br>- cT2: 52 (26.8)<br><br>P=0.64   | ORP:<br>- ≤6: 89 (45.9)<br>- 7: 78 (40.2)<br>- ≥8: 27 (13.9)<br><br>P=0.31  |   |
| Davison et al. (2014) <sup>121</sup><br>Canada | RALP: 78<br><br>ORP: 73   | RALP: 61.3 ±6.4<br><br>ORP: 62.8±6.9<br><br>P=0.17         | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR                | RALP: NR<br><br>ORP: NR  | RALP: 6.2±2.8<br><br>ORP: 7.8±5.8<br><br>P=0.04            | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                        | RALP:<br>- cT1: 36 (46.1)<br>- cT2: 39 (50.0)<br>- cT3: 3 (9.9)<br><br>ORP:<br>- cT1: 30 (41.1)<br>- cT2: 38 (52.1)<br>- cT3: 5 (6.8)<br><br>P=0.64   | RALP: 6.6±0.6<br><br>ORP: 7.0±1.0<br><br>P<0.001  | RALP: NR<br><br>ORP: NR   |
| Fode et al. (2014) <sup>122</sup><br>Denmark   | RALP: 585<br><br>ORP: 453 | RALP: 65 (43-76)<br><br>ORP: 66 (45-76)<br><br>P<0.001     | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR<br><br>P<0.001 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                    | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                        | RALP:<br>- cT1a: 0 (0.0)<br>- cT1b: 1 (0.2)<br>- cT1c: 359 (61.4)<br>- cT2a: 120 (20.5)<br>- cT2b: 72 (12.3)<br>- cT2c: 31 (5.3)<br>- cT3a: 2 (0.3)<br><br>ORP:<br>- cT1a: 2 (0.4)<br>- cT1b: 3 (0.7)<br>- cT1c: 199 (43.9) | RALP:<br>- 5: 0 (0.0)<br>- 6: 134 (22.9) (51.3)<br>- 3+4: 300 (15.0)<br>- 4+3: 88 (15.0) (7.2)<br>- 8: 42 (7.2)<br>- 9: 21 (3.6)<br><br>ORP:<br>- 5: 1 (0.2)<br>- 6: 86 (19.0) (37.3)<br>- 3+4: 169 (19.6)<br>- 4+3: 89 (16.8)<br>- 8: 76 (16.8)<br>- 9: 32 (7.1) | RALP: NR<br><br>ORP: NR   |



Table 10. Characteristics of Participants

| Study   | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD   | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%)      | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-------------------------|---|---|---------------------------------|--|--|--|------------------------------|---|--|---|---|
|   |                         |   |   |                                 |  |  |  |                              |   | - cT2a: 81 (17.9)<br>- cT2b: 93 (20.5)<br>- cT2c: 69 (15.2)<br>- cT3a: 6 (1.3)<br><br>P<0.001  | P<0.001   |   |
| Gagnon et al. (2014) <sup>165</sup><br>Canada | RALP: 200<br>ORP: 200   | RALP: 64.2±7.1<br>ORP: 64.7±7.2<br><br>P=0.55                 | RALP (n=199): 27.2±3.3<br>ORP (195): 27.2±4.3<br><br>*P=0.86            | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 6.6±4.3<br>ORP: 11.2±11.9<br><br>P<0.001   | RALP: NR<br>ORP: NR          | RALP: 54 (27.0)<br>ORP: 62 (31.0)<br><br>P=0.44 | RALP (n=103):<br>- ≤cT1c: 98 (49.0)<br>- cT2: 5 (2.5)<br>- ≥cT3: 0 (0.0)<br><br>ORP(n=122):<br>- ≤cT1c: 105 (52.5)<br>- cT2: 15 (7.5)<br>- ≥cT3: 2 (1.0)<br><br>P=0.02 | RALP (n=199):<br>- 6: 97 (48.5)<br>- 7: 89 (44.5)<br>- ≥8: 13 (6.5)<br><br>ORP:<br>- 6: 49 (24.5)<br>- 7: 91 (45.5)<br>- ≥8: 60 (30.0)<br><br>P<0.001 | RALP (n=148): 36.9±24.0<br>ORP (n=129): 35.2±24.1<br><br>*P=0.55    |
| Gandaglia et al (2014) <sup>166</sup><br>USA  | RALP: 3476<br>ORP: 2439 | RALP: 68.0 [66.0-71.0]<br>ORP: 69.0 [67.0-71.0]<br><br>P=0.01 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- low: 841 (24.2)<br>- intermediate: 1835 (52.8)<br>- high: 800 (23.0)<br><br>ORP:<br>- low: 604 (24.8)<br>- intermediate: 1136 (46.6)<br>- high: 699 (28.7)<br><br>P<0.001 | RALP:<br>- 0: 2432 (70.0)<br>- 1: 354 (10.2)<br>- 2: 361 (10.4)<br>≥3: 329 (9.5)<br><br>ORP:<br>- 0: 1648 (67.6)<br>- 1: 248 (10.2)<br>- 2: 292 (12.0)<br>≥3: 251 (10.3) | RALP (n=3123)++:<br>- ≤10: 2607 (75.0)<br>- 10-20: 376 (10.8)<br>- >20: 140 (4.0)<br><br>ORP (n=2145)++:<br>- ≤10: 1691 (69.3)<br>- 10-20: 308 | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                             | RALP:<br>- cT1, cT2a: 3085 (88.8)<br>- cT2b: 82 (2.4)<br>- ≥cT2c: 309 (8.9)<br><br>ORP:<br>- cT1, cT2a: 2070 (84.9)<br>- cT2b: 74 (3.0)<br>- ≥cT2c: 295 (12.1)         | RALP:<br>- ≤6: 1004 (28.9)<br>- 7: 1978 (56.9)<br>- ≥8: 494 (14.2)<br><br>ORP:<br>- ≤6: 779 (31.9)<br>- 7: 1257 (51.5)<br>- ≥8: 403 (16.5)            | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD  | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)              | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-------------------------|--|---|---------------------------------|---|---|---|---|--|---|---|---|
|   |                         |  |   |                                 |   | P=0.10  | (12.6)<br>- >20: 146 (6.0)<br><br>P<0.001   |   |  | P<0.001   | P<0.001   |   |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP: 5524<br>ORP: 5524 | RALP: 69 [67-71]<br>ORP: 69 [67-71]<br><br>P=NR            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- low: 1128 (20.4)<br>- intermediate: 2335 (42.3)<br>- high: 2061 (37.3)<br><br>ORP:<br>- low: 1186 (21.5)<br>- intermediate: 1998 (36.2)<br>- high: 2340 (42.4)<br><br>P=NR | RALP:<br>- 0: 3435 (62.2)<br>- 1: 205 (3.7)<br>- 2: 713 (12.9)<br>- ≥3: 1171 (21.2)<br><br>ORP:<br>- 0: 3447 (62.4)<br>- 1: 180 (3.3)<br>- 2: 741 (13.4)<br>- ≥3: 1156 (20.9)<br><br>P=NR | RALP++:<br>- ≤10: 4772 (86.4)<br>- 10-20: 563 (10.2)<br>- >20: 189 (3.4)<br><br>ORP++:<br>- ≤10: 4760 (86.2)<br>- 10-20: 580 (10.5)<br>- >20: 184 (3.3)<br><br>P=NR | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1: 3447 (62.4)<br>- cT2a, cT2b: 1547 (28.0)<br>- ≥cT2c: 530 (9.6)<br><br>ORP:<br>- cT1: 3323 (60.2)<br>- cT2a, cT2b: 1679 (30.4)<br>- ≥cT2c: 522 (9.4)<br><br>P=NR                                   | RALP:<br>- ≤6: 1748 (31.6)<br>- 7: 3224 (58.4)<br>- ≥8: 552 (10.0)<br><br>ORP:<br>- ≤6: 1958 (35.4)<br>- 7: 2866 (51.9)<br>- ≥8: 700 (12.7)<br><br>P=NR | RALP: NR<br>ORP: NR   |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP: 175<br>ORP: 175   | RALP: 65.6±6.5<br>ORP: 65.9±6.1<br><br>P=0.59              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 42 (24.0)<br>- Intermediate: 38 (21.7)<br>- High: 95 (54.3)<br><br>ORP:<br>- Low: 38 (21.7)<br>- Intermediate: 41 (23.4)<br>- High: 96 (54.9)<br><br>P=0.85           | RALP: NR<br>ORP: NR   | RALP: 12.3±16.6<br>ORP: 12.2±16.1<br><br>P=0.95   | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR                            | RALP (n=174):<br>- cT1: 28 (16.0)<br>- cT2: 87 (49.7)<br>- cT3: 58 (33.1)<br>- cT4: 1 (0.6)<br><br>ORP:<br>- cT1: 31 (17.7)<br>- cT2: 84 (48.0)<br>- cT3: 59 (33.7)<br>- cT4: 1 (0.6)<br><br>P=1.00<br><br>P=0.82 | RALP:<br>- ≤6: 50 (28.6)<br>- 7: 92 (52.6)<br>- ≥8: 33 (18.9)<br><br>ORP:<br>- ≤6: 50 (28.6)<br>- 7: 92 (52.6)<br>- ≥8: 33 (18.9)<br><br>P=1.00         | RALP: NR<br>ORP: NR   |
| Ritch et al                                     | RALP: 742               | RALP: 62 [57-67]   | RALP: 28.5  | RALP: NR                        | RALP:   | RALP: NR  | RALP: 6.7 [4.8-   | RALP: 0 (0.0)                             | RALP: NR                                       | RALP:   | RALP:   | RALP: NR  |



Table 10. Characteristics of Participants

| Study   | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                  | Neoadjuvant therapy<br>n (%)                | Previous abdominal/pelvic surgery<br>n (%)      | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-------------------------|---|---|---------------------------------|---|--|---|---|---|--|---|---|
| (2014) <sup>169</sup><br>USA  | ORP: 237                | ORP: 63 [57-67]<br><br>P=0.32                                 | [25.9-31.9]<br><br>ORP: 27.1 [24.6-30.4]<br><br>P=0.001                 | ORP: NR                         | - low: 0 (0.0)<br>- intermediate: 584 (78.7)<br>- high: 158 (21.3)<br><br>ORP:<br>- low: 0 (0.0)<br>- intermediate: 151 (63.7)<br>- high: 86 (36.3)<br><br>P<0.001  | ORP: NR  | 11.0]<br><br>ORP: 7.9 [5.4-13.0]<br><br>P=0.002                             | ORP: 0 (0.0)<br><br>P=NA                    | ORP: NR   | - cT1, cT2: 727 (98.0)<br>- cT3a: 13 (1.8)<br>- cT3b: 1 (0.3)<br><br>ORP (n=235):<br>- cT1, cT2: 226 (95.4) [96.2%]<br>- cT3a: 8 (3.4) [3.4%]<br>- cT3b: 1 (0.4) [0.4%]<br><br>*p=0.20     | - ≤6: 119 (16.0)<br>- 3+4: 379 (51.1)<br>- 4+3: 130 (17.5)<br>- ≥8: 114 (15.4)<br><br>ORP:<br>- ≤6: 45 (19.0)<br>- 3+4: 92 (38.8)<br>- 4+3: 35 (14.8)<br>- ≥8: 65 (27.4)<br><br>P<0.001 | ORP: NR   |
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | RALP: 89<br>ORP: 105    | RALP: 67 (47-79)<br>ORP: 68 (50-79)<br><br>P≥0.05             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 7.3 (2.9-35.1)<br><br>ORP: 9.0 (2.9-44.2)<br><br>P≥0.05               | RALP: 7 (7.9)<br>ORP: 6 (5.7)<br><br>P≥0.05 | RALP: 22 (24.7)<br>ORP: 27 (25.7)<br><br>P≥0.05 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>ORP: 9778 | RALP (n=7683): 60.8±6.9<br>ORP (n=9768): 60.5±6.9<br><br>P=NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP (n=4951):<br>- Low: 2381 (30.9) [48.1%]<br>- Intermediate: 2031 (26.4) [41.0%]<br>- High: 539 (7.0) [10.9%]<br><br>ORP (n=6461):<br>- Low: 2606 (26.7) [40.3%]<br>- Intermediate: 2552 (26.1) [39.5%]<br>- High: 1303 (13.1) | RALP: NR<br>ORP: NR  | RALP (n=7650): 5.4 (3.7) +++<br><br>ORP (n=8807): 6.5 (5.0) +++<br><br>P=NR | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                             | RALP (n=5016):<br>- cT1: 3660 (47.6) [73.0%]<br>- cT2: 1307 (17.0) [26.1%]<br>- cT3- cT4: 49 (0.6) [1.0%]<br><br>ORP (n=7658):<br>- cT1: 4129 (42.2) [53.9%]<br>- cT2: 3161 (32.3) [41.3%] | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |



Table 10. Characteristics of Participants

| Study  | Sample size            | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|------------------------|--|---|---|-------------------------|--|--|---|--|--|---|---|
|  |                        |  |   |   | [20.2%]<br>P=NR         |  |  |   |  | - cT3- cT4: 368 (3.8) [4.8%]<br><br>P=NR   |   |   |
| Choo et al. (2013) <sup>171</sup><br>South Korea | RALP: 77<br>ORP: 176   | RALP: 66.0±7.8<br><br>ORP: 67.0±6.3<br><br>P=0.15          | RALP: 24.0±2.6<br><br>ORP: 24.0±2.7<br><br>P=0.70                       | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | RALP: 7.2±13.2<br><br>ORP: 7.6±19.3<br><br>P=0.09          | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                    | RALP:<br>- cT1: 56 (72.7)<br>- cT2: 21 (27.3)<br><br>ORP:<br>- cT1: 115 (65.3)<br>- cT2: 61 (34.7)<br><br>P=0.16 | RALP (n=75):<br>- ≤6: 41 (53.2) [54.7%]<br>- 7: 20 (26.0) [26.7%]<br>- ≥8: 14 (18.2) [18.7%]<br><br>ORP (n=171):<br>- ≤6: 84 (47.7) [49.1%]<br>- 7: 48 (27.3) [28.1%]<br>- ≥8: 39 (22.2) [22.8%]<br><br>*P=0.68 | RALP: 41.0±15.8<br><br>ORP: 42.0±18.8<br><br>P=0.48                 |
| Froehner et al. (2013) <sup>172</sup><br>Germany | RALP: 317<br>ORP: 2437 | RALP: 62.6±NR<br><br>ORP: 64.9±NR<br><br>P<0.001           | RALP: NR<br><br>ORP: NR   | RALP (n=270):<br>- ≤2: 246 (77.6) [91.1%]<br>- 3: 24 (7.6) [8.9%]<br><br>ORP (n=1745):<br>- ≤2: 1464 (60.1) [83.9%]<br>- 3: 281 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | RALP: 6.4±NR<br><br>ORP: 10.4±NR<br><br>P<0.001            | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                    | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   |



Table 10. Characteristics of Participants

| Study  | Sample size               | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|---------------------------|--|--|-----------------------------------|---|--|--|---|--|--|---|---|
|  |                           |  |  | (11.5)<br>[16.1%]<br><br>*P=0.002 |   |  |  |   |  |  |   |   |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium | RALP: 64<br><br>ORP: 116  | RALP: 61.5±6.1<br><br>ORP: 62.2±6.1<br><br>P=0.44          | RALP++:<br>- ≤25: 21 (32.8)<br>- >25-30: 36 (56.3)<br>->30: 7 (10.9)<br><br>ORP++:<br>- ≤25: 33 (28.4)<br>- >25-30: 63 (54.3)<br>->30: 20 (17.2)<br><br>P=0.50 | RALP: NR<br><br>ORP: NR           | RALP:<br>- Low: 14 (21.9)<br>- Intermediate: 43 (67.2)<br>- High: 7 (10.9)<br><br>ORP (n=115):<br>- Low: 8 (6.9) [6.9%]<br>- Intermediate: 50 (43.1) [43.5%]<br>- High: 57 (49.1) [49.6%]<br><br>*P<0.001 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                    | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                    | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   |
| Harty et al. (2013) <sup>200</sup><br>USA        | RALP: 152<br><br>ORP: 153 | RALP: 61.3±6.0<br><br>ORP: 59.5±6.5<br><br>P=NR            | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR           | RALP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 152 (100.0)<br><br>ORP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 153 (100.0)<br><br>P=NA                                     | RALP: NR<br><br>ORP: NR  | RALP: 6.0 (NR)<br><br>ORP: 5.6 (NR)<br><br>P=NR            | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                    | RALP:<br>- cT1: 91 (59.9)<br>- cT2: 61 (40.1)<br><br>ORP:<br>- cT1: 108 (70.6)<br>- cT2: 45 (29.4)<br><br>P=NR | RALP:<br>- 6: 52 (34.2)<br>- 7: 67 (44.1)<br>- ≥ 8: 33 (21.7)<br><br>ORP:<br>- 6: 66 (43.1)<br>- 7: 59 (38.6)<br>- ≥ 8: 28 (18.3)<br><br>P=NR | RALP:<br>47.5±14.5<br><br>ORP: 39.6±12.2<br><br>P=NR                |
| Ludovico et al. (2013) <sup>124</sup>            | RALP: 82                  | RALP: 68.1±2.3   | RALP: NR   | RALP: NR                          | RALP: NR  | RALP: 6.0±0.8  | RALP: 8.3±3.1  | RALP: NR                                      | RALP: 0 (0.0)                              | RALP:<br>- cT1, cT2a: 82   | RALP:<br>- 6: 38 (46.3)   | RALP: NR  |



Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|---|---|---------------------------------|-----------------------|--|--|---|--|--|--|---|
| Italy  | ORP: 48               | ORP: 66.7±9.9<br><br>P=0.22                                 | ORP: NR   | ORP: NR                         | ORP: NR               | ORP: 6.3±1.1<br><br>P=0.07 (age-adjusted)                        | ORP: 7.9±2.1<br><br>P=0.38                                 | ORP: NR                                   | ORP: 0 (0.0)<br><br>P=NA                   | (100.0)<br><br>ORP:<br>- cT1, cT2a: 82 (100.0)<br><br>P=NA   | - 3+4: 29 (35.4)<br>- 4+3: 15 (18.3)<br><br>ORP:<br>- 6: 29 (60.4)<br>- 3+4: 12 (25.0)<br>- 4+3: 7 (14.6)<br><br>P=0.15  | ORP: NR   |
| Masterson et al (2013) <sup>173</sup><br>USA   | RALP: 669<br>ORP: 357 | RALP: 61.0±NR<br>ORP: 60.0±NR<br><br>P=0.07                 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 7.1±NR<br>ORP: 7.6±NR<br><br>P=0.02                  | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   |
| Pierorazio et al. (2013) <sup>149</sup><br>USA | RALP: 105<br>ORP: 743 | RALP: 62.0 (41.0-76.0)<br>ORP: 60.0 (38.0-74.0)<br><br>P=NR | RALP: 27.3 (21.8-38.5)<br>ORP: 27.1 (16.0-41.8)<br><br>P=NR             | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 6.4 (2.4-45.0)<br>ORP: 6.7 (0.2-97.0)<br><br>P=NR    | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                        | RALP (n=97):<br>- cT1c, cT2a: 75 (71.4) [77.3%]<br>- cT2b: 13 (12.4) [13.4%]<br>- cT2c, cT3a: 9 (8.6) [9.3%]<br><br>ORP (n=729):<br>- cT1c, cT2a: 547 (73.6) [75.0%]<br>- cT2b: 105 (14.1) [14.4%]<br>- cT2c, cT3a: 77 (10.4) [10.6%]<br><br>*P=NR | RALP (n=104):<br>- ≤6: 31 (29.5) [29.8%]<br>- 7: 37 (35.2) [35.6%]<br>- 8: 23 (21.9) [22.1%]<br>- ≥9: 13 (12.4) [12.5%]<br><br>ORP (740):<br>- ≤6: 141 (19.0) [19.1%]<br>- 7: 301 (40.5) [40.7%]<br>- 8: 191 (25.7) [25.8%]<br>- ≥9: 107 (14.4) [14.5%]<br><br>*P=NR | RALP: 46.5 (24.7-94.5)<br><br>ORP: 50.0 (8.5-224.0)<br><br>P=NR     |



Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD  | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|--|---|--|---|--|---|---|--|---|---|---|
| Punnen et al. (2013) <sup>174</sup><br>USA      | RALP: 233<br>ORP: 177 | RALP: 61.3±6.8<br>ORP: 60.8±6.4<br>P=0.50                  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 233 (100.0)<br><br>ORP:<br>- Low: 0 (0.0)<br>- Intermediate: 0 (0.0)<br>- High: 177 (100.0)<br><br>P=NA             | RALP: NR<br>ORP: NR  | RALP++:<br>- ≤4: 35 (15.0)<br>- 4-10: 137 (58.8)<br>- >10: 61 (26.2)<br>ORP++:<br>- ≤4: 19 (10.7)<br>- 4-10: 109 (61.6)<br>- >10: 49 (27.7)<br><br>P=0.50 | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA     | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 92 (39.5)<br>- cT2: 139 (59.7)<br>- cT3: 2 (0.9)<br><br>ORP:<br>- cT1: 59 (33.3)<br>- cT2: 116 (65.5)<br>- cT3: 2 (1.1)<br><br>P=0.43 | RALP:<br>- ≤6: 8 (3.4)<br>- 3+4: 8 (3.4)<br>- 4+3: 61 (26.2)<br>- ≥8: 156 (67.0)<br><br>ORP:<br>- ≤6: 8 (4.5)<br>- 3+4: 5 (2.8)<br>- 4+3: 59 (33.3)<br>- ≥8: 105 (59.3)<br><br>P=0.38 | RALP: NR<br>ORP: NR   |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br>ORP: 341 | RALP: 64.9±7.0<br>ORP: 64.9±6.7<br>P=0.26                  | RALP: 24.6±2.7<br>ORP: 24.7±2.7<br>P=0.65                               | RALP:<br>- ≤2: 510 (97.3)<br>- 3: 14 (2.7)<br><br>ORP:<br>- ≤2: 333 (97.7)<br>- 3: 8 (2.3)<br><br>P=0.77 | RALP:<br>- Low: 171 (32.6)<br>- Intermediate: 200 (38.2)<br>- High: 153 (29.2)<br><br>ORP:<br>- Low: 110 (32.3)<br>- Intermediate: 115 (33.7)<br>- High: 116 (34.0)<br><br>P=0.26 | RALP: NR<br>ORP: NR  | RALP: 10.1±11.4<br>ORP: 9.7±11.2<br>P=0.19  | RALP: 41 (7.8)<br>ORP: 28 (8.2)<br>P=0.84 | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: 36.0±16.9<br>ORP: 36.2±17.8<br>P=0.58                         |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br>ORP: 961 | RALP: 61.0 [56–66]<br>ORP: 60.0 [54–65]<br>P=NR            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 5.0 [4.0–7.0]<br>ORP: 5.0 [4.0–8.0]<br>P=NR   | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1b: 0 (0.0)<br>- cT1c: 299 (60.6)<br>- cT2a: 107 (21.7)<br>- ≥cT2b: 87 (17.7)  | RALP:<br>- ≤6: 170 (34.5)<br>- 7: 269 (54.6)<br>- ≥8: 54 (10.9)<br><br>ORP:<br>- ≤6: 373 (38.8)<br>- 7: 464 (48.3)<br>- ≥8: 124 (12.9)  | RALP: NR<br>ORP: NR   |



Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)              | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|--|---|---------------------------------|-----------------------|--|---|---|--|---|---|---|
|   |                       |  |   |                                 |                       |  |   |   |  | ORP:<br>- cT1b: 3 (0.3)<br>- cT1c: 613 (63.8)<br>- cT2a: 142 (14.8)<br>- ≥cT2b: 203 (21.1)<br><br>P≥0.05                  | P≥0.05  |   |
| Son et al. (2013) <sup>177</sup><br>South Korea | RALP: 146<br>ORP: 112 | RALP: 65.5±6.7<br>ORP: 65.0±6.1<br><br>P=0.54              | RALP: 24.5±2.5<br>ORP: 24.3±2.4<br><br>P=0.58                           | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP++:<br>- ≤4: 21 (14.4)<br>- 4-10: 68 (46.6)<br>- >10: 57 (39.0)<br><br>ORP++:<br>- ≤4: 18 (16.1)<br>- 4-10: 59 (52.7)<br>- >10: 35 (31.3)<br><br>P=0.43 | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: 45.9±16.3<br>ORP: 41.3±30.0<br><br>P=0.15                     |
| Bae et al (2012) <sup>178</sup><br>South Korea  | RALP: 111<br>ORP: 70  | RALP: 65.4±6.6<br>ORP: 66.1±5.0<br><br>P=0.44              | RALP: 24.0±2.3<br>ORP: 23.1±2.7<br><br>P=0.03                           | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 16.0±16.2<br>ORP: 15.9±18.0<br><br>P=0.97   | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1, cT2: 45 (40.5)<br>- cT3: 66 (59.5)<br><br>ORP:<br>- cT1, cT2: 32 (45.7)<br>- cT3: 38 (54.3)<br><br>P=0.49 | RALP:<br>- 6: 22 (19.8)<br>- 7: 58 (52.3)<br>- ≥8: 31 (27.9)<br><br>ORP:<br>- 6: 18 (25.7)<br>- 7: 32 (45.7)<br>- ≥8: 20 (28.6)<br><br>P=0.59 | RALP: 33.4±15.5<br>ORP: 28.8±13.6<br><br>P=0.05                     |
| Hong et al. (2012) <sup>8</sup><br>USA          | RALP: 182<br>ORP: 80  | RALP: 60.8±6.8<br>ORP: 60.5±6.8                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size         | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)          | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|---------------------|--|---|---|--|--|--|---------------------------------------|--|---|---|---|
|   |                     | P=0.77   |   |   |  |  |  |                                       |  |   |   |   |
| Lumen et al. (2012) <sup>179</sup><br>Belgium       | RALP: 50<br>ORP: 50 | RALP: 64 (50-78)<br>ORP: 61 (45-75)<br>P=0.02              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP:<br>- low: 13 (26.0)<br>- intermediate: 20 (40.0)<br>- high: 17 (34.0)<br>ORP:<br>- low: 8 (16.0)<br>- intermediate: 20 (40.0)<br>- high: 22 (44.0)<br>P=0.40 | RALP: NR<br>ORP: NR  | RALP: 7.4 (3.9-162)<br>ORP: 10.2 (1.8-39.0)<br>P=0.97      | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19 | RALP: 69.05±4.78<br>ORP: 67.58±5.34<br>P=0.5581            | RALP: NR<br>ORP: NR   | RALP:<br>- 1: 1 (5.3)<br>- 2: 14 (73.7)<br>- 3: 4 (21.1)<br>ORP:<br>- 1: 2 (10.5)<br>- 2: 13 (68.4)<br>- 3: 4 (21.1)<br>P <sub>1</sub> =NR<br>P <sub>2</sub> =NSR<br>P <sub>3</sub> =NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 5.2±4.1<br>ORP: 5.6±4.3<br>P=0.93                    | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 10 (52.6)<br>- cT2: 9 (47.4)<br>- cT3: 0 (0.0)<br>ORP:<br>- cT1: 11 (57.9)<br>- cT2: 8 (42.1)<br>- cT3: 0 (0.0)<br>P=NR | RALP:<br>- ≤6: 12 (63.2)<br>- 7: 3 (15.8)<br>- ≥8: 4 (21.1)<br>ORP:<br>- ≤6: 11 (57.9)<br>- 7: 4 (21.1)<br>- ≥8: 4 (21.1)<br>P=NR | RALP: 26.8±10.1<br>ORP: 27.3±11.3<br>P=0.73                         |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50 | RALP: 62.4±5.6+++<br>ORP: 62.5±6.4+++<br>P=0.66            | RALP:<br>23.7±4.4+++<br>ORP:<br>24.4±3.7+++<br>P=0.30                   | RALP:<br>- 1: 13 (26.0)<br>- 2: 37 (74.0)<br>- 3: 0 (0.0)<br>ORP:<br>- 1: 9 (18.0)  | RALP:<br>- Low: 25 (50.0)<br>- Intermediate: 21 (42.0)<br>- High: 4 (8.0)<br>ORP:  | RALP: NR<br>ORP: NR  | RALP:<br>8.1±4.4+++<br>ORP:<br>8.6±5.4+++<br>P=0.86        | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP: 2 (4.0)<br>ORP: 3 (6.0)<br>P=0.82    | RALP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 25 (50.0)<br>- cT2a: 17 (34.0)  | RALP:<br>- 6: 30 (60.0)<br>- 7: 18 (36.0)<br>- 8: 2 (4.0)<br>ORP:<br>- 6: 28 (56.0)   | RALP: 43.4±15.9<br>ORP: 42.9±13.6<br>P=0.89                         |



Table 10. Characteristics of Participants

| Study                                     | Sample size                 | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD              | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD  | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------------|--|---|--|---|---|--|------------------------------|--|---|---|---|
|   |                             |  |   | - 2: 38 (76.0)<br>- 3: 3 (6.0)<br><br>P=0.18 | - Low: 21 (42.0)<br>- Intermediate: 20 (40.0)<br>- High: 9 (18.0)<br><br>P=0.32 |   |  |                              |  | - cT2b: 4 (8.0)<br>- cT2c: 4 (8.0)<br>- cT3: 0 (0.0)<br><br>ORP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 23 (46.0)<br>- cT2a: 15 (30.0)<br>- cT2b: 5 (10.0)<br>- cT2c: 7 (14.0)<br>- cT3: 0 (0.0)<br><br>P=0.62 | - 7: 20 (40.0)<br>- 8: 2 (4.0)<br><br>P=0.82                          |   |
| Trinh et al. (2012) <sup>181</sup><br>USA | RALP: 7598<br><br>ORP: 7389 | RALP: 62 [56-67]<br><br>ORP: 62 [57-67]<br><br>P=0.73      | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                      | RALP: NR<br><br>ORP: NR   | RALP:<br>- 0: 5913 (77.8)<br>- 1: 1432 (18.8)<br>- 2: 191 (2.5)<br>- ≥3: 62 (0.8)<br><br>ORP:<br>- 0: 5644 (76.4)<br>- 1: 1470 (19.9)<br>- 2: 215 (2.9)<br>- ≥3: 60 (0.8)<br><br>P=0.15 | RALP: NR<br><br>ORP: NR                                    | RALP: NR<br><br>ORP: NR      | RALP: NR<br><br>ORP: NR                    | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   |
| Wang et al. (2012) <sup>182</sup>         | RALP: 1038                  | RALP: 60.4±6.4   | RALP: 28.5±3.2  | RALP: NR                                     | RALP: NR  | RALP: NR  | RALP: 2.4±1.2  | RALP: 28 (2.7)               | RALP: NR                                   | RALP: NR  | RALP:<br>- ≤6: 510 (49.1)   | RALP: NR  |

Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|---|---|---------------------------------|---|--|---|---|--|--|--|---|
| USA   | ORP: 707              | ORP: 59.7±8.0<br><br>P=0.04                                       | ORP: 28.5±5.3<br><br>P=0.92   | ORP: NR                         | ORP: NR   | ORP: NR  | ORP: 3.9±2.1<br><br>P=0.52                                    | ORP: 34 (4.8)<br><br>P=0.02               | ORP: NR                                    | ORP: NR  | - 7: 474 (45.7)<br>- ≥8: 54 (5.2)<br><br>ORP:<br>- ≤6: 311 (44.0)<br>- 7: 322 (45.5)<br>- ≥8: 74 (10.5)<br><br>P<0.001 | ORP: NR   |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75<br>ORP: 75   | RALP: 62.8 [58.4-67.0]<br><br>ORP: 64.3 [59.1-68.0]<br><br>P=0.15 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 12 (16.0)<br>- Intermediate: 48 (64.0)<br>- High: 15 (20.0)<br><br>ORP:<br>- Low: 16 (21.3)<br>- Intermediate: 40 (53.3)<br>- High: 19 (25.3)<br><br>P=0.26 | RALP: NR<br>ORP: NR  | RALP: 7.7 [5.6-12.1]<br><br>ORP: 7.6 [5.1-10.4]<br><br>P=0.41 | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark         | RALP: 77<br>ORP: 154  | RALP: 62.2±NR<br><br>ORP: 62.2±NR<br><br>P=NR                     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 11.6±NR<br><br>ORP: 14.4±NR<br><br>P=NR                 | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                        | RALP:<br>- cT2: 72 (93.5)<br><br>ORP:<br>- cT2: 146 (94.8)<br><br>P=NR | RALP:<br>- <7: 55 (71.4)<br><br>ORP:<br>- <7: 106 (68.8)<br><br>P=NR   | RALP: NR<br>ORP: NR   |
| Kim et al. (2011) <sup>127</sup><br>South Korea       | RALP: 528<br>ORP: 235 | RALP: 64.2±7.3<br><br>ORP: 66.5±5.7<br><br>P<0.01                 | RALP: 24.5±2.7<br><br>ORP: 25.1±3.6<br><br>P=0.01                       | RALP: NR<br>ORP: NR             | RALP:<br>- low: 177 (33.5)<br>- intermediate/ high: 351 (66.5)  | RALP: NR<br>ORP: NR  | RALP: 10.4±16.0 (9.3)<br><br>ORP: 14.6±22.1<br><br>P=0.003    | RALP: 49 (9.3)<br><br>ORP: 41 (17.4)      | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 340 (64.4)<br>- cT2: 145 (27.5)                        | RALP (n=523):<br>- ≤6: 232 (43.9) [44.4%]<br>- 7: 168 (31.8) [32.1%]   | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                        | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|---|---|---------------------------------|---|--|---|---|--|--|---|---|
|   |                       |   |   |                                 | ORP:<br>- low: 59 (25.1)<br>- intermediate/ high:<br>176 (74.9)<br><br>P=0.02 |  |   | P=0.01  |  | - cT3: 43 (8.1)<br><br>ORP:<br>- cT1: 151 (64.3)<br>- cT2: 48 (20.4)<br>- cT3: 36 (15.3)<br><br>P=0.004  | - ≥8: 123 (23.3) [23.5%]<br><br>ORP (n=234):<br>- ≤6: 87 (37.0) [37.2%]<br>- 7: 78 (33.2) [33.3%]<br>- ≥8: 69 (29.4) [19.5%]<br><br>*p=0.12     |   |
| Magheli et al. (2011) <sup>152</sup><br>USA   | RALP: 522<br>ORP: 522 | RALP: 59.0 (35.0-77.0)<br><br>ORP: 59.0 (40.0-73.0)<br><br>P=NR                   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 4.8 (0.2-37.9)<br><br>ORP: 4.9 (0.2-35.6)<br><br>P=NR | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                        | RALP:<br>- cT1: 417 (79.9)<br>- cT2: 105 (20.1)<br><br>ORP:<br>- cT1: 423 (81.0)<br>- cT2: 99 (19.0)<br><br>P=NR                                 | RALP:<br>- ≤6: 394 (75.5)<br>- 7: 114 (21.8)<br>- ≥8: 14 (2.7)<br><br>ORP:<br>- ≤6: 371 (71.1)<br>- 7: 140 (26.8)<br>- ≥8: 11 (2.1)<br><br>P=NR | RALP: NR<br><br>ORP: NR   |
| Minniti et al. (2011) <sup>184</sup><br>Italy | RALP: 22<br>ORP: 93   | RALP: 62.6 (49-72) <sup>†</sup><br><br>ORP: 66.7 (49-72) <sup>†</sup><br><br>P=NR | RALP: 26.0±NR<br><br>ORP: 26.2±NR<br><br>P=NR                           | RALP: NR<br><br>ORP: NR         | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                     | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                        | RALP:<br>- cT1: 0 (0.0)<br>- cT2: 14 (63.6)<br>- cT3: 8 (36.4)<br><br>ORP:<br>- cT1: 0 (0.0)<br>- cT2: 76 (81.7)<br>- cT3: 17 (18.3)<br><br>P=NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   |



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| Study   | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-------------------------|--|---|---------------------------------|--|--|--|-------------------------------|--|--|--|---|
| Mirza et al. (2011) <sup>185</sup><br>USA     | RALP: 191<br>ORP: 180   | RALP: 60.1±7.3<br>ORP: 61.7±6.8<br>P=NR                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 85 (44.5)<br>- Intermediate: 93 (48.7)<br>- High: 13 (6.8)<br><br>ORP (n=179):<br>- Low: 37 (20.6)<br>- Intermediate: 83 (46.1)<br>- High: 59 (32.8)<br><br>P=NR | RALP: NR<br>ORP: NR  | RALP: 6.7±7.3<br>ORP: 8.9±9.4<br>P=NR                      | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP:<br>- ≤6: 91 (47.6)<br>- 7: 89 (46.6)<br>- ≥8: 11 (5.8)<br><br>ORP:<br>- ≤6: 38 (21.1)<br>- 7: 82 (45.6)<br>- ≥8: 60 (33.3)<br><br>P<0.001  | RALP: NR<br>ORP: NR   |
| Tollefson et al. (2011) <sup>186</sup><br>USA | RALP: 1084<br>ORP: 4824 | RALP: 60.0 (38-81)<br>ORP: 61.0 (31-84)<br>P=0.01          | RALP: 27.8 (18.9-60.3)<br>ORP: 27.5 (16.2-56.8)<br>P=0.09               | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 5.0 (0.1-42.3)<br>ORP: 5.4 (0.1-194.0)<br>P<0.001    | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 798 (73.6)<br>- cT2: 282 (26.0)<br>- cT3- cT4: 4 (0.4)<br><br>ORP:<br>- cT1: 2803 (58.1)<br>- cT2: 1869 (38.7)<br>- cT3- cT4: 152 (3.2)<br><br>P<0.001 | RALP (n=1072):<br>- ≤6: 750 (69.2) [70.0%]<br>- 7: 274 (25.3) [25.6%]<br>- ≥8: 48 (4.4) [4.5%]<br><br>ORP (n=4797):<br>- ≤6: 3072 (63.7) [64.4%]<br>- 7: 1298 (26.9) [27.1%]<br>- ≥8: 427 (8.9) [8.9%]<br><br>*P<0.001 | RALP: NR<br>ORP: NR   |
| Barocas et al. (2010) <sup>128</sup><br>USA   | RALP: 1413<br>ORP: 491  | RALP: 61.0±7.3<br>ORP: 62.0±7.3                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 5.4 [4.3-7.4]<br>ORP: 5.8 [4.6-                      | RALP: 0 (0.0)<br>ORP: 0 (0.0) | RALP: NR<br>ORP: NR                        | RALP (1406):<br>- ≥cT2: 315 (22.3) [22.4%]   | RALP (1411):<br>- ≤6: 986 (69.8) [69.9%]<br>- 7: 353 (25.0)  | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study                                      | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD      | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                 | Neoadjuvant therapy<br>n (%)                | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  |
|--|-----------------------|---|--|---------------------------------|--|--|--|---|--|---|--|--|
|  |                       | P=0.04  |  |                                 |  |  | 8.4]<br>P<0.01   | P=NA  |  | ORP (n=488):<br>- ≥cT2: 144 (29.3) [29.5%]<br><br>P<0.01  | [25.0%]<br>- ≥8: 72 (5.1) [5.1%]<br><br>ORP:<br>- ≤6: 327 (66.6)<br>- 7: 116 (23.6)<br>- ≥8: 48 (9.8)<br><br>*P<0.01   |  |
| Bolenz et al. (2010) <sup>153</sup><br>USA | RALP: 262<br>ORP: 161 | RALP: 61.0 [57.0-66.0]<br><br>ORP: 61.0 [56.0-65.0]<br><br>P=NR | RALP: 28.0 [25.0-30.0]<br><br>ORP (n=156): 27.0 [25.0-30.0]<br><br>*P=NR | RALP: NR<br>ORP: NR             | RALP: NR<br>LRP: NR  | RALP: NR<br>ORP: NR  | RALP (n=260): 5.3 [4.2-7.0]<br><br>ORP (n=152): 5.3 [4.3-7.0]<br><br>*P=NR | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA   | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR   | RALP:<br>- ≤6: 128 (48.9)<br>- 7: 118 (45.0)<br>- ≥8: 16 (6.1)<br><br>ORP (n=159):<br>- ≤6: 102 (63.3) [64.1%]<br>- 7: 43 (26.7) [27.0%]<br>- ≥8: 14 (8.7) [8.8%]<br><br>*P=NR | RALP (n=257): 46 [36-58]<br><br>ORP (n=155): 45 [37-59]<br><br>*P=NR |
| Breyer et al. (2010) <sup>129</sup><br>USA | RALP: 293<br>ORP: 695 | RALP: 59.7±7.1<br><br>ORP: 59.2±6.7<br><br>P=0.23               | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR             | RALP (n=277):<br>- Low: 120 (40.9) [43.3%]<br>- Intermediate: 101 (34.5) [36.5%]<br>- High: 56 (19.1) [20.2%]<br><br>ORP (n=638):<br>- Low: 224 (32.2) [35.1%] | RALP: NR<br>ORP: NR  | RALP: 7.1±5.4<br><br>ORP: 7.6±7.3<br><br>P=0.33                            | RALP: 0 (0.0)<br>ORP: 3 (0.4)<br><br>P=0.26 | RALP: NR<br>ORP: NR                        | RALP (n=282):<br>- cT1: 159 (54.3) [56.4%]<br>- cT2: 123 (42.0) [43.6%]<br>- cT3: 0 (0.0) [0.0%]<br><br>ORP (n=680):<br>- cT1: 242 (34.8) [35.6%] | RALP (n=288):<br>- 6: 166 (56.7) [57.6%]<br>- 3+4: 70 (23.9) [24.3%]<br>- 4+3: 29 (9.9) [10.1%]<br>- ≥8: 23 (7.8) [8.0%]<br><br>ORP (n=662):                                   | RALP: 34.5±18.3<br><br>ORP: 34.3±19.6<br><br>P=0.91                  |

Table 10. Characteristics of Participants

| Study   | Sample size            | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                      | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                              | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                         |
|---|------------------------|---|---|---------------------------------|---|--|---|------------------------------|--|---|---|---|
|   |                        |   |   |                                 | - Intermediate: 251 (36.1) [39.3%]<br>- High: 163 (23.4) [25.6%]<br><br>*P=0.05 |  |   |                              |  | - cT2: 434 (62.4) [63.8%]<br>- cT3: 4 (0.6) [0.6%]<br><br>*P<0.01   | - 6: 354 (50.9) [53.5%]<br>- 3+4: 149 (21.4) [22.5%]<br>- 4+3: 84 (12.1) [12.7%]<br>- ≥8: 75 (10.8) [11.3%]<br><br>*P=0.24                    |   |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden   | RALP: 1253<br>ORP: 485 | RALP: 62 (35-78)<br>ORP: 63 (47-77)<br><br>P<0.001                              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 6.3 (0.4-50.0)<br><br>ORP: 7.4 (0.1-135.0)<br><br>P<0.001                         | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1c: 770 (61.5)<br>- cT2: 435 (34.7)<br>- cT3: 48 (3.8)<br><br>ORP (n=484):<br>- cT1c: 251 (51.8)<br>- cT2: 183 (37.7)<br>- cT3: 50 (10.3)<br><br>P<0.001 | RALP: 6.0 (4-9)<br>ORP: 6.0 (4-10)<br><br>P≥0.05  | RALP:<br>38.0 (16.0-206.0)<br><br>ORP:<br>38.0 (16.0-130.0)<br><br>P≥0.05                   |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br>ORP: 502  | RALP: 61.3 (41-76) <sup>†</sup><br>ORP: 60.1 (40-78) <sup>†</sup><br><br>P≥0.05 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 7.1 (0.7-41.0) <sup>†</sup><br><br>ORP: 8.3 (0.9-64.0) <sup>†</sup><br><br>P≥0.05 | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1a: 4 (1.9)<br>- cT1b: 2 (0.9)<br>- cT1c: 99 (46.7)<br>- cT2a: 59 (27.8)<br>- cT2b: 16 (7.5)<br>- cT2c: 32 (15.1)  | RALP:<br>- 6: 73 (34.3)<br>- 7: 128 (60.1)<br>- 8: 9 (4.2)<br>- 9: 3 (1.4)<br><br>ORP:<br>- 6: 126 (25.1)<br>- 7: 321 (63.9)<br>- 8: 25 (5.0) | RALP:<br>50.0 (16-140) <sup>†</sup><br><br>ORP:<br>53.2 (20-145) <sup>†</sup><br><br>P≥0.05 |



Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)                  | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                         | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---|-----------------------|--|--|---|--|--|---|---|
|  |                       |  |   |   |                       |  |  |   |  | - cT3: 0 (0.0)<br><br>ORP:<br>- cT1a: 5 (1.0)<br>- cT1b: 5 (1.0)<br>- cT1c: 201 (40.0)<br>- cT2a: 111 (22.1)<br>- cT2b: 70 (13.9)<br>- cT2c: 95 (18.9)<br>- cT3: 15 (3.0)<br><br>P=0.003 | - 9: 30 (6.0)<br><br>P=0.01   |   |
| Hong et al. (2010) <sup>132</sup><br>South Korea | RALP: 26<br>ORP: 25   | RALP: 66.0±6.9<br>ORP: 68.6±4.9<br><br>P≥0.05              | RALP: NR<br>ORP: NR   | RALP:<br>- ≤2: 26 (100.0)<br>- 3: 0 (0.0)<br><br>ORP:<br>- ≤2: 25 (100.0)<br>- 3: 0 (0.0)<br><br>P=NA | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Kordan et al. (2010) <sup>133</sup><br>USA       | RALP: 830<br>ORP: 414 | RALP: 60.5±7.2<br>ORP: 61.5±7.5<br><br>P=0.10              | RALP: 28.2±4.2<br>ORP: 28.0±4.6<br><br>P=0.27                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 5.5 [4.4-7.3]<br>ORP: 6.0 [4.6-9.1]<br><br>P<0.001   | RALP: 31 (3.7)<br>ORP: 25 (6.0)<br><br>P=0.06 | RALP: NR<br>ORP: NR                        | RALP (n=823):<br>- ≥cT2: 204 (24.6) [24.8%]<br>ORP (n=410):<br>- ≥cT2: 128 (30.9) [31.2%]  | RALP (n=828):<br>- ≤6: 578 (69.6) [69.8%]<br>- 7: 211 (25.4) [25.5%]<br>- ≥8: 39 (4.7) [4.7%] | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size          | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD      | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD          | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|----------------------|---|---|---------------------------------|--|--|---|------------------------------|--|---|--|---|
|   |                      |   |   |                                 |  |  |   |                              |  | *P=0.02   | ORP:<br>- ≤6: 261 (63.0)<br>- 7: 104 (25.1)<br>- ≥8: 49 (11.8)<br><br>*P<0.001 |   |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong  | RALP: 20<br>ORP: 20  | RALP: 64.0 (52-75)<br>†<br>ORP: 66.0 (47-76)<br>†<br>P=0.31 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 14.2±11.8<br>ORP: 14.5±14.3<br>P=0.45                     | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1a-cT3a: 20 (100.0)<br>ORP:<br>- cT1c-cT3b: 20 (100.0)<br>P=NA                           | RALP: 7 (6-9)<br>ORP: 7 (6-10)<br>P=0.50                                       | RALP: NR<br>ORP: NR   |
| Nadler et al. (2010) <sup>188</sup><br>USA    | RALP: 50<br>ORP: 50  | RALP: 59.7 (44-77)<br>†<br>ORP: 60.0 (40-75)<br>†<br>P=0.86 | RALP: 28.6 (22.3-42.0)<br>†<br>ORP: 28.2 (21.0-42.6)<br>†<br>P=0.75     | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 30 (60.0)<br>- Intermediate: 14 (28.0)<br>- High: 6 (12.0)<br>ORP:<br>- Low: 28 (56.0)<br>- Intermediate: 12 (24.0)<br>- High: 10 (20.0)<br>P=0.54 | RALP: NR<br>ORP: NR  | RALP: 6.5 (1.5-18.8)<br>†<br>ORP: 8.5 (1.9-95.6)<br>†<br>P=0.33 | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1: 41 (82.0)<br>- cT2: 9 (18.0)<br>ORP:<br>- cT1: 41 (82.0)<br>- cT2: 9 (18.0)<br>P=1.00 | RALP: 6.4 (6-9)<br>†<br>ORP: 6.7 (6-10)<br>†<br>P=0.20                         | RALP: NR<br>ORP: NR   |
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99<br>ORP: 217 | RALP: 59.2±7.1<br>ORP: 61.7±6.8<br>P=0.003                  | RALP: 24.6±8.3<br>ORP: 23.1±9.1<br>P=0.26                               | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 43 (43.4)<br>- Intermediate: 36 (36.4)<br>- High: 20 (20.2)<br>ORP:  | RALP: NR<br>ORP: NR  | RALP: 7.0±7.5<br>ORP: 8.4±7.6<br>P=0.17                         | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP:<br>- ≤cT2a: 57 (57.6)<br>- cT2b: 4 (4.0)<br>- ≥cT2c: 38 (38.4)<br>ORP:<br>- ≤6: 63 (29.0)       | RALP: 28 (28.3)<br>- 7: 34 (34.3)<br>- ≥8: 37 (37.4)<br>ORP:                   | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                        | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                    | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|---|---|---------------------------------|--|--|---|------------------------------|--|---|--|---|
|  |                       |   |   |                                 | - Low: 64 (29.5)<br>- Intermediate: 94 (43.3)<br>- High: 59 (27.2)<br><br>P=0.05 |  |   |                              |  | ORP:<br>- ≤cT2a: 155 (71.4)<br>- cT2b: 12 (5.5)<br>- ≥cT2c: 50 (23.0)<br><br>P=0.02   | - 7: 95 (43.8)<br>- ≥8: 59 (27.2)<br><br>P=0.15  |   |
| Uvin et al. (2010) <sup>190</sup><br>Belgium | RALP: 13<br>ORP: 9    | RALP: 62.6 (53-74) <sup>†</sup><br><br>ORP: 65.7 (53-74) <sup>†</sup><br><br>P=NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 9.2 (4-21) <sup>†</sup><br><br>ORP: 9.2 (4-21) <sup>†</sup><br><br>P=NR | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR   | RALP: 6.7 (6-9) <sup>†</sup><br><br>ORP: 6.4 (6-9) <sup>†</sup><br><br>P=NR  | RALP: NR<br>ORP: NR   |
| Williams et al. (2010) <sup>134</sup><br>USA | RALP: 604<br>ORP: 346 | RALP: 59.0 [54.0-63.0]<br><br>ORP: 59.5 [54.5-64.0]<br><br>P=0.18                 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 4.8 [3.9-6.2]<br><br>ORP: 4.8 [3.8-6.0]<br><br>P=0.18                   | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1c: 546 (90.4)<br>- cT2a: 50 (8.3)<br>- cT2b: 3 (0.5)<br>- cT2c: 5 (0.8)<br><br>ORP:<br>- ≤6: 233 (67.3)<br>- 7: 94 (27.2)<br>- ≥8: 19 (5.5)<br><br>P=0.24 | RALP:<br>- ≤6: 381 (63.1)<br>- 7: 195 (32.3)<br>- ≥8: 28 (4.6)<br><br>ORP:<br>- ≤6: 233 (67.3)<br>- 7: 94 (27.2)<br>- ≥8: 19 (5.5)<br><br>P=0.24 | RALP: NR<br>ORP: NR   |
| Coronato et al. (2009) <sup>191</sup><br>USA | RALP: 98<br>ORP: 98   | RALP: 58.9±NR<br><br>ORP:<br>RRP (n=57):  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 6.5±NR<br><br>ORP:<br>RRP (n=57):                                       | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1c: 82 (83.7)<br>- cT2a: 16  | RALP: 6.4±NR<br><br>ORP:<br>RRP (n=57):  | RALP: NR<br>ORP: NR   |

Table 10. Characteristics of Participants

| Study   | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                                | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                   | ASA score<br>n (%)<br>Mean ± SD                                     | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD           | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                            | Neoadjuvant therapy<br>n (%)                   | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|---|---|---|--|--|---|--|--|---|---|---|
|   |                       | 59.4±NR<br>RPP (n=41):<br>58.9±NR<br><br>P=NR   |   |   |  |  | 8.4±NR<br>RPP (n=41):<br>6.2±NR<br><br>P=NR   |  |  | (16.3)<br><br>ORP:<br>- cT1c: 88 (89.8)<br>- cT2a: 10 (1.02)<br><br>P≥0.05  | 6.3±NR<br>RPP (n=41):<br>6.4±NR<br><br>P=NR   |   |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71<br>ORP: 83   | RALP: 60.4 (46.0-70.0) <sup>†</sup><br><br>ORP: 60.5 (45.0-81.0) <sup>†</sup><br><br>P=NR | RALP: 22.6 (22.0-25.0) <sup>†</sup><br><br>ORP: 23.3 (22.6-24.8) <sup>†</sup><br><br>P=NR | RALP: NR<br>ORP: NR   | RALP:<br>- Low: 30 (42.2)<br>- Intermediate: 33 (46.5)<br>- High: 8 (11.3)<br><br>ORP:<br>- Low: 23 (27.7)<br>- Intermediate: 42 (50.6)<br>- High: 18 (21.7)<br><br>P=NR | RALP: NR<br>ORP: NR  | RALP: 7.8 (3.0-24.0) <sup>†</sup><br><br>ORP: 9.2 (1.2-60.0) <sup>†</sup><br><br>P=NR | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1a, cT1b: 0 (0.0)<br>- cT1c: 50 (70.4)<br>- cT2a, cT2b: 17 (24.0)<br>- cT2c: 4 (5.6)<br><br>ORP:<br>- cT1a, cT1b: 2 (2.4)<br>- cT1c: 38 (45.8)<br>- cT2a, cT2b: 28 (33.7)<br>- cT2c: 15 (18.1)<br><br>P=NR | RALP: 6.2 (6-7) <sup>†</sup><br>- ≤5: 4 (5.6)<br>- 6: 56 (78.9)<br>- 7: 11 (15.5)<br>- ≥8: 0 (0.0)<br><br>ORP: 6.2 (4-7) <sup>†</sup><br>- ≤5: 8 (9.6)<br>- 6: 51 (61.5)<br>- 7: 24 (28.9)<br>- ≥8: 0 (0.0)<br><br>P=NR | RALP: NR<br>ORP: NR   |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | RALP: 61.0 [57-67]<br>ORP: 65.0 [61-69]<br><br>P<0.001                                    | RALP: 26.0 [24.0-28.0]<br>ORP: 26.0 [24.0-28.0]   | RALP(n=35)<br>‡:<br>- 1: 6 (17.1)<br>- 2: 28 (80.0)<br>- 3: 1 (2.9) | RALP: NR<br>ORP: NR  | RALP:<br>- ≤2: 89 (86.4)<br>- >2: 14 (13.6)<br><br>ORP:<br>- ≤2: 78 (74.3) | RALP: 6.4 [4.6-9.0]<br>ORP: 6.0 [5.0-10.0]  | RALP (n=35)‡: 2 (5.7)<br>ORP (n=26)‡: 5 (19.2) | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1c: 77 (74.8)<br>- cT2a, cT2b: 22 (21.4)<br>- cT2c: 4 (3.9)  | RALP (n=97):<br>- 6: 71 (68.9) [73.2%]<br>- 7: 18 (17.5) [18.6%]<br>- ≥8: 8 (7.8)   | RALP: 37.5 [30-48]<br>ORP: 40.0 [30-47]                             |



Table 10. Characteristics of Participants

| Study                                       | Sample size             | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD   | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | Neoadjuvant therapy<br>n (%)   | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-------------------------|---|---|---|---|--|---|--|--|--|---|---|
|   |                         |   | P=0.22  | ORP (n=105)‡:<br>- 1: 8 (30.8)<br>- 2: 17 (65.4)<br>- 3: 1 (3.8)<br><br>*P=0.50<br><br>‡Data extracted from Fracalanza et al. (2008) <sup>208</sup> |   | - >2: 27 (25.7)<br><br>P=0.06                                    | P=0.32  | *P= 0.20<br><br>‡Data extracted from Fracalanza et al. (2008) <sup>208</sup> |  | ORP:<br>- cT1c: 66 (62.9)<br>- cT2a, cT2b: 32 (30.5)<br>- cT2c: 7 (6.7)<br><br>P=0.12  | [8.2%]<br>ORP (n=104):<br>- 6: 67 (63.8) [64.4%]<br>- 7: 29 (27.6) [27.9%]<br>- ≥8: 8 (7.6) [7.7%]<br><br>*P=0.63 | P=0.40  |
| Laurila et al. (2009) <sup>192</sup><br>USA | RALP: 94<br><br>ORP: 98 | RALP: 59.8 (47-71) †<br><br>ORP: 58.8 (37-74) †<br><br>P=0.60 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP:<br>- Low/intermediate: 84 (85.7)<br>- High: 14 (14.3)<br><br>ORP:<br>- Low/intermediate: 88 (93.6)<br>- High: 6 (6.4)<br><br>P=0.03 | RALP: NR<br><br>ORP: NR  | RALP: 5.9 (1.3-13.0) †<br><br>ORP: 6.7 (0.3-42.0) †<br><br>P=0.03 | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA                                | RALP: NR<br><br>ORP: NR                    | RALP:<br>- cT1c: 91 (96.8)<br>- cT2: 3 (3.2)<br><br>ORP:<br>- cT1c: 85 (86.7)<br>- cT2: 13 (13.3)<br><br>P=0.02                      | RALP:<br>- ≤7: 92 (97.9)<br>- ≥8: 2 (2.1)<br><br>ORP:<br>- ≤7: 88 (89.8)<br>- ≥8: 10 (10.2)<br><br>P=0.03         | RALP: NR<br><br>ORP: NR   |
| Ou et al. (2009) <sup>193</sup><br>Taiwan   | RALP: 30<br><br>ORP: 30 | RALP: 67.3±6.2<br><br>ORP: 70.0±6.1<br><br>P<0.05             | RALP: 24.2±3.2<br><br>ORP: 24.1±3.3<br><br>P≥0.05                       | RALP:<br>- 1: 5 (16.7)<br>- 2: 15 (50.0)<br>- 3: 10 (33.3)<br><br>ORP:<br>- 1: 4 (13.3)<br>- 2: 17 (56.7)<br>- 3: 9 (30.0)                          | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 16.5±18.8<br><br>ORP: 15.9±14.2<br><br>P≥0.05               | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                    | RALP:<br>- cT1: 15 (50.0)<br>- cT2: 15 (50.0)<br>- cT3: 0 (0.0)<br><br>ORP:<br>- cT1: 9 (30.0)<br>- cT2: 19 (63.3)<br>- cT3: 2 (6.7) | RALP: 6.1±0.9<br><br>ORP: 6.2±1.6<br><br>P≥0.05   | RALP: NR<br><br>ORP: NR   |

Table 10. Characteristics of Participants

| Study                                       | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|-----------------------|--|---|---------------------------------|--|--|--|------------------------------|--|---|--|---|
|   |                       |  |   | p≥0.05                          |  |  |  |                              |  | P≥0.05  |  |   |
| Rocco et al. (2009) <sup>136</sup><br>Italy | RALP: 120<br>ORP: 240 | RALP: 63.0 (47-76)<br>ORP: 63.0 (46-77)<br>P=0.36  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 6.9 (0.4-23.0)<br>ORP: 6.7 (0.7-22.0)<br>P=0.86  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP (n=118):<br>- cT1c: 82 (68.3) [69.5%]<br>- cT2a: 36 (30.0) [30.5%]<br>ORP (n=238):<br>- cT1c: 145 (60.4) [60.9%]<br>- cT2a: 93 (38.7) [39.1%]<br>*P=0.11 | RALP: 6 (4-9)<br>ORP: 6 (4-10)<br>P=0.32   | RALP: NR<br>ORP: NR   |
| White et al. (2009) <sup>194</sup><br>USA   | RALP: 50<br>ORP: 50   | RALP: 62.0±NR<br>ORP: 64.7±NR<br>P=0.08  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 4.6±NR<br>ORP: 5.0±NR<br>P=0.40  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 40 (80.0)<br>- cT2: 10 (20.0)<br>- cT3: 0 (0.0)<br>ORP:<br>- cT1: 38 (76.0)<br>- cT2: 12 (24.0)<br>- cT3: 0 (0.0)<br>P=0.81                   | RALP:<br>- 6: 39 (78.0)<br>- 7: 10 (20.0)<br>- 8: 1 (2.0)<br>ORP:<br>- 6: 40 (80.0)<br>- 7: 9 (18.0)<br>- 8: 1 (2.0)<br>P=1.00   | RALP: NR<br>ORP: NR   |
| Chan et al. (2008) <sup>195</sup><br>USA    | RALP: 660<br>ORP: 340 | RALP:<br>- LP (n=81): 63.9±5.7<br>- SP (n=579): 59.5±7.3<br>ORP:<br>- LP (n=27): 65.7±6.1<br>- SP (n=313): | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP:<br>- Low: 412 (63.8)<br>- LP (n=81): 54 (66.7)<br>- SP (n=579): 358 (61.8)<br>- Intermediate: 203 (30.8)<br>- LP (n=81): 20 (24.7) | RALP: NR<br>ORP: NR  | RALP:<br>- LP (n=81): 9.1±11<br>- SP (n=579): 6.5±4.7<br>ORP:<br>- LP (n=27): 9.9±6.1<br>- SP (n=313): | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1: 497 (75.3)<br>- LP (n=81): 70 (86.4)<br>- SP (n=579): 427 (73.7)<br>- cT2: 160 (24.2)<br>- LP (n=81):   | RALP:<br>- mean:<br>- LP (n=81): 6.3±0.7<br>- SP (n=579): 6.3±0.7<br>- ≤6: 459 (69.5)<br>- LP (n=81): 66 (81.5)<br>- SP (n=579): | RALP: NR<br>ORP: NR   |



Table 10. Characteristics of Participants

| Study | Sample size | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD       | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD      | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|-------|-------------|--|---|---------------------------------|--|--|---|------------------------------|--|--|---|---|
|       |             | 60.8±7.6<br><br>P <sub>LP</sub> =0.928<br>P <sub>SP</sub> <0.001 |   |                                 | - SP (n=579): 183 (31.6)<br>- High: 45 (6.8)<br>- LP (n=81): 7 (8.6)<br>- SP (n=579): 38 (6.6)<br><br>ORP:<br>- Low: 167 (49.1)<br>- LP (n=27): 16 (59.3)<br>- SP (n=313): 51 (16.3)<br>- Intermediate: 111 (32.6)<br>- LP (n=27): 6 (22.2)<br>- SP (n=313): 105 (33.5)<br>- High: 62 (18.2)<br>- LP (n=27): 5 (18.5)<br>- SP (n=313): 57 (18.2)<br><br>P=NR |  | 8.1±7.2<br><br>P <sub>LP</sub> =0.638<br>P <sub>SP</sub> <0.001 |                              |  | 11 (13.6)<br>- SP (n=579): 149 (25.7)<br>- cT3: 3 (0.5)<br>- LP (n=81): 0<br>- SP (n=579): 3 (0.5)<br><br>ORP:<br>- cT1: 225 (66.2)<br>- LP (n=27): 24 (89)<br>- SP (n=313): 201 (64.2)<br>- cT2: 111 (32.6)<br>- LP (n=27): 3 (11)<br>- SP (n=313): 108 (34.5)<br>- cT3: 4 (1.2)<br>- LP (n=27): 0<br>- SP (n=313): 4 (1.3)<br><br>P <sub>cT1,LP</sub> =0.730<br>P <sub>cT1,SP</sub> =0.004<br>P <sub>cT2,LP</sub> =0.730<br>P <sub>cT2,SP</sub> =0.007<br>P <sub>cT3,LP</sub> =NR<br>P <sub>cT3,SP</sub> =NR | 393 (67.9)<br>- 7: 173 26.2)<br>- LP (n=81): 11 (13.6)<br>- SP (n=579): 162 (28)<br>- 8-10: 28 (4.2)<br>- LP (n=81): 4 (4.9)<br>- SP (n=579): 24 (4.1)<br><br>ORP:<br>- mean:<br>- LP (n=81): 6.4±0.9<br>- SP (n=579): 6.6±0.9<br>- ≤6: 212<br>- LP (n=27): 22 (82)<br>- SP (n=313): 190 (60.7)<br>- 7: 87<br>- LP (n=27): 2 (7)<br>- SP (n=313): 85 (27.2)<br>- 8-10: 41<br>- LP (n=27): 3 (11)<br>- SP (n=313): 38 (12.1)<br><br>P <sub>mean,LP</sub> =0.602<br>P <sub>mean,SP</sub> <0.001 |   |



Table 10. Characteristics of Participants

| Study  | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---------------------------------|---|--|--|------------------------------|--|---|---|---|
|  |                       |  |   |                                 |   |  |  |                              |  |   | P <sub>≤6,LP</sub> =1.00<br>P <sub>≤6,SP</sub> =0.034<br>P <sub>7,LP</sub> =0.328<br>P <sub>7,SP</sub> =0.793<br>P <sub>8-10,LP</sub> =0.343<br>P <sub>8-10,SP</sub> <0.001 |   |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br>ORP: 588 | RALP: 61.0 (38.0-76.0)<br>ORP: 61.0 (41.0-77.0)<br>P≥0.05  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 4.9 (0.5-33.5)<br>ORP: 5.0 (0.6-39.7)<br>P≥0.05      | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP:<br>- cT1a-cT1b: 0 (0.0)<br>- cT1c: 214 (72.8)<br>- cT2a: 75 (25.5)<br>- cT2b: 4 (1.4)<br>- cT3- cT4: 1 (0.3)<br><br>ORP:<br>- cT1a-cT1b: 4 (0.7)<br>- cT1c: 418 (71.1)<br>- cT2a: 130 (22.1)<br>- cT2b: 28 (4.8)<br>- cT3- cT4: 8 (1.4)<br><br>P=NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Schroeck et al. (2008) <sup>197</sup><br>USA | RALP: 362<br>ORP: 435 | RALP: 59.2 [54.5-63.8]<br>ORP: 60.3 [55.3-64.7]            | RALP: 27.8 [25.7-29.9]<br>ORP: 27.7 [25.5-30.4]                         | RALP: NR<br>ORP: NR             | RALP (n=321):<br>- Low: 211 (58.3) [65.7%]<br>- Intermediate: 95 (26.2) [29.6%]<br>- High: 15 (4.1) | RALP: NR<br>ORP: NR  | RALP: 5.4 [4.1-7.1]<br>ORP: 5.3 [4.1-7.2]                  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                        | RALP (n=338):<br>- cT1: 281 (77.6) [83.1%]<br>- cT2: 57 (15.7) [16.9%]<br>- cT3: 0 (0.0)  | RALP (n=352):<br>- ≤6: 254 (70.2) [72.2%]<br>- 7: 89 (24.6) [25.3%]<br>- ≥8: 9 (2.5)  | RALP: NR<br>ORP: NR   |



Table 10. Characteristics of Participants

| Study                                      | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---------------------------------|--|--|--|------------------------------|--|--|--|---|
|  |                       | P=0.13   | P=0.40  |                                 | [4.7%]<br><br>ORP (n=371):<br>- Low: 189 (43.4) [50.9%]<br>- Intermediate: 125 (28.7) [33.7%]<br>- High: 57 (13.1) [15.4%]<br><br>*P<0.001 |  | P=0.90   |                              |  | [0.0%]<br><br>ORP (n=409):<br>- cT1: 296 (68.0) [72.4%]<br>- cT2: 101 (23.2) [24.7%]<br>- cT3: 12 (2.8) [2.9%]<br><br>*P<0.001                     | [2.6%]<br><br>ORP (n=410):<br>- ≤6: 241 (55.4) [58.8%]<br>- 7: 127 (29.2) [31.0%]<br>- ≥8: 42 (9.7) [10.2%]<br><br>*P<0.001                |   |
| Miller et al. (2007) <sup>137</sup><br>USA | RALP: 42<br>ORP: 120  | RALP: 61.1±NR<br>ORP: 60.6±NR<br><br>P=0.66                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   |
| Nelson et al. (2007) <sup>138</sup><br>USA | RALP: 629<br>ORP: 374 | RALP: 59.3±NR<br>ORP: 59.9±NR<br><br>P<0.05                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 6.7±NR<br>ORP: 8.4±NR<br><br>P<0.05                  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR  | RALP: 6.2±NR<br>ORP: 6.3±NR<br><br>p≥0.05  | RALP: NR<br>ORP: NR   |
| Ball et al. (2006) <sup>116</sup><br>USA   | RALP: 82<br>ORP: 135  | RALP: 60±7<br>ORP: 59±6<br><br>P=NR                        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: 6.0±2.4<br>ORP: 7.8±5.6<br><br>P=NR                  | RALP: NR<br>ORP: NR          | RALP: NR<br>ORP: NR                            | RALP:<br>- cT1: 66 (80.5)<br>- cT2: 15 (18.3)<br>- cT3: 1 (1.2)<br><br>ORP:<br>- cT1: 116 (85.9)<br>- cT2: 19 (14.1)<br>- cT3: 0 (0.0)<br><br>P=NR | RALP:<br>- ≤6: 59 (71.9)<br>- 7: 15 (18.3)<br>- ≥8: 8 (9.8)<br><br>ORP:<br>- ≤6: 85 (63.0)<br>- 7: 37 (27.4)<br>- ≥8: 13 (9.6)<br><br>P=NR | RALP: NR<br>ORP: NR   |
| Ahlering et al.                            | RALP: 60              | RALP: 62.9 (43-  | RALP:   | RALP: NR                        | RALP: NR   | RALP: NR   | RALP: 8.1 (0.1-  | RALP: NR                     | RALP: NR                                       | RALP:  | RALP:  | RALP:   |



Table 10. Characteristics of Participants

| Study                                      | Sample size           | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%) | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%)  | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|-----------------------|--|---|---------------------------------|-----------------------|--|--|------------------------------|---|---|---|---|
| (2004) <sup>198</sup><br>USA               | ORP: 60               | 78)†<br>ORP: 62.7 (50-78)†<br>P≥0.05                       | 26.3 (20.6-33.6)†<br>ORP: 26.5 (20.0-34.5)†<br>P≥0.05                   | ORP: NR                         | ORP: NR               | ORP: NR  | 62.0)†<br>ORP: 8.4 (1.1-39.6)†<br>P≥0.05                   | ORP: NR                      | ORP: NR                                     | - cT1c: 38 (63.3)<br>- cT2a: 19 (31.7)<br>- cT2b: 2 (3.3)<br>- cT3a: 1 (1.7)<br><br>ORP:<br>- cT1c: 36 (60.0)<br>- cT2a: 23 (38.3)<br>- cT2b: 0 (0.0)<br>- cT3a: 1 (1.7)<br><br>P=NR                            | - ≤6: 33 (55.0)<br>- 3+4: 16 (26.7)<br>- 4+3: 4 (6.7)<br>- ≥8: 7 (11.7)<br><br>ORP:<br>- ≤6: 31 (51.7)<br>- 3+4: 13 (21.7)<br>- 4+3: 7 (11.7)<br>- ≥8: 9 (15.0)<br><br>P=NR | 52.5 (18-135)†<br>ORP: 50.7 (30-108)†<br>P≥0.05                     |
| Tewari et al. (2003) <sup>139</sup><br>USA | RALP: 200<br>ORP: 100 | RALP: 59.9 (40-72)†<br>ORP: 63.1 (43-72)†<br>P≥0.05        | RALP: 27.7 (19.0-38.0)†<br>ORP: 27.6 (17.0-41.0)†<br>P≥0.05             | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR   | RALP: 2.3±NR<br>ORP: 2.5±NR<br>P≥0.05                            | RALP: 6.4 (0.6-41.0)†<br>ORP: 7.3 (1.9-35.0)†<br>P≥0.05    | RALP: NR<br>ORP: NR          | RALP: 40 (20.0)<br>ORP: 19 (19.0)<br>P≥0.05 | RALP:<br>- cT1a: 1 (0.5)<br>- cT1c: 98 (49.0)<br>- cT2a: 20 (10.0)<br>- cT2b: 78 (39.0)<br>- cT3a: 3 (1.5)<br><br>ORP:<br>- cT1a: 0 (0.0)<br>- cT1c: NR<br>- cT2a: NR<br>- cT2b: NR<br>- cT3a: NR<br><br>P≥0.05 | RALP: 6.5±NR<br>ORP: 6.6±NR<br>P≥0.05   | RALP: 58.8 (18-140)†<br>ORP: 48.4 (24.2-70)†<br>P≥0.05              |
| Menon et al.                               | RALP: 30              | RALP: 62.0 (51-  | RALP: 30±NR   | RALP: NR                        | RALP: NR              | RALP: NR   | RALP: 9.9 (2.0-  | RALP: NR                     | RALP: NR                                    | RALP:   | RALP: 6.3 ± 1.0   | RALP:   |

Table 10. Characteristics of Participants

| Study   | Sample size              | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD           | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD               | Neoadjuvant therapy<br>n (%) | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                       |
|---|--------------------------|--|---|---------------------------------|--|--|--|------------------------------|--|---|---|---|
| (2002) <sup>140</sup><br>USA                        | ORP: 30                  | 71) <sup>†</sup><br><br>ORP: 64.0 (59–70) <sup>†</sup><br><br>P≥0.05 | ORP: 30±NR<br><br>P≥0.05  | ORP: NR                         | ORP: NR  | ORP: NR  | 19.0) <sup>†</sup><br><br>ORP: 8.4 (1.5–16.0) <sup>†</sup><br><br>P<0.05 | ORP: NR                      | ORP: NR                                    | - cT1c: 22 (73.3)<br>- cT2a: 2 (6.7)<br>- cT2b: 3 (10.0)<br>- cT2c: 3 (10.0)<br><br>ORP:<br>- cT1c: 20 (66.7)<br>- cT2a: 3 (10.0)<br>- cT2b: 3 (10.0)<br>- cT2c: 4 (13.3)<br><br>P≥0.05 | - ≤6: 20 (66.7)<br>- 7: 7 (23.3)<br>- ≥8: 3 (10.0)<br><br>ORP: 6.3 ± 0.8<br>- ≤6: 19 (63.3)<br>- 7: 9 (30.0)<br>- ≥8: 2 (6.7)<br><br>P≥0.05 | 58.8 (18.0–140.0) <sup>†</sup><br><br>ORP:<br>48.4 (24.2–70.0) <sup>†</sup><br><br>P≥0.05 |
| <b>RALP vs. BT</b>                                  |                          |  |   |                                 |  |  |  |                              |  |   |   |   |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br><br>BT: 29   | RALP: 59.5±6.1<br><br>BT: 63.8±5.5<br><br>P=NR                       | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR          | RALP:<br>- low: 65 (100.0)<br>- intermediate: 0 (0.0)<br>- high: 0 (0.0)<br><br>BT:<br>- low: 29 (100.0)<br>- intermediate: 0 (0.0)<br>- high: 0 (0.0)<br><br>P=NR | RALP: NR<br><br>BT: NR   | RALP: 6.4±2.1<br><br>BT: 6.8±1.9<br><br>P=NR                             | RALP: NR<br><br>BT: NR       | RALP: NR<br><br>BT: NR                     | RALP:<br>- cT1c: 35 (53.8)<br>- cT2a: 30 (46.2)<br><br>BT:<br>- cT1c: 14 (48.3)<br>- cT2a: 15 (51.7)<br><br>P=NR  | RALP:<br>- 6: 65 (100.0)<br><br>BT:<br>- 6: 29 (29.0)<br><br>P=NA   | RALP: 46.7±19.6<br><br>BT: 44.1±13.6<br><br>P=0.63  |
| Baena et al (2013) <sup>141</sup><br>Spain          | RALP: 153<br><br>BT: 160 | RALP: NR<br><br>BT: NR   | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR          | RALP: NR<br><br>BT: NR   | RALP: NR<br><br>BT: NR   | RALP: NR<br><br>BT: NR   | RALP: NR<br><br>BT: NR       | RALP: NR<br><br>BT: NR                     | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br><br>BT: 118  | RALP: 60±7<br><br>BT: 67±7   | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR          | RALP: NR<br><br>BT: NR   | RALP: NR<br><br>BT: NR   | RALP: 6.0±2.4<br><br>BT: 7.8±4.9   | RALP: NR<br><br>BT: NR       | RALP: NR<br><br>BT: NR                     | RALP:<br>- cT1: 66 (80.5)<br>- cT2: 15 (18.3)   | RALP:<br>- ≤6: 59 (71.9)<br>- 7: 15 (18.3)  | RALP: NR<br><br>BT: NR  |

Table 10. Characteristics of Participants

| Study                                      | Sample size         | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD    | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)   | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%)              | Previous abdominal/pelvic surgery<br>n (%) | Clinical T stage<br>n (%)   | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|--|---------------------|---|---|---------------------------------|---|--|--|---|--|---|---|---|
|  |                     | P=NR  |   |                                 |   |  | P=NR   |   |  | - cT3: 1 (1.2)<br><br>BT:<br>- cT1: 93 (78.8)<br>- cT2: 25 (21.2)<br>- cT3: 0 (0.0)<br><br>P=NR   | - ≥8: 8 (9.8)<br><br>BT:<br>- ≤6: 84 (71.2)<br>- 7: 24 (20.3)<br>- ≥8: 10 (8.5)<br><br>P=NR   |   |
| <b>RALP vs. Radiotherapy</b>               |                     |   |   |                                 |   |  |  |   |  |   |   |   |
| Hung et al (2015) <sup>199</sup><br>Taiwan | RALP: 43<br>RT: 96  | RALP: 76.0 [75.0-78.0]<br>RT: 79.5 [77.0-82.0]<br><br>P<0.001 | RALP: NR<br>RT: NR  | RALP: NR<br>RT: NR              | RALP:<br>- Low: 8 (18.6)<br>- Intermediate: 13 (30.2)<br>- High: 22 (51.2)<br><br>RT:<br>- Low: 9 (9.4)<br>- Intermediate: 21 (21.9)<br>- High: 66 (68.8)<br><br>P=0.09 | RALP: NR<br>RT: NR   | RALP: 12.2 [7.5-22.2]<br>RT: 15.7 [9.8-29.1]<br><br>P=0.05 | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br>RT: NR                         | RALP:<br>- ≤cT2a: 16 (37.2)<br>- cT2b: 9 (20.9)<br>- ≥cT2c: 18 (41.9)<br><br>RT:<br>- ≤cT2a: 28 (29.2)<br>- cT2b: 21 (21.9)<br>- ≥cT2c: 47 (49.0)<br><br>P=0.76 | RALP:<br>- ≤6: 18 (41.9)<br>- 7: 17 (39.5)<br>- ≥8: 8 (18.6)<br><br>RT:<br>- ≤6: 36 (37.5)<br>- 7: 29 (30.2)<br>- ≥8: 31 (32.3)<br><br>P=0.26 | RALP: NR<br>RT: NR  |
| <b>RALP vs. Cryoablation</b>               |                     |   |   |                                 |   |  |  |   |  |   |   |   |
| Ball et al (2006) <sup>116</sup><br>(USA)  | RALP: 82<br>CRY: 39 | RALP: 60±7<br>CRY: 72±7<br><br>P=NR                           | RALP: NR<br>CRY: NR   | RALP: NR<br>CRY: NR             | RALP: NR<br>CRY: NR   | RALP: NR<br>CRY: NR  | RALP: 6.0±2.4<br>CRY: 11.7±8.5<br><br>P=NR                 | RALP: NR<br>CRY: NR                       | RALP: NR<br>CRY: NR                        | RALP:<br>- cT1: 66 (80.5)<br>- cT2: 15 (18.3)<br>- cT3: 1 (1.2)<br><br>CRY:<br>- cT1: 26 (66.7)<br>- cT2: 11 (28.2)   | RALP:<br>- ≤6: 59 (71.9)<br>- 7: 15 (18.3)<br>- ≥8: 8 (9.8)<br><br>CRY:<br>- ≤6: 20 (51.3)<br>- 7: 11 (28.2)                                  | RALP: NR<br>CRY: NR   |



Table 10. Characteristics of Participants

| Study   | Sample size        | Age (years)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | BMI (kg/m <sup>2</sup> )<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | ASA score<br>n (%)<br>Mean ± SD | D'Amico risk<br>n (%)  | Charlson comorbidity index<br>n (%)<br>Median [IQR]<br>Mean ± SD | PSA (ng/mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Neoadjuvant therapy<br>n (%) | Previous abdominal/<br>pelvic surgery<br>n (%) | Clinical T stage<br>n (%)  | Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Prostate Volume (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |
|---|--------------------|--|---|---------------------------------|--|--|--|------------------------------|--|--|---|---|
|   |                    |  |   |                                 |  |  |  |                              |  | - cT3: 2 (5.1)<br>P=NR   | - ≥8: 8 (20.5)<br>P=NR  |   |
| <b>RALP vs. Active Surveillance</b>                 |                    |  |   |                                 |  |  |  |                              |  |  |   |   |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50 | RALP: 59.5±6.1<br>AS: 63.8±6.9<br>P=NR                     | RALP: NR<br>AS: NR  | RALP: NR<br>AS: NR              | RALP:<br>- low: 65 (100.0)<br>- intermediate: 0 (0.0)<br>- high: 0 (0.0)<br>AS:<br>- low: 50 (100.0)<br>- intermediate: 0 (0.0)<br>- high: 0 (0.0)<br>P=NR | RALP: NR<br>AS: NR   | RALP: 6.4±2.1<br>AS: 5.8±2.4<br>P=NR                       | RALP: NR<br>AS: NR           | RALP: NR<br>AS: NR                             | RALP:<br>- cT1c: 35 (53.8)<br>- cT2a: 30 (46.2)<br>AS:<br>- cT1c: 33 (66.0)<br>- cT2a: 17 (34.0)<br>P=NR | RALP:<br>- 6: 65 (100.0)<br>AS:<br>- 6: 50 (100.0)<br>P=NA            | RALP: 46.7±19.6<br>AS: 59.3±27.8<br>P=0.01                          |

AS= Active Surveillance; ASA = American Society of Anesthesiologists; BMI = Body Mass Index; BT= Brachytherapy; CRY= cryoablation; HRQOL= health-related quality of life; IQR= Interquartile Range; LP = Large Prostate; LRP= Laparoscopic Radical Prostatectomy; NA = Not applicable; NR = Not Reported; PDE5= phosphodiesterase-5; PSA = Prostate-Specific Antigen; RALP = Robot-Assisted Radical Prostatectomy; RPP= Radical Perineal Prostatectomy; RRP= Radical Retropubic Prostatectomy; RT= Radiotherapy; ORP = Open Radical Prostatectomy; SD = Standard Deviation; SP = Small Prostate

Percentages as [%] refer to the reported data and are based on incomplete sample size described in (n=)

\* P value between comparators with incomplete sample size

†Values are reported as mean (range)

†† Values are reported as n (%)

†††Values are reported as median± SD



Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD              | Pathological T stage n (%)  | Positive surgical margins n (%)                     |   |
|--|-----------------------|---|--|-------------------------------|---|---|---|---|
|  |                       |   |  |                               |   |   | Total   | by Pathological stage   |
| <b>RALP vs. LRP</b>                                  |                       |   |  |                               |   |   |   |   |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br>LRP: 308  | RALP: NR<br>RRP: NR   | RALP: 44.0±NR<br>LRP: 50.4±NR<br>P=NR                              | RALP: NR<br>LRP: NR           | RALP: 6.7±NR<br>LRP: 6.6±NR<br>P=NR   | RALP:<br>- pT2a: 10 (12.7)<br>- pT2b: 15 (19.0)<br>- pT2c: 32 (40.5)<br>- pT3a: 16 (20.3)<br>- pT3b: 6 (7.6)<br>- pT3c: 0 (0.0)<br>- pT4: 0 (0.0)<br><br>LRP:<br>- pT2a: 59 (19.2)<br>- pT2b: 45 (14.6)<br>- pT2c: 63 (20.5)<br>- pT3a: 88 (28.6)<br>- pT3b: 51 (16.6)<br>- pT3c: 1 (0.3)<br>- pT4: 1 (0.3)<br><br>P=NR | RALP: 22 (27.8)<br>LRP: 86 (27.9)<br>P=NR           | RALP:<br>- pT2: 4 (7.0)<br>- pT3: 18 (81.8)<br><br>LRP:<br>- pT2: 15 (9.0)<br>- pT3: 71 (50.7)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR  |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br>LRP: 100 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP: NR<br>LRP: NR   | RALP:<br>- pT2: 69 (69.0)<br>- pT3a: 25 (25.0)<br>- pT3b: 6 (6.0)<br><br>LRP (n=96):<br>- pT2: 60 (63.0)<br>- pT3a: 24 (25.0)<br>- pT3b: 12 (12.0)<br><br>P=0.28  | RALP: 10 (10.0)<br>LRP (n=96): 13 (13.5)<br>P= 0.53 | RALP:<br>- pT2: 2 (2.9)<br>- pT3: 8 (25.8)<br><br>LRP:<br>- pT2: 4 (6.7)<br>- pT3: 9 (25.0)<br><br>P <sub>T2</sub> =0.36<br>P <sub>T3</sub> =0.99 |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand  | RALP: 486<br>LRP: 561 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP (n=475):<br>- ≤6: 99 (20.4) [20.8%]<br>- 7: 260 (53.5) [54.7%]<br>- ≥8: 116 (23.9) [24.4%] | RALP(n=485):<br>- pT0: 10 (2.1) [2.1%]<br>- pT2: 280 (57.6) [57.7%]<br>- pT3a: 102 (21.0)   | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR   |



Table 11. Key histopathological findings

| Study  | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                    | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                       |   |
|--|-----------------------------|---|--|--|---|--|---|---|
|  |                             |   |  |  |   |  | Total   | by Pathological stage   |
|  |                             |   |  |  | LRP (n=537):<br>- ≤6: 104 (18.5) [19.4%]<br>- 7: 293 (52.2) [54.6%]<br>- ≥8: 140 (25.0) [26.1%]<br><br>*P=0.76  | [21.0%]<br>- pT3b: 84 (17.3) [17.3%]<br>- pT4: 9 (1.9) [1.9%]<br><br>LRP:<br>- pT0: 26 (4.6)<br>- pT2: 299 (53.3)<br>- pT3a: 137 (24.4)<br>- pT3b: 87 (15.5)<br>- pT4: 12 (2.1)<br><br>*P=0.10                 |   |   |
| Busch et al (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br><br>LRP: 194   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: 5 (3.0)<br><br>LRP: 2 (2.7)<br><br>P= 1.00 | RALP (n=192):<br>- ≤6: 49 (25.3)<br>- 7: 119 (61.3)<br>- ≥8: 24 (12.4)<br><br>LRP (n=193):<br>- ≤6: 46 (23.7)<br>- 7: 122 (62.9)<br>- ≥8: 25 (12.9)<br><br>P=0.96 | RALP (n=164):<br>- pT2: 114 (58.8)<br>- pT3a: 40 (20.6)<br>- pT3b: 10 (5.2)<br><br>LRP (n=164):<br>- pT2: 114 (58.8)<br>- pT3a: 40 (20.6)<br>- pT3b: 10 (5.2)<br><br>P=NR                                      | RALP: 61 (31.4)<br><br>LRP: 44 (22.7)<br><br>P=0.05   | RALP:<br>- pT2: 33 (28.9)<br>- pT3: 28 (56.0)<br><br>LRP:<br>- pT2: 25 (21.9)<br>- pT3: 19 (38.0)<br><br>P <sub>T2</sub> =0.30<br>P <sub>T3</sub> =0.11     |
| Ploussard et al (2014) <sup>111</sup><br>France      | RALP: 1009<br><br>LRP: 1377 | RALP: NR<br><br>LRP: NR   | RALP: 47.5±NR<br><br>LRP: 53.0±NR<br><br>P<0.001                   | RALP: NR<br><br>LRP: NR                          | RALP:<br>- 6: 295 (29.2)<br>- 7: 609 (60.4)<br>- ≥8: 105 (10.4)<br><br>LRP:<br>- 6: 372 (27.0)<br>- 7: 856 (62.2)<br>- ≥8: 149 (10.8)<br><br>P=0.49               | RALP:<br>- pT0: 8 (0.8)<br>- pT2a: 110 (10.9)<br>- pT2b: 14 (1.4)<br>- pT2c: 452 (44.8)<br>- pT3a: 325 (32.2)<br>- pT3b, pT4: 98 (9.8)<br><br>LRP:<br>- pT0: 7 (0.5)<br>- pT2a: 141 (10.2)<br>- pT2b: 35 (2.5) | RALP: 316 (31.3)<br><br>LRP: 366 (26.6)<br><br>P=0.04 | RALP:<br>- pT2: 113 (19.6)<br>- pT3: 203 (47.4)<br><br>LRP:<br>- pT2: 136 (16.8)<br>- pT3: 230 (41.1)<br><br>P <sub>T2</sub> =0.51<br>P <sub>T3</sub> =0.03 |



Table 11. Key histopathological findings

| Study  | Sample size             | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)  |   |
|--|-------------------------|---|--|-------------------------------|---|--|--|---|
|  |                         |   |  |                               |   |  | Total  | by Pathological stage   |
|  |                         |   |  |                               |   | - pT2c: 631 (45.8)<br>- pT3a: 418 (30.3)<br>- pT3b, pT4: 145 (10.5)<br><br>P=0.79  |  |   |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP (n=7656):<br>- ≤5: 135 (1.8)<br>- 6: 2454 (31.9)<br>- 7: 4475 (58.1)<br>- 8: 259 (3.4)<br>- ≥9: 333 (4.3)<br><br>LRP (n=4783):<br>- ≤5: 172 (3.5)<br>- 6: 1742 (35.4)<br>- 7: 2564 (52.1)<br>- 8: 195 (4.0)<br>- ≥9: 110 (2.2)<br><br>P=NR | RALP (n=7271):<br>- pT2: 5353 (69.5)<br>- pT3a: 1534 (19.9)<br>- pT3b: 384 (5.0)<br><br>LRP (n=4766):<br>- pT2: 3622 (73.6)<br>- pT3a: 805 (16.4)<br>- pT3b: 339 (6.9)<br><br>P=NR | RALP: 1062 (13.8)<br>LRP: 802 (16.3)<br><br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> <0.001 | RALP: NR<br>LRP: NR   |
| Tozawa et al (2014) <sup>147</sup><br>Japan  | RALP: 157<br>LRP: 551   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP (n=153):<br>42 (26.8) [27.5%]<br><br>LRP (n=546):<br>167 (30.3) [30.6%]<br><br>*P=0.24                | RALP:<br>- pT2: 9 (NR)<br>- pT3: 33 (NR)<br><br>LRP:<br>- pT2: 115 (NR)<br>- pT3: 52 (NR)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy   | RALP: 136<br>LRP: 91    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP:<br>- 6: 64 (47.1)<br>- ≥7: 72 (52.9)<br><br>LRP:  | RALP:<br>- pT2a: 19 (14.0)<br>- pT2b: 8 (5.9)<br>- pT2c: 91 (66.9)<br>- pT3a: 18 (13.2)  | RALP: 21 (15.4)<br>LRP: 6 (6.6)<br><br>P=0.04  | RALP: NR<br>LRP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                 | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                     |   |
|---|---------------------------|---|--|---|---|--|---|---|
|   |                           |   |  |   |   |  | Total   | by Pathological stage   |
|   |                           |   |  |   | - 6: 51 (56.0)<br>- ≥7: 40 (44.0)<br><br>P=0.22   | LRP:<br>- pT2a: 10 (11.0)<br>- pT2b: 1 (1.1)<br>- pT2c: 66 (72.5)<br>- pT3a: 14 (15.4)<br><br>P=0.27   |   |   |
| Berge et al (2013) <sup>113</sup><br>Norway   | RALP: 210<br><br>LRP: 210 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR                       | RALP:<br>- ≤6: 91 (43.3)<br>- 7: 115 (54.8)<br>- ≥8: 4 (1.9)<br><br>LRP:<br>- ≤6: 76 (36.4)<br>- 7: 126 (60.3)<br>- ≥8: 7 (3.3)<br><br>P=0.40 | RALP (n=209):<br>- pT2: 132 (62.9) [63.2%]<br>- pT3: 77 (36.7) [36.8%]<br><br>LRP (n=209):<br>- pT2: 146 (69.5)<br>- pT3: 63 (30.0)<br><br>P=0.10  | RALP: 62 (29.5)<br><br>LRP: 48 (22.9)<br><br>P=0.10 | RALP:<br>- pT2: NR<br>- pT3: NR<br><br>LRP:<br>- pT2: NR<br>- pT3: NR<br><br>P <sub>T2</sub> ≥0.05<br>P <sub>T3</sub> ≥0.05   |
| Harty et al (2013) <sup>200</sup><br>USA      | RALP: 152<br><br>LRP: 140 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: 5 (3.3)<br><br>LRP: 5 (3.6)<br><br>P=NR | RALP: NR<br><br>LRP: NR   | RALP:<br>- pT2: 33 (21.7)<br>- pT3: 112 (73.7)<br>- pT4: 7 (4.6)<br><br>LRP:<br>- pT2: 42 (30.0)<br>- pT3: 98 (70.0)<br>- pT4: 0 (0.0)<br><br>P=NR | RALP: 76 (50.0)<br><br>LRP: 58 (41.4)<br><br>P=NR   | RALP:<br>- pT2: 9 (27.3)<br>- pT3: 60 (53.6)<br>- pT4: 7 (100.0)<br><br>LRP:<br>- pT2: 7 (16.7)<br>- pT3: 51 (52.0)<br>- pT4: 0 (0.0)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Pierorazio et al (2013) <sup>149</sup><br>USA | RALP: 105<br><br>LRP: 65  | RALP: NR<br><br>LRP: NR   | RALP: 46.5 (24.7-94.5)<br><br>LRP: 48.4 (28.0-                     | RALP: 4 (3.8)<br><br>LRP: 2 (3.1)             | RALP:<br>- ≤6: 5 (4.8)<br>- 7: 13 (12.4)<br>- 8: 45 (42.9)  | RALP:<br>- pT2: 36 (34.3)<br>- pT3a: 46 (43.8)<br>- pT3b: 19 (18.1)  | RALP: 36 (34.3)<br><br>LRP: 18 (27.7)               | RALP:<br>- pT2: 3 (8.3)<br>- pT3: 33 (50.8)   |

Table 11. Key histopathological findings

| Study   | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                   | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)                     |   |
|---|---------------------------|---|--|---|--|---|---|---|
|   |                           |   |  |   |  |   | Total   | by Pathological stage   |
|   |                           |   | 87.0)<br><br>P<0.001   | P=NR  | - ≥9: 42 (40.0)<br><br>LRP:<br>- ≤6: 9 (13.8)<br>- 7: 10 (15.4)<br>- 8: 27 (41.5)<br>- ≥9: 19 (29.2)<br><br>P=NR                           | - N1: 4 (3.8)<br><br>LRP:<br>- pT2: 33 (50.8)<br>- pT3a: 22 (33.8)<br>- pT3b: 8 (12.3)<br>- N1: 2 (3.1)<br><br>P=NR | P=0.52  | LRP:<br>- pT2: 2 (6.1)<br>- pT3: 16 (53.3)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR  |
| Porpiglia et al (2013) <sup>109</sup><br>Italy  | RALP: 60<br><br>LRP: 60   | RALP: 6.7±7.9<br><br>LRP: 7.3±10.2<br><br>LRP: 0.71               | RALP: 46.7±15.7<br><br>LRP: 50.2±15.8<br><br>P=0.22                | RALP: NR<br><br>LRP: NR                         | RALP:<br>- ≤6:10 (16.7)<br>- 7: 45 (75.0)<br>- ≥8: 5 (8.3)<br><br>LRP:<br>- ≤6: 14 (23.3)<br>- 7: 45 (75.0)<br>- ≥8: 1 (1.7)<br><br>P=0.20 | RALP:<br>- pT2:38 (63.3)<br>- pT3: 22 (36.7)<br><br>LRP:<br>- pT2: 38 (63.3)<br>- pT3: 22 (36.7)<br><br>P=1.00      | RALP: 16 (26.7)<br><br>LRP: 12 (20.0)<br><br>P=0.39 | RALP:<br>- pT2: 5 (13.2)<br>- pT3: 11 (50.0)<br><br>LRP:<br>- pT2: 6 (15.8)<br>- pT3: 6 (27.3)<br><br>P <sub>T2</sub> =0.74<br>P <sub>T3</sub> =0.12  |
| Koutlidis et al (2012) <sup>114</sup><br>France | RALP: 175<br><br>LRP: 104 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR                         | RALP:<br>- ≤6: 66 (37.7)<br>- ≥7: 109 (62.3)<br><br>LRP:<br>- ≤6: 41 (39.4)<br>- ≥7: 63 (60.6)<br><br>P=0.80                               | RALP:<br>- pT2: 149 (85.1)<br>- pT3: 26 (14.9)<br><br>LRP:<br>- pT2: 79 (76.0)<br>- pT3: 25 (24.0)<br><br>P=0.05    | RALP: 30 (17.1)<br><br>LRP: 14 (13.5)<br><br>P=0.40 | RALP:<br>- pT2: 18 (12.1)<br>- pT3: 12 (46.2)<br><br>LRP:<br>- pT2: 8 (10.1)<br>- pT3: 6 (24.0)<br><br>P <sub>T2</sub> =0.80<br>P <sub>T3</sub> =0.15 |
| Park et al (2012) <sup>150</sup><br>South Korea | RALP: 183<br><br>LRP: 144 | RALP: NR<br><br>LRP: NR   | RALP: 32.0 (12.3-78.0)<br><br>LRP: 36.0 (16.0-80.0)                | RALP: 1 (1.7)<br><br>LRP: 3 (6.1)<br><br>P=0.33 | RALP: 7 (NR)<br><br>LRP: 7 (NR)<br><br>P=0.65  | RALP:<br>- pT0: 0 (0.0)<br>- pT2a, pT2b: 30 (16.4)<br>- pT2c: 97 (53.0)<br>- pT3a: 43 (23.5)                        | RALP: 25 (13.7)<br><br>LRP: 22 (15.3)<br><br>P=0.75 | RALP:<br>- pT2: 14 (8.2)<br>- pT3: 9 (16.7)<br>- pT4: 2 (100.0)   |



Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                 |  |
|--|-----------------------|---|--|-------------------------------|---|--|---|--|
|  |                       |   |  |                               |   |  | Total   | by Pathological stage  |
|  |                       |   | P=0.03   |                               |   | - pT3b: 11 (6.0)<br>- pT4: 2 (1.1)<br><br>LRP:<br>- pT0: 1 (0.7)<br>- pT2a, pT2b: 25 (17.4)<br>- pT2c: 64 (44.4)<br>- pT3a: 40 (27.8)<br>- pT3b: 12 (8.3)<br>- pT4: 2 (1.4)<br><br>P=0.56      |   | LRP:<br>- pT2: 6 (6.7)<br>- pT3: 14 (26.9)<br>- pT4: 2 (100)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR<br>P <sub>T4</sub> =NR                  |
| Asimakopoulus et al (2011) <sup>110</sup><br>Italy | RALP: 52<br>LRP: 60   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP:<br>- ≤5: 1 (1.9)<br>- 6: 29 (55.8)<br>- 7: 21 (40.4)<br>- 8: 1 (1.9)<br><br>LRP:<br>- ≤5: 1 (1.7)<br>- 6: 41 (68.3)<br>- 7: 18 (30.0)<br>- 8: 0 (0.0)<br><br>P=0.41 | RALP:<br>- pT2a: 7 (13.5)<br>- pT2c: 36 (69.2)<br>- pT3a: 8 (15.4)<br>- pT3b: 1 (1.9)<br><br>LRP:<br>- pT2a: 5 (8.3)<br>- pT2c: 47 (78.3)<br>- pT3a: 8 (13.3)<br>- pT3b: 0 (0.0)<br><br>P=0.53 | RALP: 8 (15.4)<br>LRP: 6 (10.0)<br><br>P=0.39   | RALP:<br>- pT2: 3 (7.0)<br>- pT3: 5 (55.6)<br><br>LRP:<br>- pT2: 4 (7.7)<br>- pT3: 2 (25.0)<br><br>P <sub>T2</sub> =0.89<br>P <sub>T3</sub> =0.20      |
| Kasraeian et al (2011) <sup>151</sup><br>France    | RALP: 200<br>LRP: 200 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR           | RALP:<br>- 5: 1 (0.5)<br>- 6: 69 (34.5)<br>- 7: 121 (60.5)<br>- 8: 5 (2.5)<br>- 9: 4 (2.0)<br><br>LRP:<br>- 5: 1 (0.5)<br>- 6: 57 (28.5)                                  | RALP:<br>- pT2a: 15 (7.5)<br>- pT2b: 13 (6.5)<br>- pT2c: 124 (62.0)<br>- pT3a: 37 (18.5)<br>- pT3b: 11 (5.5)<br><br>LRP:<br>- pT2a: 15 (7.5)<br>- pT2b: 20 (10.0)                              | RALP: 27 (13.5)<br>LRP: 24 (12.0)<br><br>P=0.76 | RALP:<br>- pT2: 17 (11.2)<br>- pT3: 10 (20.8)<br><br>LRP:<br>- pT2: 12 (8.3)<br>- pT3: 12 (21.4)<br><br>P <sub>T2</sub> =0.35<br>P <sub>T3</sub> =0.40 |



Table 11. Key histopathological findings

| Study  | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%) | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                     |   |
|--|---------------------------|---|--|----------------------------|--|--|---|---|
|  |                           |   |  |                            |  |  | Total   | by Pathological stage   |
|  |                           |   |  |                            | - 7: 135 (67.5)<br>- 8: 4 (2.0)<br>- 9: 3 (1.5)<br><br>P=0.69  | - pT2c: 109 (54.5)<br>- pT3a: 40 (20.0)<br>- pT3b: 16 (8.0)<br><br>P=0.48  |   |   |
| Magheli et al (2011) <sup>152</sup><br>USA   | RALP: 522<br><br>LRP: 522 | RALP: NR<br><br>LRP: NR   | RALP: 46 (15-150)<br><br>LRP: 48 (13-130)<br><br>P= NR             | RALP: NR<br><br>LRP: NR    | RALP:<br>- ≤6: 306 (58.6)<br>- 7: 188 (36.0)<br>- ≥8: 28 (5.4)<br><br>LRP:<br>- ≤6: 380 (72.8)<br>- 7: 122 (23.4)<br>- ≥8: 20 (3.8)<br><br>P= NR | RALP:<br>- pT2: 386 (73.9)<br>- pT3: 136 (26.1)<br><br>LRP:<br>- pT2: 433 (83.0)<br>- pT3: 89 (17.0)<br><br>P=NR | RALP: 102 (19.5)<br><br>LRP: 68 (13.0)<br><br>P= NR | RALP:<br>- pT2: 36 (9.3)<br>- pT3: 66 (48.5)<br><br>LRP:<br>- pT2: 29 (6.7)<br>- pT3: 39 (43.8)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> = NR  |
| Willis et al (2011) <sup>115</sup><br>USA    | RALP: 121<br><br>LRP: 161 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR    | RALP: NR<br><br>LRP: NR  | RALP:<br>- pT2: 91 (75.2)<br>- pT3: 30 (24.8)<br><br>LRP:<br>- pT2: 130 (80.7)<br>- pT3: 31 (19.3)<br><br>P=0.39 | RALP: 21 (16.5)<br><br>LRP: 21 (13.0)<br><br>P=0.23 | RALP:<br>- pT2: 6 (6.6)<br>- pT3: 15 (50.0)<br><br>LRP:<br>- pT2: 12 (9.2)<br>- pT3: 9 (29.0)<br><br>P <sub>T2</sub> =0.48<br>P <sub>T3</sub> =0.07 |
| Bolenz et al (2010) <sup>153</sup><br>USA    | RALP: 262<br><br>LRP: 220 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR    | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR                             | RALP: NR<br><br>LRP: NR   |
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br><br>LRP: 85   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR    | RALP:<br>- ≤5: 0 (0.0)<br>- 6: 49 (69.0)   | RALP:<br>- pT2a: 3 (4.2)<br>- pT2b: 10 (14.1)  | RALP: 12 (16.9)<br><br>LRP: 16 (18.8)               | RALP:<br>- pT2: 6 (9.8)<br>- pT3: 6 (60.0)  |



Table 11. Key histopathological findings

| Study                                       | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%) | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)                     |   |
|---|---------------------------|---|--|----------------------------|---|--|---|---|
|   |                           |   |  |                            |   |  | Total   | by Pathological stage   |
|   |                           |   |  |                            | - 7: 21 (29.6)<br>- ≥8: 1 (1.4)<br><br>LRP:<br>- ≤5: 3 (3.5)<br>- 6: 50 (58.8)<br>- 7: 28 (32.9)<br>- ≥8: 4 (4.7)<br><br>P=NR | - pT2c: 48 (67.6)<br>- pT3a: 9 (12.7)<br>- pT3b: 1 (1.4)<br><br>LRP:<br>- pT2a: 6 (7.1)<br>- pT2b: 6 (7.1)<br>- pT2c: 58 (68.2)<br>- pT3a: 11 (12.9)<br>- pT3b: 4 (4.7)<br><br>P=NR  | P=NR  | LRP:<br>- pT2: 8 (11.4)<br>- pT3: 8 (53.3)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR  |
| Hakimi et al (2009) <sup>155</sup><br>USA   | RALP: 75<br><br>LRP: 75   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR    | RALP: NR<br><br>LRP: NR   | RALP:<br>- pT2: 64 (85.3)<br>- pT3: 11 (14.7)<br><br>LRP:<br>- pT2: 71 (94.7)<br>- pT3: 4 (5.3)<br><br>P=0.10  | RALP: 9 (12.0)<br><br>LRP: 10 (13.3)<br><br>P=NR    | RALP:<br>- pT2: 7 (10.9)<br>- pT3: 2 (18.2)<br><br>LRP:<br>- pT2: 9 (12.7)<br>- pT3: 1 (25.0)<br><br>P <sub>T2</sub> =0.32<br>P <sub>T3</sub> =0.57   |
| Rozet et al (2009) <sup>156</sup><br>France | RALP: 133<br><br>LRP: 133 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR    | RALP: 6.5 (5-9)†<br><br>LRP: 6.5 (5-9)†<br><br>P=0.43   | RALP:<br>- pT2a: 16 (12.0)<br>- pT2b: 2 (1.5)<br>- pT2c: 92 (69.2)<br>- pT3a: 16 (12.0)<br>- pT3b: 7 (5.3)<br><br>LRP:<br>- pT2a: 11 (8.3)<br>- pT2b: 6 (4.5)<br>- pT2c: 86 (64.7)<br>- pT3a: 22 (16.5)<br>- pT3b: 8 (6.0) | RALP: 26 (19.5)<br><br>LRP: 21 (15.8)<br><br>P=0.42 | RALP:<br>- pT2: 23 (20.9)<br>- pT3: 3 (13.0)<br><br>LRP:<br>- pT2: 16 (15.5)<br>- pT3: 5 (16.7)<br><br>P <sub>T2</sub> =0.31<br>P <sub>T3</sub> =1.00 |

Table 11. Key histopathological findings

| Study                                       | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)          | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)           |   |
|---|-----------------------|---|--|--|---|--|---|---|
|   |                       |   |  |  |   |  | Total                                     | by Pathological stage   |
|   |                       |   |  |  |   | P=NR   |   |   |
| Trabulsi et al (2008) <sup>157</sup><br>USA | RALP: 50<br>LRP: 190  | RALP: NR<br>LRP: NR   | RALP: 41.0 (16-102)<br>LRP: 43.3 (14-156)<br>P=0.51                | RALP : 1 (2.0)<br>LRP: 0 (0.0)<br>P=NR | RALP:<br>- ≤6: 33 (66.0)<br>- 3+4: 12 (24.0)<br>- 4+3: 3 (6.0)<br>- ≥8: 2 (4.0)<br><br>LRP:<br>- ≤6: 109 (57)<br>- 3+4: 52 (27)<br>- 4+3: 15 (8)<br>- ≥8: 8 (4)<br><br>P=NR | RALP:<br>- pT0: 0 (0.0)<br>- pT2a: 12 (24.0)<br>- pT2b: 0 (0.0)<br>- pT2c: 31 (62.0)<br>- pT3a: 5 (10.0)<br>- pT3b: 2 (4.0)<br>- pT4: 0 (0.0)<br><br>LRP:<br>- pT0: 1 (0.5)<br>- pT2a: 40 (21.1)<br>- pT2b: 2 (1.1)<br>- pT2c: 119 (62.6)<br>- pT3a: 12 (6.3)<br>- pT3b: 6 (3.2)<br>- pT4:10 (5.3) | RALP: 3 (6.0)<br>LRP: 35 (18.4)<br>P=0.03 | RALP:<br>- pT2: 2 (4.7)<br>- pT3, pT4: 1 (14.3)<br><br>LRP:<br>- pT2: 20 (12.4)<br>- pT3, pT4: 15 (53.6)<br><br>P <sub>T2</sub> =0.14<br>P <sub>T3/T4</sub> =0.06 |
| Ball et al (2006) <sup>116</sup><br>USA     | RALP: 82<br>LRP: 124  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                    | RALP: NR<br>LRP: NR   | RALP (n=81):<br>- pT2: 58 (71.6)<br>- pT3, pT4: 23 (28.4)<br><br>LRP (n=124):<br>- pT2: 96 (77.4)<br>- pT3, pT4: 26 (21.1)<br><br>P=NR   | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR   |
| Hu et al (2006) <sup>158</sup><br>USA       | RALP: 322<br>LRP: 358 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR   |



Table 11. Key histopathological findings

| Study                                       | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                                     | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)   |                         |
|---|-----------------------------|---|--|---|--|--|---|-------------------------|
|   |                             |   |  |   |  |  | Total   | by Pathological stage   |
| Joseph et al (2005) <sup>159</sup><br>USA   | RALP: 50<br><br>LRP: 50     | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | RALP:<br>- pT2a: 8 (16.0)<br>- pT2b: 36 (72.0)<br>- pT3a: 6 (12.0)<br>- pT3b: 0 (0.0)<br>- PIN: 0 (0.0)<br><br>LRP:<br>- pT2a: 13 (26.0)<br>- pT2b: 27 (54.0)<br>- pT3a: 7 (14.0)<br>- pT3b: 2 (4.0)<br>- PIN: 1 (2.0)<br><br>P=NR | RALP: 6 (12.0)<br><br>LRP: 7 (14.0)<br><br>P=NR   | RALP: NR<br><br>LRP: NR |
| <b>RALP vs. ORP</b>                         |                             |   |  |   |  |  |   |                         |
| Hu et al (2017) <sup>160</sup><br>USA       | RALP: 4164<br><br>ORP: 4164 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP (n=4089): 79 (1.9)<br><br>ORP (n=4096): 70 (1.7)<br><br>P=NR | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR |
| Jackson et al. (2016) <sup>117</sup><br>USA | RALP: 116<br><br>ORP: 63    | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP:<br>- ≤6: 51 (44.0)<br>- 7: 63 (54.3)<br>- 8: 2 (1.7)<br><br>ORP:<br>- ≤6: 11 (17.5)<br>- 7: 50 (79.4)<br>- 8: 2 (3.2)<br><br>P=0.002 | RALP:<br>- pT2: 97 (83.6)<br>- pT3: 19 (16.4)<br><br>ORP:<br>- pT2: 45 (71.4)<br>- pT3: 18 (28.6)<br><br>P=0.08  | RALP: 31 (26.7)<br><br>ORP: 26 (41.3)<br><br>P <sub>unadjusted</sub> =0.05<br>P <sub>adjusted</sub> =0.23 | RALP: NR<br><br>ORP: NR |



Table 11. Key histopathological findings

| Study   | Sample size                     | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%)  | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)  |   |
|---|---------------------------------|---|--|---|--|--|--|---|
|   |                                 |   |  |   |  |  | Total  | by Pathological stage   |
| Ong et al. (2016) <sup>118</sup><br>Australia | RALP: 885<br><br>ORP: 1117      | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: - pT2: 557 (62.9)<br>- pT3, pT4: 328 (37.1)<br><br>ORP: - pT2: 735 (65.8)<br>- pT3, pT4: 382 (34.2)<br><br>P=0.20  | RALP: 202 (22.8)<br><br>ORP: 378 (33.8)<br><br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> <0.01                 | RALP: - pT2: 46 (8.3)<br>- pT3, pT4: 156 (47.6)<br><br>ORP: - pT2: 174 (23.7)<br>- pT3, pT4: 204 (53.4)<br><br>P <sub>T2unadjusted</sub> <0.001<br>P <sub>T2, adjusted</sub> <0.01<br>P <sub>T3,T4unadjusted</sub> =0.10<br>P <sub>T3,T4 adjusted</sub> =0.30 |
| Pearce et al. (2016) <sup>161</sup><br>USA    | RALP: 73,131<br><br>ORP: 23,804 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: - Unmatched: 1,019 (2.1)<br>- Matched: 386 (3.4)<br><br>ORP: - Unmatched: 665 (3.6)<br>- Matched: 387 (3.4)<br><br>P=NR | RALP: - ≤6: - Unmatched: 23,657 (32.7)<br>- Matched: 4,124 (30.9)<br>- 7: - Unmatched: 43,231 (59.7)<br>- Matched: 7,791 (58.4)<br>- 8-10: - Unmatched: 5,546 (7.6)<br>- Matched: 1,416 (10.6)<br><br>ORP: - ≤6: - Unmatched: 7,774 (34.9) | RALP: - pT2: - Unmatched: 55,865 (78.7)<br>- Matched: 10,094 (75.7)<br>- pT3: - Unmatched: 15,157 (21.3)<br>- Matched: 3,237 (24.3)<br><br>ORP: - pT2: - Unmatched: 17,013 (77.9)<br>- Matched: 10,015 (75.1)<br>- pT3: - Unmatched: 4,816 (22.1)<br>- Matched: 3,316 (24.9) | RALP: - Unmatched: 14,940 (20.5)<br>- Matched: 2,883 (21.6)<br><br>ORP: - Unmatched: 5,077 (22.5)<br>- Matched: 3,179 (23.9) | RALP: - pT2: - Unmatched: 8,421 (15.1)<br>- Matched: 1,510 (15.0)<br>- pT3: - Unmatched: 6,179 (41.0)<br>- Matched: 1,373 (42.4)<br><br>ORP: - pT2: - Unmatched: 2,777 (16.5)<br>- Matched: 1,723 (17.2)<br>- pT3: - Unmatched: 2,127 (44.6)                  |





Table 11. Key histopathological findings

| Study  | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD       | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%)                           | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)                                    |   |
|--|-----------------------------|---|--|--|---|---|--|---|
|  |                             |   |  |  |   |   | Total  | by Pathological stage   |
|  |                             |   |  |  | - Matched: 4,143 (31.1)<br>- 7:<br>- Unmatched: 12,212 (54.8)<br>- Matched: 7,783 (58.4)<br>- 8-10:<br>- Unmatched: 2,289 (10.3)<br>- Matched: 1,405 (10.5)<br><br>P=NR   | P=NR  |  | - Matched: 1,456 (43.9)   |
| Suardi et al. (2016) <sup>162</sup><br>Italy     | RALP: 1790<br><br>ORP: 4404 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 97 (5.4)<br><br>ORP: 665 (15.1)<br><br>P<0.001 | RALP:<br>- ≤6: 601 (33.6)<br>- 7: 1045 (58.4)<br>- ≥8: 144 (8.0)<br><br>ORP:<br>- ≤6: 1623 (36.9)<br>- 7: 2089 (47.4)<br>- ≥8: 692 (15.7)<br><br>P<0.001  | RALP:<br>- pT2: 1479 (82.6)<br>- pT3: 311 (17.4)<br><br>ORP:<br>- pT2: 3672 (83.4)<br>- pT3: 732 (16.6)<br><br>P=NR                         | RALP: 291 (16.3)<br><br>ORP: 1044 (23.7)<br><br>P<0.001            | RALP: NR<br><br>ORP: NR   |
| Yaxley et al. (2016) <sup>103</sup><br>Australia | RALP: 163<br><br>ORP: 163   | RALP (n=157): 2.31 ± 2.32<br><br>ORP (n=151): 2.40 ± 2.20<br><br>p=0.74 | RALP: NR<br><br>ORP: NR  | RALP (n=157): 6<br><br>ORP (n=151): 3                | RALP (n=157):<br>- ≤6: 6 (3.7) [3.8%]<br>- 3+4: 72 (44.2) [45.9%]<br>- 4+3: 63 (38.7) [40.1%]<br>- 8: 2 (1.2) [1.3%]<br>- 4+5: 13 (8.0) [8.3%]<br>- 5+4: 1 (0.6) [0.6%]<br><br>ORP (n=151):<br>- ≤6: 5 (3.1) [3.3%] | RALP (n=157):<br>- pT2: 102 (65.0)<br>- pT3, pT4: 55 (35.0)<br><br>ORP (n=151):<br>- pT2: 102 (67.5)<br>- pT3, pT4: 49 (32.5)<br><br>P=0.77 | RALP (n=157): 23 (14.6)<br><br>ORP (n=151): 15 (9.9)<br><br>P=0.21 | RALP:<br>- pT2: 5 (4.9)<br>- pT3, pT4: 18 (32.7)<br><br>ORP:<br>- pT2: 3 (2.9)<br>- pT3, pT4: 12 (24.5) |



Table 11. Key histopathological findings

| Study   | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%) | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)   |  |
|---|-----------------------|---|--|----------------------------|---|---|---|--|
|   |                       |   |  |                            |   |   | Total   | by Pathological stage  |
|   |                       |   |  |                            | - 3+4: 72 (44.2) [47.7%]<br>- 4+3: 57 (35.0) [37.7%]<br>- 8: 0 (0.0) [0.0%]<br>- 4+5: 15 (9.2) [9.9%]<br>- 5+4: 2 (1.2) [1.3%]<br><br>*P=0.61 |   |   | P <sub>T2</sub> =NR<br>P <sub>T3,4</sub> =NR   |
| Akand et al. (2015) <sup>142</sup><br>Turkey    | RALP: 79<br>ORP: 50   | RALP: NR<br>ORP: NR   | RALP: 44.0±NR<br>ORP: 45.0±NR<br><br>P=NR                          | RALP: NR<br>ORP: NR        | RALP: 6.7±NR<br>ORP: 6.6±NR<br><br>P>0.05   | RALP:<br>- pT2a: 10 (12.7)<br>- pT2b: 15 (19.0)<br>- pT2c: 32 (40.5)<br>- pT3a: 16 (20.3)<br>- pT3b: 6 (7.6)<br>- pT3c: 0 (0.0)<br>- pT4: 0 (0.0)<br><br>ORP:<br>- pT2a: 6 (12.0)<br>- pT2b: 15 (30.0)<br>- pT2c: 11 (22.0)<br>- pT3a: 12 (24.0)<br>- pT3b: 6 (12.0)<br>- pT3c: 0 (0.0)<br>- pT4: 0 (0.0)<br><br>P=NR | RALP: 22 (27.8)<br>ORP: 15 (30.0)<br><br>P=NR   | RALP:<br>- pT2: 4 (7.0)<br>- pT3: 18 (81.8)<br><br>ORP:<br>- pT2: 5 (15.6)<br>- pT3: 10 (55.6)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Antonelli et al. (2015) <sup>163</sup><br>Italy | RALP: 291<br>LRP: 285 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: 71 (24.4)<br>ORP: 91 (31.9)<br><br>P <sub>unadjusted</sub> =0.04<br>P <sub>adjusted</sub> =0.04 | RALP: NR<br>ORP: NR  |
| Haglind et al (2015) <sup>119</sup>             | RALP: 1847            | RALP: NR<br>ORP: NR   | RALP (n=1824)‡:<br>- ≤19: 18 (1.0) [1.0%]                          | RALP: NR<br>ORP: NR        | RALP (n=1795):<br>- ≤7: 1657 (89.7)<br>- ≥8: 138 (7.5)  | RALP (n=1815):<br>- pT2: 1287 (69.7) [70.9%]  | RALP (n=1812): 395 (21.4) [21.8%]   | RALP: NR<br>ORP: NR  |



Table 11. Key histopathological findings

| Study   | Sample size         | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD  | Positive lymph nodes n (%)                    | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)   |                       |
|---|---------------------|---|---|---|---|---|---|-----------------------|
|   |                     |   |   |   |   |   | Total   | by Pathological stage |
| Sweden  | ORP: 778            |   | - 20-39: 782 (42.3) [42.9%]<br>- 40-59: 729 (39.5) [40.0%]<br>- 60-79: 209 (11.3) [11.5%]<br>- ≥80: 86 (4.7) [4.7%]<br><br>ORP (n=752)‡:<br>≤19: 4 (0.5) [0.5%]<br>- 20-39: 267 (34.3) [35.5%]<br>- 40-59: 334 (42.9) [44.4%]<br>- 60-79: 96 (12.3) [12.8%]<br>- ≥80: 51 (6.6) [6.8%]<br><br>*P=0.03<br><br>‡Data taken from Wallerstedt et al (2015) |   | ORP (n=673):<br>- ≤7: 643 (82.6)<br>- ≥8: 30 (3.9)<br><br>P=0.005   | - pT3: 511 (27.7) [28.3%]<br>- pT4: 10 (0.5) [0.6%]<br>- pTX: 7 (0.4) [0.4%]<br><br>ORP (n=755):<br>- pT2: 562 (72.2) [74%]<br>- pT3: 190 (24.4) [25.2%]<br>- pT4: 3 (0.4) [0.4%]<br>- pTX: 0 (0.0) [0.0%]<br><br>*P=0.20 | ORP (n=748): 156 (20.1) [20.9%]<br><br>*P <sub>unadjusted</sub> =0.60<br>*P <sub>adjusted</sub> ≥0.05 |                       |
| Lee et al. (2015) <sup>164</sup><br>South Korea | RALP: 99<br>ORP: 99 | RALP: 30.4±NR<br>ORP: 29.1±NR<br><br>P=0.71                       | RALP: NR<br>ORP: NR   | RALP: 7 (7.1)<br>ORP: 11 (11.1)<br><br>P=0.32 | RALP:<br>- ≤6: 5 (5.1)<br>- 7: 53 (53.5)<br>- ≥8: 41 (41.4)<br><br>ORP:<br>- ≤6: 2 (2.0)<br>- 7: 49 (49.5)<br>- ≥8: 48 (48.5) | RALP:<br>- pT2: 35 (35.4)<br>- pT3a: 38 (38.4)<br>- pT3b: 26 (26.3)<br><br>ORP:<br>- pT2: 31 (31.3)<br>- pT3a: 36 (36.4)<br>- pT3b: 32 (32.3)   | RALP: 34 (34.3)<br>ORP: 36 (36.4)<br><br>P=0.77   | RALP: NR<br>ORP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)             | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)   |   |
|---|-----------------------|---|--|---|--|--|---|---|
|   |                       |   |  |   |  |  | Total   | by Pathological stage   |
|   |                       |   |  |   | P=0.37   | P=0.63   |   |   |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                       | RALP:<br>- ≤6: 10 (20.0)<br>- 7: 38 (76.0)<br>- ≥8: 2 (4.0)<br><br>ORP:<br>- ≤6: 6 (17.6)<br>- 7: 25 (73.5)<br>- ≥8: 3 (8.8)<br><br>P=0.52               | RALP:<br>- pT2: 44 (88.0)<br>- pT3: 6 (12.0)<br><br>ORP:<br>- pT2: 22 (64.7)<br>- pT3: 12 (35.3)<br><br>P=0.08   | RALP: 16 (32.0)<br>ORP: 11 (32.3)<br><br>P=0.97   | RALP: NR<br>ORP: NR   |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 5 (3.0)<br>ORP: 6 (3.4)<br><br>P=NR | RALP (n=192):<br>- ≤6: 49 (25.3)<br>- 7: 119 (61.3)<br>- ≥8: 24 (12.4)<br><br>ORP:<br>- ≤6: 46 (23.7)<br>- 7: 129 (66.5)<br>- ≥8: 19 (9.8)<br><br>P=0.44 | RALP (n=164):<br>- pT2: 114 (58.8)<br>- pT3a: 40 (20.6)<br>- pT3b: 10 (5.2)<br><br>ORP:<br>- pT2: 145 (74.7)<br>- pT3a: 29 (14.9)<br>- pT3b: 20 (10.3)<br><br>P=NR | RALP: 61 (31.4)<br>ORP: 46 (23.7)<br><br>P=NR   | RALP:<br>- pT2: 33 (28.9)<br>- pT3: 28 (56.0)<br><br>ORP:<br>- pT2: 28 (19.3)<br>- pT3: 18 (36.7)<br><br>P <sub>T2</sub> =0.47<br>P <sub>T3</sub> =0.07 |
| Davison et al. (2014) <sup>121</sup><br>Canada        | RALP: 78<br>ORP: 73   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Fode et al. (2014) <sup>122</sup><br>Denmark          | RALP: 585<br>ORP: 453 | RALP: 6 (0-57)<br>ORP: 7 (0-75)<br><br>P<0.001                    | RALP: 53.0 (20-149)<br>ORP: 52.0 (19-211)<br><br>P=0.34            | RALP: NR<br>ORP: NR                       | RALP (n=581):<br>- ≤6: 102 (17.4)<br>- 3+4: 248 (42.4)<br>- 4+3: 163 (27.9)<br>- ≥8: 68 (11.6)<br><br>ORP (n=450):                                       | RALP:<br>- pT0: 2 (0.3)<br>- pT2a: 37 (6.3)<br>- pT2b: 13 (2.2)<br>- pT2c: 329 (56.2)<br>- pT3a: 162 (27.7)<br>- pT3b: 40 (6.8)                                    | RALP: 96 (16.4)<br>ORP: 116 (25.6)<br><br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> =0.96 | RALP: NR<br>ORP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                      | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                              |   |
|---|-----------------------------|---|--|--|---|--|--|---|
|   |                             |   |  |  |   |  | Total  | by Pathological stage   |
|   |                             |   |  |  | - ≤6: 68 (15.0)<br>- 3+4: 142 (31.3)<br>- 4+3: 142 (31.3)<br>- ≥8: 98 (21.6)<br><br>P<0.001   | - pT3c: 0 (0.0)<br>- pT4:2 (0.3)<br><br>ORP:<br>- pT0: 3 (0.7)<br>- pT2a: 24 (5.3)<br>- pT2b: 13 (2.9)<br>- pT2c: 219 (48.3)<br>- pT3a: 127 (28.0)<br>- pT3b: 56 (12.4)<br>- pT3c: 1 (0.2)<br>- pT4: 10 (2.2)<br><br>P=0.003 |  |   |
| Gagnon et al. (2014) <sup>165</sup><br>Canada | RALP: 200<br><br>ORP: 200   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 2 (1.0)<br><br>ORP: 18 (9.0)<br><br>P=NR     | RALP (n=187):<br>- 6: 44 (22.0)<br>- 7: 136 (68.0)<br>- ≥8: 7 (3.5)<br><br>ORP (n=184):<br>- 6: 12 (6.0)<br>- 7: 125 (62.5)<br>- ≥8: 47 (23.5)<br><br>P<0.001 | RALP (n=199):<br>- pT2: 156 (78.0)<br>- pT3: 43 (21.5)<br><br>ORP:<br>- pT2: 115 (57.5)<br>- pT3: 85 (42.5)<br><br>P=NR  | RALP: 49 (24.5) [24.6%]<br><br>ORP: 62 (31.0)<br><br>*P=0.18 | RALP:<br>- pT2: 27 (17.3)<br>- pT3: 22 (51.2)<br><br>ORP:<br>- pT2: 25 (21.7)<br>- pT3: 37 (43.5)<br><br>P <sub>T2</sub> =0.44<br>P <sub>T3</sub> =0.46 |
| Gandaglia et al (2014) <sup>166</sup><br>USA  | RALP: 3476<br><br>ORP: 2439 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 47 (1.4)<br><br>ORP: 82 (3.4)<br><br>P<0.001 | RALP: NR<br><br>ORP: NR   | RALP (3252):<br>- pT2: 2376 (68.4)<br>- pT3: 848 (24.4)<br>- pT4: 28 (0.8)<br><br>ORP (2238):<br>- pT2: 1678 (68.8)<br>- pT3: 532 (21.8)<br>- pT4: 28 (1.1)  | RALP: NR<br><br>ORP: NR                                      | RALP: NR<br><br>ORP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                       | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                         |   |
|---|-----------------------------|---|--|---|---|--|---|---|
|   |                             |   |  |   |   |  | Total   | by Pathological stage   |
|   |                             |   |  |   |   | P=0.01   |   |   |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP: 5524<br><br>ORP: 5524 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA       | RALP: NR<br><br>ORP: NR   | RALP:<br>- pT2: 4531 (82.0)<br>- pT3: 993 (18.0)<br><br>ORP:<br>- pT2: 4625 (83.7)<br>- pT3: 899 (16.3)<br><br>P=NR                                  | RALP: 752 (13.6)<br><br>ORP: 1010 (18.3)<br><br>P<0.001 | RALP:<br>- pT2: 466 (10.3)<br>- pT3: 286 (28.8)<br><br>ORP:<br>- pT2: 676 (14.6)<br>- pT3: 334 (37.2)<br><br>P <sub>T2</sub> <0.001<br>P <sub>T3</sub> <0.001   |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP: 175<br><br>ORP: 175   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 8 (4.6)<br><br>ORP: 2 (1.1)<br><br>P=0.50     | RALP:<br>- ≤6: 64 (36.6)<br>- 7: 80 (45.7)<br>- ≥8: 31 (17.7)<br><br>ORP:<br>- ≤6: 75 (42.9)<br>- 7: 72 (41.1)<br>- ≥8: 28 (16.0)<br><br>P=0.49                                   | RALP:<br>- pT2: 67 (38.3)<br>- pT3: 95 (54.3)<br>- pT4: 13 (7.4)<br><br>ORP:<br>- pT2: 71 (40.6)<br>- pT3: 95 (54.3)<br>- pT4: 9 (5.1)<br><br>P=0.84 | RALP: 62 (35.4)<br><br>ORP: 64 (36.6)<br><br>P=0.91     | RALP:<br>- pT2: 9 (13.4)<br>- pT3: 33 (34.7)<br>- pT4: 9 (69.2)<br><br>ORP:<br>- pT2: 10 (14.1)<br>- pT3: 38 (40.0)<br>- pT4: 6 (66.7)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR<br>P <sub>T4</sub> =NR |
| Ritch et al (2014) <sup>169</sup><br>USA        | RALP: 742<br><br>ORP: 237   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 18 (2.4)<br><br>ORP: 26 (11.0)<br><br>P<0.001 | RALP:<br>- ≤6: 117 (15.8)<br>- 3+4: 314 (42.3)<br>- 4+3: 183 (24.7)<br>- ≥8: 128 (17.3)<br><br>ORP:<br>- ≤6: 34 (14.3)<br>- 3+4: 93 (39.2)<br>- 4+3: 42 (17.7)<br>- ≥8: 68 (28.7) | RALP:<br>- pT2: 449 (60.5)<br>- pT3, pT4: 293 (39.5)<br><br>ORP:<br>- pT2: 111 (46.8)<br>- pT3, pT4: 126 (53.2)<br><br>P<0.001                       | RALP: 242 (32.6)<br><br>ORP: 93 (39.2)<br><br>P=0.06    | RALP:<br>- pT2: 110 (24.5)<br>- pT3, pT4: 132 (45.1)<br><br>ORP:<br>- pT2: 28 (25.2)<br>- pT3, pT4: 65 (51.6)<br><br>P <sub>T2</sub> =0.87  |



Table 11. Key histopathological findings

| Study   | Sample size             | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%) | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)                   |                          |
|---|-------------------------|---|--|----------------------------|---|---|---|--------------------------|
|   |                         |   |  |                            |   |   | Total   | by Pathological stage    |
|   |                         |   |  |                            | P=0.001   |   |   | P <sub>T3,T4</sub> =0.22 |
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | RALP: 89<br>ORP: 105    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR      |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>ORP: 9778 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP (n=7656):<br>- ≤5: 135 (1.8)<br>- 6: 2454 (31.9)<br>- 7: 4475 (58.1)<br>- 8: 259 (3.4)<br>- ≥9: 333 (4.3)<br><br>ORP (n=9634):<br>- ≤5: 132 (1.3)<br>- 6: 3208 (32.8)<br>- 7: 5314 (54.3)<br>- 8: 493 (5.0)<br>- ≥9: 487 (5.0)<br><br>P=NR | RALP (n=7271):<br>- pT2: 5353 (69.5)<br>- pT3a: 1534 (19.9)<br>- pT3b: 384 (5.0)<br><br>ORP (n=9775):<br>- pT2: 6072 (62.1)<br>- pT3a: 2620 (26.8)<br>- pT3b: 1083 (11.1)<br><br>P=NR             | RALP: 1062 (13.8)<br>ORP: 2229 (22.8)<br><br>P=NR | RALP: NR<br>ORP: NR      |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP: 77<br>ORP: 176    | RALP: 11.0±15.8<br>ORP: 17.0±22.0<br><br>P=0.03                   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP (n=74):<br>- ≤6: 34 (44.2) [45.9%]<br>- 7: 36 (46.8) [48.6%]<br>- ≥8: 4 (5.2) [5.4%]<br><br>ORP (n=165):<br>- ≤6: 55 (31.3) [33.3%]<br>- 7: 91 (51.7) [55.2%]<br>- ≥8: 19 (10.8) [11.5%]<br><br>*P=0.10                                    | RALP (n=76):<br>- pT2: 37 (48.1) [48.7%]<br>- pT3a: 32 (41.6) [42.1%]<br>- pT3b: 7 (9.1) [9.2%]<br><br>ORP (n=170):<br>- pT2: 103 (58.5)<br>- pT3a: 40 (22.7)<br>- pT3b: 27 (15.3)<br><br>*p=0.01 | RALP: 30 (39.0)<br>ORP: 70 (39.8)<br><br>P=0.91   | RALP: NR<br>ORP: NR      |
| Froehner et al. (2013) <sup>172</sup><br>Germany  | RALP: 317               | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR      |

Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)         | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)                     |  |
|--|-----------------------|---|--|---------------------------------------|--|---|---|--|
|  |                       |   |  |                                       |  |   | Total   | by Pathological stage  |
|  | ORP:<br>2437          |   |  |                                       |  |   |   |  |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium | RALP: 64<br>ORP: 116  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: 19 (29.7)<br>ORP (n=115): 24 (20.9)<br>P=0.20 | RALP: NR<br>ORP: NR  |
| Harty et al. (2013) <sup>200</sup><br>USA        | RALP: 152<br>ORP: 153 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 5 (3.3)<br>ORP: 4 (2.6)<br>P=NR | RALP: NR<br>ORP: NR  | RALP:<br>- pT2: 33 (21.7)<br>- pT3: 112 (73.7)<br>- pT4: 7 (4.6)<br><br>ORP:<br>- pT2: 37 (24.2)<br>- pT3: 107 (69.9)<br>- pT4: 9 (5.9)<br><br>P=NR | RALP: 76 (50.0)<br>ORP: 81 (52.9)<br>P=0.13         | RALP:<br>- pT2: 9 (27.3)<br>- pT3: 60 (53.6)<br>- pT4: 7 (100.0)<br><br>ORP:<br>- pT2: 12 (32.4)<br>- pT3: 60 (56.1)<br>- pT4: 9 (100.0)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Ludovico et al. (2013) <sup>124</sup><br>Italy   | RALP: 82<br>ORP: 48   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP:<br>- 6: 38 (46.3)<br>- 3+4: 27 (32.9)<br>- 4+3: 17 (20.7)<br><br>ORP:<br>- 6: 23 (47.9)<br>- 3+4: 18 (37.5)<br>- 4+3: 7 (14.6)<br><br>P=NR | RALP:<br>- pT2: 52 (63.4)<br>- pT3: 30 (36.6)<br><br>ORP:<br>- pT2: 31 (64.6)<br>- pT3: 17 (35.4)<br><br>P=NR                                       | RALP: 8 (9.8)<br>ORP: 14 (29.2)<br>P=0.01           | RALP: NR<br>ORP: NR  |
| Masterson et al (2013) <sup>173</sup><br>USA     | RALP: 669             | RALP: NR<br>ORP: NR   | RALP: 48.2±NR<br>ORP: 44.2±NR                                      | RALP: 54 (8.1)<br>ORP: 4 (1.1)        | RALP:<br>- 5: 50 (7.5)<br>- 6: 266 (39.8)  | RALP:<br>- pT2a: 79 (11.8)<br>- pT2b: 406 (60.7)  | RALP: 97 (14.5)<br>ORP: 63 (17.6)                   | RALP:<br>- pT2: 48 (9.9)<br>- pT3: 49 (26.8)   |





Table 11. Key histopathological findings

| Study  | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%)                        | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                    |   |
|--|---------------------------|---|--|---|--|--|--|---|
|  |                           |   |  |   |  |  | Total  | by Pathological stage   |
|  | ORP: 357                  |   | P<0.001  | P=0.001   | - 3+4: 259 (38.7)<br>- 4+3: 65 (9.7)<br>- 8: 6 (0.9)<br>- 9: 23 (3.4)<br>- 10: 0 (0.0)<br><br>ORP:<br>- 5: 55 (15.4)<br>- 6: 112 (31.4)<br>- 3+4: 113 (31.7)<br>- 4+3: 42 (11.8)<br>- 8: 9 (2.5)<br>- 9: 25 (7.0)<br>- 10: 1 (0.3)<br><br>P=0.89 | - pT3a: 127 (19.0)<br>- pT3b: 56 (8.4)<br>- pT4: 1 (0.1)<br><br>ORP:<br>- pT2a: 45 (12.6)<br>- pT2b: 211 (59.1)<br>- pT3a: 79 (22.1)<br>- pT3b: 22 (6.2)<br>- pT4: 0 (0.0)<br><br>P=0.50   | P=0.09   | ORP:<br>- pT2: 27 (10.5)<br>- pT3: 36 (35.6)<br><br>P <sub>T2</sub> =0.78<br>P <sub>T3</sub> =0.12  |
| Pierorazio et al. (2013) <sup>149</sup><br>USA | RALP: 105<br><br>ORP: 743 | RALP: NR<br><br>ORP: NR   | RALP: 46.5 (24.7-94.5)<br><br>ORP: 50.0 (8.5-224.0)<br><br>P=0.002 | RALP: 4 (3.8)<br><br>ORP: 80 (10.8)<br><br>P=0.02 | RALP:<br>- ≤6: 5 (4.8)<br>- 7: 13 (12.4)<br>- 8: 45 (42.9)<br>- ≥9: 42 (40.0)<br><br>ORP:<br>- ≤6: 39 (5.2)<br>- 7: 104 (14.0)<br>- 8: 324 (43.6)<br>- ≥9: 276 (37.1)<br><br>P=NR  | RALP:<br>- pT2: 36 (34.3)<br>- pT3a: 46 (43.8)<br>- pT3b: 19 (18.1)<br>- N1: 4 (3.8)<br><br>ORP (n=741):<br>- pT2: 247 (33.2) [33.3%]<br>- pT3a: 299 (40.2) [40.4%]<br>- pT3b: 115 (15.5) [15.5%]<br>- N1: 80 (10.8) [10.8%]<br><br>* P=0.06 | RALP: 36 (34.3)<br><br>ORP: 218 (29.4)<br><br>P=NR | RALP:<br>- pT2: 3 (8.3)<br>- pT3: 33 (50.8)<br><br>ORP:<br>- pT2: 14 (5.7)<br>- pT3: 204 (44.9)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Punnen et al. (2013) <sup>174</sup><br>USA     | RALP: 233<br><br>ORP: 177 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 9 (3.9)<br><br>ORP: 25 (14.1)               | RALP:<br>- ≤6: 7 (3.0)<br>- 3+4: 75 (32.2)<br>- 4+3: 99 (42.5)   | RALP:<br>- pT2: 128 (54.9)<br>- pT3: 100 (42.9)<br>- pT4: 5 (2.1)  | RALP: 68 (29.2)<br><br>ORP: 40 (22.6)              | RALP: NR<br><br>ORP: NR   |

Table 11. Key histopathological findings

| Study   | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                     | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)                              |  |
|---|---------------------------|---|--|---|--|--|--|--|
|   |                           |   |  |   |  |  | Total  | by Pathological stage  |
|   |                           |   |  | P<0.01  | - ≥8: 52 (22.3)<br><br>ORP:<br>- ≤6: 6 (3.4)<br>- 3+4: 46 (26.0)<br>- 4+3: 73 (41.2)<br>- ≥8: 52 (29.4)<br><br>P=0.34  | ORP:<br>- pT2: 94 (53.1)<br>- pT3: 76 (42.9)<br>- pT4: 7 (4.0)<br><br>P=0.55   | P <sub>unadjusted</sub> =0.13<br>P <sub>adjusted</sub> =0.27 |  |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br><br>ORP: 341 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 13 (2.5)<br><br>ORP: 15 (4.4)<br><br>P=0.16 | RALP (n=491):<br>- ≤6: 83 (15.8) [16.9%]<br>- 7: 305 (58.2) [62.1%]<br>- ≥8: 103 (19.7) [21.0%]<br><br>ORP (n=314):<br>- ≤6: 58 (17.0) [18.5%]<br>- 7: 189 (55.4) [60.2%]<br>- ≥8: 67 (19.6) [21.3%]<br><br>P=0.82 | RALP:<br>- pT2: 347 (66.2)<br>- pT3a: 135 (25.8)<br>- pT3b: 42 (8.0)<br><br>ORP:<br>- pT2: 220 (64.5)<br>- pT3a: 90 (26.4)<br>- pT3b: 31 (9.1)<br><br>P=0.82                                     | RALP: NR<br><br>ORP: NR                                      | RALP: NR<br><br>ORP: NR  |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br><br>ORP: 961 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 41 (8.3)<br><br>ORP: 97 (10.1)<br><br>P=NR  | RALP (n=482):<br>- ≤6: 83 (16.8)<br>- 7: 361 (73.2)<br>- ≥8: 38 (7.7)<br><br>ORP:<br>- ≤6: 170 (17.7)<br>- 7: 684 (71.2)<br>- ≥8: 101 (10.5)<br><br>P=NR   | RALP:<br>- pT2: 315 (63.9)<br>- pT3a: 142 (28.8)<br>- pT3b: 30 (6.1)<br>- pT4: 6 (1.2)<br><br>ORP:<br>- pT2: 597 (62.1)<br>- pT3a: 269 (28.0)<br>- pT3b: 77 (8.0)<br>- pT4: 18 (1.9)<br><br>P=NR | RALP: 74 (15.0)<br><br>ORP: 147 (15.3)<br><br>P=NR           | RALP:<br>- pT2: 31 (9.8)<br>- pT3: 39 (22.7)<br>- pT4: 4 (66.7)<br><br>ORP:<br>- pT2: 46 (7.7)<br>- pT3: 86 (24.9)<br>- pT4: 15 (83.3)<br><br>P=NR |
| Son et al. (2013) <sup>177</sup>                | RALP: 146                 | RALP: NR  | RALP: NR   | RALP: NR  | RALP:<br>- ≤6: 22 (15.1)   | RALP:<br>- pT2a, pT2b: 17 (11.6)   | RALP: NR   | RALP: NR   |

Table 11. Key histopathological findings

| Study  | Sample size          | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)              |  |
|--|----------------------|---|--|-------------------------------|---|--|--|--|
|  |                      |   |  |                               |   |  | Total  | by Pathological stage  |
| South Korea                                    | ORP: 112             | ORP: NR   | ORP: NR  | ORP: NR                       | - 3+4: 73 (50.0)<br>- 4+3: 28 (19.2)<br>- ≥8: 23 (15.8)<br><br>RPP:<br>- ≤6: 23 (20.5)<br>- 3+4: 60 (53.6)<br>- 4+3: 17 (15.2)<br>- ≥8: 12 (10.7)<br><br>P=0.39 | - pT2c: 78 (53.4)<br>- pT3a: 33 (22.6)<br>- pT3b, pT4: 18 (12.3)<br><br>ORP:<br>- pT2a, pT2b: 10 (8.9)<br>- pT2c: 64 (57.1)<br>- pT3a: 26 (23.2)<br>- pT3b, pT4: 12 (10.7)<br><br>P=0.86   | ORP: NR                                      | ORP: NR  |
| Bae et al (2012) <sup>178</sup><br>South Korea | RALP: 111<br>ORP: 70 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 14 (12.6)<br>ORP: 17 (24.3)<br>P=0.04  | RALP: NR<br>ORP: NR  |
| Hong et al. (2012) <sup>8</sup><br>USA         | RALP: 182<br>ORP: 80 | RALP: 16.0±13.6<br>ORP: 18.8±14.9<br>P=0.21                       | RALP: 47.8±16.1<br>ORP: 40.1±14.8<br>P<0.001                       | RALP: NR<br>ORP: NR           | RALP: 6.5±0.8<br>ORP: 7.0±0.8<br>P<0.001  | RALP:<br>- pT2a: 28 (15.4)<br>- pT2b: 8 (4.4)<br>- pT2c: 112 (61.5)<br>- pT3: 33 (18.1)<br>- pT4: 1 (0.5)<br><br>ORP:<br>- pT2a: 6 (7.5)<br>- pT2b: 4 (5.0)<br>- pT2c: 51 (63.8)<br>- pT3: 19 (23.8)<br>- pT4: 0 (0.0)<br><br>P=0.31 | RALP: 52 (28.6)<br>ORP: 46 (57.5)<br>P<0.001 | RALP:<br>- pT2: 35 (23.6)<br>- pT3, pT4: 17 (50.0)<br><br>ORP:<br>- pT2: 33 (54.1)<br>- pT3, pT4: 13 (68.4)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3/T4</sub> =0.19 |
| Lumen et al. (2012) <sup>179</sup><br>Belgium  | RALP: 50<br>ORP: 50  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP:<br>- ≤6: 21 (42.0)<br>- 7: 20 (40.0)<br>- ≥8: 9 (18.0)  | RALP:<br>- pT2: 33 (66.0)<br>- pT3: 17 (34.0)  | RALP: 4 (8.0)<br>ORP: 12 (24.0)              | RALP:<br>- pT2: 0 (0.0)<br>- pT3: 4 (23.5)   |



Table 11. Key histopathological findings

| Study   | Sample size         | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pathological T stage n (%)  | Positive surgical margins n (%)          |  |
|---|---------------------|---|--|-------------------------------|--|---|--|--|
|   |                     |   |  |                               |  |   | Total                                    | by Pathological stage  |
|   |                     |   |  |                               | ORP:<br>- ≤6: 15 (30.0)<br>- 7: 23 (46.0)<br>- ≥8: 12 (24.0)<br><br>P=0.44         | ORP:<br>- pT2: 34 (68.0)<br>- pT3: 16 (32.0)<br><br>P=1.00  | P=0.05                                   | ORP:<br>- pT2: 4 (11.8)<br>- pT3: 8 (50.0)<br><br>P <sub>T2</sub> =0.11<br>P <sub>T3</sub> =NR |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19 | RALP: 26.84±10.05<br>ORP: 27.26±11.29<br>P=0.7256                 | RALP: 43.47±NR<br>ORP: 43.57±NR<br>P=NS                            | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP:<br>- pT1: 1 (5.3)<br>- pT1a: 1 (5.3)<br>- pT2: 16 (84.2)<br>- pT2a: 0<br>- pT2b: 0<br>- pT2c: 16 (84.2)<br>- pT3: 2 (10.5)<br>- pT3a: 2 (10.5)<br>- pT3b: 0<br><br>ORP:<br>- pT1: 1 (5.3)<br>- pT1a: 0<br>- pT2: 15 (78.9)<br>- pT2a: 6 (31.6)<br>- pT2b: 0<br>- pT2c: 9 (47.4)<br>- pT3: 3 (15.8)<br>- pT3a: 1 (5.3)<br>- pT3b: 2 (10.5)<br><br>P <sub>pT1</sub> =1.0<br>P <sub>pT2</sub> =1.0<br>P <sub>pT3</sub> =0.66 | RALP: 3 (15.8)<br>ORP: 3 (15.8)<br>P=1.0 | RALP:<br>- pT2: 2 (10.5)<br><br>ORP:<br>- pT2: 1 (5.3)<br><br>P=NR                             |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP:<br>- 6: 28 (56.0)<br>- 7: 18 (36.0)  | RALP:<br>- pT2: 32 (64.0)<br>- pT3a: 16 (32.0)  | RALP: 9 (18.0)<br>ORP: 10 (20.0)         | RALP:<br>- pT2: 5 (15.6)<br>- pT3: 4 (22.2)  |



Table 11. Key histopathological findings

| Study   | Sample size                 | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                      | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)                      |  |
|---|-----------------------------|---|--|--|---|--|--|--|
|   |                             |   |  |  |   |  | Total  | by Pathological stage  |
|   |                             |   |  |  | - ≥8: 4 (8.0)<br><br>ORP:<br>- 6: 19 (38.0)<br>- 7: 29 (58.0)<br>- ≥8: 2 (4.0)<br><br>P=0.08                                  | - pT3b: 2 (4.0)<br><br>ORP:<br>- pT2: 27 (54.0)<br>- pT3a: 17 (34.0)<br>- pT3b: 6 (12.0)<br><br>P=0.31   | P=0.80   | ORP:<br>- pT2: 4 (14.8)<br>- pT3: 6 (26.1)<br><br>P <sub>T2</sub> =0.61<br>P <sub>T3</sub> =0.53                                       |
| Trinh et al. (2012) <sup>181</sup><br>USA             | RALP: 7598<br><br>ORP: 7389 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                            | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                              | RALP: NR<br><br>ORP: NR  |
| Wang et al. (2012) <sup>182</sup><br>USA              | RALP: 1038<br><br>ORP: 707  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                            | RALP: NR<br><br>ORP: NR   | RALP (n=1012):<br>- pT2a: 223 (21.5)<br>- pT2b: 654 (63.0)<br>- pT3a: 107 (10.3)<br>- pT3b, pT3c: 28 (2.7)<br><br>ORP (n=704):<br>- pT2a: 157 (22.2)<br>- pT2b: 417 (59.0)<br>- pT3a: 83 (11.7)<br>- pT3b, pT3c: 47 (6.6)<br><br>P=0.001 | RALP: 160 (15.4)<br><br>ORP: 95 (13.4)<br><br>P=0.25 | RALP: NR<br><br>ORP: NR  |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75<br><br>ORP: 75     | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 9 (12.0)<br><br>ORP: 12 (16.0)<br><br>P=0.81 | RALP:<br>- 6: 15 (20.0)<br>- 7: 48 (64.0)<br>- 8: 12 (16.0)<br><br>ORP:<br>- 6: 20 (26.7)<br>- 7: 38 (50.7)<br>- 8: 17 (22.7) | RALP:<br>- pT1: 0 (0.0)<br>- pT2: 60 (80.0)<br>- pT3: 14 (18.7)<br>- pT4: 1 (1.3)<br><br>ORP:<br>- pT1: 2 (2.7)<br>- pT2: 54 (54.0)  | RALP: 12 (16.0)<br><br>ORP: 24 (32.0)<br><br>P=0.002 | RALP:<br>- pT2: 5 (8.3)<br>- pT3: 6 (42.9)<br>- pT4: 1 (100.0)<br><br>ORP:<br>- pT2: 13 (24.1)<br>- pT3: 10 (55.6)<br>- pT4: 1 (100.0) |



Table 11. Key histopathological findings

| Study   | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)           | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)              |  |
|---|-----------------------|---|--|---|--|---|--|--|
|   |                       |   |  |   |  |   | Total  | by Pathological stage  |
|   |                       |   |  |   |  | - pT3: 18 (24.0)<br>- pT4: 1 (1.3)<br><br>P=0.50  |  | P <sub>T2</sub> =0.01<br>P <sub>T3</sub> =0.25<br>P <sub>T4</sub> =NR  |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark   | RALP: 77<br>ORP: 154  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR  |
| Kim et al. (2011) <sup>127</sup><br>South Korea | RALP: 528<br>ORP: 235 | RALP: 15.2±20.2<br>ORP: 18.2±23.4<br>P=0.13                       | RALP: NR<br>ORP: NR  | RALP: 15 (2.8)<br>ORP: 16 (6.8)<br>P=NR | RALP (n=479)**:<br>- 6: 106 (20.1)<br>- 7: 293 (55.5)<br>- ≥8: 80 (15.2)<br><br>ORP (n=194)**:<br>- 6: 40 (17.0)<br>- 7: 110 (46.8)<br>- ≥8: 44 (18.7)<br><br>P=0.004<br><br>**Gleason score was not assessed in patients undergoing neoadjuvant therapy | RALP:<br>- pT2: 334 (63.3)<br>- pT3a: 126 (23.9)<br>- pT3b: 53 (10.0)<br>- N1: 15 (2.8)<br><br>ORP:<br>- pT2: 118 (50.2)<br>- pT3a: 67 (28.5)<br>- pT3b: 34 (14.5)<br>- N1: 16 (6.8)<br><br>P=0.002 | RALP: 143 (27.1)<br>ORP: 58 (24.7)<br>P=0.49 | RALP:<br>- pT2: 45 (13.5)<br>- pT3: 86 (48.0)<br><br>ORP:<br>- pT2: 11 (9.3)<br>- pT3: 39 (38.6)<br><br>P <sub>T2</sub> =0.24<br>P <sub>T3</sub> =0.13 |
| Magheli et al. (2011) <sup>152</sup><br>USA     | RALP: 522<br>ORP: 522 | RALP: NR<br>ORP: NR   | RALP: 46 (15-150)<br>ORP: 51 (12-150)<br>P=NR                      | RALP: NR<br>ORP: NR                     | RALP:<br>- ≤6: 306 (58.6)<br>- 7: 188 (36.0)<br>- ≥8: 28 (5.4)<br><br>ORP:<br>- ≤6: 316 (60.5)<br>- 7: 177 (33.9)<br>- ≥8: 29 (5.6)<br><br>P=NR  | RALP:<br>- pT2: 386 (73.9)<br>- pT3: 136 (26.1)<br><br>ORP:<br>- pT2: 363 (69.5)<br>- pT3: 159 (30.5)<br><br>P=NR   | RALP: 102 (19.5)<br>ORP: 75 (14.4)<br>P=NR   | RALP:<br>- pT2: 36 (9.3)<br>- pT3: 66 (48.5)<br><br>ORP:<br>- pT2: 24 (6.6)<br>- pT3: 51 (32.1)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR      |

Table 11. Key histopathological findings

| Study   | Sample size | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                             | Pathological T stage n (%)   | Positive surgical margins n (%) |                       |
|---|-------------|---|--|-------------------------------|--|--|---------------------------------|-----------------------|
|   |             |   |  |                               |  |  | Total                           | by Pathological stage |
| Minniti et al. (2011) <sup>184</sup><br>Italy | RALP: 22    | RALP: NR  | RALP: NR   | RALP: NR                      | RALP: NR   | RALP: NR   | RALP: NR                        | RALP: NR              |
|   | ORP: 93     | ORP: NR   | ORP: NR  | ORP: NR                       | ORP: NR  | ORP: NR  | ORP: NR                         | ORP: NR               |
| Mirza et al. (2011) <sup>185</sup><br>USA     | RALP: 191   | RALP: 14.8±11.8   | RALP: NR   | RALP: NR                      | RALP: NR   | RALP:<br>- pT2a: 27 (14.1)<br>- pT2b: 5 (2.6)<br>- pT2c: 140 (73.3)<br>- pT3, pT4: 19 (9.9)                | RALP: 26 (13.6)                 | RALP: NR              |
|   | ORP: 180    | ORP: 18.0±15.8<br>P=0.03  | ORP: NR  | ORP: NR                       | ORP: NR  | ORP:<br>- pT2a: 19 (10.6)<br>- pT2b: 3 (1.7)<br>- pT2c: 109 (60.6)<br>- pT3, pT4: 49 (27.2)                | ORP: 52 (28.9)<br>P<0.001       | ORP: NR               |
| Tollefson et al. (2011) <sup>186</sup><br>USA | RALP: 1084  | RALP: NR  | RALP: NR   | RALP: NR                      | RALP: NR   | RALP: NR   | RALP: NR                        | RALP: NR              |
|   | ORP: 4824   | ORP: NR   | ORP: NR  | ORP: NR                       | ORP: NR  | ORP: NR  | ORP: NR                         | ORP: NR               |
| Barocas et al. (2010) <sup>128</sup><br>USA   | RALP: 1413  | RALP: NR  | RALP: NR   | RALP: 0 (0.0)                 | RALP (n=1413):<br>- ≤6: 723 (51.2) [51.5%]<br>- 7: 588 (41.6) [41.8%]<br>- ≥8: 94 (6.7) [6.7%]                 | RALP (n=1411):<br>- pT0: 7 (0.5)<br>- pT2: 1136 (80.5)<br>- pT3: 268 (19.0)<br>- pT4: 0 (0.0)              | RALP: 281 (19.9)                | RALP: NR              |
|   | ORP: 491    | ORP: NR   | ORP: NR  | ORP: 0 (0.0)<br>P=NA          | ORP (n=488):<br>- ≤6: 221 (45.0) [45.3%]<br>- 7: 213 (43.4) [43.6%]<br>- ≥8: 54 (11.0) [11.1%]<br><br>*P<0.001 | ORP (n=461):<br>- pT0: 3 (0.6)<br>- pT2: 342 (69.7)<br>- pT3: 114 (23.2)<br>- pT4: 2 (0.4)<br><br>*P<0.001 | ORP: 148 (30.1)<br>P<0.001      | ORP: NR               |



Table 11. Key histopathological findings

| Study   | Sample size            | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)                  |  |
|---|------------------------|---|--|--|--|--|--|--|
|   |                        |   |  |  |  |  | Total  | by Pathological stage  |
| Bolenz et al. (2010) <sup>153</sup><br>USA        | RALP: 262<br>ORP: 161  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR  |
| Breyer et al. (2010) <sup>129</sup><br>USA        | RALP: 293<br>ORP: 695  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 0 (0.0)<br>ORP: 26 (3.7)<br><br>P<0.01 | RALP (n=289):<br>- ≤6: 103 (35.2) [35.6%]<br>- ≥7: 186 (63.5) [64.4%]<br><br>ORP (n=684):<br>- ≤6: 220 (31.7) [32.2%]<br>- ≥7: 464 (66.8) [67.8%]<br><br>*P=0.29 | RALP (n=291):<br>- pT2: 242 (82.6) [83.2%]<br>- pT3: 49 (16.7) [16.8%]<br><br>ORP:<br>- pT2: 478 (68.8) [69.1%]<br>- pT3: 214 (30.8) [30.9%]<br><br>*P<0.01  | RALP: 54 (18.4)<br>ORP: 108 (15.5)<br><br>P=0.25 | RALP: NR<br>ORP: NR  |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden   | RALP: 1253<br>ORP: 485 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR  |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br>ORP: 502  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 0 (0.0)<br>ORP: 16 (3.2)<br><br>P=0.14 | RALP:<br>- 6: 45 (21.2)<br>- 7: 149 (70.3)<br>- ≥8: 18 (8.5)<br><br>ORP:<br>- 6: 76 (15.2)<br>- 7: 357 (71.1)<br>- ≥8: 69 (13.7)<br><br>P=0.04                   | RALP:<br>- pT2a: 18 (8.5)<br>- pT2b: 12 (5.7)<br>- pT2c: 116 (54.7)<br>- pT3a: 55 (25.9)<br>- pT3b: 11 (5.2)<br><br>ORP:<br>- pT2a: 37 (7.4)<br>- pT2b: 20 (4.0)<br>- pT2c: 268 (53.4)<br>- pT3a: 129 (25.7)<br>- pT3b: 48 (9.6)<br><br>P=0.32 | RALP: 45 (21.2)<br>ORP: 84 (16.7)<br><br>P=0.18  | RALP:<br>- pT2: 17 (11.6)<br>- pT3: 28 (42.4)<br><br>ORP:<br>- pT2: 33 (10.2)<br>- pT3: 51 (28.8)<br><br>P <sub>T2</sub> =0.74<br>P <sub>T3</sub> =0.004 |
| Hong et al. (2010) <sup>132</sup>                 | RALP: 26               | RALP: NR  | RALP: NR   | RALP: NR                                     | RALP: NR   | RALP: NR   | RALP: NR   | RALP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD    | Positive lymph nodes n (%)                        | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)                        |   |
|---|---------------------------|---|---|---|---|--|--|---|
|   |                           |   |   |   |   |  | Total  | by Pathological stage   |
| South Korea                                   | ORP: 25                   | ORP: NR   | ORP: NR   | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR  | ORP: NR   |
| Kordan et al. (2010) <sup>133</sup><br>USA    | RALP: 830<br><br>ORP: 414 | RALP: NR<br><br>ORP: NR   | RALP: 46 [37-58]<br><br>ORP: 41 [31-52]<br><br>P<0.001                | RALP: 0 (0.0)<br><br>ORP: 17 (4.1)<br><br>P<0.001 | RALP (n=823):<br>- ≤6: 450 (54.2) [54.7%]<br>- 7: 312 (37.9) [37.9%]<br>- ≥8: 61 (7.3) [7.4%]<br><br>ORP (n=411):<br>- ≤6: 186 (44.9) [45.3%]<br>- 7: 167 (40.3) [40.6%]<br>- ≥8: 58 (14.0) [14.1%]<br><br>*P<0.001 | RALP: NR<br><br>ORP: NR  | RALP: 171 (20.6)<br><br>ORP: 132 (31.9)<br><br>P<0.001 | RALP: NR<br><br>ORP: NR   |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong  | RALP: 20<br><br>ORP: 20   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 4 (20.0)<br><br>ORP: 5 (25.0)<br><br>P=0.36      | RALP: NR<br><br>ORP: NR   |
| Nadler et al. (2010) <sup>188</sup><br>USA    | RALP: 50<br><br>ORP: 50   | RALP: NR<br><br>ORP: NR   | RALP: 49.4 (27.2-109.1)†<br><br>ORP: 62.8 (14.9-135.8)†<br><br>P<0.01 | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | RALP:<br>- pT2: 43 (86.0)<br>- pT3: 7 (14.0)<br><br>ORP:<br>- pT2: 33 (66.0)<br>- pT3: 17 (34.0)<br><br>P=0.02                                 | RALP: 5 (10.0)<br><br>ORP: 12 (24.0)<br><br>P=0.06     | RALP:<br>- pT2: 2 (4.7)<br>- pT3: 3 (42.9)<br><br>ORP:<br>- pT2: 3 (9.1)<br>- pT3: 9 (52.9)<br><br>P <sub>T2</sub> =0.44<br>P <sub>T3</sub> =0.65 |
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99<br><br>ORP: 217  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP: 1 (1.0)<br><br>ORP: 19 (8.8)<br><br>P=0.01  | RALP:<br>- ≤6: 14 (14.1)<br>- 7: 71 (71.7)<br>- ≥8: 14 (14.1)<br><br>ORP:<br>- ≤6: 26 (12.0)  | RALP (n=98):<br>- pT2: 71 (71.7) [72.4%]<br>- pT3: 23 (23.2) [23.5%]<br>- pT4: 4 (4.0) [4.1%]<br><br>ORP (n=213):<br>- pT2: 136 (62.7) [63.8%] | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR   |



Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pathological T stage n (%)  | Positive surgical margins n (%)  |  |
|--|-----------------------|---|--|-------------------------------|--|---|--|--|
|  |                       |   |  |                               |  |   | Total  | by Pathological stage  |
|  |                       |   |  |                               | - 7: 135 (62.2)<br>- ≥8: 56 (25.8)<br><br>P=0.07                                   | - pT3: 70 (32.3) [32.9%]<br>- pT4: 7 (3.2) [3.3%]<br><br>*P=0.24  |  |  |
| Uvin et al. (2010) <sup>190</sup><br>Belgium | RALP: 13<br>ORP: 9    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP:<br>- pT0: 0 (0.0)<br>- pT2a: 0 (0.0)<br>- pT2b: 2 (15.4)<br>- pT2c: 6 (46.2)<br>- pT3a: 4 (30.8)<br>- pT3b: 1 (7.7)<br><br>ORP:<br>- pT0: 1 (11.1)<br>- pT2a: 2 (22.2)<br>- pT2b: 1 (11.1)<br>- pT2c: 4 (44.4)<br>- pT3a: 0 (0.0)<br>- pT3b: 1 (11.1)<br><br>P=NR | RALP: 1 (7.7)<br>ORP: 0 (0.0)<br><br>P=NR  | RALP: NR<br>ORP: NR  |
| Williams et al. (2010) <sup>134</sup><br>USA | RALP: 604<br>ORP: 346 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: 80 (13.2)<br>ORP: 30 (8.7)<br><br>P <sub>unadjusted</sub> =0.04<br>P <sub>adjusted</sub> =0.01 | RALP: NR<br>ORP: NR  |
| Coronato et al. (2009) <sup>191</sup><br>USA | RALP: 98<br>ORP: 98   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP:<br>- pT2a: 15 (15.3)<br>- pT2b: 2 (2.0)<br>- pT2c: 56 (57.1)<br>- pT3a: 24 (24.5)<br>- pT3b: 1 (1.0)<br><br>ORP:  | RALP: 12 (12.2)<br>ORP: 29 (29.6)<br><br>P=0.005   | RALP:<br>- pT2: 3 (4.1)<br>- pT3: 9 (36.0)<br><br>ORP:<br>- pT2: 12 (16.2)<br>- pT3: 17 (70.8) |



Table 11. Key histopathological findings

| Study   | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%) | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)                 |   |
|---|-----------------------|---|--|----------------------------|---|--|---|---|
|   |                       |   |  |                            |   |  | Total   | by Pathological stage   |
|   |                       |   |  |                            |   | - pT2a: 41 (41.8)<br>- pT2b: 13 (13.3)<br>- pT2c: 20 (20.4)<br>- pT3a: 19 (19.4)<br>- pT3b: 5 (5.1)<br><br>P=NR  |   | P <sub>T2</sub> =0.03<br>P <sub>T3</sub> =0.02  |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71<br>ORP: 83   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP:<br>- ≤5: 0 (0.0)<br>- 6: 49 (69.0)<br>- 7: 21 (29.6)<br>- ≥8: 1 (1.4)<br><br>ORP:<br>- ≤5: 0 (0.0)<br>- 6: 45 (54.2)<br>- 7: 35 (42.2)<br>- ≥8: 3 (3.6)<br><br>P=NR                 | RALP:<br>- pT2a: 3 (4.2)<br>- pT2b: 10 (14.1)<br>- pT2c: 48 (67.6)<br>- pT3a: 9 (12.7)<br>- pT3b: 1 (1.4)<br><br>ORP:<br>- pT2a: 5 (6.0)<br>- pT2b: 5 (6.0)<br>- pT2c: 58 (69.9)<br>- pT3a: 13 (15.7)<br>- pT3b: 2 (2.4)<br><br>P=NR | RALP: 12 (16.9)<br>ORP: 15 (18.1)<br><br>P=NR   | RALP:<br>- pT2: 6 (9.8)<br>- pT3: 6 (60.0)<br><br>ORP:<br>- pT2: 5 (7.4)<br>- pT3: 10 (66.7)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR      |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR        | RALP (n=35)‡:<br>- ≤6: 14 (40.0)<br>- 7: 13 (37.1)<br>- ≥8: 8 (22.9)<br><br>ORP (n=26)‡:<br>- ≤6: 6 (23.1)<br>- 7: 16 (61.5)<br>- ≥8: 4 (15.4)<br><br>*P=0.40<br><br>‡Data extracted from | RALP:<br>- pT2: 60 (58.3)<br>- pT3a: 39 (37.9)<br>- pT3b: 4 (3.9)<br><br>ORP:<br>- pT2: 49 (46.7)<br>- pT3a: 42 (40.0)<br>- pT3b: 14 (13.3)<br><br>P=0.19  | RALP: 35 (34.0)<br>ORP: 21 (20.0)<br><br>P=0.97 | RALP:<br>- pT2: 7 (11.7)<br>- pT3: 28 (65.1)<br><br>ORP:<br>- pT2: 6 (12.2)<br>- pT3: 15 (26.8)<br><br>P <sub>T2</sub> =0.70<br>P <sub>T3</sub> =NR |



Table 11. Key histopathological findings

| Study                                       | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD   | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD                            | Positive lymph nodes<br>n (%)                    | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Pathological T stage n (%)   | Positive surgical margins n (%)   |   |
|---|-----------------------|---|---|--|---|--|---|---|
|   |                       |   |   |  |   |  | Total   | by Pathological stage   |
|   |                       |   |   |  | Fracalanza et al. (2008) <sup>208</sup>   |  |   |   |
| Laurila et al. (2009) <sup>192</sup><br>USA | RALP: 94<br>ORP: 98   | RALP (n=88):<br>12.7±NR<br><br>ORP (n=84):<br>13.0±NR<br><br>P=0.90 | RALP(n=88): 42 (23-81) <sup>†</sup><br><br>ORP (n=84): 47 (22-147) <sup>†</sup><br><br>P=0.20 | RALP: NR<br><br>ORP: NR                          | RALP (n=88):<br>- ≤6: 41 (43.6) [46.6%]<br>- 7: 40 (42.6) [45.5%]<br>- ≥8: 7 (7.4) [8.0%]<br><br>ORP (n=84):<br>- ≤6: 55 (56.1) [65.5%]<br>- 7: 25 (25.5) [29.8%]<br>- ≥8: 4 (4.1) [4.8%]<br><br>P=NR | RALP(n=88):<br>- pT2: 80 (85.1) [90.9%]<br>- pT3a: 6 (6.4) [6.8%]<br>- pT3b: 2 (2.1) [2.3%]<br><br>ORP (n=84):<br>- pT2: 73 (74.5) [86.9%]<br>- pT3a: 8 (8.2) [9.5%]<br>- pT3b: 3 (3.1) [3.5%]<br><br>P=NR | RALP: 13 (13.8)<br><br>ORP: 17 (17.3)<br><br>P=NR   | RALP(n=88):<br>- pT2: 8 (10.0)<br>- pT3: 3 (37.5)<br><br>ORP (n=84):<br>- pT2: 11 (15.1)<br>- pT3: 1 (9.1)<br><br>P <sub>T2</sub> =0.50<br>P <sub>T3</sub> =0.30    |
| Ou et al. (2009) <sup>193</sup><br>Taiwan   | RALP: 30<br>ORP: 30   | RALP: 21.4±17.8<br><br>ORP: 23.5±21.4<br><br>P≥0.05                 | RALP: 40.2±16.7<br><br>ORP: 48.6±20.7<br><br>P≥0.05   | RALP: 2 (6.7)<br><br>ORP: 3 (10.0)<br><br>P≥0.05 | RALP: 7.2±1.1<br><br>ORP: 6.7±1.6<br><br>P≥0.05   | RALP:<br>- pT2: 15 (50.0)<br>- pT3: 15 (50.0)<br><br>ORP:<br>- pT2: 15 (50.0)<br>- pT3: 15 (50.0)<br><br>P=NR  | RALP: 15 (50.0)<br><br>ORP: 6 (20.0)<br><br>P<0.05  | RALP:<br>- pT2: 2 (13.3)<br>- pT3: 13 (86.7)<br><br>ORP:<br>- pT2: 0 (0.0)<br>- pT3: 6 (40.0)<br><br>P <sub>T2</sub> ≥0.05<br>P <sub>T3</sub> <0.05                 |
| Rocco et al. (2009) <sup>136</sup><br>Italy | RALP: 120<br>ORP: 240 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA    | RALP: 7 (4-9)<br><br>ORP: 7 (3-9)<br><br>P=0.07   | RALP:<br>- pT2: 88 (73.3)<br>- pT3: 29 (24.2)<br>- pT4: 3 (2.5)<br><br>ORP:<br>- pT2: 150 (62.5)<br>- pT3: 85 (35.4)<br>- pT4: 5 (2.1)<br><br>P=0.04   | RALP: 26 (21.7)<br><br>ORP: 61 (25.4)<br><br>P <sub>unadjusted</sub> =0.41<br>P <sub>adjusted</sub> =0.77 | RALP:<br>- pT2: 15 (17.0)<br>- pT3, pT4: 11 (34.4)<br><br>ORP:<br>- pT2: 23 (15.3)<br>- pT3, pT4: 38 (42.2)<br><br>P <sub>T2</sub> =0.73<br>P <sub>T3/4</sub> =0.44 |



Table 11. Key histopathological findings

| Study                                     | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD   | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)  |   |
|---|---------------------------|---|--|-------------------------------|--|---|--|---|
|   |                           |   |  |                               |  |   | Total  | by Pathological stage   |
| White et al. (2009) <sup>194</sup><br>USA | RALP: 50<br><br>ORP: 50   | RALP: 21±NR<br><br>ORP: 19.5±NR<br><br>P=0.21                     | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR       | RALP:<br>- 6: 25 (50.0)<br>- 7: 24 (48.0)<br>- 8: 1 (2.0)<br><br>ORP:<br>- 6: 35 (70.0)<br>- 7: 15 (30.0)<br>- 8: 0 (0.0)<br><br>P=0.07  | RALP:<br>- pT2a: 12 (24.0)<br>- pT2b: 0 (0.0)<br>- pT2c: 35 (70.0)<br>- pT3a: 3 (6.0)<br><br>ORP:<br>- pT2a: 12 (24.0)<br>- pT2b: 0 (0.0)<br>- pT2c: 35 (70.0)<br>- pT3a: 3 (6.0)<br><br>P=NR   | RALP: 11 (22.0)<br><br>ORP: 18 (36.0)<br><br>P=0.01  | RALP:<br>- pT2: 9 (19.1)<br>- pT3: 2 (66.7)<br><br>ORP:<br>- pT2: 16 (34.0)<br>- pT3: 2 (66.7)<br><br>P <sub>T2</sub> =0.10<br>P <sub>T3</sub> =NR  |
| Chan et al. (2008) <sup>195</sup><br>USA  | RALP: 660<br><br>ORP: 340 | RALP: NR<br><br>ORP: NR   | RALP:<br>- LP: 98.4±22.6<br>- SP: 46.1±11.8<br><br>ORP:<br>- LP: 97.8±31.8<br>- SP: 40.2±13.8<br><br>P <sub>LP</sub> = 0.928<br>P <sub>SP</sub> <0.001 | RALP: NR<br><br>ORP: NR       | RALP:<br>- mean:<br>- LP (n=81): 6.3±0.9<br>- SP (n=579): 6.6±0.7<br>- ≤6: 356 (53.9)<br>- LP (n=81): 60 (74.1)<br>- SP (n=579): 296 (51.1)<br>- 7: 261 (39.5)<br>- LP (n=81): 16 (19.8)<br>- SP (n=579): 245 (42.3)<br>- 8-10: 43 (6.5)<br>- LP (n=81): 5 (6.2)<br>- SP (n=579): 38 (6.6)<br><br>ORP:<br>- mean:<br>- LP (n=27): 6.5±0.8<br>- SP (n=313): 6.8±0.9<br>- ≤6: 145 (42.6) | RALP:<br>- pT1: 2 (0.3)<br>- LP (n=81): 1 (1.2)<br>- SP (n=579): 1 (0.2)<br>-pT2: 530 (80.3)<br>- LP (n=81): 70 (86.4)<br>- SP (n=579): 460 (79.4)<br>- pT3: 128 (19.4)<br>- LP (n=81): 10 (12.3)<br>- SP (n=579): 118 (20.4)<br>- pT4: 0<br>- LP (n=81): 0<br>- SP (n=579): 0<br><br>ORP:<br>- pT1: 1 (0.3)<br>- LP (n=27): 0<br>- SP (n=313): 1 (0.3)<br>-pT2: 226 (66.5)<br>- LP (n=27): 23 (64.9)<br>- SP (n=313): 203 (64.9) | RALP: 118 (17.9)<br>- LP (n=81): 8 (9.9)<br>- SP (n=579): 110 (19.0)<br><br>ORP: 116 (34.1)<br>- LP (n=27): 5 (19 (35.5)<br>- SP (n=313): 111 (35.5)<br><br>P <sub>LP</sub> =0.291<br>P <sub>SP</sub> <0.001 | RALP:<br>- pT1: 0<br>- LP: 0<br>- SP: 0<br>-pT2: 60 (11.3)<br>- LP: 4 (5.7)<br>- SP: 56 (12.2)<br>- pT3: 58 (45.3)<br>- LP: 4 (40)<br>- SP: 54 (45.8)<br>- pT4: 0<br>- LP: 0<br>- SP: 0<br><br>ORP:<br>- pT1: 0<br>- LP: 0<br>- SP: 0<br>-pT2: 51 (22.6)<br>- LP: 4 (17)<br>- SP: 47 (23.2) |



Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)           | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)   | Positive surgical margins n (%)              |  |
|--|-----------------------|---|--|---|--|--|--|--|
|  |                       |   |  |   |  |  | Total  | by Pathological stage  |
|  |                       |   |  |   | - LP (n=27): 17 (63)<br>- SP (n=313): 128 (40.9)<br>- 7: 143 (42.1)<br>- LP (n=27): 6 (22)<br>- SP (n=313): 137 (43.8)<br>- 8-10: 52 (15.3)<br>- LP (n=27): 4 (15)<br>- SP (n=313): 48 (15.3)<br><br>$P_{mean,LP}=0.28$<br>$P_{mean,SP}=0.001$<br>$P_{\leq 6,LP}=0.29$<br>$P_{\leq 6,SP}=0.003$<br>$P_{7,LP}=0.79$<br>$P_{7,SP}=0.66$<br>$P_{8-10,LP}=0.24$<br>$P_{8-10,SP}<0.001$ | - pT3: 111 (32.6)<br>- LP (n=27): 4 (15)<br>- SP (n=313): 107 (34.2)<br>- pT4: 2 (0.6)<br>- LP (n=27): 0<br>- SP (n=313): 2 (0.6)<br><br>$P_{pT1,LP}=NR$<br>$P_{pT1,SP}=NR$<br>$P_{pT2,LP}=0.86$<br>$P_{pT2,SP}<0.001$<br>$P_{pT3,LP}=0.01$<br>$P_{pT3,SP}=0.75$<br>$P_{pT4,LP}=NR$<br>$P_{pT4,SP}=NR$ |  | - pT3: 63 (56.8)<br>- LP: 1 (25)<br>- SP: 62 (57.9)<br>- pT4: 2 (100)<br>- LP: 0<br>- SP: 2 (100)<br><br>$P_{pT1,LP}=NR$<br>$P_{pT1,SP}=NR$<br>$P_{pT2,LP}=0.16$<br>$P_{pT2,SP}=0.001$<br>$P_{pT3,LP}=0.57$<br>$P_{pT3,SP}=0.07$<br>$P_{pT4,LP}=NR$<br>$P_{pT4,SP}=NR$ |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br>ORP: 588 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: 0 (0.0)<br>ORP: 8 (1.4)<br>P=0.34 | RALP (n=293):<br>- 6: 192 (65.3) [65.5%]<br>- 7: 87 (29.6) [29.7%]<br>- ≥8: 14 (4.8) [4.8%]<br><br>ORP:<br>- 6: 391 (66.5)<br>- 7: 167 (28.4)<br>- ≥8: 30 (5.1)<br><br>*P=0.79   | RALP (n=293):<br>- pT2a: 105 (35.7) [35.8%]<br>- pT2b: 159 (54.1) [54.3%]<br>- pT3a: 15 (5.1) [5.1%]<br>- pT3b: 14 (4.8) [4.8%]<br><br>ORP:<br>- pT2a: 206 (35.0)<br>- pT2b: 315 (53.6)<br>- pT3a: 35 (6.0)<br>- pT3b: 24 (4.1)<br><br>P=0.34  | RALP: 46 (15.6)<br>ORP: 100 (17.0)<br>P=0.61 | RALP: NR<br>ORP: NR  |
| Schroeck et al.                              | RALP:                 | RALP: NR  | RALP: 42.9 [34.3-  | RALP: 1 (0.6)                           | RALP:  | RALP:  | RALP: 106 (29.3)                             | RALP: NR   |



Table 11. Key histopathological findings

| Study  | Sample size           | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Pathological T stage n (%)  | Positive surgical margins n (%)   |   |
|--|-----------------------|---|--|-------------------------------|--|---|---|---|
|  |                       |   |  |                               |  |   | Total   | by Pathological stage                           |
| (2008) <sup>197</sup><br>USA                 | 362<br>ORP: 435       | ORP: NR   | 55.0]<br>ORP: 41.3 [32.4-52.0]<br>P=0.15                           | ORP: 8 (1.8)<br>P=0.06        | - ≤6: 168 (46.4)<br>- 7: 176 (48.6)<br>- ≥8: 18 (5.0)<br><br>ORP:<br>- ≤6: 177 (40.7)<br>- 7: 199 (45.7)<br>- ≥8: 59 (13.6)<br><br>P<0.001 | - pT2: 287 (79.3)<br>- pT3, pT4: 75 (20.7)<br><br>ORP:<br>- pT2: 324 (74.5)<br>- pT3, pT4: 111 (25.5)<br><br>P=0.11                   | ORP: 122 (28.0)<br><br>P <sub>unadjusted</sub> =0.70<br>P <sub>adjusted</sub> =0.09 | ORP: NR   |
| Miller et al. (2007) <sup>137</sup><br>USA   | RALP: 42<br>ORP: 120  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             |
| Nelson et al. (2007) <sup>138</sup><br>USA   | RALP: 629<br>ORP: 374 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP (n=176): 5.4±2.5<br>ORP (n=103): 5.5±2.5<br><br>*P=0.78<br><br>‡Data taken from Farnham et al. (2006) <sup>209</sup>                  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             |
| Ball et al. (2006) <sup>116</sup><br>USA     | RALP: 82<br>ORP: 135  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR  | RALP (n=81):<br>- pT2: 58 (71.6)<br>- pT3, pT4: 23 (28.4)<br><br>ORP (n=132):<br>- pT2: 86 (6.7)<br>- pT3, pT4: 46 (34.1)<br><br>P=NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             |
| Ahlering et al. (2004) <sup>198</sup><br>USA | RALP: 60<br>ORP: 60   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR           | RALP:<br>- ≤6: 37 (61.7)<br>- 3+4: 11 (18.3)<br>- 4+3: 3 (5.0)   | RALP:<br>- pT2a: 16 (26.7)<br>- pT2b: 29 (48.3)<br>- pT2c: 0 (0.0)  | RALP: 10 (16.7)<br>ORP: 12 (20.0)   | RALP:<br>- pT2: 2 (4.4)<br>- pT3, pT4: 8 (53.3) |

Table 11. Key histopathological findings

| Study                                      | Sample size               | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%)                   | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                                 | Pathological T stage n (%)  | Positive surgical margins n (%)                    |  |
|--|---------------------------|---|--|---|--|---|--|--|
|  |                           |   |  |   |  |   | Total  | by Pathological stage  |
|  |                           |   |  |   | - ≥8: 9 (15.0)<br><br>ORP:<br>- ≤6: 25 (41.7)<br>- 3+4: 19 (31.7)<br>- 4+3: 7 (11.7)<br>- ≥8: 9 (15.0)<br><br>P=NR | - pT3a: 10 (16.7)<br>- pT3b: 4 (6.7)<br>- pT4: 1 (1.7)<br><br>ORP:<br>- pT2a: 9 (15.0)<br>- pT2b: 35 (58.3)<br>- pT2c: 0 (0.0)<br>- pT3a: 9 (15.0)<br>- pT3b: 5 (8.3)<br>- pT4: 2 (3.3)<br><br>P=NR | P=NR   | ORP:<br>- pT2: 4 (9.1)<br>- pT3, pT4: 8 (50.0)<br><br>P <sub>T2</sub> =NR<br>P <sub>T3</sub> =NR |
| Tewari et al. (2003) <sup>139</sup><br>USA | RALP: 200<br><br>ORP: 100 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 2 (1.0)<br><br>ORP: 2 (2.0)<br><br>P≥0.05 | RALP: 6.9±NR<br><br>ORP: 6.6±NR<br><br>P≥0.05  | RALP:<br>- pT2a: 30 (15.0)<br>- pT2b: 144 (72.0)<br>- pT3a: 14 (7.0)<br>- pT3b: 12 (6.0)<br><br>ORP:<br>- pT2a: 18 (18.0)<br>- pT2b: 75 (75.0)<br>- pT3a: 4 (4.0)<br>- pT3b: 3 (3.0)<br><br>P≥0.05  | RALP: 18 (9.0)<br><br>ORP: 23 (23.0)<br><br>P<0.05 | RALP: NR<br><br>ORP: NR  |
| Menon et al. (2002) <sup>140</sup><br>USA  | RALP: 30<br><br>ORP: 30   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P≥0.05 | RALP: 6.9 (2-9)†<br><br>ORP: 6.6 (2-9)†<br><br>P≥0.05  | RALP: NR<br><br>ORP: NR   | RALP: 8 (26)<br><br>ORP: 9 (29)<br><br>P≥0.05      | RALP: NR<br><br>ORP: NR  |
| <b>RALP vs. BT</b>                         |                           |   |  |   |  |   |  |  |
| Acar et al (2014) <sup>201</sup>           | RALP: 65                  | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR   |



Table 11. Key histopathological findings

| Study   | Sample size          | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes n (%)      | Pathological Gleason score n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pathological T stage n (%)   | Positive surgical margins n (%)   |                       |
|---|----------------------|---|--|---------------------------------|---|--|-----------------------------------|-----------------------|
|   |                      |   |  |                                 |   |  | Total                             | by Pathological stage |
| The Netherlands                                     | BT: 29               | BT: NA  | BT: NA   | BT: NA                          | BT: NA  | BT: NA   | BT: NA                            | BT: NA                |
| Baena et al (2013) <sup>141</sup><br>Spain          | RALP: 153<br>BT: 160 | RALP: NR<br>BT: NA  | RALP: NR<br>BT: NA   | RALP: NR<br>BT: NA              | RALP: NR<br>BT: NA  | RALP: NR<br>BT: NA   | RALP: NR<br>BT: NA                | RALP: NR<br>BT: NA    |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>BT: 118  | RALP: NR<br>BT: NA  | RALP: NR<br>BT: NA   | RALP: NR<br>BT: NA              | RALP: NR<br>BT: NA  | RALP (n=81):<br>- pT2: 58 (71.6)<br>- pT3, pT4: 23 (28.4)<br>BT: NA<br>P=NA  | RALP: NR<br>BT: NA<br>P=NA        | RALP: NR<br>BT: NA    |
| <b>RALP vs. Radiotherapy</b>                        |                      |   |  |                                 |   |  |                                   |                       |
| Hung et al (2015) <sup>199</sup><br>Taiwan          | RALP: 43<br>RT: 96   | RALP: NR<br>RT: NR  | RALP: NR<br>RT: NR   | RALP: 2 (4.7)<br>RT: NR<br>P=NA | RALP: NR<br>RT: NR  | RALP: NR<br>RT: NR   | RALP: 22 (51.2)<br>RT: NA<br>P=NA | RALP: NR<br>RT: NA    |
| <b>RALP vs. Cryoablation</b>                        |                      |   |  |                                 |   |  |                                   |                       |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>CRY: 39  | RALP: NR<br>CRY: NA   | RALP: NR<br>CRY: NA  | RALP: NR<br>CRY: NA             | RALP: NR<br>CRY: NA   | RALP (n=81):<br>- pT2: 58 (71.6)<br>- pT3, pT4: 23 (28.4)<br>CRY: NA<br>P=NR | RALP: NR<br>CRY: NA               | RALP: NR<br>CRY: NA   |
| <b>RALP vs. Active Surveillance</b>                 |                      |   |  |                                 |   |  |                                   |                       |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50   | RALP: NR<br>AS: NA  | RALP: NR<br>AS: NA   | RALP: NR<br>AS: NA              | RALP: NR<br>AS: NA  | RALP: NR<br>AS: NA   | RALP: NR<br>AS: NA                | RALP: NR<br>AS: NA    |

AS= Active Surveillance; BT= Brachytherapy; LP = Large Prostate; LRP= Laparoscopic Radical Prostatectomy; NA= Not Applicable; NR= Not Reported; ORP= Open Radical Prostatectomy; PIN = Prostatic Intraepithelial Neoplasia; PSA= prostate-specific antigen; RALP= Robot-assisted Radical Prostatectomy; RT= Radiotherapy; SD= Standard



Table 11. Key histopathological findings

| Study | Sample size | Tumor volume (%cc),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Prostate weight (g),<br>Median (Range)<br>Median [IQR]<br>Mean± SD | Positive lymph nodes<br>n (%) | Pathological Gleason score<br>n (%)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pathological T stage n (%) | Positive surgical margins n (%) |                       |
|-------|-------------|---|--|-------------------------------|--|----------------------------|---------------------------------|-----------------------|
|       |             |   |  |                               |  |                            | Total                           | by Pathological stage |

Deviation; SP = Small Prostate

†Values are reported as mean (range)

†† Values are reported as n (%)

†††Values are reported as median± SD

Percentages in [%] refer to the reported data and are based on incomplete sample size described in (n=).

\* P value between comparators with incomplete sample size

Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size               | Approach  | Characteristic of surgical technique/ Treatment   | Nerve-sparing  |   | Lymph node dissection   |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study   |
|--|---------------------------|---|---|--|---|---|---|---|---------------------------------|--|
|  |                           |   |   | Criteria   | N (%)   | Criteria  | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
| <b>RALP vs. LRP</b>                                  |                           |   |   |  |   |   |   |   |                                 |  |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br><br>LRP: 308  | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR   | NR   | RALP: NR<br><br>LRP: NR   | NR  | RALP: NR<br><br>LRP: NR                         | RALP: NR<br><br>LRP: NR                                   | Single surgeon for RALP and LRP | Initial experience with each technique. First transition from ORP to LRP. Second transition from LRP to RALP |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br><br>LRP: 100 | RALP: transperitoneal<br><br>LRP: extraperitoneal | RALP: 4-arm system via 6 ports<br><br>LRP: standard antegrade prostatectomy via 5 ports | Potent patients (ability to achieve erections satisfactory for intercourse with or without PDE-5) and low volume disease | RALP: 89 (89.0)<br>- Unilateral: 43 (43.0)<br>- Bilateral: 46 (46.0)<br><br>LRP (n=99): 60 (60.0)<br>- Unilateral: 28 (28.0)<br>- Bilateral: 32 (32.0)<br><br>P<0.001   | At surgeon's discretion, cT3 tumors, Gleason score≥8 and PSA>20 ng/ml | RALP: 8 (8.0)<br><br>LRP: 10 (10.0)<br><br>P=NR | RALP: NR<br><br>LRP: NR                                   | Single surgeon for RALP and LRP | 1: >250 LRPs, initial experience with RALP   |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand  | RALP: 486<br><br>LRP: 561 | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR   | NR   | RALP (n=485): 194 (39.9)[40.0%]<br>- Unilateral:35 (7.2) [7.2%]<br>- Bilateral: 159 (32.7) [32.8%]<br><br>LRP: 176 (31.4)<br>- Unilateral: 51 (9.1)<br>- Bilateral: 125 | NR  | RALP: NR<br><br>LRP: NR                         | RALP: NR<br><br>LRP: NR                                   | 9 surgeons for RALP and LRP     | 1-9: experienced   |

Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size             | Approach                                      | Characteristic of surgical technique/ Treatment                   | Nerve-sparing   |   | Lymph node dissection           |   |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study   |
|--|-------------------------|---|---|---|---|---------------------------------|---|---|------------------------|--|
|  |                         |   |   | Criteria  | N (%)   | Criteria                        | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |  |
|  |                         |   |   |   | (22.3)<br>*P=0.18   |                                 |   |   |                        |  |
| Busch et al (2014) <sup>145</sup><br>Germany and USA   | RALP: 194<br>LRP: 194   | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR   | NR  | RALP: 152 (78.4)<br>LRP:150 (77.3)<br>P=0.90  | NR                              | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR                                       | RALP: NR<br>LRP: NR    | Majority of patients were operated by experienced surgeons (>200 cases)  |
| Ploussard et al (2014) <sup>111</sup><br>France  | RALP: 1009<br>LRP: 1377 | RALP: extraperitoneal<br>LRP: extraperitoneal | RALP: 3-arm system with same surgical technique of LRP<br>LRP: NR | Potent patients (ability to achieve erections satisfactory for intercourse with or without PDE-5), ≤cT2b tumor, Gleason score≤7 or PSA <20ng/ml | RALP: 804 (79.7)<br>- Unilateral: 93 (9.2)<br>- Bilateral: 711 (70.5)<br>LRP: 1046 (76.0)<br>- Unilateral: 180 (13.1)<br>- Bilateral: 866 (62.9)<br>P=0.002 | Gleason score ≥7 or PSA>10ng/ml | RALP: 458 (45.4)<br>LRP: 603 (43.8)<br>P=0.49 | RALP: NR<br>LRP: NR                                       | RALP: 2<br>LRP: 3      | 1 <sub>RALP/LRP</sub> : >100 LRPs, initial experience with RALP<br>2 <sub>RALP/LRP</sub> : >100 LRPs, initial experience with RALP<br>3 <sub>LRP</sub> : >100 LRPs |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR   | NR  | RALP: NR<br>LRP: NR   | NR                              | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR                                       | Multiple               | NR   |
| Tozawa et al (2014) <sup>147</sup>   | RALP: 157               | RALP: transperitoneal                         | RALP: modified Montsouris   | NR  | RALP: 35 (22.3)   | NR                              | RALP: NR                                      | RALP: NR  | RALP: NR               | RALP: NR   |



Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                                     | Nerve-sparing  |  | Lymph node dissection   |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study |
|--|---------------------------|---|---|--|--|---|---|---|---------------------------------|--|
|  |                           |   |   | Criteria   | N (%)  | Criteria  | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
| Japan  | LRP: 551                  | LRP: NR   | technique with a 4-arm system<br><br>LRP: NR  |  | LRP: NR<br><br>P=NR  |   | LRP: NR   | LRP: NR   | LRP: NR                         | LRP: NR  |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy | RALP: 136<br><br>LRP: 91  | RALP: transperitoneal<br><br>LRP: transperitoneal | RALP: antegrade, energy-free procedure<br><br>LRP: antegrade, energy-free procedure | All patients   | RALP: 136 (100.0)<br>- Bilateral: 136 (100.0)<br><br>LRP: 91 (100.0)<br>- Bilateral: 91 (100.0)<br><br>P=NA  | NR  | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR                                   | Single surgeon for RALP and LRP | 1: >900 LRPs, 300 RALPs                                      |
| Berge et al (2013) <sup>113</sup><br>Norway        | RALP: 210<br><br>LRP: 210 | RALP: transperitoneal<br><br>LRP: transperitoneal | RALP: modified Montsouris technique<br><br>LRP: Montsouris technique                | Low-volume or, cT1 tumor and at surgeon's discretion | RALP: 156 (74.3)<br>- Unilateral: 66 (31.4)<br>- Bilateral: 90 (42.9)<br><br>LRP: 172 (81.9)<br>- Unilateral: 67 (31.9)<br>- Bilateral: 105 (50.0)<br><br>P=0.08 | Risk >7% of lymph node involvement according to Partin tables | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR                                   | 4 surgeons for RALP and LRP     | 1-4: Experienced with LRP, initial experience with RALP      |
| Harty et al (2013) <sup>200</sup><br>USA           | RALP: 152<br><br>LRP: 140 | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR   | At surgeon's discretion                              | RALP: NR<br><br>LRP: NR  | At surgeon's discretion                                       | RALP: 85 (55.9)<br><br>LRP: 53 (37.9)<br><br>P=NR | RALP: NR<br><br>LRP: NR                                   | RALP: 3<br><br>LRP: 3           | NR   |
| Pierorazio et al                                   | RALP:                     | RALP: NR  | RALP: NR  | NR   | RALP: NR   | Institutional   | RALP: 102   | RALP: 6 (1-22)  | RALP: 7                         | Median   |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size           | Approach                                      | Characteristic of surgical technique/ Treatment                           | Nerve-sparing   |  | Lymph node dissection  |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study   |
|---|-----------------------|---|---|---|--|--|---|---|---------------------------------|--|
|   |                       |   |   | Criteria  | N (%)  | Criteria   | N (%)                                       | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                                 |  |
| (2013) <sup>149</sup><br>USA                    | 105<br>LRP: 65        | LRP: NR                                       | LRP: NR   |   | LRP: NR  | policy is that all patients receive lymph node dissection  | (97.1)<br>LRP: 61 (93.8)<br>P=0.05          | LRP: 5 (0-39)<br>P<0.001                                      | LRP: 2                          | (range) case number<br>RALP: 297 (32-945)<br>LRP: 440 (22-977) |
| Porpiglia et al (2013) <sup>109</sup><br>Italy  | RALP: 60<br>LRP: 60   | RALP: transperitoneal<br>LRP: transperitoneal | RALP: anterograde procedure<br>ORP: anterograde procedure                 | Potent patients (IIEF-5>17), Gleason score<7, PSA<10ng/ml and Positive core<30% | RALP: 35 (58.3)<br>- Unilateral:18 (30.0)<br>- Bilateral: 11 (18.3)<br>LRP: 35 (58.3)<br>- Unilateral: 14 (23.3)<br>- Bilateral: 15 (25.0)<br>P=NR | Gleason score $\geq$ 7 (4+3) PSA>10 ng/ml and/or Risk >5% of lymph node involvement according to Partin tables | RALP: 13 (21.7)<br>LRP: 13 (21.7)<br>P=NR   | RALP: NR<br>LRP: NR   | Single surgeon for RALP and LRP | 1: 100RALPs, >600LRPs  |
| Koutlidis et al (2012) <sup>114</sup><br>France | RALP: 175<br>LRP: 104 | RALP: intraperitoneal<br>LRP: intraperitoneal | RALP: modified Montsouris technique<br>LRP: modified Montsouris technique | All patients  | RALP: 175 (100.0)<br>LRP: 104 (100.0)  | NR   | RALP: NR<br>LRP: NR                         | RALP: NR<br>LRP: NR   | Single surgeon for RALP and LRP | 1: Initial experience with LRP and RALP                        |
| Park et al (2012) <sup>150</sup><br>South Korea | RALP: 183<br>LRP: 144 | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR   | Potent patients (IIEF-5 score $\geq$ 17) and, $\leq$ cT2 tumors or PSA<10ng/ml  | RALP: 156 (85.2)<br>- Unilateral: 44 (24.0)<br>- Bilateral: 112 (61.2)<br>LRP: 83 (57.6)<br>- Unilateral: 29 (20.1)                                | Gleason score $\geq$ 7 (4+3) or PSA $\geq$ 10ng/mL   | RALP: 64 (35.0)<br>ORP: 50 (34.7)<br>P=1.00 | RALP: 6 (0-22)<br>ORP: 5 (0-21)<br>P=0.54                     | Single surgeon for RALP and LRP | RALP: NR<br>LRP: NR  |



Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                                       | Nerve-sparing                |  | Lymph node dissection |                         |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study |
|--|---------------------------|---|---|------------------------------|--|-----------------------|-------------------------|---|---------------------------------|--|
|  |                           |   |   | Criteria                     | N (%)  | Criteria              | N (%)                   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
|  |                           |   |   |                              | - Bilateral: 54 (37.5)<br>P<0.001  |                       |                         |   |                                 |  |
| Asimakopoulus et al (2011) <sup>110</sup><br>Italy | RALP: 52<br><br>LRP: 60   | RALP: transperitoneal<br><br>LRP: transperitoneal | RALP: antegrade, energy-free procedure<br><br>LRP: antegrade, energy-free procedure   | All patients                 | RALP: 52 (100.0)<br>- Bilateral: 52 (100.0)<br><br>LRP: 60 (100.0)<br>- Bilateral: 60 (100.0)<br><br>P=NA  | NR                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR                                   | Single surgeon for RALP and LRP | 1: >900 LRPs, 300 RALPs                                      |
| Kasraeian et al (2011) <sup>151</sup><br>France    | RALP: 200<br><br>LRP: 200 | RALP: extraperitoneal<br><br>LRP: extraperitoneal | RALP: Montsouris II technique with a 3-arm system<br><br>LRP: Montsouris II technique | NR                           | RALP: 197 (98.5)<br>- Unilateral: 61 (30.5)<br>- Bilateral: 136 (68.0)<br><br>LRP: 177 (88.5)<br>- Unilateral: 61 (30.5)<br>- Bilateral: 116 (58.0)<br><br>P<0.001 | NR                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR                                   | 4 surgeons for RALP and LRP     | 1-4: >250 LRP and RALP                                       |
| Magheli et al (2011) <sup>152</sup><br>USA         | RALP: 522<br><br>LRP: 522 | RALP: NR<br><br>LRP: NR                           | RALP: NR<br><br>LRP: NR   | NR                           | RALP: NR<br><br>LRP: NR  | NR                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR                                   | RALP: >1<br><br>LRP: >1         | RALP and LRP: Completed urological training                  |
| Willis et al (2011) <sup>115</sup><br>USA          | RALP: 121                 | RALP: transperitoneal                             | RALP: Montsouris technique  | Low-volume or, cT1 tumor and | RALP: 109 (90.1)<br>- Unilateral: 35 (28.9)  | All patients          | RALP: 121 (100.0)       | RALP: NR<br><br>LRP: NR                                   | Single surgeon for RALP and LRP | 1: 250 LRPs, initial experience                              |

Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size           | Approach  | Characteristic of surgical technique/ Treatment   | Nerve-sparing  |   | Lymph node dissection   |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study                                |
|--|-----------------------|---|---|--|---|---|---|---|---------------------------------|---|
|  |                       |   |   | Criteria   | N (%)   | Criteria  | N (%)                                     | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |   |
|  | LRP: 161              | LRP: transperitoneal                                | LRP: Montsouris technique   | at surgeon's discretion  | - Bilateral: 74 (61.2)<br>LRP (n=160): 139 (86.3)<br>- Unilateral: 53 (32.9)<br>- Bilateral: 86 (53.4)<br>P=0.21                          |   | LRP: 161 (100.0)<br>P=NA                  |   |                                 | with RALP   |
| Bolenz et al (2010) <sup>153</sup><br>USA    | RALP: 262<br>LRP: 220 | RALP: NR<br>LRP: NR                                 | RALP: 4-arm system<br>LRP: NR   | At surgeon's discretion  | RALP (n=225): 192 (73.3) [85.3%]<br>LRP (n=219): 210 (95.5) [95.9%]<br>*P=NR  | At surgeon's discretion   | RALP: 29 (11.1)<br>LRP: 48 (21.8)<br>P=NR | RALP: NR<br>LRP: NR                                       | RALP: 2<br>LRP: 1               | 1-2 <sub>RALP</sub> : Experienced with RALP<br>1 <sub>LRP</sub> : Experienced with LRP      |
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br>LRP: 85   | RALP: transperitoneal<br>LRP: transperitoneal       | RALP: Montsouris technique with a 3-arm system via 6 ports<br>LRP: Montsouris technique | NR   | RALP: NR<br>LRP: NR   | Gleason score ≥8 or PSA >10ng/ml or Suspicious lymph nodes detected on abdominal CT | RALP: 37 (52.1)<br>LRP: 43 (50.6)<br>P=NR | RALP: NR<br>LRP: NR                                       | RALP: 1<br>LRP: 3               | 1 <sub>RALP</sub> : initial experience with RALP<br>1-3 <sub>LRP</sub> : >250 LRP, >400 ORP |
| Hakimi et al (2009) <sup>155</sup><br>USA    | RALP: 75<br>LRP: 75   | RALP: NR<br>LRP: intraperitoneal or extraperitoneal | RALP: NR<br>LRP: NR   | Potent patients (IIEF-5 score ≥3 in questions 2 and 3) and at surgeon's discretion | RALP: 58 (77.3)<br>- Unilateral: 7 (9.3)<br>- Bilateral: 51 (68.0)<br>LRP: 55 (73.3)<br>- Unilateral: 10 (13.3)<br>- Bilateral: 45 (60.0) | Gleason score ≥7 or PSA >10 ng/mL   | RALP: 34 (45.3)<br>LRP: 41 (54.7)<br>P=NR | RALP: NR<br>LRP: NR                                       | Single surgeon for RALP and LRP | 1: >300 LRPs, initial experience with RALP  |



Table 12. Characteristics of surgical/ treatment procedure

| Study                                       | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                                       | Nerve-sparing                                |   | Lymph node dissection                          |   |   | Surgeons/ Urologists n      | Surgeons' / urologists' experience at the start of the study |
|---|---------------------------|---|---|--|---|--|---|---|-----------------------------|--|
|   |                           |   |   | Criteria                                     | N (%)   | Criteria                                       | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                             |  |
|   |                           |   |   |  | P=NR  |  |   |   |                             |  |
| Rozet et al (2009) <sup>156</sup><br>France | RALP: 133<br><br>LRP: 133 | RALP: extraperitoneal<br><br>LRP: extraperitoneal | RALP: Montsouris II technique with a 3-arm system<br><br>LRP: Montsouris II technique | Potent patients, ≤cT2 tumor and PSA ≤10ng/ml | RALP: 126 (94.7)<br>- Unilateral: 35 (26.3)<br>- Bilateral: 91 (68.4)<br><br>LRP: 126 (94.7)<br>- Unilateral: 30 (22.6)<br>- Bilateral: 96 (72.2)<br><br>P=1.00   | NR   | RALP: 2 (1.5)<br><br>LRP: 3 (2.3)<br><br>P=0.65       | RALP: NR<br><br>LRP: NR                                   | 4 surgeons for RALP and LRP | NR   |
| Trabulsi et al (2008) <sup>157</sup><br>USA | RALP: 50<br><br>LRP: 190  | RALP: transperitoneal<br><br>LRP: transperitoneal | RALP: Montsouris technique<br><br>LRP: Montsouris technique                           | NR   | RALP: NR<br><br>LRP: NR   | ≥cT2b tumors, Gleason score ≥7 or PSA >10ng/mL | RALP: 14 (28.0)<br><br>LRP: 51 (26.8)<br><br>P ≥ 0.05 | RALP: NR<br><br>LRP: NR                                   | RALP: NR<br><br>LRP: NR     | RALP: NR<br><br>LRP: NR                                      |
| Ball et al (2006) <sup>116</sup><br>USA     | RALP: 82<br><br>LRP: 124  | RALP: transperitoneal<br><br>LRP: transperitoneal | RALP: Vattikuti Institute technique<br><br>LRP: Montsouris technique                  | NR   | RALP (n=81): 52 (63.4)<br>- Unilateral: 9 (11.0)<br>- Bilateral: 54 (65.9)<br><br>LRP: 95 (76.6)<br>- Unilateral: 23 (18.5)<br>- Bilateral: 34 (27.4)<br><br>P=NR | NR   | RALP: NR<br><br>LRP: NR                               | RALP: NR<br><br>LRP: NR                                   | RALP: 2<br><br>LRP: 2       | 1-2: completed RALP and LRP fellowship training              |
| Hu et al (2006) <sup>158</sup><br>USA       | RALP: 322<br><br>LRP:     | RALP: transperitoneal<br><br>LRP:                 | RALP: modified Montsouris technique with a 4-arm system                               | When oncologically appropriate               | RALP: 286 (88.8)<br>- Unilateral: 27 (8.4)<br>- Bilateral: 259 (80.4)   | All patients                                   | RALP: 322 (100.0)<br><br>LRP: 358                     | RALP: NR<br><br>LRP: NR                                   | 3 surgeons for RALP and LRP | NR   |

Table 12. Characteristics of surgical/ treatment procedure

| Study                                      | Sample size                 | Approach  | Characteristic of surgical technique/ Treatment   | Nerve-sparing           |  | Lymph node dissection   |                         |   | Surgeons/ Urologists n  | Surgeons' / urologists' experience at the start of the study  |
|--|-----------------------------|---|---|-------------------------|--|-------------------------|-------------------------|---|-------------------------|---|
|  |                             |   |   | Criteria                | N (%)  | Criteria                | N (%)                   | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                         |   |
|  | 358                         | transperitoneal                                   | via 6 ports<br><br>LRP: modified Montsouris technique                                     |                         | LRP: 260 (72.6)<br>- Unilateral: 23 (6.4)<br>- Bilateral: 237 (66.2)<br><br>P=NR   |                         | (100.0)<br><br>P=NA     |   |                         |   |
| Joseph et al (2005) <sup>159</sup> USA     | RALP: 50<br><br>LRP: 50     | RALP: extraperitoneal<br><br>LRP: extraperitoneal | RALP: Montsouris II technique via 5 ports<br><br>LRP: Montsouris II technique via 4 ports | NR                      | RALP: 47 (94.0)<br>- Unilateral: 1 (2.0)<br>- Bilateral: 46 (52.0)<br><br>LRP: 34 (68.0)<br>- Unilateral: 10 (20.0)<br>- Bilateral: 24 (48.0)<br><br>P<0.001 | NR                      | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR                                       | RALP: NR<br><br>LRP: NR | Experienced with LRP  |
| <b>RALP vs. ORP</b>                        |                             |   |   |                         |  |                         |                         |   |                         |   |
| Hu et al (2017) <sup>160</sup> USA         | RALP: 4164<br><br>ORP: 4164 | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR  | NR                      | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                       | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   |
| Jackson et al. (2016) <sup>117</sup> USA   | RALP: 116<br><br>ORP: 63    | RALP: transperitoneal<br><br>ORP: NR              | RALP: modified Montsouris technique<br><br>ORP: modified Walsh technique                  | At surgeon's discretion | RALP: NR<br><br>ORP: NR  | At surgeon's discretion | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                       | RALP: 1<br><br>ORP: 1   | <sup>1</sup> <sub>RALP</sub> : 75RALPs, 45 ORPs, 16 LRPs<br><br><sup>1</sup> <sub>ORP</sub> : 1500 ORPs |
| Ong et al. (2016) <sup>118</sup> Australia | RALP: 885                   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR  | NR                      | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                       | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size                 | Approach            | Characteristic of surgical technique/ Treatment | Nerve-sparing           |  | Lymph node dissection                                     |   |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study |
|---|-----------------------------|---------------------|---|-------------------------|--|---|---|---|------------------------|--|
|   |                             |                     |   | Criteria                | N (%)  | Criteria  | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD   |                        |  |
|   | ORP: 1117                   |                     |   |                         |  |   |   |   |                        |  |
| Pearce et al. (2016) <sup>161</sup> USA       | RALP: 73,131<br>ORP: 23,804 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                             | NR                      | RALP: NR<br>ORP: NR  | NR  | RALP:<br>- Unmatched: 39,443 (54.0)<br>- Matched: 10,324 (77.4)<br><br>ORP:<br>- Unmatched: 17,113 (72.0)<br>- Matched: 10,394 (78.0)<br><br>P=NR | RALP:<br>- Unmatched: 4.7 $\pm$ 11.8<br>- Matched: 6.0 $\pm$ 11.8<br><br>ORP:<br>- Unmatched: 7.5 $\pm$ 15.4<br>- Matched: 7.3 $\pm$ 13.8<br><br>P=NR | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR  |
| Suardi et al. (2016) <sup>162</sup> Italy     | RALP: 1790<br>ORP: 4404     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                             | NR                      | RALP: 1573 (87.9)<br>- Unilateral: 156 (8.7)<br>- Bilateral: 1417 (79.2)<br><br>ORP: 2000 (45.4)<br>- Unilateral: 171 (3.9)<br>- Bilateral: 1826 (41.5)<br><br>P<0.001 | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: 6<br>ORP: 13     | NR   |
| Yaxley et al. (2016) <sup>103</sup> Australia | RALP: 163<br>ORP: 163       | RALP:<br>ORP:       | RALP: NR<br>ORP: NR                             | At surgeon's discretion | RALP: NR<br>ORP: NR  | Serum PSA > 10 ng/mL, a palpable nodule on digital rectal | RALP (n=157): 59 (38)<br>ORP (n=151): 53 (35)   | RALP: 6.50 $\pm$ 10.38<br>ORP: 3.26 $\pm$ 5.45  | RALP: 1<br>ORP: 1      | 1 <sub>RALP</sub> : 200 RALP<br>1 <sub>ORP</sub> : 1500 ORP  |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size            | Approach              | Characteristic of surgical technique/ Treatment | Nerve-sparing      |   | Lymph node dissection              |  |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study  |
|---|------------------------|-----------------------|---|--------------------|---|------------------------------------|--|---|---------------------------------|---|
|   |                        |                       |   | Criteria           | N (%)   | Criteria                           | N (%)  | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |   |
|   |                        |                       |   |                    |   | exam, or primary Gleason score ≥ 4 | p=NR   | p=0.0004  |                                 |   |
| Akand et al. (2015) <sup>142</sup><br>Turkey    | RALP: 79<br>ORP: 50    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             | NR                 | RALP: NR<br>ORP: NR   | NR                                 | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: initial experience with each technique. First transition from ORP to LRP. Second transition from LRP to RALP |
| Antonelli et al. (2015) <sup>163</sup><br>Italy | RALP: 291<br>LRP: 285  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             | NR                 | RALP: NR<br>ORP: NR   | NR                                 | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR             | NR  |
| Haglund et al (2015) <sup>119</sup><br>Sweden   | RALP: 1847<br>ORP: 778 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                             | NR                 | RALP: 1554 (84.1)<br>- Unilateral: 583 (31.6)<br>- Bilateral: 971 (52.6)<br><br>ORP: 514 (66.1)<br>- Unilateral: 167 (21.5)<br>- Bilateral: 347 (44.6)<br><br>p<0.001 | NR                                 | RALP: 235 (12.7)<br><br>ORP: 206 (26.5)<br><br>P<0.001 | RALP: NR<br>ORP: NR                                       | Total of 49 surgeons            | All surgeons were experienced (≥100 procedures)   |
| Lee et al. (2015) <sup>164</sup>                | RALP: 99               | RALP: transperitoneal | RALP: NR  | When oncologically | RALP: 66 (66.7)<br>- Unilateral: 6 (6.1)  | All patients                       | RALP: 99 (100.0)                                       | RALP: 5.1±NR  | Single surgeon for              | 1: experienced  |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size           | Approach             | Characteristic of surgical technique/ Treatment | Nerve-sparing |  | Lymph node dissection |                            |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study  |
|---|-----------------------|----------------------|---|---------------|--|-----------------------|----------------------------|---|------------------------|---|
|   |                       |                      |   | Criteria      | N (%)  | Criteria              | N (%)                      | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                        |   |
| South Korea   | ORP: 99               | ORP: extraperitoneal | ORP: NR   | appropriate   | - Bilateral: 60 (60.6)<br>ORP: 67 (67.7)<br>- Unilateral: 5 (5.1)<br>- Bilateral: 62 (62.6)<br><br>P=0.93  |                       | ORP 99 (100.0)<br><br>P=NA | ORP: 5.6 $\pm$ NR<br><br>P=0.42                               | RALP and ORP           |   |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                             | NR            | RALP: NR<br>ORP: NR  | NR                    | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: 2<br>ORP: 2      | 1-2 <sub>RALP</sub> : initial experience with RALP, experienced with ORP<br><br>1-2 <sub>ORP</sub> : experienced with ORP |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                             | NR            | RALP: 152 (78.4)<br>ORP: 157 (80.9)<br><br>P=0.61  | NR                    | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR    | Majority of patients were operated by experienced surgeons (>200 cases)   |
| Davison et al. (2014) <sup>121</sup><br>Canada        | RALP: 78<br>ORP: 73   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                             | NR            | RALP: 70 (89.7)<br>- Unilateral: 16 (20.5)<br>- Bilateral: 54 (69.2)<br><br>ORP (n=70): 43 (58.9)<br>- Unilateral: 13 (17.8)<br>- Bilateral: 30 (41.1) | NR                    | RALP: NR<br>ORP: NR        | RALP: NR<br>ORP: NR   | RALP: 2<br>ORP: 2      | 1-2 <sub>RALP</sub> : experienced<br><br>1-2 <sub>ORP</sub> : experienced   |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                 | Nerve-sparing  |   | Lymph node dissection |   |   | Surgeons/ Urologists n  | Surgeons' / urologists' experience at the start of the study   |
|---|---------------------------|---|---|--|---|-----------------------|---|---|-------------------------|--|
|   |                           |   |   | Criteria   | N (%)   | Criteria              | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                         |  |
|   |                           |   |   |  | P=0.001   |                       |   |   |                         |  |
| Fode et al. (2014) <sup>122</sup><br>Denmark  | RALP: 585<br><br>ORP: 453 | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | No palpable tumor in the apex, Gleason score <9 and PSA <20ng/ml | RALP: 419 (71.6)<br>- Unilateral: 234 (40.0)<br>- Bilateral: 185 (31.6)<br><br>ORP: 264 (58.3)<br>- Unilateral: 173 (38.2)<br>- Bilateral: 91 (20.1)<br><br>P<0.001 | NR                    | RALP: NR<br><br>ORP: NR                               | RALP: NR<br><br>ORP: NR                                       | RALP: 6<br><br>ORP: 7   | 1-4 <sub>RALP/ORP</sub> : initial experience with RALP, experienced with ORP<br><br>5 <sub>RALP</sub> : experienced with RALP, experienced with ORP<br><br>6 <sub>RALP</sub> : initial experience with RALP, experienced with ORP<br><br>5-8 <sub>ORP</sub> : experienced with ORP |
| Gagnon et al. (2014) <sup>165</sup><br>Canada | RALP: 200<br><br>ORP: 200 | RALP: transperitoneal<br><br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br><br>ORP: Walsh technique | NR   | RALP: NR<br><br>ORP: NR   | NR                    | RALP: 39 (19.5)<br><br>ORP: 165 (82.5)<br><br>P<0.001 | RALP: 3.9 $\pm$ 2.24<br><br>ORP: 5.4 $\pm$ 4.7<br><br>P=0.04  | RALP: 1<br><br>ORP: 1   | 1 <sub>RALP</sub> : initial experience with RALP and experienced with ORP<br><br>1 <sub>ORP</sub> : experienced with ORP   |
| Gandaglia et al (2014) <sup>166</sup><br>USA  | RALP: 3476<br><br>ORP:    | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR   | NR   | RALP: NR<br><br>ORP: NR   | NR                    | RALP: 1717 (49.4)<br><br>ORP: 1751                    | RALP: NR<br><br>ORP: NR                                       | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size             | Approach                                      | Characteristic of surgical technique/ Treatment                  | Nerve-sparing |                     | Lymph node dissection   |  |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study  |
|---|-------------------------|---|--|---------------|---------------------|-------------------------|--|---|------------------------|---|
|   |                         |   |  | Criteria      | N (%)               | Criteria                | N (%)  | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                        |   |
|   | 2439                    |   |  |               |                     |                         | (71.8)   |   |                        |   |
|   |                         |   |  |               |                     |                         | P<0.001  |   |                        |   |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP: 5524<br>ORP: 5524 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR  | NR            | RALP: NR<br>ORP: NR | NR                      | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP: 175<br>ORP: 175   | RALP: NR<br>ORP: NR                           | RALP: 4-arm system<br>ORP: NR                                    | NR            | RALP: NR<br>ORP: NR | NR                      | RALP: NR<br>ORP: NR                            | RALP: 12.5 $\pm$ 7.8<br>ORP: 3.8 $\pm$ 5.9<br>P<0.001         | RALP: 2<br>ORP: 2      | 1-2 <sub>RALP</sub> : >100 RALPs<br>1-2 <sub>ORP</sub> : >100 ORPs  |
| Ritch et al (2014) <sup>169</sup><br>USA        | RALP: 742<br>ORP: 237   | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br>ORP: Walsh technique      | NR            | RALP: NR<br>ORP: NR | At surgeon's discretion | RALP: 732 (98.7)<br>ORP: 232 (97.9)<br>P<0.001 | RALP: NR<br>ORP: NR   | RALP: 4<br>ORP: 4      | 1-2 <sub>RALP</sub> : initial experience with RALP<br>1-2 <sub>ORP</sub> : experienced with ORP<br>3-4 <sub>RALP/ORP</sub> : initial experience with RALP, experienced with ORP |
| Shigemura et al. (2014) <sup>170</sup><br>Japan | RALP: 89<br>ORP: 105    | RALP: NR<br>ORP: NR                           | RALP: antegrade approach via 5 ports<br>ORP: retrograde approach | NR            | RALP: NR<br>ORP: NR | NR                      | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR    | NR  |
| Sooriakumaran                                   | RALP:                   | RALP: NR                                      | RALP: NR   | NR            | RALP: NR            | NR                      | RALP: NR                                       | RALP: NR  | Multiple               | NR  |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size            | Approach                                      | Characteristic of surgical technique/ Treatment                               | Nerve-sparing  |   | Lymph node dissection |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study  |
|---|------------------------|---|---|--|---|-----------------------|---|---|---------------------------------|---|
|   |                        |   |   | Criteria   | N (%)   | Criteria              | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |   |
| et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | 7697<br>ORP: 9778      | ORP: NR                                       | ORP: NR   |  | ORP: NR   |                       | ORP: NR   | ORP: NR   |                                 |   |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP 77<br>ORP: 176    | RALP: transperitoneal<br>ORP: NR              | RALP: antegrade approach<br>ORP: modified Walsh technique                     | Potent patients (IIEF-5≥12) and when oncologically appropriate | RALP: 41 (53.2)<br>- Unilateral: 8 (10.4)<br>- Bilateral: 33 (42.9)<br><br>ORP: 55 (31.1)<br>- Unilateral: 8 (4.5)<br>- Bilateral: 47 (26.7)<br><br>P=0.001 | NR                    | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: > 25 RALPs, >100ORPs   |
| Froehner et al. (2013) <sup>172</sup><br>Germany  | RALP: 317<br>ORP: 2437 | RALP: NR<br>ORP: NR                           | RALP: 3-arm system<br>ORP: NR   | NR   | RALP: NR<br>ORP: NR   | NR                    | RALP: 290 (91.5)<br>ORP: 2324 (95.4)<br>P=0.003 | RALP: 13±NR<br>ORP: 15±NR<br>P<0.001                      | RALP: 5<br>ORP: 8               | 1-5 <sub>RALP/ORP</sub> : initial experience with RALP, 100 ORPs<br><br>6-8 <sub>ORP</sub> : 100 ORPs |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium  | RALP: 64<br>ORP: 116   | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br>ORP: as described by Hsu et al. (2005) | NR   | RALP: 64 (100.0)<br>- Unilateral:4 (6.3)<br>- Bilateral: 60 (93.8)<br><br>ORP: 92 (79.3)<br>- Unilateral:40 (34.5)<br>- Bilateral: 52 (44.8)                | NR                    | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR                                       | 3 surgeons for RALP and ORP     | 1: >150 RALPs<br>2: >700 ORPs and >50RALPs<br>3: >3000 ORPs   |





Table 12. Characteristics of surgical/ treatment procedure

| Study                                       | Sample size           | Approach                                      | Characteristic of surgical technique/ Treatment      | Nerve-sparing                  |   | Lymph node dissection   |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study            |
|---|-----------------------|---|--|--------------------------------|---|---|---|---|---------------------------------|---|
|   |                       |   |  | Criteria                       | N (%)   | Criteria  | N (%)                                       | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |   |
|   |                       |   |  |                                | P<0.001   |   |   |   |                                 |   |
| Harty et al. (2013) <sup>200</sup> USA      | RALP: 152<br>ORP: 153 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | At surgeon's discretion        | RALP: NR<br>ORP: NR   | At surgeon's discretion   | RALP: 85 (55.9)<br>ORP: 89 (58.2)<br>P=NR   | RALP: NR<br>ORP: NR                                       | RALP: 3<br>ORP: 4               | NR  |
| Ludovico et al. (2013) <sup>124</sup> Italy | RALP: 82<br>ORP: 48   | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: intrafascial technique<br>ORP: Walsh technique | All patients                   | RALP: 82 (100.0)<br>- Unilateral: 0 (0.0)<br>- Bilateral: 82 (100.0)<br><br>ORP: 48 (100.0)<br>- Unilateral: 0 (0.0)<br>- Bilateral: 48 (100.0)<br><br>P=NA | NA  | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA       | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA                     | Single surgeon for RALP and ORP | 1: >50 RALPs and ORPs   |
| Masterson et al (2013) <sup>173</sup> USA   | RALP: 669<br>ORP: 357 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | when oncologically appropriate | RALP: 29 (4.3)<br>ORP: 22 (6.2)<br>P=NR   | NR  | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: initial experience with RALP and experienced with ORP                |
| Pierorazio et al. (2013) <sup>149</sup> USA | RALP: 105<br>ORP: 743 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | NR                             | RALP: NR<br>ORP: NR   | Institutional policy is that all patients receive lymph node dissection | RALP: 102 (97.1)<br>ORP: 737 (99.2)<br>P=NR | RALP: 6 (1-22)<br>ORP: 8 (0-37)<br>P=NR                   | RALP: 7<br>ORP: 15              | Median (range) case number<br>RALP: 297 (32-945)<br>ORP: 1428 (20-4540) |
| Punnen et al. (2013) <sup>174</sup> USA     | RALP: 233             | RALP: transperitoneal                         | RALP: 3-arm system                                   | NR                             | RALP: 229 (98.3)<br>- Unilateral: 103 (44.2)  | NR  | RALP: 147 (63.1)                            | RALP: 11±NR<br>ORP: 15±NR                                 | Multiple surgeons for RALP and  | NR  |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                                    | Nerve-sparing                        |  | Lymph node dissection  |  |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study                              |
|---|---------------------------|---|--|--------------------------------------|--|--|--|---|---------------------------------|---|
|   |                           |   |  | Criteria                             | N (%)  | Criteria   | N (%)  | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                                 |   |
|   | ORP: 177                  | ORP: extraperitoneal                              | ORP: Walsh technique   |                                      | - Bilateral: 126 (54.1)<br><br>ORP: 163 (92.1)<br>- Unilateral: 103 (58.2)<br>- Bilateral: 60 (33.9)<br><br>P<0.01 |  | ORP: 170 (96.0)<br><br>P<0.01                        | P<0.01  | ORP                             |   |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br><br>ORP: 341 | RALP: NR<br><br>ORP: NR                           | RALP: antegrade approach<br><br>ORP: modified Walsh technique                      | RALP: potent patients<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | All patients   | RALP: 524 (100.0)<br><br>ORP 341 (100.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: initial experience with RALP and experienced with ORP                                  |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br><br>ORP: 961 | RALP: transperitoneal<br><br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br><br>ORP: Walsh technique                    | NR                                   | RALP: NR<br><br>ORP: NR<br><br>Overall: 1323 (91.0)  | Risk $\geq$ 2% of lymph node involvement according to nomogram and at surgeon's discretion | RALP: NR<br><br>ORP: NR<br><br>Overall: 1363 (94.0)  | RALP: 15 [10-21]<br><br>ORP: 15 [10-21]                       | RALP: 2<br><br>ORP: 2           | 1-2 <sub>RALP</sub> : >250 RALPs and ORPs<br><br>1-2 <sub>ORP</sub> : >250 RALPs and ORPs |
| Son et al. (2013) <sup>177</sup><br>South Korea | RALP: 146<br><br>ORP: 112 | RALP: transperitoneal<br><br>ORP: NR              | RALP: Vattikuti Institute technique with a 4-arm system via 6-ports<br><br>ORP: NR | NR                                   | RALP: 82 (56.2)<br><br>ORP:42 (37.5)<br><br>P=0.004  | NR   | RALP: NR<br><br>ORP: NR                              | RALP: NR<br><br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: 100 RALPs  |
| Bae et al (2012) <sup>178</sup>                 | RALP: 111                 | RALP: transperitoneal                             | RALP: Vattikuti Institute  | NR                                   | RALP: NR   | NR   | RALP: NR   | RALP: NR  | Single surgeon for              | NR  |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size          | Approach                                      | Characteristic of surgical technique/ Treatment                                 | Nerve-sparing   |   | Lymph node dissection  |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study            |
|---|----------------------|---|---|---|---|--|---|---|---------------------------------|---|
|   |                      |   |   | Criteria  | N (%)   | Criteria   | N (%)                                       | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |   |
| South Korea   | ORP: 70              | ORP: NR                                       | technique<br>ORP: NR  |   | ORP: NR   |  | ORP: NR                                     | ORP: NR   | RALP and ORP                    |   |
| Hong et al. (2012) <sup>8</sup><br>USA              | RALP: 182<br>ORP: 80 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | NR   | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR             | NR  |
| Lumen et al. (2012) <sup>179</sup><br>Belgium       | RALP: 50<br>ORP: 50  | RALP: NR<br>ORP: extraperitoneal              | RALP: as described by Mottrie et al (2011)<br>ORP: Walsh technique              | at the side where a palpable is not present or Gleason score >7 | RALP: 41 (82.0)<br>- Unilateral: 26 (52.0)<br>- Bilateral: 15 (30.0)<br>ORP: 23 (46.0)<br>- Unilateral: 6 (12.0)<br>- Bilateral: 17 (34.0)<br><br>P<0.001 | Risk ≥15% of lymph node involvement according to Roach's formula | RALP: 28 (56.0)<br>ORP: 41 (82.0)<br>P=0.25 | RALP: 10 (6-24)<br>ORP: 9 (3-44)<br>P=0.37                | Single surgeon for RALP and ORP | 1: initial experience with RALP and 1500 ORPs                           |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | NR  | RALP: 5<br>- Unilateral: 1<br>- Bilateral: 4<br><br>ORP: 6<br>- Unilateral: 1<br>- Bilateral: 2<br><br>P=NR   | All patients   | RALP: 19 (100)<br>ORP: 19 (100)             | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR             | RALP: "experienced"<br>ORP: "experienced"                               |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50  | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: antegrade approach with a 4-arm system via 6-port<br>ORP: Walsh technique | NR  | RALP: 42 (84.0)<br>- Unilateral:14 (28.0)<br>- Bilateral: 28 (56.0)<br><br>ORP: 37 (74.0)<br>- Unilateral: 13   | NR   | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: initial experience with each technique. Transition from ORP to RALP. |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size                 | Approach  | Characteristic of surgical technique/ Treatment       | Nerve-sparing |  | Lymph node dissection |   |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study   |
|---|-----------------------------|---|---|---------------|--|-----------------------|---|---|------------------------|--|
|   |                             |   |   | Criteria      | N (%)  | Criteria              | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |  |
|   |                             |   |   |               | (26.0)<br>- Bilateral: 24 (48.0)<br><br>P=0.22   |                       |   |   |                        |  |
| Trinh et al. (2012) <sup>181</sup><br>USA             | RALP: 7598<br><br>ORP: 7389 | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR                               | NR            | RALP: NR<br><br>ORP: NR  | NR                    | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR                                   | Multiple               | NR   |
| Wang et al. (2012) <sup>182</sup><br>USA              | RALP: 1038<br><br>ORP: 707  | RALP: intraperitoneal or extraperitoneal<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                               | NR            | RALP: 902 (86.9)<br>- Unilateral: 115 (11.1)<br>- Bilateral: 787 (75.8)<br><br>ORP: 579 (81.9)<br>- Unilateral: 82 (11.6)<br>- Bilateral: 494 (70.3)<br><br>P=0.01 | NR                    | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR                                   | RALP: 9<br><br>ORP: 14 | 1-9 <sub>RALP</sub> : initial experience<br><br>1-14 <sub>ORP</sub> : experienced with ORP                       |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75<br><br>ORP: 75     | RALP: transperitoneal<br><br>ORP: NR                    | RALP: antegrade, energy-free procedure<br><br>ORP: NR | NR            | RALP: 53 (70.7)<br>- Unilateral: 30 (40.0)<br>- Bilateral: 23 (30.7)<br><br>ORP: 49 (65.3)<br>- Unilateral: 19 (25.3)<br>- Bilateral: 30 (40.0)<br><br>P=0.62      | All patients          | RALP: 75 (100.0)<br><br>ORP: 75 (100.0)<br><br>P=NA | RALP: 12 [9-17]<br><br>ORP: 18 [12-23]<br><br>P<0.001     | RALP: 1<br><br>ORP: 3  | 1 <sub>RALP</sub> : experience of 6 months with RALPs and 9 years with ORPs<br><br>1-3 <sub>ORP</sub> : >100 LRP |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size           | Approach                                      | Characteristic of surgical technique/ Treatment      | Nerve-sparing   |   | Lymph node dissection   |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study |
|---|-----------------------|---|--|---|---|---|---|---|---------------------------------|--|
|   |                       |   |  | Criteria  | N (%)   | Criteria  | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean $\pm$ SD |                                 |  |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark   | RALP: 77<br>ORP: 154  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | NR  | RALP: 52 (67.6)<br>ORP: 77 (50.0)<br>P=NR   | NR  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             |  |
| Kim et al. (2011) <sup>127</sup><br>South Korea | RALP: 528<br>ORP: 235 | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: antegrade approach<br>ORP: retrograde approach | Preoperatively potent patients, on side not suspicious for cancer extension | RALP: 373 (70.6)<br>- Unilateral: 94 (17.8)<br>- Bilateral: 279 (52.8)<br>ORP: 122 (51.9)<br>- Unilateral: 42 (17.9)<br>- Bilateral: 80 (34.0)<br>P<0.001 | Intermediate and high risk patients according to the D'Amico risk | RALP: 351 (66.5)<br>ORP: 176 (74.9)<br>P=0.02 | RALP: NR<br>ORP: NR   | Single surgeon for RALP and ORP | 1: initial experience with RALP and >700 ORPs                |
| Magheli et al. (2011) <sup>152</sup><br>USA     | RALP: 522<br>ORP: 522 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | NR  | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | RALP: >1<br>ORP: >1             | RALP: Completed urological training<br>ORP: experienced      |
| Minniti et al. (2011) <sup>184</sup><br>Italy   | RALP: 22<br>ORP: 93   | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                  | NR  | RALP: 1 (4.5)<br>ORP: 19 (20.4)<br>P=NR   | NR  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR             | NR   |
| Mirza et al. (2011) <sup>185</sup><br>USA       | RALP: 191<br>ORP: NR  | RALP: transperitoneal<br>ORP: NR              | RALP: The Ohio State University technique            | NR  | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | Single surgeon for RALP and ORP | NR   |



Table 12. Characteristics of surgical/ treatment procedure

| Study                                      | Sample size             | Approach                                      | Characteristic of surgical technique/ Treatment             | Nerve-sparing           |  | Lymph node dissection   |   |   | Surgeons/ Urologists n             | Surgeons' / urologists' experience at the start of the study  |
|--|-------------------------|---|---|-------------------------|--|-------------------------|---|---|------------------------------------|---|
|  |                         |   |   | Criteria                | N (%)  | Criteria                | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                    |   |
|  | 180                     |   | ORP: technique as described by Klein et al. (2000)          |                         |  |                         |   |   |                                    |   |
| Tollefson et al. (2011) <sup>186</sup> USA | RALP: 1084<br>ORP: 4824 | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br>ORP: Walsh technique | NR                      | RALP: NR<br>ORP: NR  | All patients            | RALP: 1084 (100.0)<br>ORP: 4824 (100.0)<br>P=NA | RALP: NR<br>ORP: NR                                       | Multiple surgeons for RALP and ORP | NR  |
| Barocas et al. (2010) <sup>128</sup> USA   | RALP: 1413<br>ORP: 491  | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br>ORP: Walsh technique | NR                      | RALP: NR<br>ORP: NR  | NR                      | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR                                       | RALP: 4<br>ORP: 4                  | 1-2 <sub>RALP</sub> : initial experience with RALP<br>1-2 <sub>ORP</sub> : experienced with ORP<br>3-4 <sub>RALP/ORP</sub> : initial experience with RALP, experienced with ORP |
| Bolenz et al. (2010) <sup>153</sup> USA    | RALP: 262<br>ORP: 161   | RALP: NR<br>ORP: NR                           | RALP: 4-arm system<br>ORP: NR                               | At surgeon's discretion | RALP (n=225): 192 (73.3) [85.3%]<br>ORP (n=152): 137 (85.1) [90.1%]<br>*P=NR | At surgeon's discretion | RALP: 29 (11.1)<br>ORP: 161 (100.0)<br>P=NR     | RALP: NR<br>ORP: NR                                       | RALP: 2<br>ORP: 3                  | 1 <sub>RALP</sub> : Experienced with RALP<br>2 <sub>RALP</sub> : Experienced with RALP<br>1 <sub>ORP</sub> : Experienced with ORP<br>2 <sub>ORP</sub> :                         |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size            | Approach                                      | Characteristic of surgical technique/ Treatment                               | Nerve-sparing                  |                     | Lymph node dissection               |   |   | Surgeons/ Urologists n             | Surgeons' / urologists' experience at the start of the study   |
|---|------------------------|---|---|--------------------------------|---------------------|-------------------------------------|---|---|------------------------------------|--|
|   |                        |   |   | Criteria                       | N (%)               | Criteria                            | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                    |  |
|   |                        |   |   |                                |                     |                                     |   |   |                                    | Experienced with ORP<br>3 <sub>ORP</sub> : Experienced with ORP  |
| Breyer et al. (2010) <sup>129</sup><br>USA        | RALP: 293<br>ORP: 695  | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: 3-arm system<br>ORP: Walsh technique                                    | when oncologically appropriate | RALP: NR<br>ORP: NR | NR                                  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR                                       | Multiple surgeons for RALP and ORP | NR   |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden   | RALP: 1253<br>ORP: 485 | RALP: NR<br>ORP: NR                           | RALP: Karolinska technique<br>ORP: modified Walsh technique                   | NR                             | RALP: NR<br>ORP: NR | Gleason score ≥ 8 or PSA > 20 ng/ml | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR                                       | RALP: 6<br>ORP: 9                  | 1-3 <sub>RALP/ORP</sub> : >250 ORPs, initial experience with RALP<br>4 <sub>RALP/ORP</sub> : >100 ORPs, initial experience with RALP<br>5-6 <sub>RALP/ORP</sub> : <7 ORPs, initial experience with RALP<br>7-9 <sub>ORP</sub> : NR |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br>ORP: 502  | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: The Ohio State University technique via 6 ports<br>ORP: Walsh technique | NR                             | RALP: NR<br>ORP: NR | NR                                  | RALP: 54 (25.5)<br>ORP: 263 (52.4)<br>P < 0.001 | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP    | 1: initial experience with RALP, >2000 ORPs  |
| Hong et al.                                       | RALP:                  | RALP:   | RALP: Vattikuti   | NR                             | RALP: NR            | NR                                  | RALP: NR  | RALP: NR  | RALP: 1                            | 1 <sub>RALP</sub> : >180   |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size           | Approach                                      | Characteristic of surgical technique/ Treatment   | Nerve-sparing |  | Lymph node dissection  |   |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study |
|---|-----------------------|---|---|---------------|--|--|---|---|---------------------------------|--|
|   |                       |   |   | Criteria      | N (%)  | Criteria   | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
| (2010) <sup>132</sup><br>South Korea          | 26<br>ORP: 25         | transperitoneal<br>ORP: NR                    | Institute technique<br>ORP: NR  |               | ORP: NR  |  | ORP: NR                                       | ORP: NR   | ORP: 1                          | RALPs<br>1 <sub>ORP</sub> : NR                               |
| Kordan et al. (2010) <sup>133</sup><br>USA    | RALP: 830<br>ORP: 414 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR   | NR            | RALP: NR<br>ORP: NR  | All patients   | RALP: 830 (100.0)<br>ORP: 414 (100.0)<br>P=NA | RALP: NR<br>ORP: NR                                       | RALP: 2<br>ORP: 3               | NR   |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong  | RALP: 20<br>ORP: 20   | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: Vattikuti Institute technique with a 3-arm system via 6-ports<br>ORP: NR                | NR            | RALP: NR<br>ORP: NR  | NR   | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR             | NR   |
| Nadler et al. (2010) <sup>188</sup><br>USA    | RALP: 50<br>ORP: 50   | RALP: NR<br>ORP: NR                           | RALP: 4-arm system via 5 ports<br>ORP: technique as described by McCarthy and Catalona (1996) | NR            | RALP: 46 (92.0)<br>- Unilateral: 8 (16.0)<br>- Bilateral: 38 (76.0)<br>ORP: 43 (86.0)<br>- Unilateral: 0 (0.0)<br>- Bilateral: 43 (86.0)<br>P=0.36 | RALP: ≥cT2 tumors, Gleason score ≥7 or PSA≥ 10ng/mL<br>ORP: NR | RALP: 29 (58.0)<br>ORP: 50 (100.0)<br>P=NR    | RALP: NR<br>ORP: NR                                       | Single surgeon for RALP and ORP | 1: initial experience with RALP, >460ORPs and 24 LRP         |
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99<br>ORP: 217  | RALP: NR<br>ORP: NR                           | ARP: NR<br>ORP: NR  | NR            | RALP: NR<br>ORP: NR  | All patients   | RALP: 99 (100.0)<br>ORP: 217 (100.0)          | RALP: 6.4±4.5<br>ORP: 7.5±5.1<br>P=0.06                   | RALP: 1<br>ORP: 4               | NR   |



Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size           | Approach   | Characteristic of surgical technique/ Treatment                           | Nerve-sparing                                     |   | Lymph node dissection   |   |   | Surgeons/ Urologists n      | Surgeons' / urologists' experience at the start of the study                                |
|---|-----------------------|--|---|---|---|---|---|---|-----------------------------|---|
|   |                       |  |   | Criteria  | N (%)   | Criteria  | N (%)                                     | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                             |   |
|   |                       |  |   |   |   |   | P=NA                                      |   |                             |   |
| Uvin et al. (2010) <sup>190</sup><br>Belgium  | RALP: 13<br>ORP: 9    | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | NA  | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA     | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA                     | 2 surgeons for RALP and ORP | 1-2: experienced in ORP, initial experience with RALP                                       |
| Williams et al. (2010) <sup>134</sup><br>USA  | RALP: 604<br>ORP: 346 | RALP: transperitoneal<br>ORP: extraperitoneal  | RALP: retrograde approach<br>ORP: Walsh technique                         | Potent patients<br>Gleason grade<4<br>cT1 tumors  | RALP: 578 (96)<br>ORP: 330 (95)<br>P=0.82   | NR  | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                                       | RALP: 1<br>ORP: 1           | 1 <sub>RALP</sub> : experienced in RALP<br>1 <sub>ORP</sub> : experienced in ORP            |
| Coronato et al. (2009) <sup>191</sup><br>USA  | RALP: 98<br>ORP: 98   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR                                       | RALP: 2<br>ORP: 2           | NR  |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71<br>ORP: 83   | RALP: transperitoneal<br>ORP: NR   | RALP: Montsouris technique with a 3-arm system via 6 ports<br>ORP: NR     | NR  | RALP: NR<br>ORP: NR   | Gleason score ≥8 or<br>PSA >10ng/ml or<br>Suspicious lymph nodes detected on abdominal CT | RALP: 37 (52.1)<br>ORP: 25 (30.1)<br>P=NR | RALP: NR<br>ORP: NR                                       | RALP: 1<br>ORP: 3           | 1 <sub>RALP</sub> : initial experience with RALP<br>1-3 <sub>ORP</sub> : >250 LRP, >400 ORP |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | RALP: extraperitoneal‡<br>ORP: Extraperitoneal<br>‡Data extracted from Fracalanza et | RALP: Vattikuti Institute technique 3-arm system‡<br>ORP: Walsh technique | ≤cT2a tumors,<br>Gleason score≤7 and<br>IIEF-5>26 | RALP: NR<br>- Unilateral: NR<br>- Bilateral: 64 (62.1)<br>ORP: NR<br>- Unilateral: NR<br>- Bilateral: 41 (39.0) | RALP: intermediate or high risk of lymph node involvement according to Partin tables      | RALP: NR<br>ORP: 105 (100.0)<br>P=NR      | RALP: NR<br>ORP: NR                                       | RALP: 2<br>ORP: 4           | 1-2 <sub>RALP</sub> : >50 RALPs<br>1-4 <sub>ORP</sub> : >400ORPs                            |



Table 12. Characteristics of surgical/ treatment procedure

| Study                                    | Sample size           | Approach                                      | Characteristic of surgical technique/ Treatment  | Nerve-sparing                  |   | Lymph node dissection   |  |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study |
|--|-----------------------|---|--|--------------------------------|---|-------------------------|--|---|---------------------------------|--|
|  |                       |   |  | Criteria                       | N (%)   | Criteria                | N (%)  | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
|  |                       | al. (2008) <sup>208</sup>                     | ‡Data extracted from Fracalanza et al. (2008) <sup>208</sup>   |                                | P=NR  | ORP: all patients       |  |   |                                 |  |
| Laurila et al. (2009) <sup>192</sup> USA | RALP: 94<br>ORP: 98   | RALP: transperitoneal<br>ORP: NR              | RALP: Vattikuti Institute technique with a 4-arm system<br><br>ORP: modified Walsh technique                                 | NR                             | RALP: NR<br><br>ORP: NR   | NR                      | RALP: 6 (6.4)<br><br>ORP: 80 (81.6)<br><br>P=NR      | RALP: NR<br><br>ORP: NR                                   | Single surgeon for RALP and ORP | 1: >20 RALPs, >600 ORPs                                      |
| Ou et al. (2009) <sup>193</sup> Taiwan   | RALP: 30<br>ORP: 30   | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: The Ohio State University technique with a 4-arm system (first 6 cases) and a 3-arm system<br><br>ORP: Walsh technique | At surgeon's discretion        | RALP: 16 (53.3)<br>- Unilateral: 5 (16.7)<br>- Bilateral: 11 (36.7)<br><br>ORP: 2 (6.7)<br>- Unilateral: 1 (3.3)<br>- Bilateral: 1 (3.3)<br><br>P<0.001 | At surgeon's discretion | RALP: 22 (73.3)<br><br>ORP: 30 (100.0)<br><br>P<0.01 | RALP: NR<br><br>ORP: NR                                   | Single surgeon for RALP and ORP | 1: initial experience with RALP                              |
| Rocco et al. (2009) <sup>136</sup> Italy | RALP: 120<br>ORP: 240 | RALP: transperitoneal<br>ORP: extraperitoneal | RALP: The Ohio State University technique<br><br>ORP: Walsh technique  | NR                             | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR                              | RALP: NR<br><br>ORP: NR                                   | 3 surgeons for RALP and ORP     | 1-3: initial experience with RALP                            |
| White et al. (2009) <sup>194</sup> USA   | RALP: 50<br>ORP: 50   | RALP: transperitoneal<br>ORP: NR              | RALP: Vattikuti Institute technique<br><br>ORP: technique as described by Smith (2004)                                       | when oncologically appropriate | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR                              | RALP: NR<br><br>ORP: NR                                   | Single surgeon for RALP and ORP | 1: initial experience with RALP, >1200ORPs                   |

Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size               | Approach  | Characteristic of surgical technique/ Treatment                        | Nerve-sparing |   | Lymph node dissection   |   |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study                             |
|--|---------------------------|---|--|---------------|---|-------------------------|---|---|------------------------|--|
|  |                           |   |  | Criteria      | N (%)   | Criteria                | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |  |
| Chan et al. (2008) <sup>195</sup><br>USA     | RALP: 660<br><br>ORP: 340 | RALP: NR<br><br>ORP: NR                           | RALP: five-port technique<br><br>ORP: infra-umbilical midline incision | NR            | RALP:550 (83.3)<br>- Unilateral (n=660): 28 (4.2)<br>- LP (n=81): 2 (2.5)<br>- SP (n=579): 26 (4.5)<br>- Bilateral (n=660): 522 (79.1)<br>- LP (n=81): 51 (63.0)<br>- SP (n=579): 471 (81.3)<br><br>ORP:213 (62.6)<br>- Unilateral (n=340): 30 (8.8)<br>- LP (n=27): 0<br>- SP (n=313): 30 (9.6)<br>- Bilateral (n=340): 183 (53.8)<br>- LP (n=27): 14 (51.9)<br>- SP (n=313): 169 (54.0)<br><br>P=NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                               | RALP: NR<br><br>ORP: NR                                   | RALP: 2<br><br>ORP: 3  | 1-2 <sub>RALP</sub> : experienced in RALP<br><br>1-3 <sub>ORP</sub> : experienced in ORP |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br><br>ORP: 588 | RALP: transperitoneal<br><br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br><br>ORP: Walsh technique        | NR            | RALP: 241 (82.0)<br>- Unilateral: 20 (6.8)<br>- Bilateral: 221 (75.2)<br><br>ORP: 535 (91.0)<br>- Unilateral: 26 (4.4)  | All patients            | RALP: 294 (100.0)<br><br>ORP: 588 (100.0)<br><br>P=NA | RALP: NR<br><br>ORP: NR                                   | RALP: 3<br><br>ORP: 17 | 1-3 <sub>RALP</sub> : initial experience<br><br>1-17 <sub>ORP</sub> : initial experience |



Table 12. Characteristics of surgical/ treatment procedure

| Study                                     | Sample size           | Approach   | Characteristic of surgical technique/ Treatment   | Nerve-sparing                                      |  | Lymph node dissection |   |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study                                |
|---|-----------------------|--|---|--|--|-----------------------|---|---|------------------------|---|
|   |                       |  |   | Criteria   | N (%)  | Criteria              | N (%)   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |   |
|   |                       |  |   |  | - Bilateral: 509 (86.6)<br>P=0.02  |                       |   |   |                        |   |
| Schroeck et al. (2008) <sup>197</sup> USA | RALP: 362<br>ORP: 435 | RALP: transperitoneal<br>ORP: NR                         | RALP: Vattikuti Institute technique with a 3-arm system<br>ORP: NR  | NR   | RALP: NR<br>ORP: NR  | NR                    | RALP: 271 (74.9)<br>ORP: 313 (72.0)<br>P=0.36 | RALP: NR<br>ORP: NR                                       | RALP: 4<br>ORP: 6      | NR  |
| Miller et al. (2007) <sup>137</sup> USA   | RALP: 42<br>ORP: 120  | RALP: transperitoneal<br>ORP: NR                         | RALP: Vattikuti Institute technique with a 4-arm system<br>ORP: via a 10-12 cm infra-umbilical midline incision | Potent patients and when oncologically appropriate | RALP: NR<br>ORP: NR  | NR                    | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR    | NR  |
| Nelson et al. (2007) <sup>138</sup> USA   | RALP: 629<br>ORP: 374 | RALP: intraperitoneal (majority)<br>ORP: extraperitoneal | RALP: NR<br>ORP: NR   | NR   | RALP: NR<br>ORP: NR  | NR                    | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR    | NR  |
| Ball et al. (2006) <sup>116</sup> USA     | RALP: 82<br>ORP: 135  | RALP: transperitoneal<br>ORP: extraperitoneal            | RALP: Vattikuti Institute technique<br>ORP: Walsh technique   | NR   | RALP (n=81): 52 (63.4)<br>- Unilateral: 9 (11.0)<br>- Bilateral: 54 (65.9)<br>ORP: 57 (42.2)<br>- Unilateral: 30 | NR                    | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR                                       | RALP: 2<br>ORP: 3      | <sup>1</sup> RALP/ORP: completed RALP and ORP fellowship training<br><br><sup>2</sup> RALP: |



Table 12. Characteristics of surgical/ treatment procedure

| Study  | Sample size               | Approach  | Characteristic of surgical technique/ Treatment  | Nerve-sparing |  | Lymph node dissection |                         |   | Surgeons/ Urologists n          | Surgeons' / urologists' experience at the start of the study                                     |
|--|---------------------------|---|--|---------------|--|-----------------------|-------------------------|---|---------------------------------|--|
|  |                           |   |  | Criteria      | N (%)  | Criteria              | N (%)                   | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                                 |  |
|  |                           |   |  |               | (22.2)<br>- Bilateral: 65 (48.1)<br><br>P=NR |                       |                         |   |                                 | completed RALP fellowship training<br><br>2-3 <sub>ORP</sub> : completed ORP fellowship training |
| Ahlering et al. (2004) <sup>198</sup><br>USA | RALP: 60<br><br>ORP: 60   | RALP: NR<br><br>ORP: NR                           | RALP: modified Vattikuti Institute technique<br><br>ORP: NR  | NR            | RALP: NR<br><br>ORP: NR                      | NR                    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                   | Single surgeon for RALP and ORP | 1: 45 RALPs, experienced in ORP  |
| Tewari et al. (2003) <sup>139</sup><br>USA   | RALP: 200<br><br>ORP: 100 | RALP: transperitoneal<br><br>ORP: extraperitoneal | RALP: Vattikuti Institute technique<br><br>ORP: Walsh technique  | NR            | RALP: NR<br><br>ORP: NR                      | NR                    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                   | RALP: 1<br><br>ORP: 8           | 1 <sub>RALP</sub> : 16 RALPs<br><br>1-8 <sub>ORP</sub> : >100 ORPs                               |
| Menon et al. (2002) <sup>140</sup><br>USA    | RALP: 30<br><br>ORP: 30   | RALP: transperitoneal<br><br>ORP: extraperitoneal | RALP: Montsouris technique (early cases) and Vattikuti Institute technique<br><br>ORP: Walsh technique | NR            | RALP: NR<br><br>ORP: NR                      | NR                    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                   | RALP: 1<br><br>ORP: 8           | 1 <sub>RALP</sub> : 16 RALPs<br><br>1-8 <sub>ORP</sub> : >100 ORPs                               |
| <b>RALP vs. BT</b>                           |                           |   |  |               |  |                       |                         |   |                                 |  |
| Acar et al                                   | RALP:                     | RALP: NR  | RALP: NR   | NR            | RALP: NR                                     | NR                    | RALP: NR                | RALP: NR  | RALP: NR                        | NR   |

Table 12. Characteristics of surgical/ treatment procedure

| Study                                      | Sample size          | Approach                        | Characteristic of surgical technique/ Treatment  | Nerve-sparing |  | Lymph node dissection |                    |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study  |
|--|----------------------|---------------------------------|--|---------------|--|-----------------------|--------------------|---|------------------------|---|
|  |                      |                                 |  | Criteria      | N (%)  | Criteria              | N (%)              | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |   |
| (2014) <sup>201</sup><br>The Netherlands   | 65<br>BT: 29         | BT: NA                          | BT: NR   |               | BT: NA   |                       | BT: NA             | BT: NA  | BT: NR                 |   |
| Baena et al (2013) <sup>141</sup><br>Spain | RALP: 153<br>BT: 160 | RALP: NR<br>BT: NA              | RALP: NR<br>BT: rapid-strand brachytherapy with a dose of 145 Gy   | NR            | RALP: NR<br>BT: NA   | NR                    | RALP: NR<br>BT: NA | RALP: NR<br>BT: NA  | RALP: NR<br>BT: NR     | NR  |
| Ball et al (2006) <sup>116</sup><br>USA    | RALP: 82<br>BT: 118  | RALP: transperitoneal<br>BT: NA | RALP: Vattikuti Institute technique<br>BT: peripheral loading technique with a dose of 125 Gy                                | NR            | RALP (n=81): 52 (63.4)<br>- Unilateral: 9 (11.0)<br>- Bilateral: 54 (65.9)<br>BT: NA<br>P=NA | NR                    | RALP: NR<br>BT: NA | RALP: NR<br>BT: NA  | RALP: 2<br>BT: 1       | 1: completed RALP, LRP and ORP fellowship training<br>2: completed RALP and LRP fellowship training<br>BT: NR |
| <b>RALP vs. Radiotherapy</b>               |                      |                                 |  |               |  |                       |                    |   |                        |   |
| Hung et al (2015) <sup>199</sup><br>Taiwan | RALP: 43<br>RT: 96   | RALP: NR<br>RT: NA              | RALP: technique as described by Patel with a 4-arm system<br>RT: intensity modulated radiotherapy with daily doses > 180 cGy | NR            | RALP: NR<br>RT: NA   | NR                    | RALP: NR<br>RT: NA | RALP: NR<br>RT: NA  | RALP: NR<br>RT: NR     | NR  |
| <b>RALP vs. Cryoablation</b>               |                      |                                 |  |               |  |                       |                    |   |                        |   |
| Ball et al                                 | RALP:                | RALP:                           | RALP: Vattikuti  | NR            | RALP (n=81): 52  | NR                    | RALP: NR           | RALP: NR  | RALP: 2                | 1: completed  |

Table 12. Characteristics of surgical/ treatment procedure

| Study   | Sample size        | Approach                   | Characteristic of surgical technique/ Treatment                                 | Nerve-sparing |   | Lymph node dissection |                    |   | Surgeons/ Urologists n | Surgeons' / urologists' experience at the start of the study  |
|---|--------------------|----------------------------|---|---------------|---|-----------------------|--------------------|---|------------------------|---|
|   |                    |                            |   | Criteria      | N (%)   | Criteria              | N (%)              | Lymph nodes removed Median (Range) Median [IQR] Mean ± SD |                        |   |
| (2006) <sup>116</sup><br>USA                        | 82<br>CRY: 39      | transperitoneal<br>CRY: NA | Institute technique<br><br>CRY: transperineal technique with Cryocare CS system |               | (63.4)<br>- Unilateral: 9 (11.0)<br>- Bilateral: 54 (65.9)<br><br>CRY: NA<br><br>P=NR |                       | CRY: NA            | CRY: NA   | CRY: 1                 | RALP, LRP and ORP fellowship training<br><br>2: completed RALP and LRP fellowship training<br><br>CRY: NR |
| <b>RALP vs. Active Surveillance</b>                 |                    |                            |   |               |   |                       |                    |   |                        |   |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50 | RALP: NR<br>AS: NA         | RALP: NR<br>AS: NA  | NR            | RALP: NR<br>AS: NA  | NR                    | RALP: NR<br>AS: NA | RALP: NR<br>AS: NA  | RALP: NR<br>AS: NA     | NR  |

AS= Active Surveillance; BT= Brachytherapy; CRY= Cryoablation; CT= Computerized Tomography; IIEF-5= the International Index of Erectile Function Questionnaire; LP = Large Prostate; LRP= Laparoscopic Radical Prostatectomy; NA= Not Applicable; NR= Not Reported; ORP= Open Radical Prostatectomy; PDE5= Phosphodiesterase-5; PSA= Prostate-specific Antigen; RALP= Robot-assisted Radical Prostatectomy; RT= Radiotherapy; SD= Standard Deviation; SP = Small Prostate  
Percentages in [%] refer to the reported data and are based on incomplete sample size described in (n=).

\* P value between comparators with incomplete sample size

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Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size           | Urinary function/ Continence |   |  | Sexual function/ Potency   |   |  | HRQOL               |                     |                         |
|--|-----------------------|------------------------------|---|--|--|---|--|---------------------|---------------------|-------------------------|
|  |                       | Definition/ Measures         | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)       | Results n (%) Mean ± SD |
| <b>RALP vs. LRP</b>                                  |                       |                              |   |  |  |   |  |                     |                     |                         |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br>LRP: 308  | NR                           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br>LRP: 100 | Continence: 0 pads           | RALP: 12 months (n=96)<br>LRP: 12 months (n=87)   | RALP: 89 (92.7)<br>LRP: 71 (81.6)<br>P <sub>12months</sub> =0.03   | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in preoperatively potent patients and only in those having BNS | RALP: preop. potent/ BNS 12 months (n=82/n=42)<br>LRP: preop. potent/ BNS 12 months (n=59/n=27) | RALP: preop. potent/ BNS 38 (46.3) / 31 (73.8)<br>LRP: preop. potent/ BNS 17 (28.8) / 15 (55.6)<br>P <sub>12months</sub> =0.04/ 0.12 | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand  | RALP: 486<br>LRP: 561 | Continence: 0-1 pad          | RALP: 6 months (n=484)<br>12 months (n=484)<br>LRP: 6 months (n=537)<br>12 months (n=537) | RALP: 328 (67.8)<br>387 (80.0)<br>LRP: 209 (38.9)<br>342 (63.7)<br>P <sub>6months</sub> <0.001<br>P <sub>12months(unadj)</sub> <0.001<br>P <sub>12months(adj)</sub> <0.001 | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |
| Busch et al (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>LRP:     | NR                           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size             | Urinary function/ Continence |   |   | Sexual function/ Potency  |   |   | HRQOL               |                     |                         |
|--|-------------------------|------------------------------|---|---|---|---|---|---------------------|---------------------|-------------------------|
|  |                         | Definition/ Measures         | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)       | Results n (%) Mean ± SD |
|  | 194                     |                              |   |   |   |   |   |                     |                     |                         |
| Ploussard et al (2014) <sup>111</sup><br>France  | RALP: 1009<br>LRP: 1377 | Continence: 0 pads           | RALP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR)<br>LRP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR) | RALP: NR (22.9)<br>NR (50.3)<br>NR (72.0)<br>NR (75.4)<br>NR (83.6)<br>LRP: NR (13.7)<br>NR (39.4)<br>NR (58.9)<br>NR (68.5)<br>NR (78.8)<br>$P_{1\text{month}}=0.19$<br>$P_{3\text{months}}=0.02$<br>$P_{6\text{months}}=0.02$<br>$P_{12\text{months(unadj)}}=0.18$<br>$P_{12\text{months(adj)}}=0.25$<br>$P_{24\text{months}}=0.02$ | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in those having BNS | RALP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR)<br>LRP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR) | RALP: NR (20.3)<br>NR (35.1)<br>NR (42.1)<br>NR (57.7)<br>NR (69.0)<br>LRP: NR (6.7)<br>NR (16.3)<br>NR (20.4)<br>NR (31.6)<br>NR (55.0)<br>$P_{1\text{month}}<0.001$<br>$P_{3\text{months}}=0.001$<br>$P_{6\text{months}}<0.001$<br>$P_{12\text{months(unadj)}}<0.001$<br>$P_{12\text{months(adj)}}=0.04$<br>$P_{24\text{months}}<0.001$ | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | NR                           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | NR  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |
| Tozawa et al (2014) <sup>147</sup><br>Japan  | RALP: 157<br>LRP:       | NR                           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | NR  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | NR                  | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR     |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size           | Urinary function/ Continence                         |   |  | Sexual function/ Potency   |  |  | HRQOL                        |   |  |
|--|-----------------------|--|---|--|--|--|--|------------------------------|---|--|
|  |                       | Definition/ Measures                                 | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure          | Follow up (n)   | Results n (%) Mean ± SD  |
|  | 551                   |  |   |  |  |  |  |                              |   |  |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy | RALP: 136<br>LRP: 91  | Continence: no leakage or 0 pads                     | RALP: 18 [14-24] months (n=136)<br>LRP: 21 [15-32] months (n=91)<br>Median [25°-75° Percentile]   | RALP: 123 (90.4)<br>LRP: 74 (81.3)<br>P=0.05   | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in those having BNS  | RALP: 18 [14-24] months (n=136)<br>LRP: 21 [15-32] months (n=91)<br>Median [25°-75° Percentile]  | RALP: 90 (66.2)<br>LRP: 36 (39.6)<br>P<0.001   | NR                           | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  |
| Berge et al (2013) <sup>113</sup><br>Norway        | RALP: 210<br>LRP: 210 | Continence: 0 pads<br><br>Urinary function: UCLA-PCI | RALP: 3 months (n=198)<br>12 months (n=183)<br>36 months (n=159)<br>LRP: 3 months (n=197)<br>12 months (n=197)<br>36 months (b=183)<br><br>RALP: 62.1±26.2<br>77.4±22.4<br>77.0±23.2<br>LRP: 60.2±27.2<br>78.5±23.4 | RALP: 81 (40.9)<br>135 (73.8)<br>123 (77.4)<br>LRP: 71 (36.0)<br>151 (76.6)<br>156 (85.2)<br>P <sub>3months</sub> = 0.30<br>P <sub>12months</sub> =0.70<br>P <sub>36months</sub> =0.06<br>P <sub>overall</sub> =0.50<br><br>RALP: 62.1±26.2<br>77.4±22.4<br>77.0±23.2<br>LRP: 60.2±27.2<br>78.5±23.4 | Potency: had sexual intercourse during the last 4 weeks - measured in those having BNS<br><br>Sexual function: UCLA-PCI questionnaire - measured in those having | RALP: 3 months (n=62)<br>12 months (n=58)<br>36 months (n=49)<br>LRP: 3 months (n=83)<br>12 months (n=81)<br>36 months (n=74)<br><br>RALP: 3 months (n=62)<br>12 months (n=58) | RALP: 16 (25.8)<br>24 (41.4)<br>24 (48.9)<br>LRP: 16 (19.3)<br>38 (46.9)<br>35 (47.3)<br>P <sub>3months</sub> = 0.50<br>P <sub>12months</sub> =0.10<br>P <sub>36months</sub> =0.80<br>P <sub>overall</sub> =0.06<br><br>RALP: 27.7 ± 21.6<br>38.5 ± 25.1<br>46.6±28.6<br>LRP: 24.8± 19.9<br>35.2± 23.2 | PCS: SF-12<br><br>MCS: SF-12 | RALP: 3 months (n=NR)<br>12 months (n=NR)<br>36 months (n=NR)<br>LRP: 3 months (n=NR)<br>12 months (n=NR)<br>36 months (n=NR) | RALP: NR<br>NR<br>NR<br>LRP: NR<br>NR<br>NR<br>P <sub>3months</sub> ≥0.05<br>P <sub>12months</sub> ≥0.05<br>P <sub>36months</sub> ≥0.05<br>RALP: NR<br>NR<br>NR<br>LRP: NR<br>NR<br>NR |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continenence |   |   | Sexual function/ Potency                               |   |   | HRQOL               |   |  |
|--|---------------------------|--------------------------------|---|---|--|---|---|---------------------|---|--|
|  |                           | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure                                    | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)   | Results n (%) Mean ± SD  |
|  |                           |                                | (n=198)<br>12 months (n=183)<br>36 months (n=159)<br><br>LRP:<br>3 months (n=197)<br>12 months (n=197)<br>36 months (n=183) | 80.4±22.7<br><br>P <sub>3months</sub> = 0.90<br>P <sub>12months</sub> =0.20<br>P <sub>36months</sub> =0.06<br>P <sub>overall</sub> =0.90                    | BNS  | 36 months (n=49)<br><br>LRP:<br>3 months (n=83)<br>12 months (n=81)<br>36 months (n=74)   | 43.2±25.8<br><br>P <sub>3months</sub> = 0.30<br>P <sub>12months</sub> =0.40<br>P <sub>36months</sub> =0.50<br>P <sub>overall</sub> =0.90                    |                     | 12 months (n=NR)<br>36 months (n=NR)<br><br>LRP:<br>3 months (n=NR)<br>12 months (n=NR)<br>36 months (n=NR) | P <sub>3months</sub> ≥0.05<br>P <sub>12months</sub> ≥0.05<br>P <sub>36months</sub> ≥0.05 |
| Harty et al (2013) <sup>200</sup><br>USA       | RALP: 152<br><br>LRP: 140 | NR                             | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR                  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  |
| Pierorazio et al (2013) <sup>149</sup><br>USA  | RALP: 105<br><br>LRP: 65  | NR                             | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR                  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  |
| Porpiglia et al (2013) <sup>109</sup><br>Italy | RALP: 60<br><br>LRP: 60   | Continenence: 0-1 pad          | RALP:<br>1 month (n=60)<br>3 months (n=60)<br>6 months (n=60)<br>12 months (n=60)<br><br>LRP:<br>1 month (n=60)             | RALP:<br>33 (55.0)<br>48 (80.0)<br>53 (88.3)<br>57 (95.0)<br><br>LRP:<br>20 (33.3)<br>37 (61.6)<br>44 (73.3)<br>50 (83.3)<br><br>P <sub>1month</sub> = 0.02 | Potency: IIEF-5 score>17 - measured in those having NS | RALP:<br>1 month (n=35)<br>3 months (n=35)<br>6 months (n=35)<br>12 months (n=35)<br><br>LRP:<br>1 month (n=35)<br>3 months (n=35)<br>6 months (n=35)<br>12 months (n=35) | RALP:<br>15 (42.8)<br>21 (60.0)<br>23 (65.7)<br>28 (80.0)<br><br>LRP:<br>10 (28.5)<br>14 (40.0)<br>17 (48.5)<br>19 (54.2)<br><br>P <sub>1month</sub> = 0.21 | NR                  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continenence     |   |   | Sexual function/ Potency   |  |  | HRQOL               |                         |                         |
|--|---------------------------|------------------------------------|---|---|--|--|--|---------------------|-------------------------|-------------------------|
|  |                           | Definition/ Measures               | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD |
|  |                           |                                    | 3 months (n=60)<br>6 months (n=60)<br>12 months (n=60)  | P <sub>3months</sub> = 0.03<br>P <sub>6months</sub> =0.04<br>P <sub>12months</sub> =0.04  |  |  | P <sub>3months</sub> = 0.09<br>P <sub>6months</sub> =0.14<br>P <sub>12months</sub> =0.02   |                     |                         |                         |
| Koutlidis et al (2012) <sup>114</sup><br>France    | RALP: 175<br><br>LRP: 104 | NR                                 | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR  | NR                  | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |
| Park et al (2012) <sup>150</sup><br>South Korea    | RALP: 183<br><br>LRP: 144 | Continenence: 0 pads               | RALP:<br>3 months (n=183)<br>6 months (n=183)<br>12 months (n=183)<br><br>LRP:<br>3 months (n=144)<br>6 months (n=144)<br>12 months (n=144) | RALP:<br>140 (76.4)<br>153 (83.5)<br>160 (87.4)<br><br>LRP:<br>66 (45.6)<br>94 (65.5)<br>112 (78.1)<br><br>P <sub>3months(unadj)</sub> <0.001<br>P <sub>3months(adj)</sub> <0.001<br>P <sub>6months(unadj)</sub> =0.001<br>P <sub>6months(adj)</sub> =0.01<br>P <sub>12months</sub> =0.09 | Potency:<br>ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured those having NS | RALP:<br>3 months (n=156)<br>6 months (n=156)<br>12 months (n=156)<br><br>LRP:<br>3 months (n =83)<br>6 months (n=83)<br>12 months (n =83) | RALP:<br>11 (7.3)<br>49(31.1)<br>57 (36.5)<br><br>LRP:<br>5 (6.5)<br>26 (30.8)<br>27 (32.7)<br><br>P <sub>3months</sub> =1.00<br>P <sub>6months</sub> =1.00<br>P <sub>12months</sub> =0.72 | NR                  | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |
| Asimakopoulos et al (2011) <sup>110</sup><br>Italy | RALP: 52<br><br>LRP: 60   | Continenence: no leakage or 0 pads | RALP:<br>1 month (n=52)<br>3 months (n=52)<br>6 months (n=52)<br>12 months (n=52)   | RALP:<br>23 (44.2)<br>36 (69.2)<br>46 (88.5)<br>49 (94.2)<br><br>LRP:<br>18 (30.0)<br>38 (63.3)   | Potency:<br>ability to achieve erections satisfactory for intercourse with or without PDE-5                            | RALP:<br>1 month (n=52)<br>3 months (n=52)<br>6 months (n=52)<br>12 months (n=52)<br><br>LRP:<br>1 month (n=60)                            | RALP:<br>18 (34.6)<br>33 (63.5)<br>39 (75.0)<br>40 (76.9)<br><br>LRP:<br>1 (1.7)<br>8 (13.3)   | NR                  | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |







Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |   |  | Sexual function/ Potency |               |                         | HRQOL   |   |   |
|-------|-------------|--------------------------------|---|--|--------------------------|---------------|-------------------------|---|---|---|
|       |             | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure                                   | Follow up (n)   | Results n (%) Mean ± SD   |
|       |             |                                | (n=120)   | 72.3±17.6<br>82.7±16.1<br>85.9±15.4  |                          |               |                         | - measured in those having BNS                        | 12 months (n=120)   | LRP:<br>31.6±23.8<br>38.6±24.3<br>50.4±23.5   |
|       |             |                                | RALP:<br>3 months (n=105)<br>6 months (n=77)<br>12 months (n=44)  | P <sub>3months</sub> = 0.75<br>P <sub>6months</sub> =0.17<br>P <sub>12months</sub> =0.44<br>P <sub>overall</sub> =0.05 |                          |               |                         |   |   | P <sub>3months</sub> <0.001<br>P <sub>6months</sub> <0.001<br>P <sub>12months</sub> =0.33<br>P <sub>overall</sub> =0.01   |
|       |             |                                | LRP:<br>3 months (n=142)<br>6 months (n=122)<br>12 months (n=120) |  |                          |               |                         | Sexual bother: EPIC<br>- measured in those having BNS | LRP:<br>3 months (n=66)<br>6 months (n=58)<br>12 months (n=57)  | LRP:<br>36.3±28.1<br>42.4±29.3<br>56.1±28.7<br>P <sub>3months</sub> = 0.02<br>P <sub>6months</sub> =0.01<br>P <sub>12months</sub> =0.59<br>P <sub>overall</sub> =0.01 |
|       |             |                                |   |  |                          |               |                         |   | RALP:<br>3 months (n=44)<br>6 months (n=41)<br>12 months (n=23) | LRP:<br>50.8±29.0<br>61.3±25.8<br>60.4±25.6   |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continence      |   |  | Sexual function/ Potency   |  |   | HRQOL               |  |                         |
|--|---------------------------|-----------------------------------|---|--|--|--|---|---------------------|--|-------------------------|
|  |                           | Definition/ Measures              | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)  | Results n (%) Mean ± SD |
|  |                           |                                   |   |  |  |  |   |                     | LRP:<br>3months<br>(n=66)<br>6 months<br>(n=58)<br>12 months<br>(n=57) |                         |
| Bolenz et al (2010) <sup>153</sup><br>USA    | RALP: 262<br><br>LRP: 220 | NR                                | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | NR                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR |
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br><br>LRP: 85   | NR                                | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | NR                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR |
| Hakimi et al (2009) <sup>155</sup><br>USA    | RALP: 75<br><br>LRP: 75   | Continence: no leakage and 0 pads | RALP: 3 months (n=75)<br>6 months (n=75)<br>12 months (n=75)<br><br>LRP: 3 months (n=75)<br>6 months (n=75)<br>12 months (n=75) | RALP: 49 (65.3)<br>56 (74.7)<br>70 (93.3)<br><br>LRP: 41 (54.7)<br>49 (65.3)<br>67 (89.3)<br><br>$P_{3months}=0.24$<br>$P_{6months}=0.28$<br>$P_{12months}=0.56$ | Potency: IIEF-5 score $\geq 3$ - measured in preoperatively potent, sexually active patients having NS | RALP: BNS/ UNS 3 months (n=51/n=7)<br>6 months (n=51/n=7)<br>12 months (n=51/n=7)<br><br>LRP: BNS/ UNS 3 months (n=45/n=10)<br>6 months (n=45/n=10)<br>12 months (n=45/n=10) | RALP: BNS/ UNS 16 (31.4)/ 1 (14.3)<br>34 (66.7)/ 3 (42.9)<br>39 (76.5)/ 4 (57.1)<br><br>LRP: BNS/ UNS 9 (20.0)/ 1 (10.0)<br>22 (48.9)/ 4 (40.0)<br>32 (71.1)/ 4 (40.0)<br><br>$P_{3months}=0.24/1.00$<br>$P_{6months}=0.09/ 1.00$<br>$P_{12months}=0.64/1.00$ | NR                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR |
| Rozet et al (2009) <sup>156</sup><br>France  | RALP: 133                 | NR                                | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR  | NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR   | NR                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR |





Table 13. Description and findings for functional and quality of life outcomes

| Study                                    | Sample size | Urinary function/ Continence  |                      |                           | Sexual function/ Potency   |                      |                           | HRQOL   |                      |                           |
|--|-------------|---|----------------------|---------------------------|--|----------------------|---------------------------|---|----------------------|---------------------------|
|  |             | Definition/ Measures  | Follow up (n)        | Results n (%) Mean ± SD   | Definition/ Measure  | Follow up (n)        | Results n (%) Mean ± SD   | Definition/ Measure   | Follow up (n)        | Results n (%) Mean ± SD   |
|  | LRP: 133    |   |                      |                           |  |                      |                           |   |                      |                           |
| Trabulsi et al (2008) <sup>157</sup> USA | RALP: 50    | NR  | RALP: NR             | RALP: NR                  | NR   | RALP: NR             | RALP: NR                  | NR  | RALP: NR             | RALP: NR                  |
|  | LRP: 190    |   | LRP: NR              | LRP: NR                   |  | LRP: NR              | LRP: NR                   |   | LRP: NR              |                           |
| Ball et al (2006) <sup>116</sup> USA     | RALP: 82    | Urinary function: UCLA-PCI<br>- in those with preoperatively scores ≥30 | RALP: 1 month (n=NR) | RALP: % baseline 33±25    | Sexual function: UCLA-PCI<br>- in those with preoperatively scores ≥30 | RALP: 1 month (n=NR) | RALP: % baseline 19±19    | Urinary bother: UCLA-PCI<br>- in those with preoperatively scores ≥30 | RALP: 1 month (n=NR) | RALP: % baseline 39±39    |
|  | LRP: 124    |   | 3 months (n=NR)      | 58±28                     |  | 3 months (n=NR)      | 35±31                     |   | 3 months (n=NR)      | 65±34                     |
|  |             |   | 6 months (n=NR)      | 69±31                     |  | 6 months (n=NR)      | 43±43                     |   | 6 months (n=NR)      | 78±45                     |
|  |             |   | LRP: 1 month (n=NR)  | LRP: % baseline 25±22     |  | LRP: 1 month (n=NR)  | LRP: % baseline 14±17     |   | LRP: 1 month (n=NR)  | LRP: % baseline 24±29     |
|  |             |   | 3 months (n=NR)      | 53±38                     |  | 3 months (n=NR)      | 21±21                     |   | 3 months (n=NR)      | 62±43                     |
|  |             |   | 6 months (n=NR)      | 69±40                     |  | 6 months (n=NR)      | 25±21                     |   | 6 months (n=NR)      | 75±40                     |
|  |             |   | LRP: 1 month (n=NR)  | P <sub>1month</sub> = NR  |  |                      | P <sub>1month</sub> = NR  |   | LRP: 1 month (n=NR)  | P <sub>1month</sub> = NR  |
|  |             |   | 3 months (n=NR)      | P <sub>3months</sub> = NR |  |                      | P <sub>3months</sub> = NR |   | 3 months (n=NR)      | P <sub>3months</sub> = NR |
|  |             |   | 6 months (n=NR)      | P <sub>6months</sub> = NR |  |                      | P <sub>6months</sub> = NR |   | 6 months (n=NR)      | P <sub>6months</sub> = NR |
|  |             | Urinary function: AUA SI<br>- in those with preoperatively scores ≥30   |                      | RALP: % baseline 86±41    |  |                      |                           |   |                      | RALP: % baseline 40±56    |
|  |             |   |                      | 106±39                    |  |                      |                           |   |                      | 43±50                     |
|  |             |   |                      | 123±52                    |  |                      |                           |   |                      | 32±41                     |
|  |             |   |                      | LRP: % baseline 76±30     |  |                      |                           |   |                      |                           |
|  |             |   | RALP: 1 month (n=NR) | 101±37                    |  |                      |                           |   |                      | LRP: % baseline 40±56     |
|  |             |   | 3 months (n=NR)      | 106±34                    |  |                      |                           |   | 3 months (n=NR)      | 40±48                     |
|  |             |   | 6 months (n=NR)      | P <sub>1month</sub> = NR  |  |                      |                           |   | 6 months (n=NR)      | 38±45                     |
|  |             |   | LRP: 1 month         | P <sub>3months</sub> = NR |  |                      |                           |   | LRP: 1 month         | P <sub>1month</sub> = NR  |
|  |             |   |                      | P <sub>6months</sub> = NR |  |                      |                           |   |                      | P <sub>3months</sub> = NR |
|  |             |   |                      |                           |  |                      |                           |   |                      | P <sub>6months</sub> = NR |
|  |             |   |                      |                           |  |                      |                           | Bowel   |                      |                           |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |  |                         | Sexual function/ Potency |               |                         | HRQOL   |   |   |
|-------|-------------|--------------------------------|--|-------------------------|--------------------------|---------------|-------------------------|---|---|---|
|       |             | Definition/ Measures           | Follow up (n)  | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   |
|       |             |                                | 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) |                         |                          |               |                         | function:<br>UCLA-PCI<br>- in those with preoperatively scores≥30     | (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)                                      | RALP: %<br>baseline<br>88±25<br>98±28<br>98±24<br><br>LRP: % baseline<br>86±28<br>101±25<br>102±25<br><br>RALP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)   |
|       |             |                                |  |                         |                          |               |                         | Bowel bother:<br>UCLA-PCI<br>- in those with preoperatively scores≥30 | (n=NR)<br>6 months (n=NR)<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) | RALP: %<br>baseline<br>88±35<br>98±34<br>99±30<br><br>LRP: % baseline<br>75±34<br>95±28<br>94±27<br><br>P <sub>1month</sub> = NR<br>P <sub>3months</sub> = NR<br>P <sub>6months</sub> = NR<br><br>RALP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) |



Table 13. Description and findings for functional and quality of life outcomes

| Study                                       | Sample size                 | Urinary function/ Continence                 |   |   | Sexual function/ Potency   |  |   | HRQOL                |   |   |
|---|-----------------------------|--|---|---|--|--|---|----------------------|---|---|
|   |                             | Definition/ Measures                         | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD                                       | Definition/ Measure  | Follow up (n)   | Results n (%) Mean ± SD                     |
|   |                             |  |   |   |  |  |   |                      | LRP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)                              |   |
| Hu et al (2006) <sup>158</sup><br>USA       | RALP: 322<br><br>LRP: 358   | NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | NR   | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR                                       | NR                   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR                     |
| Joseph et al (2005) <sup>159</sup><br>USA   | RALP: 50<br><br>LRP: 50     | Continence: 0 pads                           | RALP: 3 months (n=50)<br><br>LRP: 3 months (n=50)   | RALP: 45 (90.0)<br><br>LRP: 46 (92.0)<br><br>P <sub>3months</sub> ≥0.05 | Sexual function: IIEF-5 questionnaire  | RALP:3months (n=50)<br><br>LRP:3months (n=50)  | RALP: 37±15<br><br>LRP: 34±11<br><br>P <sub>3months</sub> =NR | NR                   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR                     |
| <b>RALP vs. ORP</b>                         |                             |  |   |   |  |  |   |                      |   |   |
| Hu et al (2017) <sup>160</sup><br>USA       | RALP: 4164<br><br>ORP: 4164 | NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                       | NR                   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                     |
| Jackson et al. (2016) <sup>117</sup><br>USA | RALP: 116<br><br>ORP: 63    | Continence: total urinary control or 0-1 pad | Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile]<br>RALP: 121.2 [115.2-126.0] (n=101) | RALP: 96 (95.0)<br><br>ORP: 50 (92.6)<br><br>P=0.72                     | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 | Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile]<br>RALP: 121.2 [115.2-126.0] (n=100)<br><br>ORP: 123.6 [116.4 – 128.4] (n=53) | RALP: 48 (48.0)<br><br>ORP: 22 (41.5)<br><br>P=0.50           | Urinary bother: EPIC | Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile]<br>RALP: 121.2 [115.2-126.0] (n=101) | RALP: 100 [75-100]<br><br>ORP: 100 [75-100] |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size                      | Urinary function/ Continence |   |                         | Sexual function/ Potency |                         |                         | HRQOL   |   |   |
|---|----------------------------------|------------------------------|---|-------------------------|--------------------------|-------------------------|-------------------------|---|---|---|
|   |                                  | Definition/ Measures         | Follow up (n)                           | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n)           | Results n (%) Mean ± SD | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   |
|   |                                  |                              | ORP:<br>123.6 [116.4 – 128.4]<br>(n=54) |                         |                          |                         |                         | Sexual bother:<br>EPIC  | ORP:<br>123.6 [116.4 – 128.4]<br>(n=54)<br><br>Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile]<br>RALP:<br>121.2 [115.2-126.0]<br>(n=100)<br><br>ORP:<br>123.6 [116.4 – 128.4]<br>(n=53) | P=0.39<br><br>RALP:<br>75 [25-100]<br><br>ORP:<br>75 [25-100]<br><br>P=0.99   |
| Ong et al. (2016) <sup>118</sup><br>Australia | RALP:<br>885<br><br>ORP:<br>1117 | NR                           | RALP: NR<br><br>ORP: NR                 | RALP: NR<br><br>ORP: NR | NR                       | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | Urinary bother: EPIC<br><br><br><br><br><br><br><br><br><br>Sexual bother: EPIC | RALP:<br>12 months (n=639)<br>24 months (n=639)<br><br>ORP:<br>12 months (n=731)<br>24 months (n=731)<br><br>RALP:<br>12 months (n=639)<br>24 months (n=639)                                  | RALP:<br>77.6±27.2<br>81.0±25.8<br><br>ORP:<br>74.9±30.0<br>78.0±28.6<br><br>P <sub>12 months, unadjusted</sub> =0.08<br>P <sub>12 months, adjusted</sub> =0.30<br>P <sub>24 months, unadjusted</sub> =0.10<br>P <sub>24 months, adjusted</sub> =0.02<br><br>RALP:<br>RALP: |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size                 | Urinary function/ Continenence |   |   | Sexual function/ Potency |   |  | HRQOL                               |   |  |
|--|-----------------------------|--------------------------------|---|---|--------------------------|---|--|-------------------------------------|---|--|
|  |                             | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure      | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure                 | Follow up (n)   | Results n (%) Mean ± SD  |
|  |                             |                                |   |   |                          |   |  |                                     | 12 months (n=634)<br>24 months (n=633)<br>ORP:<br>12 months (n=731)<br>24 months (n=731)    | 37.0±38.0<br>41.9±38.6<br>ORP:<br>36.9±39.7<br>41.0±40.0<br>P <sub>12 months, unadjusted</sub> =0.96<br>P <sub>12 months, adjusted</sub> =0.70<br>P <sub>24 months, unadjusted</sub> =0.65<br>P <sub>24 months, adjusted</sub> =0.50 |
| Pearce et al. (2016) <sup>161</sup><br>USA       | RALP: 73,131<br>ORP: 23,804 | NR                             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                                  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  |
| Suardi et al. (2016) <sup>162</sup><br>Italy     | RALP: 1790<br>ORP: 4404     | NR                             | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                                  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  |
| Yaxley et al. (2016) <sup>103</sup><br>Australia | RALP: 163<br>ORP: 163       | Urinary symptoms: IPSS         | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR)<br>ORP:<br>6 weeks (n=136) | 9.41 (8.26 – 10.55)<br>6.62 (5.65 – 7.58)<br>NR<br>8.53 (7.55 – 9.50)<br>6.80 (5.88 – 7.72)<br>NR<br>p <sub>6 weeks</sub> =0.25 | Sexual function: EPIC    | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR)<br>ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR) | 32.70 (28.67 – 36.79)<br>38.90 (34.83 – 42.96)<br>NR<br>30.70 (27.18 – 34.21)<br>35.00 (30.94 – 39.06)<br>NR<br>p <sub>6 weeks</sub> =0.45 | HRQOL (SF36) – Physical Functioning | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR)<br>ORP:<br>6 weeks (n=136) | 53.70 (52.70 – 54.70)<br>59.57 (58.51 – 60.63)<br>NR<br>51.96 (50.71 – 53.20)<br>59.39 (58.39 –  |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |                       |                         | Sexual function/ Potency                            |   |                         | HRQOL                             |                       |                         |
|-------|-------------|--------------------------------|-----------------------|-------------------------|---|---|-------------------------|-----------------------------------|-----------------------|-------------------------|
|       |             | Definition/ Measures           | Follow up (n)         | Results n (%) Mean ± SD | Definition/ Measure                                 | Follow up (n)                                       | Results n (%) Mean ± SD | Definition/ Measure               | Follow up (n)         | Results n (%) Mean ± SD |
|       |             | Urinary function: EPIC         | 12 weeks (n=119)      | $p_{12weeks}=0.79$      | Domain specific QOL – IIEF total                    |   | $p_{12weeks}=0.18$      | HRQOL (SF36) – Mental Functioning | 12 weeks (n=119)      | 60.39)                  |
|       |             |                                | 24 months (n=NR)      | 71.10 (68.22 – 73.95)   |   | 25.63 (22.35 – 28.92)                               | 24 months (n=NR)        |                                   | NR                    | NR                      |
|       |             | Pad use – none                 | RALP: 6 weeks (n=131) | 74.50 (72.77 – 77.17)   | Erection firm enough for intercourse – almost never | RALP: 6 weeks (n=131)                               | NR                      | RIES                              | RALP: 6 weeks (n=131) | 47.99 (46.19 – 49.79)   |
|       |             |                                | 12 weeks (n=129)      | 83.80 (81.33 – 86.17)   |   | ORP: 6 weeks (n=136)                                | NR                      |                                   | 12 weeks (n=129)      | NR                      |
|       |             | Pad use – 1/day                | 24 months (n=NR)      | NR                      | Erection firm enough for intercourse – ≤½ the time  | 24 months (n=NR)                                    | $p_{6weeks}=0.38$       | HADS                              | 24 months (n=NR)      | 45.83 (43.72 – 47.94)   |
|       |             |                                | ORP: 6 weeks (n=136)  | $p_{6weeks}=0.09$       |   | Erection firm enough for intercourse – almost never | ORP: 6 weeks (n=136)    |                                   | $p_{12weeks}=0.48$    | ORP: 6 weeks (n=136)    |
|       |             |                                | 12 weeks (n=119)      | 44 (33)                 |   | RALP: 6 weeks (n=131)                               | NR                      |                                   | 12 weeks (n=119)      | NR                      |
|       |             |                                | 24 months (n=NR)      | 79 (60)                 |   | 12 weeks (n=129)                                    | 98 (72)                 |                                   | 24 months (n=NR)      | $p_{6weeks}=0.13$       |
|       |             |                                |                       | NR                      |   | 24 months (n=NR)                                    | 76 (64)                 |                                   |                       | $p_{12weeks}=0.97$      |
|       |             |                                |                       | 42 (31)                 |   | ORP: 6 weeks (n=136)                                | NR                      |                                   |                       | 6.71 (5.19 – 8.23)      |
|       |             |                                |                       | 80 (66)                 |   | 12 weeks (n=119)                                    | 23 (18)                 |                                   | RALP: 6 weeks (n=131) | 4.30 (2.91 – 5.69)      |
|       |             |                                |                       | NR                      |   | 24 months (n=NR)                                    | 21 (16)                 |                                   | 12 weeks (n=129)      | NR                      |
|       |             |                                |                       | 54 (41)                 |   | RALP: 6 weeks (n=131)                               | NR                      |                                   | 24 months (n=NR)      | 8.65 (6.52 – 10.79)     |
|       |             |                                |                       | 39 (30)                 |   | 12 weeks (n=129)                                    | 24 (18)                 |                                   | ORP: 6 weeks (n=131)  | 6.47 (4.65 – 8.29)      |
|       |             |                                |                       | NR                      |   | 24 months (n=NR)                                    | 23 (19)                 |                                   | ORP: 6 weeks (n=131)  | NR                      |
|       |             |                                |                       | 61 (45)                 |   |   | NR                      |                                   |                       |                         |

Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size      | Urinary function/ Continence                                     |  |                         | Sexual function/ Potency                           |   |  | HRQOL               |   |  |   |
|-------|------------------|--|--|-------------------------|--|---|--|---------------------|---|--|---|
|       |                  | Definition/ Measures   | Follow up (n)  | Results n (%) Mean ± SD | Definition/ Measure                                | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)                                   | Results n (%) Mean ± SD  |   |
|       |                  | Pad use – 2/day  | (n=136)<br>12 weeks  | 33 (27)<br>NR           | Erection firm enough for intercourse – >½ the time | ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR) | 19 (15)<br>24 (31)<br>NR   |                     | (n=136)<br>12 weeks (n=119)<br>24 months (n=NR) | $p_{6\text{ weeks}}=0.15$<br>$p_{12\text{ weeks}}=0.06$          |   |
|       | Pad use – ≥3/day |  | (n=119)<br>24 months (n=NR)                                      | 20 (15)<br>9 (7)<br>NR  |  |   | 14 (10)<br>19 (16)<br>NR   |                     | 6.16 (5.10 – 7.22)<br>5.26 (4.16 – 6.36)<br>NR  |  |   |
|       |                  |  | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR) | 25 (19)<br>5 (4)<br>NR  |  |   | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR) |                     | NR  | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR) | 6.85 (5.66 – 8.04)<br>7.03 (5.78 – 8.28)<br>NR          |
|       |                  |  | ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR)  | 15 (11)<br>4 (3)<br>NR  |  |   | ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR)  |                     | 7 (5)<br>3 (2)<br>NR                            | ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR)  | $p_{6\text{ weeks}}=0.39$<br>$p_{12\text{ weeks}}=0.04$ |
|       |                  | RALP:<br>6 weeks (n=131)<br>12 weeks (n=129)<br>24 months (n=NR) | ORP:<br>6 weeks (n=136)<br>12 weeks (n=119)<br>24 months (n=NR)  |                         |  |   |  |                     |   |  |   |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size                | Urinary function/ Continenence                  |   |   | Sexual function/ Potency  |  |   | HRQOL                   |                         |                         |
|---|----------------------------|---|---|---|---|--|---|-------------------------|-------------------------|-------------------------|
|   |                            | Definition/ Measures                            | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure   | Follow up (n)  | Results n (%) Mean ± SD   | Definition/ Measure     | Follow up (n)           | Results n (%) Mean ± SD |
|   |                            |   | (n=NR)<br><br>RALP:<br>6 weeks<br>(n=131)<br>12 weeks<br>(n=129)<br>24 months<br>(n=NR)<br><br>ORP:<br>6 weeks<br>(n=136)<br>12 weeks<br>(n=119)<br>24 months<br>(n=NR) |   |   |  |   |                         |                         |                         |
| Akand et al. (2015) <sup>142</sup><br>Turkey    | RALP: 79<br><br>ORP: 50    | NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | NR  | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Antonelli et al. (2015) <sup>163</sup><br>Italy | RALP: 291<br><br>LRP: 285  | NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | NR  | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR   | NR                      | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Haglund et al (2015) <sup>119</sup><br>Sweden   | RALP: 1847<br><br>ORP: 778 | Continenence: 0 pads<br><br><br>Continenence: : | RALP: 12 months (n=1718)<br><br>ORP: 12 months (n=711)  | RALP: 1352 (78.7)<br><br>ORP: 567 (79.7)<br><br>$P_{adjusted} \geq 0.05$<br><br>RALP: | Potency: ability to achieve erections satisfactory for intercourse during the last 3 months | RALP: 12 months (n=1718)<br><br>ORP: 12 months (n=711) | RALP: 518 (30.2)<br><br>ORP: 180 (25.3)<br><br>$P_{adjusted} < 0.05$<br><br>RALP: | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |





Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence      |                                |   | Sexual function/ Potency                                  |                                |  | HRQOL  |               |                         |
|-------|-------------|-------------------------------------|--------------------------------|---|---|--------------------------------|--|--|---------------|-------------------------|
|       |             | Definition/ Measures                | Follow up (n)                  | Results n (%) Mean ± SD   | Definition/ Measure                                       | Follow up (n)                  | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n) | Results n (%) Mean ± SD |
|       |             | no leakage and 0 pad                | RALP:<br>12 months<br>(n=1718) | 740 (43.1)  | Potency: IIEF-5>17  | RALP:<br>12 months<br>(n=1692) | 381 (22.5)   |  |               |                         |
|       |             | Continenence: no leakage at daytime | ORP:<br>12 months<br>(n=711)   | ORP:<br>312 (43.9)<br><br>P <sub>adjusted</sub> ≥0.05                             |   |                                | ORP:<br>12 months<br>(n=708)   | ORP:<br>138 (19.5)<br><br>P <sub>adjusted</sub> <0.05                          |               |                         |
|       |             | Continenence: no leakage            | RALP:<br>12 months<br>(n=1718) | RALP:<br>1112 (64.7)<br><br>ORP:<br>459 (64.6)<br><br>P <sub>adjusted</sub> ≥0.05 | Potency: penile stiffness more than half of the time      | RALP:<br>12 months<br>(n=1718) | RALP:<br>395 (23.0)<br><br>ORP:<br>137 (19.3)<br><br>P <sub>adjusted</sub> <0.05 |  |               |                         |
|       |             | Continenence: no urinary discomfort | ORP:<br>12 months<br>(n=711)   | RALP:<br>1408 (82.0)<br><br>ORP:<br>594 (83.5)<br><br>P <sub>adjusted</sub> ≥0.05 |   |                                | ORP:<br>12 months<br>(n=711)   | RALP:<br>196 (11.4)<br><br>ORP:<br>47 (6.6)<br><br>P <sub>adjusted</sub> <0.05 |               |                         |
|       |             |                                     | RALP:<br>12 months<br>(n=1718) | RALP:<br>1126 (65.5)<br><br>ORP:<br>450 (63.3)<br><br>P <sub>adjusted</sub> ≥0.05 | Potency: spontaneous morning erection                     | RALP:<br>12 months<br>(n=1718) | RALP:<br>436 (25.4)<br><br>ORP:<br>150 (21.1)<br><br>P <sub>adjusted</sub> <0.05 |  |               |                         |
|       |             |                                     | ORP:<br>12 months<br>(n=711)   |   |   |                                | ORP:<br>12 months<br>(n=711)   |  |               |                         |
|       |             |                                     | RALP:<br>12 months<br>(n=1718) |   | Potency: stiffness at sexual activity or morning erection | RALP:<br>12 months<br>(n=1718) |  |  |               |                         |
|       |             |                                     | ORP:<br>12 months              |   |   |                                | ORP:<br>12 months  |  |               |                         |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size           | Urinary function/ Continence |   |   | Sexual function/ Potency  |   |  | HRQOL                    |  |   |
|---|-----------------------|------------------------------|---|---|---|---|--|--------------------------|--|---|
|   |                       | Definition/ Measures         | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure      | Follow up (n)                                | Results n (%) Mean ± SD                 |
|   |                       |                              | (n=711)   |   |   | (n=711)   |  |                          |  |   |
| Lee et al. (2015) <sup>164</sup><br>South Korea       | RALP: 99<br>ORP: 99   | NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                       | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR                     |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | Continence: 0 pads           | RALP:<br>1 month (n=50)<br>3 months (n=50)<br>6 months (n=50)<br>12 months (n=50)<br>ORP:<br>1 month (n=34)<br>3 months (n=34)<br>6 months (n=34)<br>12 months (n=34) | RALP:<br>14 (28.0)<br>29 (58.0)<br>44 (88.0)<br>47 (94.0)<br>ORP:<br>3 (8.8)<br>13 (38.2)<br>23 (67.7)<br>28 (82.3)<br><br>P <sub>1month</sub> =0.07<br>P <sub>3months</sub> =0.01<br>P <sub>6month</sub> =0.04<br>P <sub>12month</sub> =0.18 | Potency:<br>ability to achieve erections satisfactory for intercourse with or without PDE-5 | RALP:<br>1 month (n=50)<br>3 months (n=50)<br>6 months (n=50)<br>12 months (n=50)<br>ORP:<br>1 month (n=34)<br>3 months (n=34)<br>6 months (n=34)<br>12 months (n=34) | RALP:<br>10 (20.0)<br>20 (40.0)<br>25 (50.0)<br>35 (70.0)<br>ORP:<br>0 (0.0)<br>2 (5.9)<br>2 (5.9)<br>7 (20.6)<br><br>P <sub>1month</sub> <0.001<br>P <sub>3months</sub> <0.001<br>P <sub>6month</sub> <0.001<br>P <sub>12month</sub> <0.001 | NR                       | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR                     |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                       | RALP: NR<br>ORP: NR                          | RALP: NR<br>ORP: NR                     |
| Davison et al. (2014) <sup>121</sup><br>Canada        | RALP: 78<br>ORP: 73   | NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | Urinary summary:<br>EPIC | RALP:<br>6 months (n=78)<br>12 months (n=78) | RALP:<br>77.4±18.2<br>81.3±14.4<br>ORP: |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |               |                         | Sexual function/ Potency |               |                         | HRQOL                |  |   |
|-------|-------------|--------------------------------|---------------|-------------------------|--------------------------|---------------|-------------------------|----------------------|--|---|
|       |             | Definition/ Measures           | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure  | Follow up (n)                                | Results n (%) Mean ± SD   |
|       |             |                                |               |                         |                          |               |                         | Urinary bother: EPIC | ORP:<br>6 months (n=73)<br>12 months (n=73)  | 78.8±17.7<br>83.6±17.1<br>P <sub>6month</sub> ≥0.05<br>P <sub>12month</sub> ≥0.05         |
|       |             |                                |               |                         |                          |               |                         |                      | RALP:<br>6 months (n=78)<br>12 months (n=78) | RALP:<br>77.9±19.2<br>82.7±13.9   |
|       |             |                                |               |                         |                          |               |                         | Sexual summary: EPIC | ORP:<br>6 months (n=73)<br>12 months (n=73)  | ORP:<br>78.8±18.5<br>83.1±18.0<br>P <sub>6month</sub> ≥0.05<br>P <sub>12month</sub> ≥0.05 |
|       |             |                                |               |                         |                          |               |                         |                      | ORP:<br>6 months (n=73)<br>12 months (n=73)  | RALP:<br>27.2±17.2<br>32.6±20.8   |
|       |             |                                |               |                         |                          |               |                         | Sexual bother: EPIC  | ORP:<br>6 months (n=73)<br>12 months (n=73)  | ORP:<br>20.7±17.3<br>25.4±19.9<br>P <sub>6month</sub> ≥0.05<br>P <sub>12month</sub> ≥0.05 |
|       |             |                                |               |                         |                          |               |                         |                      | RALP:<br>6 months (n=78)<br>12 months (n=78) | RALP:<br>35.0±23.6<br>42.8±28.3   |
|       |             |                                |               |                         |                          |               |                         |                      | ORP:<br>6 months (n=73)<br>12 months (n=73)  | ORP:<br>28.5±24.5<br>34.6±28.7<br>P <sub>6month</sub> ≥0.05                               |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continence  |   |  | Sexual function/ Potency  |   |   | HRQOL               |                         |                            |
|--|---------------------------|---|---|--|---|---|---|---------------------|-------------------------|----------------------------|
|  |                           | Definition/ Measures  | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD    |
|  |                           |   |   |  |   |   |   |                     |                         | P <sub>12month</sub> ≥0.05 |
| Fode et al. (2014) <sup>122</sup><br>Denmark | RALP: 585<br><br>ORP: 453 | Continence:0-1 pad<br><br><br><br><br><br><br><br><br><br>Continence:0 pads | RALP:<br>3 months (n=497)<br>6 months (n=495)<br>12 months (n=406)<br><br>ORP:<br>3 months (n=388)<br>6 months (n=406)<br>12 months (n=366) | RALP:<br>245 (49.3)<br>355 (71.7)<br>304 (74.9)<br><br>ORP:<br>228 (58.8)<br>290 (71.4)<br>299 (81.7)<br><br>P <sub>3months(unadj)</sub> =0.01<br>P <sub>3months(adj)</sub> =0.01<br>P <sub>6month(unadj)</sub> =0.92<br>P <sub>6month(adj)</sub> =0.29<br>P <sub>12month(unadj)</sub> =0.02<br>P <sub>12month(adj)</sub> =0.01<br><br>RALP:<br>211 (52.0)<br><br>ORP:<br>220 (60.1) | Potency: IIEF-5 score≥17 - measured in preoperatively potent and sexually active patients | RALP:<br>3 months (n=155)<br>6 months (n=202)<br>12 months (n=182)<br><br>ORP:<br>3 months (n=112)<br>6 months (n=136)<br>12 months (n=142) | RALP:<br>32 (20.6)<br>53 (26.2)<br>66 (36.3)<br><br>ORP:<br>14 (12.5)<br>21 (15.4)<br>41 (28.9)<br><br>P <sub>3months(unadj)</sub> =0.08<br>P <sub>3months(adj)</sub> =0.16<br>P <sub>6month(unadj)</sub> =0.02<br>P <sub>6month(adj)</sub> =0.11<br>P <sub>12month(unadj)</sub> =0.16<br>P <sub>12month(adj)</sub> =0.70 | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR    |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size                       | Urinary function/ Continenence |   |  | Sexual function/ Potency   |   |  | HRQOL               |                         |                         |
|---|-----------------------------------|--------------------------------|---|--|--|---|--|---------------------|-------------------------|-------------------------|
|   |                                   | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD |
|   |                                   |                                | RALP:<br>12 months<br>(n=406)<br><br>ORP:<br>12 months<br>(n=366)   | P12month=NR  |  |   |  |                     |                         |                         |
| Gagnon et al. (2014) <sup>165</sup><br>Canada   | RALP:<br>200<br><br>ORP:<br>200   | Continenence: 0-1 pad          | RALP:<br>6 months<br>(n=169)<br>12 months<br>(n=152)<br><br>ORP:<br>6 months<br>(n=160)<br>12 months<br>(n=145) | RALP:<br>145 (85.8)<br>145 (95.4)<br><br>ORP:<br>142 (88.8)<br>138 (95.2)<br><br>P <sub>6month</sub> =0.51<br>P <sub>12month</sub> =1.00 | Potency:<br>ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in the overall sample and only in those having NS | RALP:<br>overall/BNS/UNS 6 months(n=159/ n=106/ n=36)<br>12 months(n=135/ n=95/ n=27)<br><br>ORP:<br>6 months (n=127/ n=72/ n=36)<br>12 months(n=125/ n=67/ n=20) | RALP:<br>38 (23.9)/31 (29.2)/7 (19.4)<br>52 (38.5)/45 (47.4)/7 (18.9)<br><br>ORP:<br>21 (16.5)/17 (81.0)/3 (13.0)<br>34 (27.2)/21 (19.4)/5 (25.0)<br><br>P <sub>6month</sub> =0.14/0.49/0.72<br>P <sub>12month</sub> =0.06/0.05/1.00 | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Gandaglia et al (2014) <sup>166</sup><br>USA    | RALP:<br>3476<br><br>ORP:<br>2439 | NR                             | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP:<br>5524<br><br>ORP:<br>5524 | NR                             | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP:<br>175                      | Continenence: 0 pads           | RALP:<br>12 months<br>(n=175)   | RALP:<br>46 (26.2)   | NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size                       | Urinary function/ Continenence            |  |  | Sexual function/ Potency   |  |  | HRQOL               |                         |                         |
|---|-----------------------------------|---|--|--|--|--|--|---------------------|-------------------------|-------------------------|
|   |                                   | Definition/ Measures                      | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD |
|   | ORP:<br>175                       |   | ORP:<br>12 months<br>(n=175)   | ORP:<br>60 (34.2)<br><br>P <sub>12month</sub> =0.06  |  |  |  |                     |                         |                         |
| Ritch et al (2014) <sup>169</sup><br>USA  | RALP:<br>742<br><br>ORP:<br>237   | NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | RALP:<br>89<br><br>ORP:<br>105    | NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP:<br>7697<br><br>ORP:<br>9778 | NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP<br>77<br><br>ORP:<br>176     | Continenence:<br>no leakage or<br>0-1 pad | RALP:<br>1 month<br>(n=77)<br><br>3 months<br>(n=77)<br><br>6 months<br>(n=77)<br><br>9 months<br>(n=77)<br><br>12 months<br>(n=77)<br><br>24 months | RALP:<br>29 (37.7)<br>55 (71.4)<br>65 (84.4)<br>68 (88.3)<br>72 (93.5)<br>72 (93.5)<br><br>ORP:<br>97 (55.1)<br>141 (80.1)<br>162 (92.0) | Potency:<br>ability to<br>achieve<br>erections<br>satisfactory<br>for<br>intercourse<br>with or<br>without PDE-5<br>- measured in<br>those having<br>BNS | RALP:<br>1 month (n=41)<br>3 months (n=41)<br>6 months (n=41)<br>9 months (n=41)<br>12 months<br>(n=41)<br>24 months<br>(n=41)<br><br>ORP:<br>1 month (n=55) | RALP:<br>0 (0.0)<br>7 (17.1)<br>12 (29.3)<br>12 (29.3)<br>22 (53.7)<br>23 (56.1)<br><br>ORP:<br>1 (1.8)<br>3 (5.5)<br>8 (14.5) | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size            | Urinary function/ Continence                  |   |   | Sexual function/ Potency |   |   | HRQOL   |  |  |
|--|------------------------|---|---|---|--------------------------|---|---|---|--|--|
|  |                        | Definition/ Measures                          | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure      | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure                                     | Follow up (n)  | Results n (%) Mean ± SD                                      |
|  |                        |   | (n=77)<br>ORP:<br>1 month (n=176)<br>3 months (n=176)<br>6 months (n=176)<br>9 months (n=176)<br>12 months (n=176)<br>24 months (n=176) | 167 (94.9)<br>169 (96.0)<br>171 (97.2)<br><br>P <sub>24months</sub> =0.10<br>P <sub>KM</sub> =0.06  |                          | 3 months (n=55)<br>6 months (n=55)<br>9 months (n=55)<br>12 months (n=55)<br>24 months (n=55) | 12 (21.8)<br>22 (40.0)<br>28 (50.9)<br><br>P <sub>24months</sub> =0.61<br>P <sub>KM</sub> =0.41 |   |  |  |
| Froehner et al. (2013) <sup>172</sup><br>Germany | RALP: 317<br>ORP: 2437 | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium | RALP: 64<br>ORP: 116   | Continence: no leakage for 3 consecutive days | RALP:<br>1 month (n=61)<br>3 months (n=61)<br>6 months (n=61)<br>12 months (n=61)<br>ORP:<br>1 month (n=109)<br>3 months (n=109)        | RALP:<br>42 (68.9)<br>53 (86.9)<br>58 (95.1)<br>59 (96.7)<br>ORP:<br>46 (42.2)<br>85 (78.0)<br>102 (93.6)<br>105 (96.3)<br>P <sub>1month</sub> =0.01<br>P <sub>3months</sub> =0.16<br>P <sub>6month</sub> =0.54 | NR                       | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | Physical limitations: KHQ<br><br>Severity measures: KHQ | RALP: 12 months<br>ORP: 12 months<br><br>RALP: 12 months<br>ORP: 12 months | RALP: NR<br>ORP: NR<br><br>RALP: NR<br>ORP: NR<br><br>P=0.01 |

Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |   |   | Sexual function/ Potency                                  |               |                         | HRQOL               |               |                         |
|-------|-------------|--------------------------------|---|---|---|---------------|-------------------------|---------------------|---------------|-------------------------|
|       |             | Definition/ Measures           | Follow up (n)                                 | Results n (%) Mean ± SD   | Definition/ Measure                                       | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n) | Results n (%) Mean ± SD |
|       |             | Continenence:<br>VAS score≤1   | 6 months<br>(n=109)                           | P <sub>12month</sub> =0.90<br>P <sub>overall(unadj)</sub> =0.01<br>P <sub>overall(adj)</sub> =0.04                  |   |               |                         |                     |               |                         |
|       |             |                                | Continenence:<br>no leakage on<br>1h pad test | 12 months<br>(n=109)  | RALP:<br>37 (59.7)<br>46 (74.2)<br>51 (82.3)<br>50 (84.7) |               |                         |                     |               |                         |
|       |             |                                |   | RALP:<br>1 month<br>(n=62)  | ORP:<br>36 (31.3)<br>70 (61.9)<br>87 (77.0)<br>84 (77.1)  |               |                         |                     |               |                         |
|       |             |                                | 3 months<br>(n=62)                            | P <sub>1month</sub> <0.001<br>P <sub>3months</sub> =0.13<br>P <sub>6month</sub> =0.33<br>P <sub>12month</sub> =0.32 |   |               |                         |                     |               |                         |
|       |             |                                | 6 months<br>(n=62)                            | RALP:<br>36 (59.0)<br>49 (79.0)<br>56 (90.3)<br>53 (89.8)   |   |               |                         |                     |               |                         |
|       |             |                                | 12 months<br>(n=59)                           | ORP:<br>36 (59.0)<br>49 (79.0)<br>56 (90.3)<br>53 (89.8)  |   |               |                         |                     |               |                         |
|       |             |                                | 3 months<br>(n=113)                           | ORP:<br>47 (42.7)<br>75 (68.2)<br>93 (85.3)<br>88 (83.8)  |   |               |                         |                     |               |                         |
|       |             |                                | 6 months<br>(n=113)                           | P <sub>1month</sub> =0.06<br>P <sub>3months</sub> =0.16<br>P <sub>6month</sub> =0.48<br>P <sub>12month</sub> =0.35  |   |               |                         |                     |               |                         |
|       |             |                                | 12 months<br>(n=109)                          |   |   |               |                         |                     |               |                         |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continenence |   |  | Sexual function/ Potency                        |   |  | HRQOL               |                         |                         |
|--|---------------------------|--------------------------------|---|--|---|---|--|---------------------|-------------------------|-------------------------|
|  |                           | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure                             | Follow up (n)                                       | Results n (%) Mean ± SD  | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD |
|  |                           |                                | RALP:<br>1 month (n=61)<br>3 months (n=62)<br>6 months (n=62)<br>12 months (n=59)<br><br>ORP:<br>1 month (n=110)<br>3 months (n=110)<br>6 months (n=109)<br>12 months (n=105) |  |   |   |  |                     |                         |                         |
| Harty et al. (2013) <sup>200</sup><br>USA      | RALP: 152<br><br>ORP: 153 | NR                             | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR  | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Ludovico et al. (2013) <sup>124</sup><br>Italy | RALP: 82<br><br>ORP: 48   | Continenence: 0-1 pad          | RALP: 12 months (n=82)<br><br>ORP: 12 months (n=48)   | RALP: 78 (95.1)<br><br>ORP: 47 (97.9)<br><br>$P_{12\text{month}}=0.74$ | Potency: IIEF≥22 - measured in those having BNS | RALP: 12 months (n=82)<br><br>ORP: 12 months (n=48) | RALP: 22 (26.8)<br><br>ORP: 12 (25.0)<br><br>$P_{12\text{month}}=0.81$ | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Masterson et al (2013) <sup>173</sup><br>USA   | RALP: 669<br><br>ORP: 357 | NR                             | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | NR  | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR  | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size           | Urinary function/ Continenence |  |   | Sexual function/ Potency |                     |                         | HRQOL               |                     |                         |
|---|-----------------------|--------------------------------|--|---|--------------------------|---------------------|-------------------------|---------------------|---------------------|-------------------------|
|   |                       | Definition/ Measures           | Follow up (n)  | Results n (%) Mean ± SD   | Definition/ Measure      | Follow up (n)       | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n)       | Results n (%) Mean ± SD |
| Pierorazio et al. (2013) <sup>149</sup><br>USA  | RALP: 105<br>ORP: 743 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Punnen et al. (2013) <sup>174</sup><br>USA      | RALP: 233<br>ORP: 177 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br>ORP: 341 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br>ORP: 961 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Son et al. (2013) <sup>177</sup><br>South Korea | RALP: 146<br>ORP: 112 | Continenence: 0-1 pad          | RALP:<br>1 month (n=146)<br>3 months (n=146)<br>6 months (n=146)<br>9 months (n=146)<br>12 months (n=146)<br>ORP:<br>1 month (n=112)<br>3 months | RALP:<br>104 (71.2)<br>132 (90.3)<br>140 (95.9)<br>144 (98.6)<br>146 (100.0)<br>ORP:<br>73 (65.2)<br>90 (80.4)<br>101 (90.1)<br>102 (91.0)<br>110 (98.2)<br>P <sub>1month</sub> =0.34<br>P <sub>3months</sub> =0.03 | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |                             |  | Sexual function/ Potency |               |                         | HRQOL               |               |                         |
|-------|-------------|--------------------------------|-----------------------------|--|--------------------------|---------------|-------------------------|---------------------|---------------|-------------------------|
|       |             | Definition/ Measures           | Follow up (n)               | Results n (%) Mean ± SD  | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n) | Results n (%) Mean ± SD |
|       |             | Continenence: 0 pads           | (n=112)<br>6 months         | P <sub>6month</sub> =0.08<br>P <sub>9months</sub> =0.01<br>P <sub>12months</sub> =0.19<br>P <sub>overall</sub> =0.01 |                          |               |                         |                     |               |                         |
|       |             |                                | (n=112)<br>9 months         | RALP:<br>67 (45.9)<br>108 (73.8)<br>128 (87.5)<br>135 (92.8)<br>138 (94.5)<br>139 (95.2)<br>139 (95.2)<br>144 (98.6) |                          |               |                         |                     |               |                         |
|       |             |                                | (n=112)<br>12 months        |  |                          |               |                         |                     |               |                         |
|       |             |                                | RALP:<br>1 month<br>(n=146) | ORP:<br>23 (20.5)<br>42 (37.8)   |                          |               |                         |                     |               |                         |
|       |             |                                | 3 months<br>(n=146)         | 58 (51.7)<br>67 (60.0)   |                          |               |                         |                     |               |                         |
|       |             |                                | 6 months<br>(n=146)         | 79 (70.7)<br>90 (80.4)   |                          |               |                         |                     |               |                         |
|       |             |                                | 9 months<br>(n=146)         | 92 (82.1)<br>96 (85.7)   |                          |               |                         |                     |               |                         |
|       |             |                                | 12 months<br>(n=146)        | P <sub>1month</sub> <0.001   |                          |               |                         |                     |               |                         |
|       |             |                                | 18 months<br>(n=146)        | P <sub>3months</sub> <0.001<br>P <sub>6month</sub> <0.001  |                          |               |                         |                     |               |                         |
|       |             |                                | 24 months<br>(n=146)        | P <sub>9months</sub> <0.001<br>P <sub>12month</sub> <0.001   |                          |               |                         |                     |               |                         |
|       |             |                                | 36 months<br>(n=146)        | P <sub>18months</sub> <0.001<br>P <sub>24months</sub> <0.001<br>P <sub>36months</sub> <0.001                         |                          |               |                         |                     |               |                         |
|       |             |                                | ORP:<br>1 month<br>(n=112)  | P <sub>overall(unadj)</sub> <0.001<br>P <sub>overall(adj)</sub> <0.001   |                          |               |                         |                     |               |                         |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size          | Urinary function/ Continenence |  |   | Sexual function/ Potency |                     |                         | HRQOL               |                     |                         |
|---|----------------------|--------------------------------|--|---|--------------------------|---------------------|-------------------------|---------------------|---------------------|-------------------------|
|   |                      | Definition/ Measures           | Follow up (n)  | Results n (%) Mean ± SD                     | Definition/ Measure      | Follow up (n)       | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n)       | Results n (%) Mean ± SD |
|   |                      |                                | 3 months (n=112)<br>6 months (n=112)<br>9 months (n=112)<br>12 months (n=112)<br>18 months (n=112)<br>24 months (n=112)<br>36 months (n=112) |   |                          |                     |                         |                     |                     |                         |
| Bae et al (2012) <sup>178</sup><br>South Korea      | RALP: 111<br>ORP: 70 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                         | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Hong et al. (2012) <sup>8</sup><br>USA              | RALP: 182<br>ORP: 80 | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                         | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Lumen et al. (2012) <sup>179</sup><br>Belgium       | RALP: 50<br>ORP: 50  | Continenence: 0-1pad           | RALP: 12 months (n=30)<br>ORP: 12 months (n=33)  | RALP: 23 (76.7)<br>ORP: 25 (76.8)<br>P=0.83 | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP:     | NR                             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                         | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size             | Urinary function/ Continence      |   |  | Sexual function/ Potency  |   |   | HRQOL               |                     |                         |
|---|-------------------------|-----------------------------------|---|--|---|---|---|---------------------|---------------------|-------------------------|
|   |                         | Definition/ Measures              | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)       | Results n (%) Mean ± SD |
|   | 19                      |                                   |   |  |   |   |   |                     |                     |                         |
| Philippou et al. (2012) <sup>125</sup><br>UK          | RALP: 50<br>ORP: 50     | Continence: no leakage or 0-1 pad | RALP: 3 months (n=NR)<br>ORP: 3 months (n=NR)   | RALP: NR (90.0)<br>ORP: NR (88.0)<br>P <sub>3months</sub> =0.75  | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in those having NS                | RALP: 3 months (n=NR)<br>ORP: 3 months (n=NR)   | RALP: NR (62.1)<br>ORP: NR (60.6)<br>P <sub>3months</sub> =0.89   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Trinh et al. (2012) <sup>181</sup><br>USA             | RALP: 7598<br>ORP: 7389 | NR                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Wang et al. (2012) <sup>182</sup><br>USA              | RALP: 1038<br>ORP: 707  | NR                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75<br>ORP: 75     | Continence: no leakage            | RALP: 3 months (n=75)<br>12 months (n=45)<br>ORP: 3 months (n=75)<br>12 months (n=75) | RALP: 71 (94.7)<br>40 (88.9)<br>ORP: 62 (82.7)<br>60 (80.0)<br>P <sub>3months</sub> =0.003<br>P <sub>12month</sub> =0.09 | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in preoperatively potent patients | RALP: 3 months (n=37)<br>12 months (n=22)<br>ORP: 3 months (n=49)<br>12 months (n=47) | RALP: 25 (67.6)<br>12 (54.5)<br>ORP: 12 (24.5)<br>12 (25.5)<br>P <sub>3months</sub> =0.01<br>P <sub>12month</sub> =0.01 | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size           | Urinary function/ Continence |   |  | Sexual function/ Potency   |   |  | HRQOL                 |                     |                         |
|---|-----------------------|------------------------------|---|--|--|---|--|-----------------------|---------------------|-------------------------|
|   |                       | Definition/ Measures         | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure   | Follow up (n)       | Results n (%) Mean ± SD |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark   | RALP: 77<br>ORP: 154  | Continence: 0-1 pad/day      | RALP: 12 months<br>ORP: 12 months   | RALP: 67 (87)<br>ORP: 108 (70)   | Potency: erectile function with or without medication  | RALP: 12 months<br>ORP: 12 months   | RALP: 31 (40.3)<br>ORP: 68 (44.2)  | NR                    | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Kim et al. (2011) <sup>127</sup><br>South Korea | RALP: 528<br>ORP: 235 | Continence: 0 pads           | RALP: 6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR)<br>ORP: 6 months (n=NR)<br>12 months (n=NR)<br>24 months (n=NR) | RALP: NR<br>NR<br>ORP: NR<br>NR<br>NR<br>HR: 1.21 (95%CI: 0.99, 1.48)<br>P <sub>KM</sub> = 0.16<br>P <sub>HR</sub> =0.06 | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in those having NS | RALP: 6 months (n=373)<br>12 months (n=373)<br>24 months (n=373)<br>ORP: 6 months (n=122)<br>12 months (n=122)<br>24 months (n=122) | RALP: 123 (33.0)<br>213 (57.1)<br>313 (83.8)<br>ORP: 8 (6.7)<br>34 (28.1)<br>58 (47.5)<br>HR: 2.00 (95%CI: 1.35, 2.97)<br>P <sub>KM</sub> <0.001<br>P <sub>HR</sub> =0.001 | NR                    | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Magheli et al. (2011) <sup>152</sup><br>USA     | RALP: 522<br>ORP: 522 | NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                    | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Minniti et al. (2011) <sup>184</sup><br>Italy   | RALP: 22<br>ORP: 93   | Continence: NR               | RALP: NR (n=22)<br>ORP: NR (n=93)   | RALP: 19 (86.4)<br>ORP: 61 (65.6)<br>P=NR  | NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                    | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     |
| Mirza et al. (2011) <sup>185</sup><br>USA       | RALP: 191             | NR                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | Sexual function: EPIC - measured in  | RALP: 12-18 months (n=78)   | RALP: 38±NR  | Urinary summary: EPIC | RALP: 12-18 months  | RALP: 83±NR             |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |               |                         | Sexual function/ Potency |                          |                         | HRQOL   |                           |                         |
|-------|-------------|--------------------------------|---------------|-------------------------|--------------------------|--------------------------|-------------------------|---|---------------------------|-------------------------|
|       |             | Definition/ Measures           | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n)            | Results n (%) Mean ± SD | Definition/ Measure                                     | Follow up (n)             | Results n (%) Mean ± SD |
|       | ORP: 180    |                                |               |                         | those having NS          | ORP: 12-18 months (n=33) | ORP: 35±NR<br>P=0.25    |   | (n=96)                    | ORP: 86±NR              |
|       |             |                                |               |                         |                          |                          |                         | Sexual summary: EPIC - measured in those having NS      | ORP: 12-18 months (n=46)  | P=0.10                  |
|       |             |                                |               |                         |                          |                          |                         |   | RALP: 44±NR               |                         |
|       |             |                                |               |                         |                          |                          |                         |   | ORP: 43±NR                |                         |
|       |             |                                |               |                         |                          |                          |                         |   | P=0.41                    |                         |
|       |             |                                |               |                         |                          |                          |                         |   | RALP: 60±NR               |                         |
|       |             |                                |               |                         |                          |                          |                         | Quality of erection: EPIC - measured in those having NS | ORP: 12-18 months (n=33)  | ORP: 57±NR              |
|       |             |                                |               |                         |                          |                          |                         |   | P=0.36                    |                         |
|       |             |                                |               |                         |                          |                          |                         |   | RALP: 12-18 months (n=78) | RALP: 94±NR             |
|       |             |                                |               |                         |                          |                          |                         | Bowel summary: EPIC                                     | ORP: 12-18 months (n=33)  | ORP: 94±NR              |
|       |             |                                |               |                         |                          |                          |                         |   | P=0.31                    |                         |
|       |             |                                |               |                         |                          |                          |                         |   | ORP: 12-18 months (n=96)  |                         |
|       |             |                                |               |                         |                          |                          |                         |   | RALP: 12-18 months (n=96) |                         |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size             | Urinary function/ Continence    |  |   | Sexual function/ Potency |                     |                             | HRQOL               |                                |                             |
|---|-------------------------|---------------------------------|--|---|--------------------------|---------------------|-----------------------------|---------------------|--------------------------------|-----------------------------|
|   |                         | Definition/ Measures            | Follow up (n)  | Results n (%) Mean $\pm$ SD                     | Definition/ Measure      | Follow up (n)       | Results n (%) Mean $\pm$ SD | Definition/ Measure | Follow up (n)                  | Results n (%) Mean $\pm$ SD |
|   |                         |                                 |  |   |                          |                     |                             |                     | ORP:<br>12-18 months<br>(n=46) |                             |
| Tollefson et al. (2011) <sup>186</sup><br>USA   | RALP: 1084<br>ORP: 4824 | NR                              | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                             | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         | NR                  | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR         |
| Barocas et al. (2010) <sup>128</sup><br>USA     | RALP: 1413<br>ORP: 491  | NR                              | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                             | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         | NR                  | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR         |
| Bolenz et al. (2010) <sup>153</sup><br>USA      | RALP: 262<br>ORP: 161   | NR                              | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                             | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         | NR                  | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR         |
| Breyer et al. (2010) <sup>129</sup><br>USA      | RALP: 293<br>ORP: 695   | NR                              | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                             | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         | NR                  | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR         |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden | RALP: 1253<br>ORP: 485  | Continence: no surgery required | RALP: 1-15 months (n=1253)<br>ORP: 1-15 months (n=485) | RALP: 1246 (99.4)<br>ORP: 474 (97.7)<br>P<0.001 | NR                       | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         | NR                  | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR         |
| Doumerc et al. (2010) <sup>131</sup>            | RALP: 212               | NR                              | RALP: NR   | RALP: NR  | NR                       | RALP: NR            | RALP: NR                    | NR                  | RALP: NR                       | RALP: NR                    |



Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size           | Urinary function/ Continence |  |   | Sexual function/ Potency                              |   |  | HRQOL               |                     |                             |
|--|-----------------------|------------------------------|--|---|---|---|--|---------------------|---------------------|-----------------------------|
|  |                       | Definition/ Measures         | Follow up (n)  | Results n (%) Mean $\pm$ SD                                     | Definition/ Measure                                   | Follow up (n)   | Results n (%) Mean $\pm$ SD  | Definition/ Measure | Follow up (n)       | Results n (%) Mean $\pm$ SD |
| Australia  | ORP: 502              |                              | ORP: NR  | ORP: NR   |   | ORP: NR   | ORP: NR  |                     | ORP: NR             | ORP: NR                     |
| Hong et al. (2010) <sup>132</sup><br>South Korea | RALP: 26<br>ORP: 25   | NR                           | RALP: NR<br>ORP: NR                                      | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Kordan et al. (2010) <sup>133</sup><br>USA       | RALP: 830<br>ORP: 414 | NR                           | RALP: NR<br>ORP: NR                                      | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong     | RALP: 20<br>ORP: 20   | Continence: 0-1 pad          | RALP: mean 6 months (n=NR)<br>ORP: mean 42 months (n=NR) | RALP: NR (95.0)<br>ORP: NR (85.0)<br>P=NR                       | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Nadler et al. (2010) <sup>188</sup><br>USA       | RALP: 50<br>ORP: 50   | Continence: 0-1pad           | RALP: 12 months (n=44)<br>ORP: 12 months (n=46)          | RALP: 39 (88.6)<br>ORP: 41 (89.1)<br>P <sub>12month</sub> =0.94 | Potency: SHIM score>17 - measured in those having BNS | RALP: 12 months (n=22)<br>18 months (n=21)<br>24 months (n=22)<br>ORP: 12 months (n=4)<br>18 months (n=6)<br>24 months (n=17) | RALP: 8 (36.4)<br>10 (47.6)<br>10 (45.5)<br>ORP: 0 (0.0)<br>3 (50.0)<br>11 (64.7)<br>P <sub>12month</sub> =0.15<br>P <sub>18months</sub> =0.92<br>P <sub>24month</sub> =0.23 | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Truesdale et al. (2010) <sup>189</sup>           | RALP: 99              | NR                           | RALP: NR   | RALP: NR  | NR  | RALP: NR  | RALP: NR   | NR                  | RALP: NR            | RALP: NR                    |

Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size           | Urinary function/ Continenence                                    |   |   | Sexual function/ Potency                                |   |   | HRQOL               |                     |                             |
|---|-----------------------|---|---|---|---|---|---|---------------------|---------------------|-----------------------------|
|   |                       | Definition/ Measures  | Follow up (n)                                     | Results n (%) Mean $\pm$ SD                                     | Definition/ Measure                                     | Follow up (n)                                   | Results n (%) Mean $\pm$ SD                                     | Definition/ Measure | Follow up (n)       | Results n (%) Mean $\pm$ SD |
| USA   | ORP: 217              |   | ORP: NR   | ORP: NR   |   | ORP: NR   | ORP: NR   |                     | ORP: NR             | ORP: NR                     |
| Uvin et al. (2010) <sup>190</sup><br>Belgium  | RALP: 13<br>ORP: 9    | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Williams et al. (2010) <sup>134</sup><br>USA  | RALP: 604<br>ORP: 346 | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Coronato et al. (2009) <sup>191</sup><br>USA  | RALP: 98<br>ORP: 98   | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71<br>ORP: 83   | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | Continenence: no leakage or leaks about once a week or less often | RALP: 12 months (n=103)<br>ORP: 12 months (n=105) | RALP: 100 (97.1)<br>ORP: 92 (87.6)<br>$P_{12\text{month}}=0.01$ | Potency: IIEF-5 score>17 - measured in those having BNS | RALP: 12 months (n=64)<br>ORP: 12 months (n=41) | RALP: 52 (81.3)<br>ORP: 20 (48.8)<br>$P_{12\text{month}}<0.001$ | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Laurila et al. (2009) <sup>192</sup><br>USA   | RALP: 94<br>ORP: 98   | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR  | RALP: NR<br>ORP: NR                             | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR         |
| Ou et al.                                     | RALP:                 | Continenence: 0   | RALP:   | RALP:   | Potency: NR   | RALP: NS/BNS/                                   | RALP: NS/BNS/ UNS   | NR                  | RALP: NR            | RALP: NR                    |

Table 13. Description and findings for functional and quality of life outcomes

| Study                                       | Sample size                     | Urinary function/ Continence |  |  | Sexual function/ Potency   |  |   | HRQOL               |                         |                         |
|---|---------------------------------|------------------------------|--|--|--|--|---|---------------------|-------------------------|-------------------------|
|   |                                 | Definition/ Measures         | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure  | Follow up (n)  | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD |
| (2009) <sup>193</sup><br>Taiwan             | 30<br><br>ORP:<br>30            | pads                         | 3 months (n=30)<br>6 months (n=30)<br>12 months (n=30)<br><br>ORP:<br>3 months (n=30)<br>6 months (n=30)<br>12 months (n=30)               | 23 (76.7)<br>29 (96.7)<br>30 (100.0)<br><br>ORP:<br>11 (36.7)<br>25 (83.3)<br>29 (96.7)<br><br>P <sub>3months</sub> <0.01<br>P <sub>6month</sub> ≥0.05<br>P <sub>12month</sub> ≥0.05             | - measured in those having NS  | UNS<br>12 months (n=16/11/5)<br><br>ORP: NS/BNS/ UNS<br>12 months (n=2/1/1)  | 14 (87.5)/11 (100.0)/3 (60.0)<br><br>ORP: NS/BNS/ UNS<br>1 (50.0)/1 (100.0)/0 (0.0)<br><br>P <sub>12month</sub> ≥0.05   |                     | ORP: NR                 | ORP: NR                 |
| Rocco et al. (2009) <sup>136</sup><br>Italy | RALP:<br>120<br><br>ORP:<br>240 | Continence: 0-1 pad          | RALP:<br>3 months (n=115)<br>6 months (n=110)<br>12 months (n=79)<br><br>ORP:<br>3 months (n=233)<br>6 months (n=229)<br>12 months (n=217) | RALP:<br>81 (70.4)<br>102 (92.7)<br>77 (97.5)<br><br>ORP:<br>146 (62.7)<br>189 (82.5)<br>191 (88.0)<br><br>P <sub>3months</sub> =0.15<br>P <sub>6month</sub> =0.01<br>P <sub>12month</sub> =0.01 | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 | RALP:<br>3 months (n=115)<br>6 months (n=110)<br>12 months (n=79)<br>12 months (n=44)*<br><br>ORP:<br>3 months (n=233)<br>6 months (n=229)<br>12 months (n=217)<br>12 months (n=96)*<br><br>*Men aged<65 years who had nerve-sparing | RALP:<br>36 (31.3)<br>46 (41.8)<br>48 (60.8)<br>32 (72.7)*<br><br>ORP:<br>42 (18.0)<br>71 (31.0)<br>88 (40.6)<br>46 (47.9)*<br><br>P <sub>3months</sub> =0.01<br>P <sub>6month</sub> =0.04<br>P <sub>12month</sub> =0.003<br>*P <sub>12month</sub> <0.001 | NR                  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size           | Urinary function/ Continenence  |  |  | Sexual function/ Potency  |   |   | HRQOL               |                         |                                |
|--|-----------------------|---|--|--|---|---|---|---------------------|-------------------------|--------------------------------|
|  |                       | Definition/ Measures  | Follow up (n)  | Results n (%) Mean ± SD  | Definition/ Measure   | Follow up (n)                                     | Results n (%) Mean ± SD   | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD        |
|  |                       |   |  |  |   | procedure   |   |                     |                         |                                |
| White et al. (2009) <sup>194</sup><br>USA    | RALP: 50<br>ORP: 50   | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR            |
| Chan et al. (2008) <sup>195</sup><br>USA     | RALP: 660<br>ORP: 340 | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR            |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br>ORP: 588 | Continenence: no leakage or 0-1 pad - measured in preoperatively continent patients<br><br>Continenence: 0 pads - measured in preoperatively continent patients | RALP: 12 months (n=244)<br>ORP: 12 months (n=476)<br><br>RALP: 12 months (n=244)<br>ORP: 12 months (n=476) | RALP: 224 (91.8)<br>ORP: 446 (93.7)<br><br>RALP: 199 (81.6)<br>ORP: 419 (88.0)<br><br>P <sub>12month</sub> =0.34<br><br>P <sub>12month</sub> =0.06 | Potency: ability to achieve erections satisfactory for intercourse with or without PDE-5 - measured in preoperatively potent patients | RALP: 12 months (n=203)<br>ORP: 12 months (n=417) | RALP: 142 (70.0)<br>ORP: 262 (62.8)<br><br>P <sub>12month</sub> =0.08 | NR                  | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR            |
| Schroeck et al. (2008) <sup>197</sup><br>USA | RALP: 362<br>ORP: 435 | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | NR                  | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR            |
| Miller et al. (2007) <sup>137</sup><br>USA   | RALP: 42              | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR   | PCS: SF-12          | RALP: 1 Week<br>2 Weeks | RALP: 34.7 ± 7.6<br>42.0 ± 6.6 |

Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |               |                         | Sexual function/ Potency |               |                         | HRQOL               |  |  |
|-------|-------------|--------------------------------|---------------|-------------------------|--------------------------|---------------|-------------------------|---------------------|--|--|
|       |             | Definition/ Measures           | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n)  | Results n (%) Mean ± SD  |
|       | ORP:<br>120 |                                |               |                         |                          |               |                         |                     | 3 Weeks<br>1 month<br>5 weeks<br>6 weeks                               | 48.6 ± 3.9<br>52.8 ± 3.3<br>55.6 ± 2.2<br>56.4 ± 1.7   |
|       |             |                                |               |                         |                          |               |                         |                     | ORP:<br>1 Week<br>2 Weeks<br>3 Weeks<br>1 month<br>5 weeks<br>6 weeks  | ORP:<br>31.7 ± 6.6<br>37.5 ± 7.2<br>42.1 ± 7.0<br>45.5 ± 7.3<br>49.7 ± 5.9<br>52.8 ± 4.7   |
|       |             |                                |               |                         |                          |               |                         | MCS: SF-12          |  | P <sub>1week</sub> =0.42<br>P <sub>2weeks</sub> =0.08<br>P <sub>3weeks</sub> <0.001<br>P <sub>1month</sub> <0.001<br>P <sub>5weeks</sub> <0.001<br>P <sub>6weeks</sub> =0.003<br>P <sub>overall</sub> <0.001 |
|       |             |                                |               |                         |                          |               |                         |                     | RALP:<br>1 Week<br>2 Weeks<br>3 Weeks<br>1 month<br>5 weeks<br>6 weeks | RALP:<br>52.7 ± 8.5<br>53.8 ± 6.5<br>55.5 ± 7.3<br>57.0 ± 5.2<br>56.5 ± 4.7<br>57.4 ± 4.3  |
|       |             |                                |               |                         |                          |               |                         |                     | ORP:<br>1 Week<br>2 Weeks<br>3 Weeks<br>1 month<br>5 weeks<br>6 weeks  | ORP:<br>54.6 ± 7.6<br>54.7 ± 7.5<br>56.1 ± 5.8<br>57.0 ± 5.6<br>57.1 ± 5.1<br>58.0 ± 4.7   |





Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |   |   | Sexual function/ Potency |               |                         | HRQOL   |  |   |
|-------|-------------|--------------------------------|---|---|--------------------------|---------------|-------------------------|---|--|---|
|       |             | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure   | Follow up (n)  | Results n (%) Mean ± SD   |
|       |             |                                | 6 months (n=NR)<br><br>ORP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) | 104±42<br><br>P <sub>1month</sub> =NR<br>P <sub>3months</sub> =NR<br>P <sub>6months</sub> =NR |                          |               |                         | Bowel function:<br>UCLA-PCI<br>- in those with preoperatively scores≥30<br><br><br><br><br><br>Bowel bother:<br>UCLA-PC<br>- in those with preoperatively scores≥30 | 6 months (n=NR)<br><br>ORP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br><br>RALP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br>ORP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br>RALP:<br>1 month | 27±41<br><br>P <sub>1month</sub> =NR<br>P <sub>3months</sub> =NR<br>P <sub>6months</sub> =NR<br><br>RALP:%<br>baseline<br>88±25<br>98±28<br>98±24<br><br>ORP:%<br>baseline<br>89±26<br>98±22<br>102±26<br><br>P <sub>1month</sub> =NR<br>P <sub>3months</sub> =NR<br>P <sub>6months</sub> =NR<br><br>RALP:%<br>baseline<br>88±35<br>98±34<br>99±30<br><br>ORP:%<br>baseline<br>78±32<br>92±31<br>99±26<br><br>P <sub>1month</sub> =NR<br>P <sub>3months</sub> =NR<br>P <sub>6months</sub> =NR |

Table 13. Description and findings for functional and quality of life outcomes

| Study  | Sample size               | Urinary function/ Continenence |   |  | Sexual function/ Potency              |   |   | HRQOL               |   |                         |
|--|---------------------------|--------------------------------|---|--|---------------------------------------|---|---|---------------------|---|-------------------------|
|  |                           | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure                   | Follow up (n)                                       | Results n (%) Mean ± SD                                 | Definition/ Measure | Follow up (n)   | Results n (%) Mean ± SD |
|  |                           |                                |   |  |                                       |   |   |                     | (n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR)<br><br>ORP:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR) |                         |
| Ahlering et al. (2004) <sup>138</sup><br>USA | RALP: 60<br><br>ORP: 60   | Continenence: 0 pads           | RALP: 3 months (n=60)<br><br>ORP: 3 months (n=60)     | RALP: 46 (76)<br><br>ORP: 45 (75)<br><br>$P_{3months} \geq 0.05$ | NR                                    | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR                                 | NR                  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR |
| Tewari et al. (2003) <sup>139</sup><br>USA   | RALP: 200<br><br>ORP: 100 | Continenence: 0-1 pad          | RALP: 1.5 months (n=NR)<br><br>ORP: 5.3 months (n=NR) | RALP: NR (50.0)<br><br>ORP: NR (50.0)<br><br>$P < 0.05$          | Potency: ability to achieve erections | RALP: 6 months (n=NR)<br><br>ORP: 7.3 months (n=NR) | RALP: NR (50.0)<br><br>ORP: NR (50.0)<br><br>$P < 0.05$ | NR                  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR |
| Menon et al. (2002) <sup>140</sup><br>USA    | RALP: 30<br><br>ORP:      | NR                             | RALP: NR<br><br>ORP: NR                               | RALP: NR<br><br>ORP: NR  | NR                                    | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR                                 | NR                  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR |





Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size        | Urinary function/ Continence |                    |                         | Sexual function/ Potency        |  |  | HRQOL   |  |                                      |
|---|--------------------|------------------------------|--------------------|-------------------------|---------------------------------|--|--|---|--|--------------------------------------|
|   |                    | Definition/ Measures         | Follow up (n)      | Results n (%) Mean ± SD | Definition/ Measure             | Follow up (n)                                    | Results n (%) Mean ± SD                  | Definition/ Measure                                 | Follow up (n)                                    | Results n (%) Mean ± SD              |
|   | 30                 |                              |                    |                         |                                 |  |  |   |  |                                      |
| <b>RALP vs. BT</b>                                  |                    |                              |                    |                         |                                 |  |  |   |  |                                      |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>BT: 29 | NR                           | RALP: NR<br>BT: NR | RALP: NR<br>BT: NR      | Sexual function: EORTC-QLQ-PR25 | RALP: >12 months (n=51)<br>BT: >12 months (n=19) | RALP: 64.4±NR<br>BT: 59.6±NR<br>P=NR     | Urinary symptoms: EORTC-QLQ-PR25                    | RALP: >12 months (n=65)<br>BT: >12 months (n=27) | RALP: 87.8±NR<br>BT: 81.8±NR<br>P=NR |
|   |                    |                              |                    |                         | Sexual function: IIEF-15        | RALP: >12 months (n=28)<br>BT: >12 months (n=10) | RALP: 16.6±11.4<br>BT: 14.6±10.2<br>P=NR | Incontinence aid: EORTC-QLQ-PR25                    | RALP: >12 months (n=26)<br>BT: >12 months (n=7)  | RALP: 64.4±NR<br>BT: 71.4±NR<br>P=NR |
|   |                    |                              |                    |                         | Orgasmic function: IIEF-15      | RALP: >12 months (n=28)<br>BT: >12 months (n=10) | RALP: 6.1±3.5<br>BT: 5.4±3.6<br>P=NR     | Bowel symptoms: EORTC-QLQ-PR25                      | RALP: >12 months (n=64)<br>BT: >12 months (n=28) | RALP: 97.1±NR<br>BT: 96.4±NR<br>P=NR |
|   |                    |                              |                    |                         | Sexual desire: IIEF-15          | RALP: >12 months (n=28)<br>BT:                   | RALP: 6.2±2.3<br>BT: 5.3±1.8<br>P=NR     | Hormonal treatment related symptoms: EORTC-QLQ-PR25 | RALP: >12 months (n=60)<br>BT:                   | RALP: 94.9±NR<br>BT: 95.1±NR<br>P=NR |
|   |                    |                              |                    |                         |                                 | RALP: >12 months (n=28)<br>BT:                   | RALP: 7.1±4.9<br>BT:                     |   | RALP: >12 months (n=60)<br>BT:                   | RALP: 57.9±NR<br>BT:                 |

Table 13. Description and findings for functional and quality of life outcomes

| Study                                      | Sample size          | Urinary function/ Continenence |                    |                         | Sexual function/ Potency          |  |                                      | HRQOL                                     |  |  |
|--|----------------------|--------------------------------|--------------------|-------------------------|-----------------------------------|--|--------------------------------------|---|--|--|
|  |                      | Definition/ Measures           | Follow up (n)      | Results n (%) Mean ± SD | Definition/ Measure               | Follow up (n)                                    | Results n (%) Mean ± SD              | Definition/ Measure                       | Follow up (n)                                    | Results n (%) Mean ± SD                  |
|  |                      |                                |                    |                         | Intercourse satisfaction: IIEF-15 | >12 months (n=12)                                | BT: 5.8±4.9<br>P=NR                  |   | >12 months (n=26)                                | BT: 65.5±NR<br>P=NR                      |
|  |                      |                                |                    |                         | Overall satisfaction: IIEF-15     | RALP: >12 months (n=28)<br>BT: >12 months (n=11) | RALP: 6.0±3.0<br>BT: 5.7±2.7<br>P=NR | Sexual active: EORTC-QLQ-PR25             | RALP: >12 months (n=63)<br>BT: >12 months (n=28) | RALP: 2.4±3.4<br>BT: 2.0±4.4<br>P=NR     |
|  |                      |                                |                    |                         |                                   | RALP: >12 months (n=27)<br>BT: >12 months (n=11) |                                      | Severity of incontinence and QOL: ICIQ-SF | RALP: >12 months (n=25)<br>BT: >12 months (n=11) | RALP: 81.6±13.1<br>BT: 71.8±14.0<br>P=NR |
|  |                      |                                |                    |                         |                                   |  |                                      | Overall quality of life: EORTC-QLC-C30    | RALP: >12 months (n=65)<br>BT: >12 months (n=28) |  |
| Baena et al (2013) <sup>141</sup><br>Spain | RALP: 153<br>BT: 160 | NR                             | RALP: NR<br>BT: NR | RALP: NR<br>BT: NR      | NR                                | RALP: NR<br>BT: NR                               | RALP: NR<br>BT: NR                   | NR  | RALP: NR<br>BT: NR                               | RALP: NR<br>BT: NR                       |
| Ball et al                                 | RALP:                | Urinary                        | RALP:              | RALP: % baseline        | Sexual                            | RALP:  | RALP: % baseline                     | Urinary                                   | RALP:  | RALP: %                                  |



Table 13. Description and findings for functional and quality of life outcomes

| Study                        | Sample size | Urinary function/ Continenence           |                    |                          | Sexual function/ Potency                 |                 |                          | HRQOL                                    |                    |                          |
|------------------------------|-------------|--|--------------------|--------------------------|--|-----------------|--------------------------|--|--------------------|--------------------------|
|                              |             | Definition/ Measures                     | Follow up (n)      | Results n (%) Mean ± SD  | Definition/ Measure                      | Follow up (n)   | Results n (%) Mean ± SD  | Definition/ Measure                      | Follow up (n)      | Results n (%) Mean ± SD  |
| (2006) <sup>116</sup><br>USA | 82          | function:<br>UCLA-PCI                    | 1 month<br>(n=NR)  | 33±25                    | function:<br>UCLA-PCI                    | 1 month (n=NR)  | 19±19                    | bother: UCLA-PCI                         | 1 month<br>(n=NR)  | baseline                 |
|                              | BT: 118     | - in those with preoperatively scores≥30 | 3 months<br>(n=NR) | 58±28                    | - in those with preoperatively scores≥30 | 3 months (n=NR) | 35±31                    | - in those with preoperatively scores≥30 | 3 months<br>(n=NR) | 39±39                    |
|                              |             |  | 6 months<br>(n=NR) | 69±31                    |  | 6 months (n=NR) | 43±43                    |  | 6 months<br>(n=NR) | 65±34                    |
|                              |             |  |                    | BT: % baseline           |  | BT:             | BT: % baseline           |  |                    | 78±45                    |
|                              |             |  |                    | 82±22                    |  | 1 month (n=NR)  | 56±41                    |  | 6 months<br>(n=NR) | BT: % baseline           |
|                              |             |  |                    | 85±23                    |  | 3 months (n=NR) | 63±41                    |  |                    | 53±36                    |
|                              |             |  |                    | 91±25                    |  | 6 months (n=NR) | 72±42                    |  |                    | 70±39                    |
|                              |             |  |                    | P <sub>1month</sub> =NR  |  |                 | P <sub>1month</sub> =NR  |  | 1 month<br>(n=NR)  | 81±43                    |
|                              |             |  |                    | P <sub>3months</sub> =NR |  |                 | P <sub>3months</sub> =NR |  | 3 months<br>(n=NR) | P <sub>1month</sub> =NR  |
|                              |             |  |                    | P <sub>6months</sub> =NR |  |                 | P <sub>6months</sub> =NR |  | 6 months<br>(n=NR) | P <sub>3months</sub> =NR |
|                              |             |  |                    | RALP: % baseline         |  |                 |                          |  |                    | P <sub>6months</sub> =NR |
|                              |             |  |                    | 86±41                    |  |                 |                          |  |                    | RALP: % baseline         |
|                              |             |  |                    | 106±39                   |  |                 |                          |  |                    | baseline                 |
|                              |             |  |                    | 123±52                   |  |                 |                          |  |                    | 40±56                    |
|                              |             |  |                    | BT: % baseline           |  |                 |                          |  |                    | 43±50                    |
|                              |             |  |                    | 58±35                    |  |                 |                          |  |                    | 32±41                    |
|                              |             |  |                    | 72±37                    |  |                 |                          |  |                    | RALP:                    |
|                              |             |  |                    | 90±38                    |  |                 |                          |  |                    | 1 month<br>(n=NR)        |
|                              |             |  |                    | P <sub>1month</sub> =NR  |  |                 |                          |  |                    | 3 months<br>(n=NR)       |
|                              |             |  |                    | P <sub>3months</sub> =NR |  |                 |                          |  |                    | 6 months<br>(n=NR)       |
|                              |             |  |                    | P <sub>6months</sub> =NR |  |                 |                          |  |                    | 6 months<br>(n=NR)       |
|                              |             |  |                    | BT:                      |  |                 |                          |  |                    | P <sub>1month</sub> =NR  |
|                              |             |  |                    | 1 month<br>(n=NR)        |  |                 |                          |  |                    | P <sub>3months</sub> =NR |
|                              |             |  |                    | 3 months<br>(n=NR)       |  |                 |                          |  |                    | P <sub>6months</sub> =NR |
|                              |             |  |                    | 6 months<br>(n=NR)       |  |                 |                          |  |                    | RALP: % baseline         |
|                              |             |  |                    |                          |  |                 |                          |  |                    | baseline                 |
|                              |             |  |                    |                          |  |                 |                          |  |                    | 88±25                    |
|                              |             |  |                    |                          |  |                 |                          |  |                    | 98±28                    |
|                              |             |  |                    |                          |  |                 |                          |  |                    | 98±24                    |
|                              |             |  |                    |                          |  |                 |                          |  |                    | BT: % baseline           |
|                              |             |  |                    |                          |  |                 |                          |  |                    | 81±31                    |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |               |                         | Sexual function/ Potency |               |                         | HRQOL               |               |   |
|-------|-------------|--------------------------------|---------------|-------------------------|--------------------------|---------------|-------------------------|---------------------|---------------|---|
|       |             | Definition/ Measures           | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n) | Results n (%) Mean ± SD   |
|       |             |                                |               |                         |                          |               |                         |                     |               | 98±33<br>105±30<br>RALP:<br>1 month (n=NR) P <sub>1month</sub> =NR<br>3 months (n=NR) P <sub>3months</sub> =NR<br>6 months (n=NR) P <sub>6months</sub> =NR<br>Bowel bother:<br>UCLA-PCI - in those with preoperatively scores≥30 RALP: % baseline 88±35<br>BT: 98±34<br>1 month (n=NR) 99±30<br>3 months (n=NR) BT: % baseline 68±40<br>6 months (n=NR) 91±37<br>96±42<br>P <sub>1month</sub> =NR<br>P <sub>3months</sub> =NR<br>P <sub>6months</sub> =NR<br>RALP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>BT:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) |



Table 13. Description and findings for functional and quality of life outcomes

| Study                                      | Sample size  | Urinary function/ Continenence   |  |   | Sexual function/ Potency  |   |   | HRQOL  |   |   |
|--|--|--|--|---|---|---|---|--|---|---|
|  |  | Definition/ Measures   | Follow up (n)  | Results n (%) Mean ± SD   | Definition/ Measure   | Follow up (n)   | Results n (%) Mean ± SD   | Definition/ Measure  | Follow up (n)   | Results n (%) Mean ± SD   |
| <b>RALP vs. Radiotherapy</b>               |  |  |  |   |   |   |   |  |   |   |
| Hung et al (2015) <sup>199</sup><br>Taiwan | RALP: 43<br>RT: 96                                     | NR   | RALP: NR<br>RT: NR   | RALP: NR<br>RT: NR  | NR  | RALP: NR<br>RT: NR  | RALP: NR<br>RT: NR  | NR   | RALP: NR<br>RT: NR  | RALP: NR<br>RT: NR  |
| <b>RALP vs. Cryoablation</b>               |  |  |  |   |   |   |   |  |   |   |
| Ball et al (2006) <sup>116</sup><br>USA    | RALP: 82<br>LRP: 124<br>ORP: 135<br>BT: 118<br>CRY: 39 | Urinary function: UCLA-PCI<br>- in those with preoperatively scores≥30 | RALP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>LRP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>ORP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>BT: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>CRY: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>BT: 1 month (n=NR)<br>3 months (n=NR) | RALP: % baseline<br>33±25<br>58±28<br>69±31<br>LRP: % baseline<br>25±22<br>53±38<br>69±40<br>ORP: % baseline<br>38±32<br>62±33<br>75±40<br>BT: % baseline<br>82±22<br>85±23<br>91±25<br>CRY: % baseline<br>72±43<br>89±57<br>98±53<br>P <sub>1month</sub> <0.05<br>P <sub>3months</sub> ≥0.05<br>P <sub>6months</sub> ≥0.05 | Sexual function: UCLA-PCI<br>- in those with preoperatively scores≥30 | RALP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>LRP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>ORP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>BT: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>CRY: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) | RALP: % baseline<br>19±19<br>35±31<br>43±43<br>LRP: % baseline<br>14±17<br>21±21<br>25±21<br>ORP: % baseline<br>19±28<br>24±27<br>33±33<br>BT: % baseline<br>56±41<br>63±41<br>72±42<br>CRY: % baseline<br>13±12<br>18±20<br>43±29<br>P <sub>1month</sub> =0.01<br>P <sub>3months</sub> =0.01<br>P <sub>6months</sub> <0.05 | Urinary bother: UCLA-PCI<br>- in those with preoperatively scores≥30 | RALP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>LRP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>ORP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br>BT: 1 month (n=NR)<br>3 months (n=NR) | RALP: % baseline<br>39±39<br>65±34<br>78±45<br>LRP: % baseline<br>24±29<br>62±43<br>75±40<br>ORP: % baseline<br>37±37<br>67±42<br>74±40<br>BT: % baseline<br>53±36<br>70±39<br>81±43<br>CRY: % baseline<br>51±37<br>64±36<br>84±33<br>P <sub>1month</sub> ≥0.05<br>P <sub>3months</sub> ≥0.05 |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence  |  |   | Sexual function/ Potency    |               |                         | HRQOL  |   |  |
|-------|-------------|---|--|---|-----------------------------|---------------|-------------------------|--|---|--|
|       |             | Definition/ Measures  | Follow up (n)                                      | Results n (%) Mean ± SD                       | Definition/ Measure         | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure  | Follow up (n)                                 | Results n (%) Mean ± SD                        |
|       |             | Urinary function: AUA SI<br>- in those with preoperatively scores ≥30 | 6 months (n=NR)                                    | RALP: % baseline<br>86±41<br>106±39<br>123±52 |                             |               |                         | Sexual bother: UCLA-PCI<br>- in those with preoperatively scores ≥30                                     | 6 months (n=NR)                               | P <sub>6months</sub> ≥0.05<br>RALP: % baseline |
|       |             |   | 1 month (n=NR)                                     | LRP: % baseline<br>76±30                      |                             |               |                         |  | 1 month (n=NR)                                | 40±56  |
|       |             |   | 3 months (n=NR)                                    | 101±37  |                             |               |                         |  | 3 months (n=NR)                               | 43±50  |
|       |             |   | 6 months (n=NR)                                    | 106±34  |                             |               |                         |  | 6 months (n=NR)                               | 32±41  |
|       |             |   |  | ORP: % baseline<br>79±40<br>97±39<br>104±42   |                             |               |                         |  |   | LRP: % baseline<br>40±56<br>40±48<br>38±45     |
|       |             |   |  | RALP: 1 month (n=NR)<br>72±37                 | BT: % baseline<br>58±35     |               |                         |  |   | RALP: 1 month (n=NR)<br>28±41                  |
|       |             |   |  | 3 months (n=NR)<br>90±38                      | 72±37                       |               |                         |  |   | 3 months (n=NR)<br>27±41                       |
|       |             |   |  | 6 months (n=NR)<br>72±30                      | CRY: % baseline<br>72±30    |               |                         |  |   | 6 months (n=NR)<br>69±43                       |
|       |             |   |  | 98±46   | 98±46                       |               |                         |  |   | 65±46  |
|       |             |   |  | 90±37   | 90±37                       |               |                         |  |   | 70±45  |
|       |             |   |  |   | P <sub>1month</sub> =0.04   |               |                         |  |   | LRP: 1 month (n=NR)<br>54±55                   |
|       |             |   |  |   | P <sub>3months</sub> ≥0.003 |               |                         |  |   | 3 months (n=NR)<br>58±53                       |
|       |             |   |  | P <sub>6months</sub> ≥0.05                    |                             |               |                         | 6 months (n=NR)<br>55±48   |   |  |
|       |             |   |  |   |                             |               |                         | 6 months (n=NR)<br>P <sub>1month</sub> ≥0.05<br>P <sub>3months</sub> ≥0.05<br>P <sub>6months</sub> ≥0.05 |   |  |
|       |             |   | ORP: 1 month (n=NR)<br>3 months (n=NR)<br>6 months |   |                             |               |                         | Bowel function: UCLA-PCI<br>- in those with preoperatively   | 1 month (n=NR)<br>3 months (n=NR)<br>6 months | RALP: % baseline<br>88±25                      |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |   |                         | Sexual function/ Potency |               |                         | HRQOL   |  |  |
|-------|-------------|--------------------------------|---|-------------------------|--------------------------|---------------|-------------------------|---|--|--|
|       |             | Definition/ Measures           | Follow up (n)   | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure   | Follow up (n)  | Results n (%) Mean ± SD  |
|       |             |                                | (n=NR)  |                         |                          |               |                         | scores≥30   | (n=NR)   | 98±28<br>98±24   |
|       |             |                                | BT:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR)  |                         |                          |               |                         |   | BT:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR)   | LRP: % baseline<br>86±28<br>101±25<br>102±25   |
|       |             |                                | CRY:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR) |                         |                          |               |                         |   | CRY:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR)  | ORP: % baseline<br>89±26<br>98±22<br>102±26  |
|       |             |                                |   |                         |                          |               |                         |   |  | BT: % baseline<br>81±31<br>98±33<br>105±30   |
|       |             |                                |   |                         |                          |               |                         |   |  | CRY: % baseline<br>103±39<br>112±33<br>98±43   |
|       |             |                                |   |                         |                          |               |                         | Bowel bother:<br>UCLA-PCI<br>- in those with<br>preoperatively<br>scores≥30 | RALP:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months<br>(n=NR) | P <sub>1month</sub> ≥0.05<br>P <sub>3months</sub> ≥0.05<br>P <sub>6months</sub> ≥0.05<br>RALP: % baseline<br>88±35 |
|       |             |                                |   |                         |                          |               |                         |   | LRP:<br>1 month<br>(n=NR)<br>3 months<br>(n=NR)<br>6 months            | 98±34<br>99±30<br>LRP: % baseline<br>75±34<br>95±28  |



Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continenence |               |                         | Sexual function/ Potency |               |                         | HRQOL               |                         |                            |
|-------|-------------|--------------------------------|---------------|-------------------------|--------------------------|---------------|-------------------------|---------------------|-------------------------|----------------------------|
|       |             | Definition/ Measures           | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure      | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure | Follow up (n)           | Results n (%) Mean ± SD    |
|       |             |                                |               |                         |                          |               |                         |                     | (n=NR)                  | 94±27                      |
|       |             |                                |               |                         |                          |               |                         |                     | ORP:<br>1 month (n=NR)  | ORP: % baseline<br>78±32   |
|       |             |                                |               |                         |                          |               |                         |                     | 3 months (n=NR)         | 92±31                      |
|       |             |                                |               |                         |                          |               |                         |                     | 6 months (n=NR)         | 99±26                      |
|       |             |                                |               |                         |                          |               |                         |                     | BT: % baseline (n=NR)   | BT: % baseline<br>68±40    |
|       |             |                                |               |                         |                          |               |                         |                     | 1 month (n=NR)          | 91±37                      |
|       |             |                                |               |                         |                          |               |                         |                     | 3 months (n=NR)         | 96±42                      |
|       |             |                                |               |                         |                          |               |                         |                     | CRY: % baseline (n=NR)  | CRY: % baseline<br>83±30   |
|       |             |                                |               |                         |                          |               |                         |                     | 6 months (n=NR)         | 101±41                     |
|       |             |                                |               |                         |                          |               |                         |                     | CRY: (n=NR)             | 93±50                      |
|       |             |                                |               |                         |                          |               |                         |                     | 1 month (n=NR)          | P <sub>1month</sub> ≥0.05  |
|       |             |                                |               |                         |                          |               |                         |                     | 3 months (n=NR)         | P <sub>3months</sub> ≥0.05 |
|       |             |                                |               |                         |                          |               |                         |                     | 6 months (n=NR)         | P <sub>6months</sub> ≥0.05 |
|       |             |                                |               |                         |                          |               |                         |                     | RALP:<br>1 month (n=NR) |                            |
|       |             |                                |               |                         |                          |               |                         |                     | 3 months (n=NR)         |                            |
|       |             |                                |               |                         |                          |               |                         |                     | 6 months (n=NR)         |                            |



Table 13. Description and findings for functional and quality of life outcomes

| Study   | Sample size        | Urinary function/ Continence |                    |                         | Sexual function/ Potency           |                            |                         | HRQOL                               |   |                         |
|---|--------------------|------------------------------|--------------------|-------------------------|------------------------------------|----------------------------|-------------------------|-------------------------------------|---|-------------------------|
|   |                    | Definition/ Measures         | Follow up (n)      | Results n (%) Mean ± SD | Definition/ Measure                | Follow up (n)              | Results n (%) Mean ± SD | Definition/ Measure                 | Follow up (n)   | Results n (%) Mean ± SD |
|   |                    |                              |                    |                         |                                    |                            |                         |                                     | LRP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br>ORP:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br>BT:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR)<br><br>CRY:<br>1 month (n=NR)<br>3 months (n=NR)<br>6 months (n=NR) |                         |
| <b>RALP vs. Active Surveillance</b>                 |                    |                              |                    |                         |                                    |                            |                         |                                     |   |                         |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50 | NR                           | RALP: NR<br>AS: NR | RALP: NR<br>AS: NR      | Sexual function:<br>EORTC-QLQ-PR25 | RALP:<br>>12 months (n=51) | RALP:<br>64.4±NR<br>AS: | Urinary symptoms:<br>EORTC-QLQ-PR25 | RALP:<br>>12 months (n=65)  | RALP:<br>87.8±NR<br>AS: |

Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continence |               |                         | Sexual function/ Potency          |                            |                                       | HRQOL   |                            |  |
|-------|-------------|------------------------------|---------------|-------------------------|-----------------------------------|----------------------------|---------------------------------------|---|----------------------------|--|
|       |             | Definition/ Measures         | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure               | Follow up (n)              | Results n (%) Mean ± SD               | Definition/ Measure                                 | Follow up (n)              | Results n (%) Mean ± SD                    |
|       |             |                              |               |                         |                                   | AS:<br>>12 months (n=33)   | 72.0±NR<br>P=NR                       |   | AS:<br>>12 months (n=40)   | 85.4±NR<br>P=NR                            |
|       |             |                              |               |                         | Sexual function: IIEF-15          | RALP:<br>>12 months (n=28) | 16.6±11.4<br>AS:<br>16.4±10.5<br>P=NR | Incontinence aid: EORTC-QLQ-PR25                    | RALP:<br>>12 months (n=26) | RALP:<br>64.4±NR<br>AS:<br>73.2±NR<br>P=NR |
|       |             |                              |               |                         | Orgasmic function: IIEF-15        | AS:<br>>12 months (n=25)   | 6.1±3.5<br>P=NR                       |   | AS:<br>>12 months (n=14)   | RALP:<br>97.1±NR<br>AS:<br>96.0±NR<br>P=NR |
|       |             |                              |               |                         | Sexual desire: IIEF-15            | RALP:<br>>12 months (n=28) | 6.0±3.8<br>P=NR                       | Bowel symptoms: EORTC-QLQ-PR25                      | RALP:<br>>12 months (n=64) | RALP:<br>94.9±NR<br>AS:<br>94.9±NR<br>P=NR |
|       |             |                              |               |                         | Intercourse satisfaction: IIEF-15 | AS:<br>>12 months (n=24)   | 6.2±2.3<br>AS:<br>5.9±2.3<br>P=NR     | Hormonal treatment related symptoms: EORTC-QLQ-PR25 | AS:<br>>12 months (n=40)   | RALP:<br>57.9±NR<br>AS:<br>61.1±NR<br>P=NR |
|       |             |                              |               |                         |                                   | RALP:<br>>12 months (n=28) | 7.1±4.9<br>P=NR                       |   | RALP:<br>>12 months (n=60) | RALP:<br>61.1±NR<br>P=NR                   |
|       |             |                              |               |                         |                                   | AS:<br>>12 months (n=26)   | 7.0±4.7<br>P=NR                       |   | AS:<br>>12 months (n=37)   | AS:<br>61.1±NR<br>P=NR                     |
|       |             |                              |               |                         |                                   | RALP:                      | RALP:                                 | Sexual active:                                      | RALP:                      | RALP:                                      |

Table 13. Description and findings for functional and quality of life outcomes

| Study | Sample size | Urinary function/ Continence |               |                         | Sexual function/ Potency      |  |  | HRQOL   |  |  |
|-------|-------------|------------------------------|---------------|-------------------------|-------------------------------|--|--|---|--|--|
|       |             | Definition/ Measures         | Follow up (n) | Results n (%) Mean ± SD | Definition/ Measure           | Follow up (n)  | Results n (%) Mean ± SD                | Definition/ Measure   | Follow up (n)  | Results n (%) Mean ± SD  |
|       |             |                              |               |                         | Overall satisfaction: IIEF-15 | >12 months (n=28)<br><br>AS: >12 months (n=25)<br><br>RALP: >12 months (n=27)<br><br>AS: >12 months (n=26) | 6.0±3.0<br><br>AS: 6.0±2.6<br><br>P=NR | EORTC-QLQ-PR25<br><br><br>Severity of incontinence and QOL: ICIQ-SF<br><br><br>Overall quality of life: EORTC-QLC-C30 | >12 months (n=63)<br><br>AS: >12 months (n=39)<br><br>RALP: >12 months (n=25)<br><br>AS: >12 months (n=28)<br><br>RALP: >12 months (n=65)<br><br>AS: >12 months (n=40) | 2.4±3.4<br><br>AS: 1.6±3.6<br><br>P=NR<br><br>RALP: 81.6±13.1<br><br>AS: 82.0±16.1<br><br>P=NR |

AS= Active Surveillance; BNS= Bilateral Nerve-sparing; BT= Brachytherapy; CI= Confidence Interval; EORTC-QLC-C30 = the European Organization for Research and Treatment of Cancer –Quality of life Core 30; EORTC-QLD-PR25= the European Organization for Research and Treatment of Cancer – Prostate-specific Quality of life; EPIC= Expanded Prostate Cancer Index Composite; HADS = Hospital Anxiety and Depression Scale; HR= Hazard Ratio; HRQOL= Health-related Quality of Life; ICIQ-SF= the International Consultation on Incontinence Questionnaire- Short Form; IIEF-5= the International Index of Erectile Function Questionnaire; IPSS = International Prostate Symptom Score; KM= Kaplan Meier; LRP= Laparoscopic Radical Prostatectomy; MCS= Mental Component Summary; NA= Not Applicable; NR= Not Reported; NS= Nerve-sparing; ORP = Open Radical Prostatectomy; PCS = Physical Component Summary; PDE-5: phosphodiesterase-5; PSA= prostate-specific antigen; QOL = Quality of Life; RALP= Robot-assisted Radical Prostatectomy; RIES = Revised Impact of Event Scale; RT= Radiotherapy; SD= Standard Deviation; SF-12= 12-Item Short Form Health Survey; SHIM = Sexual Health Inventory for Men; UCLA-PCI= UCLA Prostate Cancer Index; UNS= Unilateral Nerve-sparing



Table 14. Safety: perioperative complications

| Study  | Sample size           | Blood transfusion n (%)                 | Conversion n (%)                      | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)                       | Clavien complication total n (%)                            | Other complications (not included in Clavien) n (%) | UTI n (%)                             | BNC n (%)           |
|--|-----------------------|---|---------------------------------------|-------------------------|--|---|---------------------------------------|---|---|---------------------------------------|---------------------|
| <b>RALP vs. LRP</b>                                  |                       |   |                                       |                         |  |   |                                       |   |   |                                       |                     |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br>LRP: 308  | RALP: 7 (8.9)<br>LRP: 54 (17.5)<br>P=NR | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NA     | Grade 1<br>RALP: 0 (0.0)<br>LRP: 11 (3.6)<br>Grade 2<br>RALP: 8 (10.1)<br>LRP: 62 (20.1)<br>P=NR   | Grade 3<br>RALP: 3 (3.8)<br>LRP: 7 (2.3)<br>Grade 4<br>RALP: 0 (0.0)<br>LRP: 4 (1.3)<br>P=NR  | RALP: 0 (0.0)<br>LRP: 1 (0.3)<br>P=NR | RALP: 11 (13.9)<br>LRP: 85 (27.6)<br>P=NR                   | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br>LRP: 100 | RALP: 0 (0.0)<br>LRP: 1 (1.0)<br>P=NR   | RALP: 0 (0.0)<br>LRP: 1 (1.0)<br>P=NR | RALP: NR<br>LRP: NA     | RALP: 5 (5.0)<br>1 case of UTI<br>1 case of urinary retention<br>1 cases of lymph leak<br>1 case of pseudomembranous colitis<br>1 case of pulmonary embolism<br>LRP: 7 (7.0)<br>4 cases of UTI<br>1 case of urinary leak<br>1 case of acute renal failure<br>1 case of blood transfusion<br>P=NR | Grade 3<br>RALP: NR<br>- 3a: 1 (1)<br>- 3b: 3 (3)<br>2 cases of submeatal stenosis<br>1 case of port-site hernia<br>LRP: NR<br>- 3a: 0<br>- 3b: 3 (3)<br>2 cases of urethral stricture<br>1 case of rectal injury<br>1 case of removal of intravesical hemolok<br>Grade 4<br>RALP: 0 (0.0)<br>LRP: 1 (1.0)<br>1 case of pulmonary edema | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: 9 (9.0)<br>LRP: 12 (12.0)<br>P=0.49<br>Within 90 days | RALP: NR<br>LRP: NR                                 | RALP: 1 (1.0)<br>LRP: 4 (4.0)<br>P=NR | RALP: NR<br>LRP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size               | Blood transfusion n (%) | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)       | Clavien 3-4 n (%)  | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)                                     | BNC n (%)   |
|---|---------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--|-------------------------|----------------------------------|--|---|---|
|   |                           |                         |                         |                         |                         | $P_{\text{grade3}}=\text{NR}$<br>$P_{\text{grade4}}=\text{NR}$ |                         |                                  |  |   |   |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand | RALP: 486<br><br>LRP: 561 | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NA | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR          | RALP: NR<br>37 cases of bleeding<br>3 cases of bowel injury<br>4 cases of MI<br>2 cases of wound infection<br>2 cases of CVA<br>39 cases of anastomosis leakage<br>15 cases of BNC<br>15 cases of anastomosis stricture<br><br>LRP: NR<br>141 cases of bleeding<br>8 cases of bowel injury<br>3 cases of MI<br>8 cases of wound infection<br>1 cases of CVA<br>65 cases of anastomosis leakage<br>13 cases of BNC<br>13 cases of anastomosis stricture<br><br>$P_{\text{bleeding}} < 0.001$<br>$P_{\text{bowel}} = 0.2$<br>$P_{\text{MI}} = 0.711$<br>$P_{\text{infection}} < 0.117$<br>$P_{\text{CVA}} = 0.6$<br>$P_{\text{leakage}} = 0.054$<br>$P_{\text{stricture}} = 0.584$ | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: 15 (3.1)<br><br>LRP: 13 (2.4)<br><br>P=0.58 |
| Busch et al (2014) <sup>145</sup>                   | RALP: 194                 | RALP: NR                | RALP: NR                | RALP: NR                | RALP: NR                | RALP: NR   | RALP: NR                | RALP: NR                         | RALP: NR   | RALP: NR                                      | RALP: NR  |

Table 14. Safety: perioperative complications

| Study  | Sample size             | Blood transfusion n (%)                   | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                                  | Clavien complication total n (%)            | Other complications (not included in Clavien) n (%)  | UTI n (%)                               | BNC n (%)           |
|--|-------------------------|---|---------------------|-------------------------|--|--|--|---|--|---|---------------------|
| Germany and USA  | LRP: 194                | LRP: NR                                   | LRP: NR             | LRP: NA                 | LRP: NR  | LRP: NR  | LRP: NR  | LRP: NR                                     | LRP: NR  | LRP: NR                                 | LRP: NR             |
| Ploussard et al (2014) <sup>111</sup><br>France  | RALP: 1009<br>LRP: 1377 | RALP: 29 (2.9)<br>LRP: 65 (4.7)<br>P=0.08 | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | Grade 1<br>RALP: 7 (0.7)<br>LRP: 8 (0.6)<br>Grade 2<br>RALP: 36 (3.6)<br>LRP: 43 (3.1)<br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>Grade 4<br>RALP: 2 (0.2)<br>LRP: 3 (0.2)<br>P <sub>grade3</sub> =NA<br>P <sub>grade4</sub> =NR | Grade 5<br>RALP: 1 (0.1)<br>LRP: 0 (0.0)<br>P=NR | RALP: 47 (4.7)<br>LRP: 55 (4.0)<br>P=0.76   | RALP: NR<br>23 cases of anastomosis leakage<br>7 cases of anastomosis stenosis<br>LRP: NR<br>134 cases of anastomosis leakage<br>23 cases of anastomosis stenosis<br>p<0.001 | RALP: 32 (3.2)<br>LRP: 32 (2.3)<br>P=NR | RALP: NR<br>LRP: NR |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                              | RALP: NR<br>LRP: NR                         | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                     | RALP: NR<br>LRP: NR |
| Tozawa et al (2014) <sup>147</sup><br>Japan  | RALP: 157<br>LRP: 551   | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                              | RALP: NR<br>LRP: NR                         | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                     | RALP: NR<br>LRP: NR |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy   | RALP: 136<br>LRP: 91    | RALP: NR<br>LRP: NR                       | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                              | RALP: 20 (14.7)<br>LRP: 11 (12.1)<br>P=0.06 | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                     | RALP: NR<br>LRP: NR |
| Berge et al (2013) <sup>113</sup>  | RALP: 210               | RALP: 8 (3.8)                             | RALP: NR            | RALP: NR                | RALP: NR   | RALP: NR   | RALP: NR   | RALP: NR                                    | RALP: NR   | RALP: NR                                | RALP: NR            |

Table 14. Safety: perioperative complications

| Study   | Sample size           | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)      | Other complications (not included in Clavien) n (%) | UTI n (%)                                     | BNC n (%)               |
|---|-----------------------|-------------------------|---------------------|-------------------------|--|--|---|---------------------------------------|---|---|-------------------------|
| Norway  | LRP: 210              | LRP: 6 (2.9)<br>P=0.60  | LRP: NR             | LRP: NA                 | LRP: NR  | LRP: NR  | LRP: NR                                       | LRP: NR                               | LRP: NR   | LRP: NR                                       | LRP: NR                 |
| Harty et al (2013) <sup>200</sup><br>Jan 2000-Mar 2010<br>USA | RALP: 152<br>LRP: 140 | RALP: NR<br>LRP: NR     | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR     |
| Pierorazio et al (2013) <sup>149</sup><br>USA                 | RALP: 105<br>LRP: 65  | RALP: NR<br>LRP: NR     | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR     |
| Porpiglia et al (2013) <sup>109</sup><br>Italy                | RALP: 60<br>LRP: 60   | RALP: NR<br>LRP: NR     | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NA     | RALP: NR<br>- early: 9 (15.0)<br>2 cases of UTI<br>2 case of transient hypoaesthesia of left arm<br>1 case of ileus<br>1 case of urinary leak<br>1 case of wound infection<br>1 case of lymphocele<br>1 case of urinary retention<br>- late: 1 (1.7)<br>1 case of epidymitis<br><br>LRP: NR<br>- early: 5 (8.3)<br>1 case of UTI<br>1 case of fever<br>1 case of delirium<br>1 case of urinary leak<br>1 case of wound infection | Grade 3<br>RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>LRP: NR<br><br>P=0.43 | RALP: NR<br><br>LRP: NR                             | RALP: 2 (3.3)<br><br>LRP: 1 (1.7)<br><br>P=NR | RALP: NR<br><br>LRP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size           | Blood transfusion n (%)               | Conversion n (%)                    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                       | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%) | UTI n (%)                             | BNC n (%)                             |
|---|-----------------------|---------------------------------------|-------------------------------------|-------------------------|---|--|---------------------------------------|---|---|---------------------------------------|---------------------------------------|
|   |                       |                                       |                                     |                         | - late: 2 (3.3)<br>1 case of distal urethral stenosis<br>1 case of transient right leg edema<br><br>P=0.43<br><br>- early: within 30 days<br>- late: 30-90 days   |  |                                       |   |   |                                       |                                       |
| Koutlidis et al (2012) <sup>114</sup><br>France | RALP: 175<br>LRP: 104 | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                 | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   |
| Park et al (2012) <sup>150</sup><br>South Korea | RALP: 183<br>LRP: 144 | RALP: 1 (0.5)<br>LRP: 1 (0.7)<br>P=NR | RALP: 0 (0.0)<br>LRP: (0.0)<br>P=NA | RALP: NR<br>LRP: NA     | Grade 1<br>RALP: 6 (3.3)<br>3 cases of anastomosis leakage<br>1 case of clot retention<br>2 cases of urinary retention<br><br>LRP: 13 (9.0)<br>5 cases of anastomosis leakage<br>8 cases of urinary retention<br><br>Grade 2<br>RALP: 4 (2.2)<br>1 case of perivesical hematoma<br>1 case of pulmonary edema<br>1 case of body rash<br>1 case of leg numbness | Grade 3<br>RALP: 12 (6.6)<br>1 case of wound dehiscence<br>1 case of BNC<br>1 case of lymphocele<br>7 cases of inguinal hernia<br>1 case of incisional hernia<br>1 case of urethral tearing<br><br>LRP: 14 (9.7)<br>2 case of wound dehiscence<br>3 case of BNC<br>5 cases of inguinal hernia<br>1 case of rectourethral fistula<br>2 cases of ureter injury | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: 22 (12.0)<br>- during surgery: 1 (0.5)<br>- early: 10 (5.5)<br>- late: 11 (6.0)<br><br>LRP: 27 (18.8)<br>- during surgery: 3 (2.1)<br>- early: 16 (11.1)<br>- late: 8 (5.6)<br><br>P=0.15<br><br>- early: within 30 days<br>- late: after 30 days | RALP: NR<br>LRP: NR                                 | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: 1 (0.5)<br>LRP: 3 (2.1)<br>P=NR |



Table 14. Safety: perioperative complications

| Study  | Sample size           | Blood transfusion n (%)               | Conversion n (%)                      | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                       | Clavien complication total n (%)         | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)           |
|--|-----------------------|---------------------------------------|---------------------------------------|-------------------------|--|--|---------------------------------------|--|---|---------------------|---------------------|
|  |                       |                                       |                                       |                         | LRP: 0 (0.0)<br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR   | 1 case of IEV injury<br>P=NR   |                                       |  |   |                     |                     |
| Asimakopoulos et al (2011) <sup>110</sup><br>Italy | RALP: 52<br>LRP: 60   | RALP: 0 (0.0)<br>LRP: 3 (5)<br>P=0.10 | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: NR<br>LRP: NA     | Grade 1<br>RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>Grade 2<br>RALP: 7 (13.5)<br>4 cases of paravesical hematoma<br>1 case of thromboembolism<br>1 case of bronchitis<br>1 case of epididymitis<br>LRP: 5 (8.3)<br>5 cases of paravesical hematoma<br>P <sub>grade1</sub> =NA<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP: 1 (1.9)<br>1 case of paravesical hematoma<br>LRP: 0 (0.0)<br>Grade 4<br>RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NA | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: 8 (15.4)<br>LRP: 5 (8.3)<br>P=0.24 | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR |
| Kasraeian et al (2011) <sup>151</sup><br>France    | RALP: 200<br>LRP: 200 | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                      | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR |
| Magheli et al (2011) <sup>152</sup><br>USA         | RALP: 522<br>LRP: 522 | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                      | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR |
| Willis et al (2011) <sup>115</sup><br>USA          | RALP: 121             | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NA     | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                      | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR |



Table 14. Safety: perioperative complications

| Study  | Sample size               | Blood transfusion n (%)                        | Conversion n (%)                              | Equipment failure n (%)                  | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)              | Other complications (not included in Clavien) n (%) | UTI n (%)                                     | BNC n (%)                                     |
|--|---------------------------|--|---|--|--|--|---|---|---|---|---|
|  | LRP: 161                  |  |   |  |  |  |   |   |   |   |   |
| Bolenz et al (2010) <sup>153</sup><br>USA    | RALP: 262<br><br>LRP: 220 | RALP: 12 (4.6)<br><br>LRP: 4 (1.8)<br><br>P=NR | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NA                  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR  | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                             | RALP: NR<br><br>LRP: NR                       | RALP: NR<br><br>LRP: NR                       |
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br><br>LRP: 85   | RALP: 4 (5.6)<br><br>LRP: 5 (5.9)<br><br>P=NR  | RALP: 0 (0.0)<br><br>LRP: 1 (1.2)<br><br>P=NA | RALP: NR<br><br>LRP: NA                  | Grade 1<br>RALP: 0 (0.0)<br><br>LRP: 3 (3.5)<br>2 cases of anastomosis leakage<br>1 case of rectal injury<br><br>Grade 2<br>RALP: 1 (1.4)<br>1 case of UTI<br><br>LRP: 0 (0.0)<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP: 5 (7.0)<br>1 case of urinary retention<br>4 cases of bleeding<br><br>LRP: 3 (3.5)<br>3 cases of urinary retention<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR | RALP: NR<br><br>LRP: NR                       | RALP: 6 (8.5)<br><br>LRP: 6 (7.1)<br><br>P=NR | RALP: NR<br><br>LRP: NR                             | RALP: 1 (1.4)<br><br>LRP: 0 (0.0)<br><br>P=NR | RALP: NR<br><br>LRP: NR                       |
| Hakimi et al (2009) <sup>155</sup><br>USA    | RALP: 75<br><br>LRP: 75   | RALP: 1 (1.3)<br><br>LRP: 0 (0.0)<br><br>P=NR  | RALP: 1 (1.3)<br><br>LRP: 0 (0.0)<br><br>P=NR | RALP: 1 (1.3)<br><br>LRP: NA<br><br>P=NA | Grade 1<br>RALP: NR<br>3 cases of urinary retention<br>3 cases of ileus<br>1 case of prolonged Jackson-Pratt drainage<br><br>LRP: NR<br>1 case of urinary retention<br>1 case of ileus<br>6 cases of prolonged                           | Grade 3<br>RALP: 1 (1.3)<br>1 case of BNC<br><br>LRP: NR<br>2 cases of BNC<br>2 cases of lymphocele<br>1 case of anastomosis stricture<br>1 case of hematuria<br><br>Grade 4<br>RALP: NR   | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: NR<br><br>LRP: NR<br><br>P=NR           | RALP: NR<br><br>LRP: NR                             | RALP: 2 (2.7)<br><br>LRP: 0 (0.0)<br><br>P=NR | RALP: 1 (1.3)<br><br>LRP: 2 (2.7)<br><br>P=NR |



Table 14. Safety: perioperative complications

| Study                                       | Sample size               | Blood transfusion n (%)                          | Conversion n (%)  | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)                   | Other complications (not included in Clavien) n (%) | UTI n (%)                                     | BNC n (%)               |
|---|---------------------------|--|---|-------------------------|---|--|---|--|---|---|-------------------------|
|   |                           |  |   |                         | Jackson-Pratt drainage<br><br>Grade 2<br>RALP: 1<br>1 case of bleeding<br><br>LRP: 0 (0.0)<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR  | 1 case of DVT<br>2 cases of urinary tract sepsis<br><br>LRP: 1 (1.3)<br>1 case of pulmonary embolism<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR   |   |  |   |   |                         |
| Rozet et al (2009) <sup>156</sup><br>France | RALP: 133<br><br>LRP: 133 | RALP: 4 (3.0)<br><br>LRP: 13 (9.8)<br><br>P=0.02 | RALP: 4 (3.0)*<br><br>LRP: 0 (0.0)<br><br>P=NR<br><br>*converted to LRP | RALP: NR<br><br>LRP: NA | Grade 1<br>RALP: 1 (0.8)<br>1 case of anastomosis leakage<br><br>LRP: 1 (0.8)<br>1 case of anastomosis leakage<br><br>Grade 2<br>RALP: 16 (12.0)<br>1 case of wound abscess<br>3 cases of infected pelvic hematoma<br>6 cases of UTI<br>6 cases of bleeding<br><br>LRP: 4 (3.0)<br>2 cases of infected pelvic hematoma<br>1 case of UTI<br>1 case of bleeding<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP: 5 (3.8)<br>1 case of urinary retention<br>1 case of anastomosis leakage<br>3 cases of bleeding<br><br>LRP: 4 (3.0)<br>3 cases of urinary retention<br>1 case of anastomosis leakage<br><br>Grade 4<br>RALP: 4 (3.0)<br>2 cases of urinary sepsis<br>2 cases of renal insufficiency<br><br>LRP: 3 (2.3)<br>2 cases of urinary sepsis<br>1 case of pulmonary embolism | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA | RALP: 26 (19.4)<br><br>LRP: 12 (9.1)<br><br>P=0.01 | RALP: NR<br><br>LRP: NR                             | RALP: 6 (4.5)<br><br>LRP: 1 (0.8)<br><br>P=NR | RALP: NR<br><br>LRP: NR |

Table 14. Safety: perioperative complications

| Study                                       | Sample size           | Blood transfusion n (%)               | Conversion n (%)                      | Equipment failure n (%)          | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                       | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)                             | BNC n (%)                             |
|---|-----------------------|---------------------------------------|---------------------------------------|----------------------------------|---|--|---------------------------------------|----------------------------------|---|---------------------------------------|---------------------------------------|
|   |                       |                                       |                                       |                                  |   | P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR   |                                       |                                  |   |                                       |                                       |
| Trabulsi et al (2008) <sup>157</sup><br>USA | RALP: 50<br>LRP: 190  | RALP: NR<br>LRP: NR                   | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: NR<br>LRP: NA              | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR              | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   |
| Ball et al (2006) <sup>116</sup><br>USA     | RALP: 82<br>LRP: 124  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NA              | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR              | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR                   | RALP: NR<br>LRP: NR                   |
| Hu et al (2006) <sup>158</sup><br>USA       | RALP: 322<br>LRP: 358 | RALP: 5 (1.6)<br>LRP: 8 (2.2)<br>P=NR | RALP: 0 (0.0)<br>LRP: 3 (0.8)<br>P=NR | RALP: 2 (0.6)<br>LRP: NA<br>P=NA | Grade 1<br>RALP: NR<br>24 cases of urinary leak<br>2 cases of DVT<br>7 cases of infection<br><br>LRP: NR<br>48 cases of urinary leak<br>16 cases of infection<br>1 case of acute tubular necrosis<br>3 cases of neurological complications<br><br>Grade 2<br>RALP: NR<br>13 cases of urinary retention<br>1 case of clot retention<br>9 cases of ileus<br>2 cases of bleeding<br><br>LRP: NR<br>20 cases of urinary | Grade 3<br>RALP: NR<br>1 case of ureteral injury<br>2 cases of BNC<br>3 cases of lymphocele<br>1 case of intra-abdominal drain retraction<br>2 cases of hemocolonic injury<br>1 case of neurological complications<br><br>LRP: NR<br>1 case of ureteral injury<br>8 cases of BNC<br>3 cases of lymphocele<br>6 case of rectourethral fistulas<br>1 case of hem colonic injury<br>7 cases of rectal | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: NR<br>LRP: NR              | RALP: 3 (0.9)<br>3 cases of fever due to fluid collection<br><br>LRP: 3 (0.8)<br>3 cases of fever due to fluid collection<br><br>P=NR | RALP: 0 (0.0)<br>LRP: 0 (0.0)<br>P=NA | RALP: 2 (0.6)<br>LRP: 8 (2.2)<br>P=NR |



Table 14. Safety: perioperative complications

| Study                                       | Sample size                 | Blood transfusion n (%)                         | Conversion n (%)                         | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)         | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%)  | UTI n (%)               | BNC n (%)                                    |
|---|-----------------------------|---|--|-------------------------|---|---|-------------------------|---|--|-------------------------|--|
|   |                             |   |  |                         | retention<br>1 case of clot retention<br>19 cases of ileus<br>4 cases of bleeding<br>1 case of rectourethral fistulas<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | injury<br>3 cases of epigastric artery injury<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NA |                         |   |  |                         |  |
| Joseph et al (2005) <sup>159</sup><br>USA   | RALP: 50<br><br>LRP: 50     | RALP: 0 (0.0)<br><br>LRP: 0 (0.0)<br><br>P=NA   | RALP: NR<br><br>LRP: NR                  | RALP: NR<br><br>LRP: NA | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR   | RALP: 4 (8.0)<br>1 case of urinary leak<br>3 cases of BNC<br><br>LRP: 2 (4.0)<br>1 case of urinary leak<br>1 case of BNC<br><br>P=NR<br><br>Within 30 days | RALP: NR<br><br>LRP: NR | RALP: 3 (6.0)<br><br>LRP: 1(2.0)<br><br>P=NR |
| <b>RALP vs. ORP</b>                         |                             |   |  |                         |   |   |                         |   |  |                         |  |
| Hu et al (2017) <sup>160</sup><br>USA       | RALP: 4164<br><br>ORP: 4164 | RALP: NR<br><br>ORP: NR                         | RALP: NR<br><br>ORP: NA                  | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                      |
| Jackson et al. (2016) <sup>117</sup><br>USA | RALP: 116<br><br>ORP: 63    | RALP: 0 (0.0)<br><br>ORP: 1 (1.6)<br><br>P=0.17 | RALP: 0 (0.0)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | RALP: 11 (9.5)<br><br>ORP: 5 (7.9)<br><br>P=0.95  | RALP: 5 (4.3)<br><br>ORP: 2 (3.2)<br><br>P=0.95   | RALP: NR<br><br>ORP: NR | RALP: 16 (13.8)<br><br>ORP: 7 (11.1)<br><br>P=0.61<br><br>Within 1 year | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                      |
| Ong et al.                                  | RALP:                       | RALP: NR  | RALP: NR                                 | RALP: NR                | RALP: NR  | RALP: NR  | RALP: NR                | RALP: NR  | RALP: NR   | RALP: NR                | RALP: NR                                     |

Table 14. Safety: perioperative complications

| Study  | Sample size                       | Blood transfusion n (%)                       | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                       | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)           |
|--|-----------------------------------|---|---------------------|-------------------------|--|--|---------------------------------------|---|---|---------------------|---------------------|
| (2016) <sup>118</sup><br>Australia               | 885<br>ORP:<br>1117               | ORP: NR                                       | ORP: NA             | ORP: NA                 | ORP: NR  | ORP: NR  | ORP: NR                               | ORP: NR   | ORP: NR   | ORP: NR             | ORP: NR             |
| Pearce et al. (2016) <sup>161</sup><br>USA       | RALP:<br>73,131<br>ORP:<br>23,804 | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Suardi et al. (2016) <sup>162</sup><br>Italy     | RALP:<br>1790<br>ORP:<br>4404     | RALP: NR<br>ORP: NR                           | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Yaxley et al. (2016) <sup>103</sup><br>Australia | RALP:<br>163<br>ORP:<br>163       | RALP (n=157): 1 (0.6)<br>ORP (n=151): 6 (4.0) | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | Grade 1<br>RALP (n=157): 4 (2.5)<br>ORP (n=151): 6 (4.0)<br>Grade 2<br>RALP (n=157): 2 (1.3)<br>ORP (n=151): 3 (2.0) | Grade 3<br>RALP (n=157): 1 (0.6)<br>ORP (n=151): 5 (3.3)<br>Grade 4<br>RALP (n=157): 0 (0.0)<br>ORP (n=151): 2 (1.3) | RALP: NR<br>ORP: NR                   | RALP (n=157)*: 6 (3.8)<br>ORP (n=151)*: 14 (9.3)<br>*Some patients had more than one complication | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Akand et al. (2015) <sup>142</sup><br>Turkey     | RALP: 79<br>ORP: 50               | RALP: 7 (8.9)<br>ORP: 27 (54.0)<br>P=NR       | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | Grade 1<br>RALP: 0 (0.0)<br>ORP: 3 (6.0)<br>Grade 2<br>RALP: 8 (10.1)<br>ORP: 28 (56.0)<br>P=NR                      | Grade 3<br>RALP: 3 (3.8)<br>ORP: 10 (20.0)<br>Grade 4<br>RALP: 0 (0.0)<br>ORP: 4 (8.0)<br>P=NR                       | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NR | RALP: 11 (13.9)<br>ORP: 45 (90.0)<br>P=NR   | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Antonelli et al. (2015) <sup>163</sup>           | RALP:<br>291                      | RALP: NR                                      | RALP: NR            | RALP: NR                | RALP: NR   | RALP: NR   | RALP: NR                              | RALP: NR  | RALP: NR  | RALP: NR            | RALP: NR            |

Table 14. Safety: perioperative complications

| Study   | Sample size            | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)   | BNC n (%)           |
|---|------------------------|-------------------------|---------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|--|---|---------------------|
| Italy   | LRP: 285               | ORP: NR                 | ORP: NA             | ORP: NA                 | ORP: NR             | ORP: NR             | ORP: NR             | ORP: NR                          | ORP: NR  | ORP: NR   | ORP: NR             |
| Haglund et al (2015) <sup>119</sup><br>Sweden | RALP: 1847<br>ORP: 778 | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP‡: NR<br>- infection: 309 (16.7)<br>59 cases of infection in the operation wound<br>8 cases of pneumonia<br>- cardiovascular: 101 (5.5)<br>5 cases of pulmonary embolism<br>7 cases of hypertension<br>2 cases of acute MI<br>24 cases of arrhythmia or other heart diseases<br>4 cases of DVT<br>- surgical: 392 (21.2)<br>36 cases of bleeding from the operation wound<br>162 cases of bleeding from the urinary tract<br>33 cases of inguinal hernia<br>100 cases of catheter blockage<br>- gastrointestinal: 264 (14.3)<br>35 cases of nausea<br>64 cases of impaired appetite<br>99 cases of loose or frequent stool<br>138 cases of constipation<br>- psychological: 228 (12.3) | RALP‡: 262 (14.2)<br>ORP‡: 89 (11.4)<br>P=NR<br>‡Data taken from Wallerstedt et al (2015) | RALP: NR<br>ORP: NR |

Table 14. Safety: perioperative complications

| Study | Sample size | Blood transfusion n (%) | Conversion n (%) | Equipment failure n (%) | Clavien 1-2 n (%) | Clavien 3-4 n (%) | Clavien 5 n (%) | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%) | BNC n (%) |
|-------|-------------|-------------------------|------------------|-------------------------|-------------------|-------------------|-----------------|----------------------------------|--|-----------|-----------|
|       |             |                         |                  |                         |                   |                   |                 |                                  | 156 cases of depression mood<br>187 cases of worry<br><br>ORP‡: NR<br>- infection: 121 (15.6)<br>42 cases of infection in the operation wound<br>5 cases of pneumonia<br>- cardiovascular: 58 (7.5)<br>6 cases of pulmonary embolism<br>34 cases of hypertension<br>1 cases of acute MI<br>12 cases of arrhythmia or other heart diseases<br>14 cases of DVT<br>- surgical: 187 (24.0)<br>37 cases of bleeding from the operation wound<br>66 cases of bleeding from the urinary tract<br>14 cases of inguinal hernia<br>58 cases of catheter blockage<br>- gastrointestinal: 138 (17.7)<br>17 cases of nausea<br>37 cases of impaired appetite<br>48 cases of loose or frequent stool<br>84 cases of constipation |           |           |



Table 14. Safety: perioperative complications

| Study   | Sample size           | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%)                                  | Other complications (not included in Clavien) n (%)   | UTI n (%)           | BNC n (%)           |
|---|-----------------------|-------------------------|---------------------|-------------------------|---------------------|---------------------|---------------------|---|---|---------------------|---------------------|
|   |                       |                         |                     |                         |                     |                     |                     |   | - psychological: 122 (15.7)<br>92 cases of depression mood<br>94 cases of worry<br><br>$P_{infection(adjusted)} > 0.05$<br>$P_{cardiovascular(adjusted)} > 0.05$<br>$P_{surgical(adjusted)} > 0.05$<br>$P_{gastrointestinal(adjusted)} > 0.05$<br>$P_{psychological(adjusted)} > 0.05$<br><br>‡Data taken from Wallerstedt et al (2015) |                     |                     |
| Lee et al. (2015) <sup>164</sup><br>South Korea       | RALP: 99<br>ORP: 99   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: 9 (18.0)<br>ORP: 8 (23.5)<br><br>$P=0.44$<br>Within 90 days | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Davison et al. (2014) <sup>121</sup><br>Canada        | RALP: 78<br>ORP: 73   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Fode et al. (2014) <sup>122</sup><br>Denmark          | RALP: 585<br>ORP:     | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |



Table 14. Safety: perioperative complications

| Study   | Sample size                 | Blood transfusion n (%)                             | Conversion n (%)                         | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%)   | UTI n (%)               | BNC n (%)               |
|---|-----------------------------|---|--|-------------------------|--|--|---|---|---|-------------------------|-------------------------|
|   | 453                         |   |  |                         |  |  |   |   |   |                         |                         |
| Gagnon et al. (2014) <sup>165</sup><br>Canada | RALP: 200<br><br>ORP: 200   | RALP: 7 (3.5)<br><br>ORP: 3 (1.5)<br><br>P=0.34     | RALP: 1 (0.5)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 26 (13.0)<br><br>ORP: 11 (5.5)<br><br>Grade 2<br>RALP: 14 (7.0)<br><br>ORP: 6 (3.0)<br><br>P <sub>grade1</sub> =0.01<br>P <sub>grade2</sub> =0.11 | Grade 3<br>RALP: 4 (2.0)<br><br>ORP: 6 (6.0)<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P <sub>grade3</sub> =0.52<br>P <sub>grade4</sub> =NA | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: 44 (22.0)<br><br>ORP: 23 (11.5)<br><br>P=0.01<br><br>Within 90 days | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Gandaglia et al (2014) <sup>166</sup><br>USA  | RALP: 3476<br><br>ORP: 2439 | RARO: 66 (1.9)<br><br>ORP: 216 (8.9)<br><br>P<0.001 | RALP: NR<br><br>ORP: NA                  | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR   | RALP: NR<br>- early: 770 (22.2)<br>61 cases of cardiac complications<br>163 cases of respiratory complications<br>170 cases of genitourinary complications<br>52 cases of wound complications<br>73 cases of vascular complications<br>376 cases of other medical complications<br>156 cases of other surgical complications<br>- late: 905 (26.0)<br>70 cases of cardiac complications<br>190 cases of respiratory complications<br>193 cases of genitourinary | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 14. Safety: perioperative complications

| Study | Sample size | Blood transfusion n (%) | Conversion n (%) | Equipment failure n (%) | Clavien 1-2 n (%) | Clavien 3-4 n (%) | Clavien 5 n (%) | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%) | BNC n (%) |
|-------|-------------|-------------------------|------------------|-------------------------|-------------------|-------------------|-----------------|----------------------------------|---|-----------|-----------|
|       |             |                         |                  |                         |                   |                   |                 |                                  | complications<br>61 cases of wound complications<br>122 cases of vascular complications<br>452 cases of other medical complications<br>186 cases of other surgical complications<br><br>ORP: NR<br>- early: 581 (23.8)<br>43 cases of cardiac complications<br>134 cases of respiratory complications<br>77 cases of genitourinary complications<br>53 cases of wound complications<br>54 cases of vascular complications<br>293 cases of other medical complications<br>146 cases of other surgical complications<br>- late: 704 (28.9)<br>49 cases of cardiac complications<br>164 cases of respiratory complications<br>98 cases of genitourinary complications<br>66 cases of wound complications |           |           |

Table 14. Safety: perioperative complications

| Study   | Sample size             | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)           | BNC n (%)           |
|---|-------------------------|-------------------------|---------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|--|---------------------|---------------------|
|   |                         |                         |                     |                         |                     |                     |                     |                                  | 96 cases of vascular complications<br>368 cases of other medical complications<br>176 cases of other surgical complications<br><br>$P_{\text{early, unadjusted}}=0.10$<br>$P_{\text{early, adjusted}}=0.10$<br>$P_{\text{late, unadjusted}}=0.01$<br>$P_{\text{late, adjusted}}=0.20$<br><br>- early: within 30 days<br>- late: within 90 days |                     |                     |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP: 5524<br>ORP: 5524 | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP: 175<br>ORP: 175   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Ritch et al (2014) <sup>169</sup><br>USA        | RALP: 742<br>ORP: 237   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Shigemura et al. (2014) <sup>170</sup><br>Japan | RALP: 89<br>ORP: 105    | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: 1 (1.1)<br>1 case of infection<br><br>ORP: 6 (5.7)<br>6 cases of infection<br><br>$P=0.09$   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |



Table 14. Safety: perioperative complications

| Study   | Sample size             | Blood transfusion n (%)                     | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)           | BNC n (%)           |
|---|-------------------------|---|---------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|--|---------------------|---------------------|
|   |                         |   |                     |                         |                     |                     |                     |                                  | Within 30 days   |                     |                     |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>ORP: 9778 | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP 77<br>ORP: 176     | RALP: 13 (16.9)<br>ORP: 31 (17.6)<br>P=0.87 | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Froehner et al. (2013) <sup>172</sup><br>Germany  | RALP: 317<br>ORP: 2437  | RALP: 24 (8.9)<br>ORP: 182 (10.4)<br>P=0.45 | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: 118 (37.2)<br>98 cases of lymphocele<br>7 cases of DVT<br>1 case of pulmonary embolism<br>8 cases of wound infection<br>2 cases of relaparotomy or secondary suture<br>1 case of acute MI<br>1 case of death<br><br>ORP: 802 (32.9)<br>636 cases of lymphocele<br>57 cases of DVT<br>15 cases of pulmonary embolism<br>77 cases of wound infection | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |

Table 14. Safety: perioperative complications

| Study  | Sample size           | Blood transfusion n (%)       | Conversion n (%)                 | Equipment failure n (%) | Clavien 1-2 n (%)                     | Clavien 3-4 n (%)                     | Clavien 5 n (%)                       | Clavien complication total n (%)       | Other complications (not included in Clavien) n (%)   | UTI n (%)           | BNC n (%)           |
|--|-----------------------|-------------------------------|----------------------------------|-------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--|---|---------------------|---------------------|
|  |                       |                               |                                  |                         |                                       |                                       |                                       |  | 15 cases of relaparotomy or secondary suture<br>1 case of acute MI<br>1 case of death<br><br>P=0.44 |                     |                     |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium | RALP: 64<br>ORP: 116  | RALP: NR<br>ORP: NR           | RALP: 5 (7.8)<br>ORP: NA<br>P=NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                    | RALP and ORP:<br>1 case of sudden death<br>1 case of CVA  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Harty et al. (2013) <sup>200</sup><br>USA        | RALP: 152<br>ORP: 153 | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Ludovico et al. (2013) <sup>124</sup><br>Italy   | RALP: 82<br>ORP: 48   | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: 7 (8.5)<br>ORP: 4 (8.3)<br>P=NR | RALP: 1 (1.2)<br>ORP: 1 (2.1)<br>P=NR | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP: 8 (9.8)<br>ORP: 5 (10.4)<br>P=NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Masterson et al (2013) <sup>173</sup><br>USA     | RALP: 669<br>ORP: 357 | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Pierorazio et al. (2013) <sup>149</sup><br>USA   | RALP: 105<br>ORP: 743 | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Punnen et al. (2013) <sup>174</sup><br>USA       | RALP: 233             | RALP: 0 (0.0)<br>ORP: 9 (5.1) | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size               | Blood transfusion n (%)                              | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)         | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%)   | UTI n (%)                                       | BNC n (%)               |
|---|---------------------------|--|-------------------------|-------------------------|--|---|-------------------------|---|---|---|-------------------------|
|   | ORP:<br>177               | P<0.01   |                         |                         |  |   |                         |   |   |   |                         |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br><br>ORP: 341 | RALP: 33 (6.3)<br><br>ORP: 144 (42.2)<br><br>P<0.001 | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 84 (16.0)<br><br>ORP: 55 (16.1)<br><br>Grade 2<br>RALP: 41 (7.8)<br><br>ORP: 151 (44.3)<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP:15 (2.9)<br><br>ORP: 25 (7.3)<br><br>Grade 4<br>RALP: 3 (0.6)<br><br>ORP: 1 (0.3)<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR | RALP: NR<br><br>ORP: NR | RALP: 143 (27.3)<br><br>ORP: 232 (68.0)<br><br>P=NR<br><br>Within 90 days | RALP: 65 (12.4)<br>3 cases of cardiac problem<br>1 case of pneumonia<br>3 cases of respiratory distress<br>3 cases of acute renal failure<br>1 case of CVA<br>13 cases of femoral neuropathy<br>14 cases of urinary retention<br>12 cases of ileus<br>11 cases of extravasation of contrast medium at cystography<br>1 case of wound repair<br>3 cases of ICU care<br><br>ORP: 102 (29.9)<br>5 cases of cardiac problem<br>2 cases of pneumonia<br>3 cases of respiratory distress<br>1 case of respiratory failure<br>3 cases of acute renal failure<br>2 cases of CVA<br>7 cases of femoral | RALP: 1 (0.2)<br><br>ORP: 3 (0.9)<br><br>P=0.14 | RALP: NR<br><br>ORP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size               | Blood transfusion n (%) | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)                  | Other complications (not included in Clavien) n (%)  | UTI n (%)               | BNC n (%)               |
|---|---------------------------|-------------------------|-------------------------|-------------------------|---|--|---|---|--|-------------------------|-------------------------|
|   |                           |                         |                         |                         |   |  |   |   | neuropathy<br>24 cases of urinary retention<br>6 cases of ileus<br>34 cases of extravasation of contrast medium at cystography<br>14 cases of wound repair<br>1 case of ICU care<br><br>P=NR<br><br>Within 90 days |                         |                         |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br><br>ORP: 961 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Son et al. (2013) <sup>177</sup><br>South Korea | RALP: 146<br><br>ORP: 112 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Bae et al (2012) <sup>178</sup><br>South Korea  | RALP: 111<br><br>ORP: 70  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 2 (1.8)<br><br>ORP: 2 (2.9)<br><br>Grade 2<br>RALP: 10 (9.0)<br><br>ORP: 13 (18.6)<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | Grade 3<br>RALP: 2 (1.8)<br>1 case of wound infection<br>1 case of rectal injury<br><br>ORP: 6 (8.6)<br>4 cases of wound infection<br>1 case of rectal injury<br>1 case of anastomosis site disruption | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: 14 (12.6)<br><br>ORP: 22 (31.4)<br><br>P=NR | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |





Table 14. Safety: perioperative complications

| Study   | Sample size              | Blood transfusion n (%)                       | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                               | Clavien complication total n (%)                   | Other complications (not included in Clavien) n (%) | UTI n (%)               | BNC n (%)               |
|---|--------------------------|---|-------------------------|-------------------------|---|--|---|--|---|-------------------------|-------------------------|
|   |                          |   |                         |                         |   | Grade 4:<br>RALP: 0 (0.0)<br><br>ORP: 1 (1.4)<br>1 case of pulmonary embolism<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR  |   |  |   |                         |                         |
| Hong et al. (2012) <sup>8</sup><br>USA        | RALP: 182<br><br>ORP: 80 | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                       | RALP: NR<br><br>ORP: NR                            | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Lumen et al. (2012) <sup>179</sup><br>Belgium | RALP: 50<br><br>ORP: 50  | RALP: 0 (0.0)<br><br>ORP: 3 (6.0)<br><br>P=NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 5 (10.0)<br>3 cases of urinary leakage<br>2 cases of lymphocele<br><br>ORP: 6 (12.0)<br>6 cases of urinary leakage<br><br>Grade 2<br>RALP: 1 (2.0)<br>1 case of postoperative fever<br><br>ORP: 4 (8.0)<br>3 cases of blood transfusion<br>1 case of postoperative fever<br><br>P <sub>Grade1</sub> =NR<br>P <sub>Grade2</sub> =NR | Grade 3<br>RALP: 1 (2.0)<br>1 case of pelvic hematoma<br><br>ORP: 1 (2.0)<br>1 case of lymphocele<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P <sub>Grade4</sub> =NA | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA | RALP: 7 (14.0)<br><br>ORP: 11 (22.0)<br><br>P=0.44 | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size         | Blood transfusion n (%)                 | Conversion n (%)                 | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)                       | Clavien complication total n (%)                             | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)                               |
|---|---------------------|---|----------------------------------|-------------------------|--|---|---------------------------------------|--|---|---------------------|---|
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19 | RALP: 0<br>ORP: 2 (10.5)<br>P=NR        | RALP: 0<br>ORP: NA<br>P=NR       | RALP: NR<br>ORP: NR     | Grade 1<br>RALP: 0<br>ORP: 1 (5.3)<br><br>Grade 2<br>RALP: 2 (10.5)<br>ORP: 8 (42.1)<br><br>P <sub>Grade1</sub> =1.0<br>P <sub>Grade2</sub> =0.0625  | Grade 3<br>RALP: 4 (21.1)<br>- 3a: 4 (21.1)<br>- 3b: 0<br><br>ORP: 6 (31.6)<br>- 3a: 2 (10.5)<br>- 3b: 4 (21.1)<br><br>Grade 4<br>RALP: 0<br>ORP: 0<br><br>P <sub>Grade3</sub> =NR<br>P <sub>Grade3a</sub> =0.6599<br>P <sub>Grade3b</sub> =0.105<br>P <sub>Grade4</sub> =1.0 | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                     |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50 | RALP: 1 (2.0)<br>ORP: 4 (8.0)<br>P=0.36 | RALP: 0 (0.0)<br>ORP: NA<br>P=NA | RALP: NR<br>ORP: NA     | Grade 1<br>RALP: 1 (2.0)<br>1 case of arm paresthesia<br><br>ORP: 5 (10.0)<br>1 case of ethanol withdrawal<br>1 case of persistent pain<br>2 cases of lymphocele<br>1 case of fever<br><br>Grade 2<br>RALP: 4 (8.0)<br>2 cases of nerve neuropraxia<br>1 case of wound infection | Grade 3<br>RALP: 1 (2.0)<br>1 case of urinary leak<br><br>ORP: 2 (4.0)<br>1 case of urinary leak<br>1 case of lymphocele<br><br>Grade 4<br>RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=0.88  | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP: 6 (12.0)<br>ORP: 11 (22.0)<br>P=0.18<br>Within 30 days | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: 2 (4.0)<br>ORP: 4 (8.0)<br>P=0.68 |

Table 14. Safety: perioperative complications

| Study                                     | Sample size                 | Blood transfusion n (%)                              | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)       | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)               | BNC n (%)               |
|---|-----------------------------|--|-------------------------|-------------------------|---|-------------------------|-------------------------|----------------------------------|---|-------------------------|-------------------------|
|   |                             |  |                         |                         | 1 case of persistent hematuria<br><br>ORP: 4 (8.0)<br>1 case of wound infection<br>1 case of pneumonia<br>1 case of blood transfusion<br>1 case of bleeding<br><br>P=0.25 |                         |                         |                                  |   |                         |                         |
| Trinh et al. (2012) <sup>181</sup><br>USA | RALP: 7598<br><br>ORP: 7389 | RALP: 184 (2.4)<br><br>ORP: 572 (7.7)<br><br>P<0.001 | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: 738 (9.7)<br>33 cases of intraoperative complications<br>68 cases of cardiac complications<br>105 cases of respiratory complications<br>30 cases of vascular complications<br>35 cases of operative wound complications<br>90 cases of genitourinary complications<br>432 cases of other medical complications<br>122 cases of other surgical complications<br><br>ORP: 896 (12.1)<br>73 cases of intraoperative complications<br>96 cases of cardiac | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 14. Safety: perioperative complications

| Study                                    | Sample size                | Blood transfusion n (%) | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)       | Clavien 3-4 n (%)       | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)               | BNC n (%)   |
|--|----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------------|---|-------------------------|---|
|  |                            |                         |                         |                         |                         |                         |                         |                                  | complications<br>191 cases of respiratory complications<br>45 cases of vascular complications<br>48 cases of operative wound complications<br>86 cases of genitourinary complications<br>459 cases of other medical complications<br>121 cases of other surgical complications<br><br>P<0.001   |                         |   |
| Wang et al. (2012) <sup>182</sup><br>USA | RALP: 1038<br><br>ORP: 707 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: NR<br>2 cases of blood loss anemia<br>1 case of cardiac problems<br>1 case of gastrointestinal complication<br>22 cases of hematuria<br>46 cases of infections<br>6 cases of pelvic hematoma<br>10 cases of thrombotic complications<br>2 cases of renal complications<br>10 cases of urethral stricture<br>17 cases of urinary leak<br>15 cases of urinary retention | RALP: NR<br><br>ORP: NR | RALP: 22 (2.1)<br><br>ORP: 53 (7.5)<br><br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> <0.001 |

Table 14. Safety: perioperative complications

| Study   | Sample size         | Blood transfusion n (%)                   | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)                           | Clavien complication total n (%)                 | Other complications (not included in Clavien) n (%)  | UTI n (%)           | BNC n (%)                                   |
|---|---------------------|---|---------------------|-------------------------|--|--|---|--|--|---------------------|---|
|   |                     |   |                     |                         |  |  |   |  | 1 case of wound complication<br><br>ORP: NR<br>22 cases of blood loss anemia<br>2 cases of cardiac problems<br>1 case of fluid collection<br>12 cases of hematuria<br>12 cases of infections<br>3 cases of pelvic hematoma<br>2 cases of rectal injury<br>9 cases of thrombotic complications<br>1 case of renal complication<br>6 cases of urethral stricture<br>8 cases of urinary leak<br>28 cases of urinary retention<br>1 case of wound complication<br><br>P=NR |                     |   |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75<br>ORP: 75 | RALP: 0 (0.0)<br>ORP: 2 (2.7)<br><br>P=NR | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | Grade 1<br>RALP: NR<br>16 cases of skin redness<br>4 cases of lymphocele<br><br>ORP: NR<br>4 cases of postvoid residual>100ml<br>6 cases of skin redness | Grade 3:<br>RALP: NR<br>1 case of bladder tamponade<br>1 case of urinary retention<br>1 case of BNC<br>1 case of ureteral injury | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP: 30 (41.3)<br>ORP: 28 (52.0)<br><br>P= 0.56 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: 1 (1.3)<br>ORP: 7 (9.3)<br><br>P=0.03 |

Table 14. Safety: perioperative complications

| Study   | Sample size           | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)     | Clavien complication total n (%)         | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)           |
|---|-----------------------|-------------------------|---------------------|-------------------------|--|--|---------------------|--|---|---------------------|---------------------|
|   |                       |                         |                     |                         | 3 cases of lymphocele<br><br>Grade 2<br>RALP: NR<br>1 case of pressure skin ulcer<br>1 case of suspected malignant hyperthermia<br>1 case of epididymitis<br>1 case of vein thrombosis<br>1 case of Addison crisis<br>1 case of femoral nerve deficit<br><br>ORP: NR<br>2 cases of blood transfusion<br>2 cases of ileus<br>1 case of perineal nerve deficit<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | 1 case of port hernia<br><br>ORP: NR<br>4 cases of urinary retention<br>4 cases of lymphocele<br>7 cases of BNC<br>2 cases of ureteral ostium lesion<br>1 case of rectal injury<br>2 cases of wound dehiscence<br>1 case of pelvic abscess<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P <sub>grade3</sub> =0.02<br>P <sub>grade4</sub> =NA |                     |  |   |                     |                     |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark   | RALP: 77<br>ORP: 154  | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                      | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Kim et al. (2011) <sup>127</sup><br>South Korea | RALP: 528<br>ORP: 235 | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | Grade 1<br>RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>Grade 2<br>RALP: 19 (3.6)  | Grade 3<br>RALP: 2 (0.4)<br><br>ORP: 0 (0.0)<br><br>Grade 4<br>RALP: 0 (0.0)   | RALP: NR<br>ORP: NR | RALP: 21 (4.0)<br>ORP: 44 (18.7)<br>P=NR | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |

Table 14. Safety: perioperative complications

| Study   | Sample size                 | Blood transfusion n (%) | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)  | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)   | BNC n (%)               |
|---|-----------------------------|-------------------------|-------------------------|-------------------------|--|--|-------------------------|----------------------------------|---|---|-------------------------|
|   |                             |                         |                         |                         | ORP: 44 (18.7)<br><br>P <sub>grade1</sub> =NA<br>P <sub>grade2</sub> =NR | ORP: 0 (0.0)<br><br>P <sub>grade3</sub> =NA<br>P <sub>grade4</sub> =NA |                         |                                  |   |   |                         |
| Magheli et al. (2011) <sup>152</sup><br>USA   | RALP: 522<br><br>ORP: 522   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR |
| Minniti et al. (2011) <sup>184</sup><br>Italy | RALP: 22<br><br>ORP: 93     | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR |
| Mirza et al. (2011) <sup>185</sup><br>USA     | RALP: 191<br><br>ORP: 180   | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR |
| Tollefson et al. (2011) <sup>186</sup><br>USA | RALP: 1084<br><br>ORP: 4824 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: 24 (2.2)<br>6 cases of SSI<br>17 cases of UTI<br>1 case of sepsis<br><br>ORP: 281 (5.8)<br>216 cases of SSI<br>58 cases of UTI<br>7 case of sepsis<br><br>P<0.001<br><br>Within 30 days | RALP: 17 (1.6)<br><br>ORP: 58 (1.2)<br><br>P=0.28 | RALP: NR<br><br>ORP: NR |
| Barocas et al. (2010) <sup>128</sup><br>USA   | RALP: 1413<br><br>ORP: 491  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                           | RALP: NR<br><br>ORP: NR |
| Bolenz et al.                                 | RALP:                       | RALP: 12                | RALP: NR                | RALP: NR                | RALP: NR   | RALP: NR   | RALP: NR                | RALP: NR                         | RALP: NR  | RALP: NR  | RALP: NR                |

Table 14. Safety: perioperative complications

| Study  | Sample size                      | Blood transfusion n (%)                                      | Conversion n (%)                         | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)                                 | Clavien complication total n (%)    | Other complications (not included in Clavien) n (%) | UTI n (%)               | BNC n (%)  |
|--|----------------------------------|--|--|-------------------------|--|---|---|-------------------------------------|---|-------------------------|--|
| (2010) <sup>153</sup><br>USA                       | 262<br><br>ORP:<br>161           | (4.6)<br><br>ORP(n=154):<br>32 (19.9)<br>[20.8%]<br><br>P=NR | ORP: NA                                  | ORP: NA                 | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR                             | ORP: NR   | ORP: NR                 | ORP: NR  |
| Breyer et al.<br>(2010) <sup>129</sup><br>USA      | RALP:<br>293<br><br>ORP:<br>695  | RALP: 1 (0.3)<br><br>ORP: 54 (7.8)<br><br>P<0.01             | RALP: NR<br><br>ORP: NA                  | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                         | RALP: NR<br><br>ORP: NR             | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR | RALP: 4 (1.4)<br><br>ORP: 18 (2.6)<br><br>P=0.13<br><br>Within 18 months |
| Carlsson et al.<br>(2010) <sup>130</sup><br>Sweden | RALP:<br>1253<br><br>ORP:<br>485 | RALP: 58 (4.6)<br><br>ORP: 112 (53)<br><br>P<0.05            | RALP: 4 (0.3)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 7 (0.6)<br>6 cases of wound infection<br>1 case of rectal injury<br><br>ORP: 36 (7.4)<br>29 cases of wound infection<br>7 cases of rectal injury<br><br>Grade 2<br>RALP: 60 (4.8)<br>2 cases of femoral nerve injury<br>58 cases of blood transfusion<br><br>ORP: 118 (24.3)<br>2 cases of obturator nerve injury<br>4 cases of pneumonia | Grade 3<br>RALP: 51 (4.1)<br>3 cases of BNC<br>1 case of rectal injury<br>1 case of small bowel injury<br>1 case of ureteral injury<br>1 case of lymphocele<br>13 cases of anastomosis leakage<br>24 cases of surgical reintervention<br>7 cases of surgery for UI<br><br>ORP: 59 (12.2)<br>22 cases of BNC<br>1 case of rectal injury<br>3 cases of lymphocele<br>8 cases of anastomosis leakage | RALP: 0 (0.0)<br><br>ORP: 1 (0.2)<br><br>P≥0.05 | RALP: NR<br><br>ORP: NR<br><br>P=NR | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR | RALP: 3 (0.2)<br><br>ORP: 22 (4.5)<br><br>P<0.001                        |





Table 14. Safety: perioperative complications

| Study   | Sample size               | Blood transfusion n (%)                        | Conversion n (%)                         | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)   | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%) | UTI n (%)               | BNC n (%)               |
|---|---------------------------|--|--|-------------------------|--|---|---|---|---|-------------------------|-------------------------|
|   |                           |  |  |                         | 112 cases of blood transfusion<br><br>$P_{\text{grade1}} < 0.001$<br>$P_{\text{grade2}} < 0.001$ | 14 cases of surgical reintervention<br>11 cases of surgery for UI<br><br>Grade 4<br>RALP: 3 (0.2)<br>2 cases of pulmonary embolism<br>1 case of MI<br><br>ORP: 7 (1.4)<br>5 cases of pulmonary embolism<br>2 case of MI<br><br>$P_{\text{grade3}} < 0.001$<br>$P_{\text{grade4}} < 0.001$ |   |   |   |                         |                         |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br><br>ORP: 502 | RALP: 2 (0.9)<br><br>ORP: 10 (2)<br><br>P=0.49 | RALP: 0 (0.0)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR  | Grade 3<br>RALP: 4 (1.9)<br>1 case of bleeding<br>1 case of clot retention<br>1 case of local cellulitis<br>1 case of small bowel injury<br><br>ORP: 1 (0.2)<br>1 case of pelvic hematoma<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 2 (0.4)<br>1 case of pulmonary                      | RALP: 0 (0.0)<br><br>ORP: 1 (0.2)<br>1 case of death due to CVA<br><br>P=0.51 | RALP: 4 (1.9)<br><br>ORP: 4 (0.8)<br><br>P=0.38<br><br>Within 6 weeks postoperative | RALP: NR<br><br>ORP: NR                             | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 14. Safety: perioperative complications

| Study  | Sample size           | Blood transfusion n (%)  | Conversion n (%)                 | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)                       | Clavien complication total n (%)            | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)                              |
|--|-----------------------|--|----------------------------------|-------------------------|---|--|---------------------------------------|---|---|---------------------|--|
|  |                       |  |                                  |                         |   | embolism<br>1 case of CVA<br><br>P <sub>grade3</sub> =0.04<br>P <sub>grade4</sub> =0.88  |                                       |   |   |                     |  |
| Hong et al. (2010) <sup>132</sup><br>South Korea | RALP: 26<br>ORP: 25   | RALP: 1 (3.8)<br>ORP: 14 (56.0)<br>P<0.05  | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    |
| Kordan et al. (2010) <sup>133</sup><br>USA       | RALP: 830<br>ORP: 414 | RALP: 7 (0.8)<br>ORP: 14 (3.4)<br>P <sub>unadj</sub> =0.002<br>P <sub>adj</sub> =0.002 | RALP: NR<br>ORP: NA              | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong     | RALP: 20<br>ORP: 20   | RALP: 1 (5.0)<br>ORP: 13 (65.0)<br>P<0.001   | RALP: 0 (0.0)<br>ORP: NA<br>P=NR | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                   | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    |
| Nadler et al. (2010) <sup>188</sup><br>USA       | RALP: 50<br>ORP: 50   | RALP: 10 (20.0)<br>ORP: 45 (90.0)<br>P<0.01  | RALP: 0 (0.0)<br>ORP: NA<br>P=NA | RALP: NR<br>ORP: NA     | Grade 1<br>RALP: NR<br>1 case of extended intubation<br>2 cases of ileus<br>2 cases of prolonged drain output<br>2 cases of urinary leak<br>1 case of hematuria<br>1 case of EKG changes during anesthesia<br>ORP: NR | Grade 3<br>RALP: NR<br>2 cases of BNC<br>1 case of gastric ulcer<br>1 case of meatal stenosis<br>1 case of bladder stone<br>3 cases of migrated Weck clip<br>1 case of hematuria<br>1 case of urinary leak | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA | RALP: 16 (32.0)<br>ORP: 12 (24.0)<br>P=0.37 | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: 2 (4.0)<br>ORP: 7 (14.0)<br>P=NR |

Table 14. Safety: perioperative complications

| Study   | Sample size           | Blood transfusion n (%)                  | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)  | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%) | UTI n (%)           | BNC n (%)           |
|---|-----------------------|--|---------------------|-------------------------|--|---|---------------------|----------------------------------|---|---------------------|---------------------|
|   |                       |  |                     |                         | 2 cases of prolonged drain output<br>2 cases of urinary leak<br>1 case of DVT<br>1 case of prolonged abdominal swelling<br><br>Grade 2<br>RALP: NR<br>1 case of peritoneal hematoma<br>1 case of pneumonia<br><br>ORP: 0 (0.0)<br><br>P <sub>grade1</sub> = NR<br>P <sub>grade2</sub> = NR | ORP: NR<br>7 cases of BNC<br>1 case of inguinal hernia<br><br>Grade 4<br>RALP: NR<br>1 case of MI<br><br>ORP: 0 (0.0)<br><br>P <sub>grade3</sub> = NR<br>P <sub>grade4</sub> = NR |                     |                                  |   |                     |                     |
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99<br>ORP: 217  | RALP: NR<br>ORP: NR                      | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Uvin et al. (2010) <sup>190</sup><br>Belgium  | RALP: 13<br>ORP: 9    | RALP: 1 (7.7)<br>ORP: 3 (33.3)<br>P≥0.05 | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Williams et al. (2010) <sup>134</sup><br>USA  | RALP: 604<br>ORP: 346 | RALP: NR<br>ORP: NR                      | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Coronato et al. (2009) <sup>191</sup><br>USA  | RALP: 98<br>ORP: 98   | RALP: NR<br>ORP: NR                      | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR                                 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Drouin et al. (2009) <sup>154</sup>           | RALP: 71              | RALP: 4 (5.6)                            | RALP: 0 (0.0)       | RALP: NR                | Grade 1<br>RALP: 0 (0.0)   | Grade 3<br>RALP: 5 (7.0)  | RALP: NR            | RALP: 6 (8.5)                    | RALP: NR  | RALP: 1 (1.4)       | RALP: NR            |

Table 14. Safety: perioperative complications

| Study   | Sample size               | Blood transfusion n (%)                           | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)  | Clavien 5 n (%)         | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%)  | UTI n (%)                | BNC n (%)               |
|---|---------------------------|---|-------------------------|-------------------------|---|--|-------------------------|---|--|--------------------------|-------------------------|
| France  | ORP: 83                   | ORP: 8 (9.6)<br>P=NR                              | ORP: NA<br>P=NA         | ORP: NA                 | ORP: 2 (2.4)<br>1 case of anastomosis leakage<br>1 case of rectal injury<br><br>Grade 2<br>RALP: 1 (1.4)<br>1 case of UTI<br><br>ORP: 7 (8.4)<br>6 cases of UTI<br>1 case of lymphocele<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR | 1 case of urinary retention<br>4 cases of bleeding<br><br>ORP: 3 (3.6)<br>3 cases of urinary retention<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 1 (1.2)<br>1 case of embolism<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NR | ORP: NR                 | ORP: 13 (15.7)<br><br>P=NR  | ORP: NR  | ORP: 6 (7.2)<br><br>P=NR | ORP: NR                 |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br><br>ORP: 105 | RALP: 2 (1.9)<br><br>ORP: 15 (14.3)<br><br>P<0.01 | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | Grade 1<br>RALP: 1 (1.0)<br><br>ORP: 1 (1.0)<br><br>Grade 2<br>RALP: 4 (3.9)<br><br>ORP: 10 (9.5)<br><br>P <sub>grade1</sub> =NR<br>P <sub>grade2</sub> =NR   | Grade 3<br>RALP: 5 (4.9)<br><br>ORP: 0 (0.0)<br><br>Grade 4<br>RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P <sub>grade3</sub> =NR<br>P <sub>grade4</sub> =NA   | RALP: NR<br><br>ORP: NR | RALP: NR<br>1 case of colon lesion<br>1 case of rectal lesion<br>7 cases of bleeding<br>1 case of ileus<br><br>ORP: NR<br>7 cases of bleeding<br>1 case of ileus<br>2 cases of cardiovascular complications<br>1 case of wound dehiscence<br><br>P=0.85 | RALP (n=35)‡: 2 (5.7)<br>2 cases of fever<br><br>ORP (n=26)‡: 4 (15.4)<br>4 cases of fever<br><br>P=NR<br><br>‡Data extracted from Fracalanza et al. (2008) <sup>208</sup> | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR |
| Laurila et al.                                | RALP: 94                  | RALP: NR  | RALP: 0                 | RALP: NR                | RALP: NR  | RALP: NR   | RALP: NR                | RALP: NR  | RALP: NR   | RALP: NR                 | RALP: NR                |

Table 14. Safety: perioperative complications

| Study                                       | Sample size           | Blood transfusion n (%)   | Conversion n (%)   | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)           | BNC n (%)           |
|---|-----------------------|---|--|-------------------------|---------------------|---------------------|---------------------|----------------------------------|---|---------------------|---------------------|
| (2009) <sup>192</sup><br>USA                | ORP: 98               | ORP: NR   | (0.0)<br>ORP: NA<br>P=NA                                 | ORP: NA                 | ORP: NR             | ORP: NR             | ORP: NR             | ORP: NR                          | ORP: NR   | ORP: NR             | ORP: NR             |
| Ou et al. (2009) <sup>193</sup><br>Taiwan   | RALP: 30<br>ORP: 30   | RALP: 4 (13.3)<br>ORP: 18 (60.0)<br>P<0.001                         | RALP: NR<br>ORP: NA                                      | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: 5 (16.7)<br>2 cases of bladder injury<br>1 case of vesicourethral anastomosis tear<br>1 case of bleeding<br>1 case of lymph leakage<br><br>ORP: 3 (10.0)<br>1 case of rectal injury<br>2 cases of anastomosis leakage<br><br>P≥0.05 | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Rocco et al. (2009) <sup>136</sup><br>Italy | RALP: 120<br>ORP: 240 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NA                                      | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| White et al. (2009) <sup>194</sup><br>USA   | RALP: 50<br>ORP: 50   | RALP: NR<br>ORP: NR   | RALP: 0 (0.0)<br>ORP: NA<br>P=NA                         | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Chan et al. (2008) <sup>195</sup><br>USA    | RALP: 660<br>ORP: 340 | RALP: 5 (0.9)<br>- LP (n=81): 0<br>- SP (n=579): 5 (0.9)<br>ORP: 11 | RALP: 6 (0.9)<br>- LP (n=81): 1 (1.2)<br>- SP (n=579): 5 | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |

Table 14. Safety: perioperative complications

| Study  | Sample size               | Blood transfusion n (%)  | Conversion n (%)        | Equipment failure n (%) | Clavien 1-2 n (%)       | Clavien 3-4 n (%)       | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)                                       | BNC n (%)   |
|--|---------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------------|---|---|---|
|  |                           | (3.5%)<br>- LP (n=27): 0<br>- SP (n=313): 11 (3.5%)<br><br>P <sub>LP</sub> =NR<br>P <sub>SP</sub> =0.017 | (0.9)<br>ORP: N/A       |                         |                         |                         |                         |                                  |   |   |   |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br><br>ORP: 588 | RALP: 15 (5.1)<br><br>ORP: 77 (13.1)<br><br>P<0.001  | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: 24 (8.2)<br>- early:<br>10 cases of hematoma<br>3 cases of hernia<br>2 cases of stricture<br>8 cases of urinary retention<br>3 cases of UTI<br>1 case of DVT<br>2 cases of drug reaction<br>5 cases of ileus<br>2 cases of lymphocele<br>1 case of pulmonary embolism<br>2 cases of respiratory failure<br>3 cases of stroke<br>- late:<br>3 cases of BNC<br>1 case of DVT<br>10 cases of hernia<br>1 case of lymphocele<br>8 cases of urethral stricture<br><br>ORP: 28 (4.8)<br>- early:<br>1 case of BNC<br>10 cases of hematoma<br>3 cases of stricture | RALP: 3 (1.0)<br><br>ORP: 6 (1.0)<br><br>P=0.98 | RALP: 3 (1.0)<br><br>ORP: 24 (4.1)<br><br>P=0.012 |



Table 14. Safety: perioperative complications

| Study  | Sample size       | Blood transfusion n (%) | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)   | UTI n (%)           | BNC n (%)           |
|--|-------------------|-------------------------|---------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|---|---------------------|---------------------|
|  |                   |                         |                     |                         |                     |                     |                     |                                  | 7 cases of urinary retention<br>6 cases of UTI<br>1 case of renal failure<br>1 case of sepsis<br>1 case of ureteric obstruction<br>7 cases of DVT<br>7 cases of drug reaction<br>10 cases of ileus<br>4 cases of lymphocele<br>4 cases of pulmonary embolism<br>3 cases of respiratory failure<br>3 cases of stroke<br>1 case of lymphedema - late:<br>23 cases of BNC<br>6 cases of DVT<br>14 cases of hernia<br>5 cases of lymphocele<br>6 cases of urethral stricture<br>2 cases of abdominal abscess<br>5 cases of pulmonary embolism<br><br>P=0.06<br><br>- early: within 30 days<br>- late: after 30 days |                     |                     |
| Schroeck et al. (2008) <sup>197</sup><br>USA | RALP: 362<br>ORP: | RALP (n=256)‡: 18 (7.0) | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |



Table 14. Safety: perioperative complications

| Study                                      | Sample size           | Blood transfusion n (%)   | Conversion n (%)    | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)                                 | BNC n (%)           |
|--|-----------------------|---|---------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|--|---|---------------------|
|  | 435                   | ORP (n=280)‡: 189 (67.5)<br><br>*P<0.001<br><br>‡Data taken from D'Alonzo et al. (2009) <sup>210</sup>                    |                     |                         |                     |                     |                     |                                  |  |   |                     |
| Miller et al. (2007) <sup>137</sup><br>USA | RALP: 42<br>ORP: 120  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR |
| Nelson et al. (2007) <sup>138</sup><br>USA | RALP: 629<br>ORP: 374 | RALP (n=176): 1 (0.6)<br>ORP (n=103): 3 (2.9)<br><br>*P=0.14<br><br>‡Data taken from Farnham et al. (2006) <sup>209</sup> | RALP: NR<br>ORP: NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR              | RALP: 98 (15.6)<br>2 cases of post-catheter retention<br>2 cases of lymphocele<br>2 cases of wound infection<br>4 cases of pulmonary embolism<br>8 cases of UTI<br>26 cases of ileus<br>6 cases of epididymitis<br>11 cases of clot retention<br>15 cases of urinary leak<br>1 case of port hernia<br>1 case of rectal injury<br>1 case of hemorrhage<br>19 cases of other complications<br><br>ORP: 55 (14.7)<br>4 cases of post-catheter retention | RALP: 8 (1.3)<br>ORP: 4 (1.1)<br><br>P=NR | RALP: NR<br>ORP: NR |





Table 14. Safety: perioperative complications

| Study  | Sample size          | Blood transfusion n (%)                     | Conversion n (%)                     | Equipment failure n (%) | Clavien 1-2 n (%)   | Clavien 3-4 n (%)   | Clavien 5 n (%)     | Clavien complication total n (%)  | Other complications (not included in Clavien) n (%)  | UTI n (%)           | BNC n (%)           |
|--|----------------------|---|--------------------------------------|-------------------------|---------------------|---------------------|---------------------|---|--|---------------------|---------------------|
|  |                      |   |                                      |                         |                     |                     |                     |   | 2 cases of lymphocele<br>5 cases of wound infection<br>8 cases of DVT<br>4 cases of UTI<br>15 cases of ileus<br>4 cases of clot retention<br>4 cases of urinary leak<br>4 cases of fever<br>5 cases of other complications<br><br>P=0.71 |                     |                     |
| Ball et al. (2006) <sup>116</sup><br>USA     | RALP: 82<br>ORP: 135 | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NA                  | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |
| Ahlering et al. (2004) <sup>198</sup><br>USA | RALP: 60<br>ORP: 60  | RALP: 0 (0.0)<br>ORP: 1 (1.7)<br><br>P≥0.05 | RALP: 0 (0.0)<br>ORP: NA<br><br>P=NA | RALP: NR<br>ORP: NA     | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR | RALP: 4 (6.7)<br>1 case of pulmonary embolism<br>1 case of urinary leak<br>1 case of ileus<br>1 case of bleeding<br><br>ORP: 6 (10.0)<br>3 cases of DVT<br>1 case of pulmonary complication<br>2 cases of encroachment on the orifice<br><br>P≥0.05 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR |



Table 14. Safety: perioperative complications

| Study                                      | Sample size               | Blood transfusion n (%)                            | Conversion n (%)                         | Equipment failure n (%) | Clavien 1-2 n (%)       | Clavien 3-4 n (%)       | Clavien 5 n (%)         | Clavien complication total n (%) | Other complications (not included in Clavien) n (%)  | UTI n (%)               | BNC n (%)               |
|--|---------------------------|--|--|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------------|--|-------------------------|-------------------------|
| Tewari et al. (2003) <sup>139</sup><br>USA | RALP: 200<br><br>ORP: 100 | RALP: 0 (0.0)<br><br>ORP: 67 (67.0)<br><br>P<0.001 | RALP: 0 (0.0)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: 7 (3.5)<br>3 cases of ileus<br>2 cases of wound dehiscence<br>1 case of DVT<br>1 case of bleeding<br><br>ORP: 19 (19.0)<br>3 cases of ileus<br>1 case of wound dehiscence<br>1 case of DVT<br>4 cases of bleeding<br>1 case of rectal injury<br>4 cases of fever<br>2 cases of lymphocele<br>2 cases of obturator neuropathy<br>1 case of MI<br><br>P<0.05<br><br>Within 30 days | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Menon et al. (2002) <sup>140</sup><br>USA  | RALP: 30<br><br>ORP: 30   | RALP: 2 (6.7)<br><br>ORP: 9 (30.0)<br><br>P<0.001  | RALP: 1 (3.3)<br><br>ORP: NA<br><br>P=NA | RALP: NR<br><br>ORP: NA | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR          | RALP: 6 (20.0)<br>1 case of urinary retention<br>3 cases of ileus<br>1 case of exaggeration of arthritis<br>1 case of wound dehiscence<br><br>ORP: 6 (20.0)<br>1 case of urinary retention<br>3 cases of ileus<br>1 case of wound  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |



Table 14. Safety: perioperative complications

| Study   | Sample size                  | Blood transfusion n (%)             | Conversion n (%)                    | Equipment failure n (%)        | Clavien 1-2 n (%)              | Clavien 3-4 n (%)              | Clavien 5 n (%)                | Clavien complication total n (%)          | Other complications (not included in Clavien) n (%)   | UTI n (%)                      | BNC n (%)                      |
|---|------------------------------|-------------------------------------|-------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---|---|--------------------------------|--------------------------------|
|   |                              |                                     |                                     |                                |                                |                                |                                |   | dehiscence<br>1 case of rectal injuries<br><br>P≥0.05   |                                |                                |
| <b>RALP vs. BT</b>                                  |                              |                                     |                                     |                                |                                |                                |                                |   |   |                                |                                |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>BT: 29           | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR                        | RALP: NR<br>BT: NR  | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             |
| Baena et al (2013) <sup>141</sup><br>Spain          | RALP: 153<br>BT: 160         | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: 10 (6.5)<br>BT: 5 (3.1)<br><br>P=NR | RALP: NR<br>BT: NR  | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>BT: 118          | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA                  | RALP: NR<br>BT: NA             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR                        | RALP: NR<br>BT: NR  | RALP: NR<br>BT: NR             | RALP: NR<br>BT: NR             |
| <b>RALP vs. Radiotherapy</b>                        |                              |                                     |                                     |                                |                                |                                |                                |   |   |                                |                                |
| Hung et al (2015) <sup>199</sup><br>Taiwan          | RALP: 43<br>RT: 96           | RALP: 2 (4.7)<br>RT: NA<br><br>P=NA | RALP: 1 (2.3)<br>RT: NA<br><br>P=NA | RALP: NR<br>RT: NA             | RALP: NR<br>RT: NR             | RALP: NR<br>RT: NR             | RALP: NR<br>RT: NR             | RALP: NR<br>RT: NR                        | RALP: 1 (2.3)<br>1 case of rectal injury<br><br>RT: 77 (80.2)<br>38 cases of bladder obstruction<br>27 cases of radiation cystitis<br>12 cases of radiation proctitis<br><br>P=NR | RALP: NR<br>RT: NR             | RALP: NR<br>RT: NR             |
| <b>RALP vs. Cryotherapy</b>                         |                              |                                     |                                     |                                |                                |                                |                                |   |   |                                |                                |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>LRP: 124<br>ORP: | RALP: NR<br>LRP: NR<br>ORP: NR      | RALP: NR<br>LRP: NR<br>ORP: NA      | RALP: NR<br>LRP: NA<br>ORP: NA | RALP: NR<br>LRP: NR<br>ORP: NR | RALP: NR<br>LRP: NR<br>ORP: NR | RALP: NR<br>LRP: NR<br>ORP: NR | RALP: NR<br>LRP: NR<br>ORP: NR            | RALP: NR<br>LRP: NR<br>ORP: NR  | RALP: NR<br>LRP: NR<br>ORP: NR | RALP: NR<br>LRP: NR<br>ORP: NR |



Table 14. Safety: perioperative complications

| Study                               | Sample size | Blood transfusion n (%) | Conversion n (%) | Equipment failure n (%) | Clavien 1-2 n (%) | Clavien 3-4 n (%) | Clavien 5 n (%) | Clavien complication total n (%) | Other complications (not included in Clavien) n (%) | UTI n (%) | BNC n (%) |
|-------------------------------------|-------------|-------------------------|------------------|-------------------------|-------------------|-------------------|-----------------|----------------------------------|---|-----------|-----------|
|                                     | 135         | BT: NA                  | BT: NA           | BT: NA                  | BT: NR            | BT: NR            | BT: NR          | BT: NR                           | BT: NR  | BT: NR    | BT: NR    |
|                                     | BT: 118     | CRY: NA                 | CRY: NA          | CRY: NA                 | CRY: NR           | CRY: NR           | CRY: NR         | CRY: NR                          | CRY: NR   | CRY: NR   | CRY: NR   |
|                                     | CRY: 39     |                         |                  |                         |                   |                   |                 |                                  |   |           |           |
| <b>RALP vs. Active Surveillance</b> |             |                         |                  |                         |                   |                   |                 |                                  |   |           |           |
| Acar et al (2014) <sup>201</sup>    | RALP: 65    | RALP: NR                | RALP: NR         | RALP: NR                | RALP: NR          | RALP: NR          | RALP: NR        | RALP: NR                         | RALP: NR  | RALP: NR  | RALP: NR  |
| The Netherlands                     | AS: 50      | AS: NA                  | AS: NA           | AS: NA                  | AS: NA            | AS: NA            | AS: NA          | AS: NA                           | AS: NA  | AS: NA    | AS: NA    |

AS= Active Surveillance; BNC = Bladder Neck Contracture; BT= Brachytherapy; CRY= Cryoablation; CVA = Cerebrovascular Accident; DVT = Deep Vein Thrombosis; ER = Emergency Room; IEV= Inferior Epigastric Vessel; LRP= Laparoscopic Radical Prostatectomy; MI = Myocardial Infarction; NA = Not Applicable; NR = Not Reported; ORP= Open Radical Prostatectomy; RALP = Robot-Assisted Radical Prostatectomy; ORP = Open Radical Prostatectomy; RT= Radiotherapy; SSI = Surgical Site Infection; UI = Urinary Incontinence; UTI = Urinary Tract Infection

Table 15. Perioperative outcomes

| Study   | Sample size             | Operative time (min)  |   | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|---|-------------------------|---|---|--|---|--|------------------------|-----------------------|-----------------------|
|   |                         | Definition  | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD      |  |   |  |                        |                       |                       |
| <b>RALP vs. LRP</b>   |                         |   |   |  |   |  |                        |                       |                       |
| Akand et al. (2015) <sup>142</sup><br>Turkey  | RALP: 79<br>LRP: 308    | RALP: NR<br>LRP: NR   | RALP: 242.6±NR<br>LRP: 208.5±NR<br>P<0.001                  | RALP: 234±NR<br>LRP: 526±NR<br>P<0.001                         | RALP: 3.2±NR<br>LRP: 3.2±NR<br>P>0.05                         | RALP: 6.8±NR<br>LRP: 8.2±NR<br>P<0.01                      | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Papachristos et al. (2015) <sup>143</sup><br>Australia  | RALP: 100<br>LRP: 100   | RALP: NR, but stated that docking time is included<br>LRP: NR | RALP: 195 (140 – 330)<br>LRP: 195 (115 – 300)<br>p=0.29     | RALP: 300 (50 – 1000)<br>LRP: 300 (50 – 900)<br>p=0.88         | RALP: 2 (1–5)<br>LRP: 2 (1–7)<br>p=0.003                      | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Asawabharuj et al. (2014) <sup>144</sup><br>Thailand  | RALP: 486<br>LRP: 561   | RALP: NR<br>LRP: NR   | RALP: 210 (105 – 730)†<br>LRP: 255 (125 – 680) †<br>p<0.001 | RALP: 449 (20 – 2,600) †<br>LRP: 766 (40 – 6,000) †<br>p<0.001 | RALP: 7.0 (2 – 35) †<br>LRP: 8.6 (3 – 149) †<br>p<0.001       | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Busch et al. (2014) <sup>145</sup><br>USA   | RALP: 194<br>LRP: 194   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Ploussard et al. (2014) <sup>111</sup><br>France  | RALP: 1009<br>LRP: 1377 | RALP: NR<br>LRP: NR   | RALP: 128.9±NR<br>LRP: 175.5±NR<br>p<0.001                  | RALP: 515.4±NR<br>LRP: 800.3±NR<br>p<0.001                     | RALP: 4.0±NR<br>LRP: 5.7±NR<br>p<0.001                        | RALP: 8.0±NR<br>LRP: 7.2±NR<br>p<0.001                     | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR    | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR   |
| Tozawa et al. (2014) <sup>147</sup>   | RALP: 157               | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |

Table 15. Perioperative outcomes

| Study                                      | Sample size | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range)           | Pain medication n (%) | Readmission rate n(%) |
|--|-------------|----------------------|--|---|---|--|----------------------------------|-----------------------|-----------------------|
|  |             | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                                  |                       |                       |
| Japan                                      | LRP: 551    | LRP: NR              | LRP: NR<br>P≥0.05                                      | LRP: NR<br>P<0.05                                       | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Asimakopoulus et al. (2013) <sup>112</sup> | RALP: 136   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                         | RALP: NR              | RALP: NR              |
| Italy                                      | LRP: 91     | LRP: NR              | LRP: NR  | LRP: NR   | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Berge et al. (2013) <sup>113</sup>         | RALP: 210   | "Operation time"     | RALP: 170 ± 39   | RALP: 190±187   | RALP: NR  | RALP: NR   | RALP: NR                         | RALP: NR              | RALP: NR              |
| Norway                                     | LRP: 210    |                      | LRP: 182 ± 44<br>p=0.005                               | LRP: 203±226<br>P=0.05                                  | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Harty et al. (2013) <sup>200</sup>         | RALP: 152   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                         | RALP: NR              | RALP: NR              |
| USA  | LRP: 140    | LRP: NR              | LRP: NR  | LRP: NR   | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Pierorazio et al. (2013) <sup>149</sup>    | RALP: 105   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                         | RALP: NR              | RALP: NR              |
| USA  | LRP: 65     | LRP: NR              | LRP: NR  | LRP: NR   | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Porpiglia et al. (2013) <sup>109</sup>     | RALP: 60    | "Skin-to-skin" time  | RALP: 147.6 ± 27.1                                     | RALP: 202.0 ± 124.0                                     | RALP: 4.6 ± 2.1   | RALP: 7.5 ± 3.9  | RALP: NR                         | RALP: NR              | RALP: NR              |
| Italy                                      | LRP: 60     |                      | LRP: 138.1 ± 29.7<br>p=0.07                            | LRP: 234.1 ± 150.1<br>p=0.20                            | LRP: 4.8 ± 1.9<br>p=0.59                                      | LRP: 7.0 ± 0.5<br>p=0.32                                   | LRP: NR                          | LRP: NR               | LRP: NR               |
| Koutlidis et al. (2012) <sup>114</sup>     | RALP: 175   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                         | RALP: NR              | RALP: NR              |
| France                                     | LRP: 104    | LRP: NR              | LRP: NR  | LRP: NR   | LRP: NR   | LRP: NR  | LRP: NR                          | LRP: NR               | LRP: NR               |
| Park et al. (2012) <sup>150</sup>          | RALP: 183   | "Skin-to-skin" time  | RALP: 250 (126 -690)                                   | RALP: 200 (30-1500)                                     | RALP: 7 (4-13)  | RALP: 6 (4-50)   | RALP: - NRS: 4 (0-10)            | RALP: NR              | RALP: NR              |
| South Korea                                | LRP: 144    |                      | LRP: 290 (158 -456)<br>p<0.001                         | LRP: 150 (30- 600)<br>p=0.24                            | LRP: 7 (4-18)<br>p=0.71                                       | LRP: 7 (5- 33)<br>p<0.001                                  | LRP: - NRS: 5 (1- 10)<br>p=0.016 | LRP: NR               | LRP: NR               |
| Asimakopoulus et al. (2011) <sup>110</sup> | RALP: 52    | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: 7.3 ± 2.7  | RALP: NR                         | RALP: NR              | RALP: NR              |
| Italy                                      | LRP: 60     | LRP: NR              | LRP: NR  | LRP: NR   | LRP: NR   | LRP: 7.5 ± 2.3   | LRP: NR                          | LRP: NR               | LRP: NR               |

Table 15. Perioperative outcomes

| Study  | Sample size | Operative time (min)  |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|--|-------------|-----------------------|--|---|---|--|------------------------|-----------------------|-----------------------|
|  |             | Definition            | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                       |                       |
|  |             |                       | P≥0.05   | P≥0.05  |   | p=0.14   |                        |                       |                       |
| Kasraeian et al. (2011) <sup>151</sup><br>France | RALP: 200   | RALP: NR              | RALP: 120 (60–240)                                     | RALP: 350 (50–1500)                                     | RALP: 4 (3–11)  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 200    | LRP: NR               | LRP: 150 (75–300)                                      | LRP: 400 (50–1300)                                      | LRP: 4 (3–23)   | LRP: NR  | LRP: NR                | LRP: NR               | LRP: NR               |
|  |             |                       | p<0.001  | p=0.07  | p=0.06  |  |                        |                       |                       |
| Magheli et al. (2011) <sup>152</sup><br>USA      | RALP: 522   | RALP: NR              | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 522    | LRP: NR               | LRP: NR  | LRP: NR   | LRP: NR   | LRP: NR  | LRP: NR                | LRP: NR               | LRP: NR               |
| Willis et al. (2011) <sup>115</sup><br>USA       | RALP: 121   | “Operating room time” | RALP: 280.8 ± 44.4†                                    | RALP: 148.4 ± 87.0                                      | RALP: 2.2 ± 1.6   | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 161    |                       | LRP: 283.2 ± 39.6†                                     | LRP: 172.9 ± 95.2                                       | LRP: 2.1 ± 0.5  | LRP: NR  | LRP: NR                | LRP: NR               | LRP: NR               |
|  |             |                       | p=0.65   | p=0.01  | p=0.28  |  |                        |                       |                       |
| Bolenz et al. (2010) <sup>153</sup><br>USA       | RALP: 262   | RALP: NR              | RALP: NR   | RALP: NR  | RALP: 1 (1–2)<br>1.6 ± 1.6                                    | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 220    | LRP: NR               | LRP: NR  | LRP: NR   | LRP: 2 (1–2)<br>1.8 ± 0.8                                     | LRP: NR  | LRP: NR                | LRP: NR               | LRP: NR               |
|  |             |                       |  |   | P=NR  |  |                        |                       |                       |
| Drouin et al. (2009) <sup>154</sup><br>France    | RALP: 71    | RALP: NR              | RALP: 199.6 ± 36.6                                     | RALP: 310.7 ± 205.5                                     | RALP: 4.4 (2–22) †  | RALP: 8.1 (3-31) †   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 85     | LRP: NR               | LRP: 257.3 ± 94.3                                      | LRP: 558 ± 574  | LRP: 6.1 (3–21) †   | LRP: 8.9 (3-91) †  | LRP: NR                | LRP: NR               | LRP: NR               |
|  |             |                       | P=NR   | P=NR  | P=NR  | P=NR   |                        |                       |                       |
| Hakimi et al. (2009) <sup>155</sup><br>USA       | RALP: 75    | “Skin-to-skin” time   | RALP: 199 (75–360) †                                   | RALP: 230 (50–1,500) †                                  | RALP: 2.0 (1–7) †   | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|  | LRP: 75     |                       | LRP: 232 (170–385) †                                   | LRP: 311 (100–800) †                                    | LRP: 3.4 (2–12) †   | LRP: NR  | LRP: NR                | LRP: NR               | LRP: NR               |
|  |             |                       | p<0.001  | p<0.004   | p<0.001   |  |                        |                       |                       |
| Rozet et al.                                     | RALP: 133   | Time for “entire      | RALP: 166 (90–300) †                                   | RALP: 609 (100–   | RALP: 5.4 (3–26) †  | RALP: 9.2 (6–29)   | RALP: NR               | RALP: NR              | RALP: NR              |



Table 15. Perioperative outcomes

| Study  | Sample size               | Operative time (min)  |   | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD         | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range)  | Pain medication n (%)   | Readmission rate n(%)   |
|--|---------------------------|---|---|---|---|--|-------------------------|-------------------------|-------------------------|
|  |                           | Definition  | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  |   |   |  |                         |                         |                         |
| (2009) <sup>156</sup><br>France              | LRP: 133                  | procedure"  | LRP: 160 (90 – 270) †<br><br>p=0.09   | 3,000) †<br><br>LRP: 512 (70 – 1,800)<br>†<br><br>p=0.07        | LRP: 4.9 (3 – 20) †<br><br>p=0.21                             | †<br><br>LRP: 9.0 (7 – 31) )<br>†<br><br>p=0.56            | LRP: NR                 | LRP: NR                 | LRP: NR                 |
| Trabulsi et al. (2008) <sup>157</sup><br>USA | RALP: 50<br><br>LRP: 190  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | RALP: 287 (50 – 1500)<br><br>LRP: 370 (50 – 3200)<br><br>p=0.25 | RALP: NR<br><br>LRP: NR                                       | RALP: NR<br><br>LRP: NR                                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |
| Ball et al. (2006) <sup>116</sup><br>USA     | RALP: 82<br><br>LRP: 124  | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR   | RALP: NR<br><br>LRP: NR                                       | RALP: NR<br><br>LRP: NR                                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |
| Hu et al. (2006) <sup>158</sup><br>USA       | RALP: 322<br><br>LRP: 358 | Time between Veress needle insertion and skin closure, including time for robot preparation and docking in RALP   | RALP: 186.0 (114.0-528.0)‡<br><br>LRP: 246.0 (150.0-768.0)‡<br><br>P=NR   | RALP: 250 (50 – 1,600)<br><br>LRP: 200 (0 – 1,500)<br><br>P=NR  | RALP: NR<br><br>LRP: NR                                       | RALP: NR<br><br>LRP: NR                                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |
| Joseph et al. (2005) <sup>159</sup><br>USA   | RALP: 50<br><br>LRP: 50   | Total operating time (anaesthesia time, pre-docking/after undocking time, robot operating time) and surgical time | RALP:<br>- total operating time: 277 [14]Δ<br>- surgical time: 202 [38]Δ<br><br>LRP:<br>- total operating time: 264 [38]Δ<br>- surgical time: 235 [12]Δ | RALP: 206 [63]Δ<br><br>LRP: 299 [40]Δ<br><br>p=0.01             | RALP: NR<br><br>LRP: NR                                       | RALP: NR<br><br>LRP: NR                                    | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR | RALP: NR<br><br>LRP: NR |



Table 15. Perioperative outcomes

| Study   | Sample size                     | Operative time (min)    |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range)  | Pain medication n (%)   | Readmission rate n(%)  |
|---|---------------------------------|-------------------------|--|---|---|--|-------------------------|-------------------------|--|
|   |                                 | Definition              | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                         |                         |  |
|   |                                 |                         | Ptotal≥0.05<br>Psurgical≥0.05                          |   |   |  |                         |                         |  |
| <b>RALP vs. ORP</b>                           |                                 |                         |  |   |   |  |                         |                         |  |
| Hu et al (2017) <sup>160</sup><br>USA         | RALP: 4164<br><br>ORP: 4164     | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  |
| Jackson et al. (2016) <sup>117</sup><br>USA   | RALP: 116<br><br>ORP: 63        | RALP: NR<br><br>ORP: NR | RALP: 246 ± 62<br><br>ORP: 190 ± 23<br><br>p<0.001     | RALP: NR<br><br>ORP: NR                                 | RALP: 2 [1 – 2]<br><br>ORP: 2 [2 – 3]   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  |
| Ong et al. (2016) <sup>118</sup><br>Australia | RALP: 885<br><br>ORP: 1117      | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  |
| Pearce et al. (2016) <sup>161</sup><br>USA    | RALP: 73,131<br><br>ORP: 23,804 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                | RALP: NR<br><br>ORP: NR                                 | RALP:<br>- 2+ days:<br>- Unmatched: 8,227 (11.6)<br>- Matched: 1,553 (11.7)<br><br>ORP:<br>- 2+ days:<br>- Unmatched: 8,769 (39.0)<br>- Matched: 4,266 (32.0)<br><br>PUnmatched <0.001<br>PMatched <0.001 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP:<br>- 30 days:<br>- Unmatched: 1910 (2.6)<br>- Matched: 365 (2.7)<br><br>ORP:<br>- 30 days:<br>- Unmatched: 965 (4.1)<br>- Matched: 416 (3.1)<br><br>PUnmatched <0.001<br>PMatched = 0.06 |
| Suardi et al. (2016) <sup>162</sup>           | RALP: 1790                      | RALP: NR                | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                | RALP: NR                | RALP: NR   |

Table 15. Perioperative outcomes

| Study   | Sample size           | Operative time (min)                           |   | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                                  | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD                   | Catheterization time (days)<br>Median (Range)<br>Mean ± SD                    | Pain<br>Median (range)   | Pain medication<br>n (%) | Readmission rate<br>n(%)  |
|---|-----------------------|--|---|--|---|---|--|--------------------------|---|
|   |                       | Definition                                     | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  |  |   |   |  |                          |   |
| Italy   | ORP:<br>4404          | ORP: NR  | ORP: NR   | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                  | ORP: NR   |
| Yaxley et al. (2016)<br><sup>103</sup><br>Australia | RALP: 163<br>ORP: 163 | “Surgery time”<br>and “operating<br>room time” | RALP (n=157):<br>- Surgery time: 202.03<br>± 51.36<br>- Operating room<br>time: 246.08 ± 55.12<br><br>ORP (n=151):<br>- Surgery time: 234.34<br>± 37.07<br>- Operating room<br>time: 280.37 ± 36.36<br><br>p<0.0001 | RALP (n=157):<br>443.74 ± 294.29<br><br>ORP (n=151):<br>1338.14 ± 591.47<br><br>p<0.0001 | RALP (n=157): 1.55 ±<br>2.61<br><br>ORP (n=151): 3.27 ±<br>1.49<br><br>p<0.0001 | RALP (n=157):<br>8.21 ± 3.64<br><br>ORP (n=151): 8.42<br>± 3.28<br><br>p=0.59 | RALP:<br><i>Pain at rest</i><br>- 24 h (n=155): 3.01<br>(2.70 – 3.32)<br>- 1 week (n=152):<br>1.74 (1.47 – 2.01)<br>- 6 weeks (n=138):<br>0.82 (0.55 – 1.10)<br>- 12 weeks (n=130):<br>0.39 (0.21 – 0.58)<br><br><i>Pain during activities</i><br>- 24 h (n=155): 4.60<br>(4.25 – 4.95)<br>- 1 week (n=152):<br>2.51 (2.19 – 2.82)<br>- 6 weeks (n=138):<br>0.97 (0.73 – 1.21)<br>- 12 weeks (n=130):<br>0.55 (0.33 – 0.77)<br><br><i>Worst pain</i><br>- 24 h (n=155): 5.30<br>(4.92 – 5.68)<br>- 1 week (n=152):<br>2.37 (2.01 – 2.73)<br>- 6 weeks (n=138):<br>0.72 (0.49 – 0.95)<br>- 12 weeks (n=130):<br>0.49 (0.26 – 0.72)<br><br>ORP:<br><i>Pain at rest</i> | RALP: NR<br><br>ORP: NR  | RALP (n=157): 8 (5.1)<br><br>ORP (n=151): 12<br>(7.9)<br><br>P=0.32 |

Table 15. Perioperative outcomes

| Study | Sample size | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range)  | Pain medication<br>n (%) | Readmission rate<br>n(%) |
|-------|-------------|----------------------|--|---|---|--|---|--------------------------|--------------------------|
|       |             | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |   |                          |                          |
|       |             |                      |  |   |   |  | - 24 h (n=148): 3.02 (2.69 – 3.35)<br>- 1 week (n=144): 1.98 (1.71 – 2.24)<br>- 6 weeks (n=136): 0.78 (0.56 – 0.99)<br>- 12 weeks (n=120): 0.48 (0.29 – 0.66)<br><br><i>Pain during activities</i><br>- 24 h (n=148): 5.83 (5.44 – 6.23)<br>- 1 week (n=144): 3.19 (2.91 – 3.48)<br>- 6 weeks (n=136): 1.07 (0.84 – 1.31)<br>- 12 weeks (n=120): 0.61 (0.38 – 0.83)<br><br><i>Worst pain</i><br>- 24 h (n=148): 6.45 (6.08 – 6.81)<br>- 1 week (n=144): 3.50 (3.12 – 3.88)<br>- 6 weeks (n=136): 0.83 (0.62 – 1.13)<br>- 12 weeks (n=120): 0.48 (0.25 – 0.72)<br><br>Prest;24h= 0.97<br>Prest;1w=0.21<br>Prest;6w=0.79<br>Prest;12w=0.54<br>Pactivity;24h<0.0001<br>Pactivity;1w=0.002<br>Pactivity;6w=0.55 |                          |                          |



Table 15. Perioperative outcomes

| Study   | Sample size            | Operative time (min)                       |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                      | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range)  | Pain medication n (%)   | Readmission rate n(%)   |
|---|------------------------|--|--|--|---|--|---|-------------------------|---|
|   |                        | Definition                                 | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   |  |   |  |   |                         |   |
|   |                        |  |  |  |   |  | Pactivity;12w=0.70<br>Pworst;24h<0.0001<br>Pworst;1w<0.0001<br>Pworst;6w=0.37<br>Pworst;12w=0.96  |                         |   |
| Akand et al. (2015) <sup>142</sup><br>Turkey    | RALP: 79<br>ORP: 50    | RALP: NR<br>ORP: NR                        | RALP: 242.6 ± NR<br>ORP: 255 ± NR<br>P>0.05  | RALP: 234 ± NR<br>ORP: 602 ± NR<br>P<0.001                                   | RALP: 3.2 ± NR<br>ORP: 9.1 ± NR<br>P<0.001                                    | RALP: 6.8 ± NR<br>ORP: 16.3 ± NR<br>P<0.001                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR   |
| Antonelli et al. (2015) <sup>163</sup><br>Italy | RALP: 291<br>LRP: 285  | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR     | RALP: NR<br>ORP: NR   |
| Haglund et al (2015) <sup>119</sup><br>Sweden   | RALP: 1847<br>ORP: 778 | “skin-to-skin” time<br>Operation room time | RALP:<br>- Skin-to-skin time (n=1537): 168 [144-201]<br>- Operation room time (n=1526): 236 [210-270]<br><br>ORP:<br>- Skin-to-skin time (n=746): 236 [210-270]<br>- Operation room time (n=620): 126 [102-186]<br><br>P <sub>skin-to-skin</sub> <0.001<br>P <sub>operationroom</sub> <0.001 | RALP (n=1720): 100 [50-200]<br><br>ORP (n=766): 550 [350-800]<br><br>P<0.001 | RALP (n=1846): 3 [2-4]<br><br>ORP (n=775): 4 [3-5]<br><br>P<0.001             | RALP: NR<br><br>ORP: NR  | RALP‡:<br>- pain in the operation wound: 42 (2.4)<br>- pain in the lower abdomen: 149 (8.4)<br>- pain in the upper abdomen: 57 (3.2)<br>- chest pain: 1 (0.1)<br>- abdominal pain: 10 (0.5)<br><br>ORP‡:<br>- Pain in the operation wound: 49 (6.6)<br>- pain in the lower abdomen: 58 (7.8)<br>- pain in the upper abdomen: 20 (2.7)<br>- chest pain: 1 (0.1)<br>- abdominal pain: 2 | RALP: NR<br><br>ORP: NR | RALP (n=1753): - 90 days: 163 (9.3)<br><br>ORP (n=740): - 90 days: 57 (7.7)<br><br>Punadjusted>0.05<br>Padjusted>0.05 |

Table 15. Perioperative outcomes

| Study   | Sample size           | Operative time (min)                        |   | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD      | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                 | Pain<br>Median (range)                                     | Pain medication n (%) | Readmission rate n(%) |
|---|-----------------------|---|---|--|---|--|--|-----------------------|-----------------------|
|   |                       | Definition                                  | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                                |  |   |  |  |                       |                       |
|   |                       |   |   |  |   |  | (0.3)<br>P=NR<br>‡Data taken from Wallerstedt et al (2015) |                       |                       |
| Lee et al. (2015) <sup>164</sup><br>South Korea       | RALP: 99              | RALP: NR                                    | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR   | RALP: NR              | RALP: NR              |
|   | ORP: 99               | ORP: NR                                     | ORP: NR   | ORP: NR  | ORP: NR   | ORP: NR  | ORP: NR  | ORP: NR               | ORP: NR               |
| Lott et al. (2015) <sup>120</sup><br>Brazil           | RALP: 50              | RALP: NR                                    | RALP: 271.72 [140 – 570]  | RALP: 212.4 [50 – 1,200]                                     | RALP: 2.6 [1 – 21]  | RALP: NR   | RALP: NR   | RALP: NR              | RALP: NR              |
|   | ORP: 34               | ORP: NR                                     | ORP: 153.38 [110 – 260]<br>p=0.01   | ORP: 487.35 [150 – 1,250]<br>p=0.01                          | ORP: 3.82[2 – 38]<br>p=0.01   | ORP: NR  | ORP: NR  | ORP: NR               | ORP: NR               |
| Busch et al. (2014) <sup>145</sup><br>Germany and USA | RALP: 194             | RALP: NR                                    | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR   | RALP: NR              | RALP: NR              |
|   | ORP: 194              | ORP: NR                                     | ORP: NR   | ORP: NR  | ORP: NR   | ORP: NR  | ORP: NR  | ORP: NR               | ORP: NR               |
| Davison et al. (2014) <sup>121</sup><br>Canada        | RALP: 78              | RALP: NR                                    | RALP: NR  | RALP: NR   | RALP: NR  | RALP: NR   | RALP: NR   | RALP: NR              | RALP: NR              |
|   | ORP: 73               | ORP: NR                                     | ORP: NR   | ORP: NR  | ORP: NR   | ORP: NR  | ORP: NR  | ORP: NR               | ORP: NR               |
| Fode et al. (2014) <sup>122</sup><br>Denmark          | RALP: 585             | RALP: NR                                    | RALP: NR  | RALP: 150 (5 – 1500)   | RALP: NR  | RALP: NR   | RALP: NR   | RALP: NR              | RALP: NR              |
|   | ORP: 453              | ORP: NR                                     | ORP: NR   | ORP: 600 (50 – 4320)<br>p<0.0001                             | ORP: NR   | ORP: NR  | ORP: NR  | ORP: NR               | ORP: NR               |
| Gagnon et al. (2014) <sup>165</sup><br>Canada         | RALP: 200<br>ORP: 200 | “Skin-to-skin” time and “door-to-door” time | RALP:<br>- skin-to-skin: 233.61 ± 48.7117<br>- door-to-door: 294.79 ± 49.4695<br>ORP: | RALP: 287.5 ± 290.6007<br>ORP: 402.78 ± 185.6038<br>p=0.0001 | RALP: 1.69 ± 1.1878<br>ORP: 1.95 ± 1.0866<br>p=0.0233                         | RALP*:<br>- ≤ 7 days or less: 39 (19.5)<br>- 8-10 days: 45 (22.5)<br>- 11-14 days: 42 (21) | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |

Table 15. Perioperative outcomes

| Study  | Sample size                 | Operative time (min)    |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD   | Pain<br>Median (range)  | Pain medication<br>n (%) | Readmission rate<br>n(%)   |
|--|-----------------------------|-------------------------|--|---|---|--|-------------------------|--------------------------|--|
|  |                             | Definition              | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   |   |   |  |                         |                          |  |
|  |                             |                         | - skin-to-skin: 114.23 ± 17.5902<br>- door-to-door: 152.01 ± 20.2308<br><br>Pskin-to-skin=0.0001<br>Pdoor-to-door=0.0001 |   |   | - >14 days: 19 (9.5)<br>- unknown: 55 (27.5)<br><br>ORP*:<br>- ≤ 7 days or less: 127 (63.5)<br>- 8-10 days: 32 (16)<br>- 11-14 days: 13 (6.5)<br>- >14 days: 1 (0.5)<br>- unknown: 27 (13.5)<br><br><b>p ≤ 7 days or less = 0.0001</b><br>P8-10days=0.1277<br>P11-14days=0.0001<br>p>14 days=0.0001<br>Punknown=0.0008 |                         |                          |  |
| Gandaglia et al (2014) <sup>166</sup><br>USA | RALP: 3476<br><br>ORP: 2439 | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                 | RALP: 1 [1-2]<br><br>ORP: 2 [2-3]<br><br>P<0.001              | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR  | RALP:<br>- 30 days: 137 (3.9)<br>- 90 days: 191 (5.5)<br><br>ORP:<br>- 30 days: 93 (3.8)<br>- 90 days: 143 (5.9)<br><br>P30days=0.80<br>P90days=0.50 |
| Hu et al (2014) <sup>167</sup><br>USA        | RALP: 5524                  | RALP: NR                | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR                | RALP: NR                 | RALP: NR   |

Table 15. Perioperative outcomes

| Study   | Sample size             | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|---|-------------------------|----------------------|--|---|---|--|------------------------|-----------------------|-----------------------|
|   |                         | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                       |                       |
|   | ORP:<br>5524            | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Koo et al. (2014) <sup>168</sup><br>South Korea   | RALP: 175<br>ORP: 175   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Ritch et al (2014) <sup>169</sup><br>USA  | RALP: 742<br>ORP: 237   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | RALP: 89<br>ORP: 105    | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR<br>P<0.001                          | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>ORP: 9778 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                     | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP 77<br>ORP: 176     | RALP: NR<br>ORP: NR  | RALP: 220.0±62.1<br>ORP: 151.0±44.0<br>P<0.001         | RALP: 642±405.2<br>ORP: 917±476.8<br>P<0.001            | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Froehner et al. (2013) <sup>172</sup><br>Germany  | RALP: 317<br>ORP: 2437  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                     | RALP: 8.0 ± NR<br>ORP: 7.7 ± NR<br>p=0.71                     | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium  | RALP: 64<br>ORP: 116    | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR                                     | RALP: NR<br>ORP: NR   | RALP: 12 (NR)<br>ORP: 11 (NR)<br>p=0.252                   | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |



Table 15. Perioperative outcomes

| Study                                    | Sample size | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|--|-------------|----------------------|--|---|---|--|------------------------|-----------------------|-----------------------|
|  |             | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                       |                       |
| Harty et al. (2013) <sup>200</sup>       | RALP: 152   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| USA                                      | ORP: 153    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Ludovico et al. (2013) <sup>124</sup>    | RALP: 82    | RALP: NR             | RALP: 221 (NR)   | RALP: 280 (NR)  | RALP: 4 (NR)  | RALP: 3 (NR)   | RALP: NR               | RALP: NR              | RALP: NR              |
| Italy                                    | ORP: 48     | ORP: NR              | ORP: 103 (NR)  | ORP: 565 (NR)   | ORP: 8 (NR)   | ORP: 7 (NR)  | ORP: NR                | ORP: NR               | ORP: NR               |
|  |             |                      | p<0.001  | p<0.001   | p<0.001   | p<0.001  |                        |                       |                       |
| Masterson et al (2013) <sup>173</sup>    | RALP: 669   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| USA                                      | ORP: 357    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Pierorazio et al. (2013) <sup>149</sup>  | RALP: 105   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| USA                                      | ORP: 743    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Punnen et al. (2013) <sup>174</sup>      | RALP: 233   | RALP: NR             | RALP: NR   | RALP: 217 ± 151   | RALP: 1.62 ± 0.82   | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| USA                                      | ORP: 177    | ORP: NR              | ORP: NR  | ORP: 484 ± 299  | ORP: 1.85 ± 0.85  | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
|  |             |                      |  | p<0.01  | p<0.01  |  |                        |                       |                       |
| Ryu et al. (2013) <sup>175</sup>         | RALP: 524   | RALP: NR             | RALP: 146.4 ± 47.4                                     | RALP: NR  | RALP: 7.9 ± 5.1   | RALP: 6.2 ± 2.6  | RALP: NR               | RALP: NR              | RALP: NR              |
| South Korea                              | ORP: 341    | ORP: NR              | ORP: 170.8 ± 61.3                                      | ORP: NR   | ORP: 10.1 ± 3.2   | ORP: 7.5 ± 2.4   | ORP: NR                | ORP: NR               | ORP: NR               |
|  |             |                      | p=0.211  |   | p<0.001   | p<0.001  |                        |                       |                       |
| Silberstein et al. (2013) <sup>176</sup> | RALP: 493   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| USA                                      | ORP: 961    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Son et al. (2013) <sup>177</sup>         | RALP: 146   | RALP: NR             | RALP: 137.6 ± 27.4                                     | RALP: 144.2 ± 204.9                                     | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| South Korea                              | ORP: 112    | ORP: NR              | ORP: 139.2 ± 25.0                                      | ORP: 578.1 ± 437.0                                      | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
|  |             |                      | p=0.621  | p<0.001   |   |  |                        |                       |                       |
| Bae et al (2012) <sup>178</sup>          | RALP: 111   | “skin-to-skin” time  | RALP: 232.9±52.1                                       | RALP: 238.8±275.4                                       | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
| South Korea                              | ORP: 70     |                      | ORP: 248.8±77.1  | ORP: 410.3±188.6  | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |





Table 15. Perioperative outcomes

| Study   | Sample size             | Operative time (min)                   |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD        | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD   | Catheterization time (days)<br>Median (Range)<br>Mean ± SD   | Pain<br>Median (range)  | Pain medication n (%) | Readmission rate n(%) |
|---|-------------------------|--|--|--|---|--|---|-----------------------|-----------------------|
|   |                         | Definition                             | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD         |  |   |  |   |                       |                       |
|   |                         |  | P=0.13   | P<0.001  |   |  |   |                       |                       |
| Hong et al. (2012) <sup>8</sup><br>USA              | RALP: 182<br>ORP: 80    | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Lumen et al. (2012) <sup>179</sup><br>Belgium       | RALP: 50<br>ORP: 50     | "skin-to-skin" time                    | RALP: 205 (120-310)<br>ORP: 180 (85-280)<br>P=0.001            | RALP: NR<br>ORP: NR  | RALP: 6 (4-14)<br>ORP: 6 (5-18)<br>P=0.14   | RALP: 6 (5-47)<br>ORP: 14 (9-43)<br>P<0.001                  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19     | First incision to closure of the wound | RALP: 217±51.9 (126-318)<br>ORP: 174±57.7 (70-293)<br>P=0.0207 | RALP: 333±144 (100-700)<br>ORP: 1103±636 (400-2500)<br>P<0.001 | RALP: 8.58±1.17 (6-10)<br>ORP: 11.74±5.22 (7-30)<br>P=0.0037  | RALP: 7.95±5.69 (5-29)<br>ORP: 11.78±6.77 (6-31)<br>P=0.0016 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50     | RALP: NR<br>ORP: NR                    | RALP: 212 ± 71<br>ORP: 125 ± 30<br>p<0.001                     | RALP: 132 ± 151<br>ORP: 513 ± 343<br>p<0.001                   | RALP: 1.30 (1 – 3)†<br>ORP: 3.82 (2 – 7)†<br>p<0.001  | RALP: NR<br>ORP: NR  | RALP*:<br>- persistent pain: 0<br><br>ORP*:<br>- persistent pain: 1 (2) | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Trinh et al. (2012) <sup>181</sup><br>USA           | RALP: 7598<br>ORP: 7389 | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP*:<br>- length of stay >2 days: 1105 (14.5)<br><br>ORP*:<br>- length of stay >2 days: 2923 (39.6) | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Wang et al. (2012) <sup>182</sup><br>USA            | RALP: 1038<br>ORP: 707  | RALP: NR<br>ORP: NR                    | RALP: 236.8±58.0<br>ORP: 214.3±127.6<br>P<0.001                | RALP: 155.9±141.8<br>ORP: 795.9±550.4<br>P<0.001               | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |



Table 15. Perioperative outcomes

| Study   | Sample size | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|---|-------------|----------------------|--|---|---|--|------------------------|-----------------------|-----------------------|
|   |             | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                       |                       |
| Di Pierro et al. (2011) <sup>126</sup><br>Switzerland | RALP: 75    | RALP: NR             | RALP: 330 ± 54   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 75     | ORP: NR              | ORP: 253 ± 41<br>p=0.0205                              | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark         | RALP: 77    | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 154    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Kim et al. (2011) <sup>127</sup><br>South Korea       | RALP: 528   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 235    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Magheli et al. (2011) <sup>152</sup><br>USA           | RALP: 522   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 522    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Minniti et al. (2011) <sup>184</sup><br>Italy         | RALP: 22    | RALP: NR             | RALP: NR   | RALP: 9.1%£   | RALP: 6.85 ± NR   | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 93     | ORP: NR              | ORP: NR  | ORP: 31.2%£   | ORP: 7.52 ± NR  | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Mirza et al. (2011) <sup>185</sup><br>USA             | RALP: 191   | RALP: NR             | RALP: NR   | RALP: 189.2 ± NR  | RALP: 1.23 ± NR   | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 180    | ORP: NR              | ORP: NR  | ORP: 999.1 ± NR<br>p<0.001                              | ORP: 2.28 ± NR<br>p<0.001                                     | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Tollefson et al. (2011) <sup>186</sup><br>USA         | RALP: 1084  | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 4824   | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Barocas et al. (2010) <sup>128</sup><br>USA           | RALP: 1413  | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | ORP: 491    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |
| Bolenz et al. (2010) <sup>153</sup><br>USA            | RALP: 262   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: 1 (1 – 2); 1.56 ± 1.53                                  | RALP: NR   | RALP: NR               | RALP: NR              | RALP: NR              |
|   | LRP: 220    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: 2 (2 – 3); 2.51 ±  | ORP: NR  | ORP: NR                | ORP: NR               | ORP: NR               |



Table 15. Perioperative outcomes

| Study   | Sample size            | Operative time (min)          |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication n (%) | Readmission rate n(%) |
|---|------------------------|-------------------------------|--|---|---|--|------------------------|-----------------------|-----------------------|
|   |                        | Definition                    | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                       |                       |
|   | ORP: 161               |                               |  |   | 1.37<br>P=NR  |  |                        |                       |                       |
| Breyer et al. (2010) <sup>129</sup><br>USA        | RALP: 293<br>ORP: 695  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden   | RALP: 1253<br>ORP: 485 | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR                                    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br>ORP: 502  | RALP: console time<br>ORP: NR | RALP: 192 (119-525)†<br>ORP: 148 (75-330)†<br>p<0.001  | RALP*:<br>- <500 mL: 208 (98.4)<br>- 500 – 1000 mL: 4 (1.6)<br>- ≥1000 mL: 0<br><br>ORP*:<br>- <500 mL: 349 (69.7)<br>- 500 – 1000 mL: 147 (29.1)<br>- ≥1000 mL: 6 (1.2)<br><br>P<500<0.001<br>P500-1000<0.001<br>P>1000=0.25 | RALP: 2.8 (2-7)†<br>ORP: 5.5 (3-10)†<br>p<0.001               | RALP: 6.3 (6-21)<br>ORP: 7.9 (6-20)<br>p<0.001             | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Hong et al. (2010) <sup>132</sup><br>South Korea  | RALP: 26<br>ORP: 25    | RALP: NR<br>ORP: NR           | RALP: 279.6±34.2<br>ORP: 236.5±67.3<br>P<0.05          | RALP: 457 ± 281<br>ORP: 1410 ± 901<br>p<0.05  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |
| Kordan et al. (2010) <sup>133</sup><br>USA        | RALP: 830<br>ORP: 414  | RALP: NR<br>ORP: NR           | RALP: NR<br>ORP: NR                                    | RALP: 100 [50–200]<br>ORP: 450 [300–600]  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   |

Table 15. Perioperative outcomes

| Study   | Sample size | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication<br>n (%) | Readmission rate<br>n(%) |
|---|-------------|----------------------|--|---|---|--|------------------------|--------------------------|--------------------------|
|   |             | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                          |                          |
|   |             |                      |  | p<0.001   |   |  |                        |                          |                          |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong  | RALP: 20    | RALP: NR             | RALP: 306 ± 85   | RALP: NR  | RALP: 8 ± 6   | RALP: 12 ± 7   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 20     | ORP: NR              | ORP: 289 ± 64  | ORP: NR   | ORP: 17 ± 7   | ORP: 18 ± 7  | ORP: NR                | ORP: NR                  | ORP: NR                  |
|   |             |                      | p=0.41   |   | p<0.001   | p=0.004  |                        |                          |                          |
| Nadler et al. (2010) <sup>188</sup><br>USA    | RALP: 50    | RALP: NR             | RALP: 341 (175-591)†                                   | RALP: 533 (200-1500)†                                   | RALP: 2.5 (1-12)†   | RALP: NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 50     | ORP: NR              | ORP: 235 (152-352)†                                    | ORP: 1540 (500-5000)†                                   | ORP: 2.8 (2-6)†   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
|   |             |                      | p<0.01   | p<0.01  | p=0.30  |  |                        |                          |                          |
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99    | RALP: NR             | RALP: 153.4 ± 51.3                                     | RALP: 157.7 ± 105.1                                     | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 217    | ORP: NR              | ORP: 204.0 ± 32.9                                      | ORP: 940.5 ± 615.0                                      | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
|   |             |                      | p=0.03   | p<0.001   |   |  |                        |                          |                          |
| Uvin et al. (2010) <sup>190</sup><br>Belgium  | RALP: 13    | RALP: NR             | RALP: NR   | RALP: NR  | RALP: 8.8 ± NR  | RALP: 7.7 ± NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 9      | ORP: NR              | ORP: NR  | ORP: NR   | ORP: 11.1 ± NR  | ORP: 11.6 ± NR   | ORP: NR                | ORP: NR                  | ORP: NR                  |
|   |             |                      |  |   | p<0.025   | p<0.01   |                        |                          |                          |
| Williams et al. (2010) <sup>134</sup><br>USA  | RALP: 604   | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 346    | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
| Coronato et al. (2009) <sup>191</sup><br>USA  | RALP: 98    | RALP: NR             | RALP: NR   | RALP: NR  | RALP: NR  | RALP: NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | ORP: 98     | ORP: NR              | ORP: NR  | ORP: NR   | ORP: NR   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71    | RALP: NR             | RALP: 199.6 ± 36.6                                     | RALP: 310.7 ± 205.5                                     | RALP: 4.4 (2 – 22)†   | RALP: NR   | RALP: NR               | RALP: NR                 | RALP: NR                 |
|   | LRP: 85     | ORP: NR              | p<0.001  | NR (80 – 1,800)   | p=0.002   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
|   | ORP: 83     |                      | ORP: 208.5 ± 76  | p<0.001   | ORP: 7 (3–30)†  |  |                        |                          |                          |

Table 15. Perioperative outcomes

| Study   | Sample size           | Operative time (min) |   | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range)  | Pain medication n (%)   | Readmission rate n(%)   |
|---|-----------------------|----------------------|---|--|---|--|-------------------------|-------------------------|-------------------------|
|   |                       | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  |  |   |  |                         |                         |                         |
|   |                       |                      | p<0.001   | ORP: 821.2 ± 582.3<br>NR (210 – 2,200)   |   |  |                         |                         |                         |
|   |                       |                      | p=0.001   |  |   |  |                         |                         |                         |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | RALP: NR<br>ORP: NR  | RALP (n=35): 195.6 ± 45<br><br>ORP (n=26): 127.2 ± 31.7<br>p< 0.001<br><br>‡Data extracted from Fracalanza et al. (2008) <sup>208</sup> | RALP (n=35): 300 [200 – 400]<br><br>ORP (n=26): 500 [250 – 650]<br><br>p< 0.02<br><br>‡Data extracted from Fracalanza et al. (2008) <sup>208</sup> | RALP: 6 (5–8)<br><br>ORP: 7 (6–9)<br><br>p=0.01               | RALP: 5 (4 – 7)<br><br>ORP: 6 (5 – 12)<br><br>p< 0.001     | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Laurila et al. (2009) <sup>192</sup><br>USA   | RALP: 94<br>ORP: 98   | RALP: NR<br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                       | RALP: NR<br><br>ORP: NR                                    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Ou et al. (2009) <sup>193</sup><br>Taiwan     | RALP: 30<br>ORP: 30   | RALP: NR<br>ORP: NR  | RALP: 205.2 ± 102.6‡<br><br>ORP: 213 ± 37.22‡   | RALP: 314 ± 284<br><br>ORP: 912 ± 370<br><br>p< 0.0001   | RALP: 7.33 ± 2.32<br><br>ORP: 8.37 ± 2.22<br><br>p<0.05       | RALP: 7.70 ± 2.08<br><br>ORP: 9.20 ± 2.86<br><br>p<0.05    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Rocco et al. (2009) <sup>136</sup><br>Italy   | RALP: 120<br>ORP: 240 | RALP: NR<br>ORP: NR  | RALP: 215 (165 – 450)<br><br>ORP: 160 (90 – 240)<br><br>p<0.001   | RALP: 200 (50 – 2000)<br><br>ORP: 800 (150 – 5000)<br><br>p<0.001  | RALP: 3 (2 – 12)<br><br>ORP: 6 (3 – 16)<br><br>p<0.001        | RALP: 6 (4 – 30)<br><br>ORP: 7 (4 – 35)<br><br>p<0.001     | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| White et al. (2009) <sup>194</sup><br>USA     | RALP: 50<br>ORP: 50   | RALP: NR<br>ORP: NR  | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR                                       | RALP: NR<br><br>ORP: NR                                    | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| Chan et al. (2008)                            | RALP: 660             | RALP: NR             | RALP:   | RALP:  | RALP:   | RALP: NR   | RALP: NR                | RALP: NR                | RALP: NR                |

Table 15. Perioperative outcomes

| Study  | Sample size           | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD  | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication<br>n (%) | Readmission rate<br>n(%) |
|--|-----------------------|----------------------|--|--|--|--|------------------------|--------------------------|--------------------------|
|  |                       | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD   |  |  |  |                        |                          |                          |
| <sup>195</sup><br>USA                        | ORP: 340              | ORP: NR              | - LP (n=81):<br>233.7±51.3<br>- SP (n=579):<br>204.6±38.3<br><br>ORP:<br>- LP (n=27):<br>139.5±28.9<br>- SP (n=313):<br>141±31.1<br><br>PLP<0.0001<br>PSP<0.0001 | - LP (n=81):<br>152.1±199.3<br>- SP (n=579):<br>139.2±153.3<br><br>ORP:<br>- LP (n=27):<br>593.5±292.2<br>- SP (n=313):<br>495.3±320.6<br><br>PLP<0.0001<br>PSP<0.0001 | - LP (n=81): 1.3±1.3<br>- SP (n=579): 1.1±0.5<br><br>ORP:<br>- LP (n=27): 1.4±0.4<br>- SP (n=313): 1.3±0.4<br><br>PLP=0.222<br>PSP=0.543   | ORP: NR  | ORP: NR                | ORP: NR                  | ORP: NR                  |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br>ORP: 588 | RALP: NR<br>ORP: NR  | RALP: 236 [204 – 285]<br><br>ORP: 204 [162 – 268]<br><br>p<0.001   | RALP: NR<br>ORP: NR  | RALP*:<br>- 1 day: 86 (29.3)<br>- 2 days: 176 (59.9)<br>- 3-6 days: 31 (10.5)<br>- ≥ 7 days: 1 (0.3)<br><br>ORP*:<br>- 1 day: 114 (19.4)<br>- 2 days: 400 (68.0)<br>- 3-6 days: 65 (11.0)<br>- ≥ 7 days: 9 (1.6)<br><br>P=NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR      |
| Schroeck et al. (2008) <sup>197</sup><br>USA | RALP: 362<br>ORP: 435 | RALP: NR<br>ORP: NR  | RALP (n=219): 296 ± 76<br><br>ORP (n=251): 193 ± 69<br><br>p<0.0001<br><br>‡Data extracted from D'Alonzo (2009) <sup>210</sup>                                   | RALP: 150 [100 -173]<br><br>ORP: 800 [500 – 1200]<br><br>p<0.001<br><br>RALP (219): 287 ± 317  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR      |

Table 15. Perioperative outcomes

| Study  | Sample size           | Operative time (min)            |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD  | Length of hospital stay (days)<br>Median (Range)<br>Mean ± SD                         | Catheterization time (days)<br>Median (Range)<br>Mean ± SD | Pain<br>Median (range) | Pain medication<br>n (%) | Readmission rate<br>n(%)                      |
|--|-----------------------|---------------------------------|--|--|---|--|------------------------|--------------------------|---|
|  |                       | Definition                      | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD     |  |   |  |                        |                          |   |
|  |                       |                                 |  | ORP (251): 1087 ± 853<br><br>p<0.0001<br><br>‡Data extracted from D'Alonzo (2009) <sup>210</sup>                                 |   |  |                        |                          |   |
| Miller et al. (2007) <sup>137</sup><br>USA   | RALP: 42<br>ORP: 120  | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: 232.1 ± NR<br>ORP: 490.4 ± NR<br><br>p<0.0001  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                           |
| Nelson et al. (2007) <sup>138</sup><br>USA   | RALP: 629<br>ORP: 374 | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP (n=176)‡: 191 ± 134<br>ORP (n=103) ‡: 664 ± 417<br><br>p<0.001<br><br>‡Data taken from Farnham et al. (2006) <sup>209</sup> | RALP: 1.17 ± NR<br>1.03 (0.63-8.9)<br>ORP: 1.23 ± NR<br>1.09 (0.74-3.1)<br><br>p=0.27 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: 45 (7.1)<br>ORP: 18 (4.8)<br><br>P=0.12 |
| Ball et al. (2006) <sup>116</sup><br>USA     | RALP: 82<br>ORP: 135  | RALP: NR<br>ORP: NR             | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                           |
| Ahlering et al. (2004) <sup>198</sup><br>USA | RALP: 60<br>ORP: 60   | First incision to final closure | RALP: 231 (160-340)†<br>ORP: 214 (175-275) †<br><br>p≥0.05 | RALP: 103 (25-400) †<br>ORP: 418 (150-1200) †<br><br>p≤0.001   | RALP: 1.02 (07 – 4) †<br>ORP: 2.2 (2.0 – 8.0) †<br><br>p≤0.001                        | RALP: 7 ± NR†<br>ORP: 9 ± NR†<br><br>p≥0.05                | RALP: NR<br>ORP: NR    | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                           |
| Tewari et al. (2003) <sup>139</sup>          | RALP: 200             | Incision or dissection to       | RALP: 160 (71–315) †                                       | RALP: 153 (25 – 750) †   | RALP: 1.2 (< 1 – 5) †   | RALP: 7 (1 – 18) †   | RALP: 3 (1–7) †        | RALP: NR                 | RALP: NR                                      |

Table 15. Perioperative outcomes

| Study   | Sample size              | Operative time (min)              |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                 | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range)  | Pain medication n (%)   | Readmission rate n(%)   |
|---|--------------------------|-----------------------------------|--|---|---|--|---|-------------------------|-------------------------|
|   |                          | Definition                        | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD                 |   |   |  |   |                         |                         |
| USA   | ORP: 100                 | closure                           | ORP: 163 (86–395)†<br><br>p= NS  | ORP: 910 (200 – 5000) †<br><br>p<0.001                                  | ORP: 3.5 (3 – 6) †<br><br>p<0.05  | ORP: 15.8 (7–28) †<br><br>p<0.05   | ORP: 7 (4–10) †<br><br>p<0.05<br><br>First day post-operation                           | ORP: NR                 | ORP: NR                 |
| Menon et al. (2002) <sup>140</sup><br>USA           | RALP: 30<br><br>ORP: 30  | Incision or dissection to closure | RALP: 288 (240 – 420) †‡<br><br>ORP†: 138 (90 – 300) †‡<br><br>p<0.001 | RALP: 329 (75 – 1,050) †<br><br>ORP: 970 (400 – 2,200) †<br><br>p<0.001 | RALP: 1.5 (0.96 – 4) †‡<br><br>ORP: 2.3 (2 – 4) †‡<br><br>p=NS                | RALP: 10.7 (6 – 18) †<br><br>ORP: 13.7 (7 – 18) †<br><br>p=NS              | RALP: 4 (1 – 9)†<br><br>ORP: 7 (4 – 10) †<br><br>p<0.05<br><br>First day post-operation | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR |
| <b>RALP vs. BT</b>                                  |                          |                                   |  |   |   |  |   |                         |                         |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br><br>BT: 29   | RALP: NR<br><br>BT: NA            | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NA  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  |
| Baena et al. (2013) <sup>141</sup><br>Spain         | RALP: 153<br><br>BT: 160 | RALP: NR<br><br>BT: NA            | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NA  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  |
| Ball et al. (2006) <sup>116</sup><br>USA            | RALP: 82<br><br>BT: 118  | RALP: NR<br><br>BT: NA            | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NA  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NA   | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  | RALP: NR<br><br>BT: NR  |
| <b>RALP vs. Radiotherapy</b>                        |                          |                                   |  |   |   |  |   |                         |                         |
| Hung et al. (2015) <sup>199</sup><br>Taiwan         | RALP: 43<br><br>RT: 96   | RALP: NR<br><br>RT: NA            | RALP: NR<br><br>RT: NA   | RALP: 142.32 ± 176.59<br><br>RT: NA<br><br>P=NA                         | RALP: NR<br><br>RT: NA  | RALP: NR<br><br>RT: NR   | RALP: NR<br><br>RT: NR  | RALP: NR<br><br>RT: NR  | RALP: NR<br><br>RT: NR  |
| <b>RALP vs. Cryoablation</b>                        |                          |                                   |  |   |   |  |   |                         |                         |
| Ball et al. (2006) <sup>116</sup><br>USA            | RALP: 82<br><br>CRY: 39  | RALP: NR<br><br>CRY: NA           | RALP: NR<br><br>CRY: NA  | RALP: NR<br><br>CRY: NA   | RALP: NR<br><br>CRY: NR   | RALP: NR<br><br>CRY: NR  | RALP: NR<br><br>CRY: NR   | RALP: NR<br><br>CRY: NR | RALP: NR<br><br>CRY: NR |





Table 15. Perioperative outcomes

| Study   | Sample size        | Operative time (min) |  | EBL (mL)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Length of hospital stay (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Catheterization time (days)<br>Median (Range)<br>Median [IQR]<br>Mean ± SD | Pain<br>Median (range) | Pain medication<br>n (%) | Readmission rate<br>n(%) |
|---|--------------------|----------------------|--|---|---|--|------------------------|--------------------------|--------------------------|
|   |                    | Definition           | Results<br>Median (Range)<br>Median [IQR]<br>Mean ± SD |   |   |  |                        |                          |                          |
| <b>RALP vs. Active Surveillance</b>                 |                    |                      |  |   |   |  |                        |                          |                          |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50 | RALP: NR<br>AS: NA   | RALP: NR<br>AS: NA                                     | RALP: NR<br>AS: NA                                      | RALP: NR<br>AS: NR  | RALP: NR<br>AS: NA   | RALP: NR<br>AS: NR     | RALP: NR<br>AS: NR       | RALP: NR<br>AS: NR       |

AS= Active Surveillance; BT= Brachytherapy; CI = Confidence Interval; CRY= Cryoablation; EBL= Estimated Blood Loss; LP = Large Prostate; LRP = Laparoscopic Radical Prostatectomy; NA = Not Applicable; NR = Not Reported; NS = Not Significant; NRS = Numerical Rating Scale; ORP = Open Radical Prostatectomy; RALP = Robot-assisted Radical Prostatectomy; RT= Radiotherapy; SD = Standard Deviation; SP = Small Prostate

\*Reported as n (%)

£Units unclear, reported as “blood loss rate”

†Values are reported as mean (range)

‡Hours converted to minutes

¥ Converted from hours to days

ΔValue reported as Mean (95%CI)

Table 16. Oncological and survival outcomes

| Study  | Sample size           | Positive margins n (%)                              | Follow up  | Biochemical recurrence n/N (%)                  | Local recurrence n/N (%)  | Metastasis n/N (%)  | Further treatment n/N (%)  | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%)                   | Mortality/ Cause of Death n/N (%)  | Notes                       |
|--|-----------------------|---|--|---|---|---------------------|--|--|---|--|-----------------------------|
| <b>RALP vs. LRP</b>                                  |                       |   |  |   |   |                     |  |  |   |  |                             |
| Akand et al (2015) <sup>142</sup><br>Turkey          | RALP: 79<br>LRP: 308  | RALP: 22 (27.8)<br>LRP: 86 (27.9)<br>P=NR           | NR   | RALP: NR<br>LRP: NR                             | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                           | RALP: 0/79 (0.0)<br>LRP: 1/308 (0.3)<br>1 case of postoperative complication<br>P=NR |                             |
| Papachristos et al(2015) <sup>143</sup><br>Australia | RALP: 100<br>LRP: 100 | RALP: 10 (10.0)<br>LRP (n=96): 13 (13.5)<br>P= 0.53 | RALP: 12 months<br>LRP: 12 months  | RALP: 5/97 (5.2)<br>LRP: 10/89 (11.2)<br>P=0.14 | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR | RALP: 8/100 (8.0)<br>- RT: 7 (7.0)<br>- ADT: 1 (1.0)<br><br>LRP: 11/88 (12.5)<br>- RT: 5 (5.7)<br>- ADT: 6 (6.8)<br><br>P=0.36 | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR  | BCR defined as PSA>0.1ng/ml |
| Asawabharuj et al (2014) <sup>144</sup><br>Thailand  | RALP: 486<br>LRP: 561 | RALP: NR<br>LRP: NR                                 | RALP: 12 months<br>LRP: 12 months  | RALP: NR<br>LRP: NR                             | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                           | RALP: NR<br>LRP: NR  |                             |
| Busch et al (2014) <sup>145</sup><br>Germany and USA | RALP: 194<br>LRP: 194 | RALP: 61 (31.4)<br>LRP: 44 (22.7)<br>P=0.05         | Overall: 35.4 (12.9-59.1) months<br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: NR<br>LRP: NR                             | RALP: - 3yrs-LRFS (%): 87.4<br>LRP: - 3yrs-LRFS (%):91.0<br>P <sub>KM</sub> =NR | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR<br>P <sub>KM</sub> = 0.57 | RALP, LRP, ORP: 5/582 (0.9)<br>No deaths from prostate cancer                        |                             |

Table 16. Oncological and survival outcomes

| Study  | Sample size             | Positive margins n (%)   | Follow up  | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)                           | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/Cause of Death n/N (%)  | Notes                                       |
|--|-------------------------|--|--|---|--------------------------|---------------------|---|--|-----------------------------|---|---|
| Ploussard et al (2014) <sup>111</sup><br>France  | RALP: 1009<br>LRP: 1377 | RALP: 316 (31.3)<br>LRP: 366 (26.6)<br>P=0.04  | RALP: 15.4 months<br>LRP: 39.0 months<br>Mean  | RALP:<br>- BCRFS (%):89.7<br>LRP:<br>- BCRFS (%):82.0<br>P <sub>KM</sub> = 0.82 | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: 92/1009 (9.1)<br>LRP: 221/1377 (16.0)<br>P=NR | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: 1/1009 (0.1)<br>1 case of medical complication<br>LRP: NR<br>P=NR | BCR defined as PSA >0.2 ng/ml               |
| Sooriakumaran et al (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>LRP: 4918 | RALP: 1062 (13.8)<br>LRP: 802 (16.3)<br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> <0.001 | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR   |   |
| Tozawa et al (2014) <sup>147</sup><br>Japan  | RALP: 157<br>LRP: 551   | RALP (n=153):<br>42 (26.8) [27.5%]<br>LRP (n=546):<br>167 (30.3) [30.6%]<br>*P=0.24                    | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR   |   |
| Asimakopoulus et al (2013) <sup>112</sup><br>Italy   | RALP: 136<br>LRP: 91    | RALP: 21 (15.4)<br>LRP: 6 (6.6)<br>P=0.04  | RALP: 18 (14-24) months<br>LRP:21 (15-32) months<br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: 6/136 (4.4)<br>LRP: 0/91 (0.0)<br>P=0.08                                  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR                                 | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR   | BCR defined as 2 consecutive PSA >0.2 ng/ml |
| Berge et al  | RALP: 210               | RALP: 62 (29.5)  | RALP: 36 months  | RALP: NR  | RALP: NR                 | RALP: NR            | RALP: 2/210   | RALP: NR                                       | RALP: 210                   | RALP: 0/210   |   |

Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)                          | Follow up   | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)   | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%)                | Mortality/ Cause of Death n/N (%)   | Notes                         |
|---|-----------------------|---|---|--|--------------------------|---------------------|---|--|--|---|-------------------------------|
| (2013) <sup>113</sup><br>Norway                 | LRP: 210              | LRP: 48 (22.9)<br><br>P=0.10                    | LRP: 36 months                                    | LRP: NR  | LRP: NR                  | LRP: NR             | (1.0)<br>- ADT: 2 (1.0)<br><br>LRP: 8/210 (3.8)<br>- ADT: 8 (3.8)<br><br>P=NR   | LRP: NR  | (100.0)<br><br>LRP: 207 (98.6)<br><br>P=NR | (0.0)<br><br>LRP: 3/210 (1.0)<br>No deaths from prostate cancer<br><br>P=NR |                               |
| Harty et al (2013) <sup>200</sup><br>USA        | RALP: 152<br>LRP: 140 | RALP: 76 (50.0)<br>LRP: 58 (41.4)<br><br>P=NR   | NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                        | RALP: NR<br>LRP: NR   |                               |
| Pierorazio et al (2013) <sup>149</sup><br>USA   | RALP: 105<br>LRP: 65  | RALP: 36 (34.3)<br>LRP: 18 (27.7)<br><br>P=0.52 | RALP: 23.6 months<br>LRP: 23.4 months<br><br>Mean | RALP:<br>- 3yrs-BCRFS (%):<br>67.8<br><br>LRP:<br>- 3yrs-BCRFS (%):<br>41.1<br><br>P <sub>KM</sub> =NR | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP:8 (7.6)<br>- RT: 4 (3.8)<br>- ADT: 4 (3.8)<br><br>LRP: 13 (20.0)<br>- RT: 10 (15.4)<br>- ADT: 3 (4.6)<br><br>P <sub>RT</sub> =NR<br>P <sub>ADT</sub> =NR | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                        | RALP: NR<br>LRP: NR   |                               |
| Porpiglia et al (2013) <sup>109</sup><br>Italy  | RALP: 60<br>LRP: 60   | RALP: 16 (26.7)<br>LRP: 12 (20.0)<br><br>P=0.39 | RALP: 12 months<br>LRP: 12 months                 | RALP:1/50 (2.0)<br>LRP: 4/53 (7.5)<br><br>P=0.19   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: 10 (16.7)<br>LRP: 7 (11.7)<br><br>P=0.43  | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                        | RALP: NR<br>LRP: NR   | BCR defined as PSA >0.2 ng/ml |
| Koutlidis et al (2012) <sup>114</sup><br>France | RALP: 175<br>LRP: 104 | RALP: 30 (17.1)<br>LRP: 14 (13.5)<br><br>P=0.40 | NR  | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR                        | RALP: NR<br>LRP: NR   |                               |
| Park et al (2012) <sup>150</sup>                | RALP: 183             | RALP: 25 (13.7)                                 | RALP: 13 (1-41) months                            | RALP: 24/183 (13.1)  | RALP: NR                 | RALP: NR            | RALP: NR  | RALP: NR                                       | RALP: 183 (100.0)                          | RALP: 0/183 (0.0)   | BCR defined as 2 PSA≥0.2ng/ml |

Table 16. Oncological and survival outcomes

| Study  | Sample size           | Positive margins n (%)                      | Follow up  | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/Cause of Death n/N (%)            | Notes                                       |
|--|-----------------------|---|--|---|--------------------------|---------------------|---------------------------|--|-----------------------------|---|---|
| South Korea  | LRP: 144              | LRP: 22 (15.3)<br>P=0.75                    | LRP: 19 (1-42) months<br>Median (range)                    | - BCRFS (%): 86.9<br>LRP: 24/144 (16.7)<br>- BCRFS (%): 83.3<br>P=0.43<br>P <sub>KM</sub> =0.91 | LRP: NR                  | LRP: NR             | LRP: NR                   | LRP: NR  | LRP: 144 (100.0)<br>P=NA    | LRP: 0/144 (0.0)<br>P=NA                    |   |
| Asimakopoulus et al (2011) <sup>110</sup><br>Italy | RALP: 52<br>LRP: 60   | RALP: 8 (15.4)<br>LRP: 6 (10.0)<br>P=0.39   | RALP: 12 months<br>LRP: 12 months                          | RALP: 4/52 (7.7)<br>LRP: 2/60 (3.3)<br>P=0.30   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: 0/52 (0.0)<br>LRP: 0/60 (0.0)<br>P=NA | BCR defined as 2 consecutive PSA >0.2 ng/ml |
| Kasraeian et al (2011) <sup>151</sup><br>France    | RALP: 200<br>LRP: 200 | RALP: 27 (13.5)<br>LRP: 24 (12.0)<br>P=0.76 | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR                         |   |
| Magheli et al (2011) <sup>152</sup><br>USA         | RALP: 522<br>LRP: 522 | RALP: 102 (19.5)<br>LRP: 68 (13.0)<br>P= NR | RALP: 15.6±7.2 months<br>LRP: 16.8±8.4 months<br>Mean ± SD | RALP:<br>- BCRFS (%): 94.0<br>LRP:<br>- BCRFS (%): 94.0<br>P <sub>KM</sub> =NR                  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR                         |   |
| Willis et al (2011) <sup>115</sup><br>USA          | RALP: 121<br>LRP: 161 | RALP: 21 (16.5)<br>LRP: 21 (13.0)<br>P=0.23 | RALP: 12 months<br>LRP: 12 months                          | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR                         |   |
| Bolenz et al (2010) <sup>153</sup><br>USA          | RALP: 262<br>LRP: 220 | RALP: NR<br>LRP: NR                         | NR   | RALP: NR<br>LRP: NR   | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR                         |   |

Table 16. Oncological and survival outcomes

| Study  | Sample size           | Positive margins n (%)                          | Follow up  | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/Cause of Death n/N (%)   | Notes                        |
|--|-----------------------|---|--|--|--------------------------|---------------------|---------------------------|--|-----------------------------|--|------------------------------|
| Drouin et al (2009) <sup>154</sup><br>France | RALP: 71<br>LRP: 85   | RALP: 12 (16.9)<br>LRP: 16 (18.8)<br><br>P=NR   | RALP: 40.9±5.0 months<br>LRP: 48.4±11.0 months<br><br>Mean± SD | RALP: 7 / 71 (9.9)<br>- 5yrs-BCRFS (%) :89.6<br><br>LRP: 10/85 (11.8)<br>- 5yrs-BCRFS (%) :88.1<br><br>P=NR<br>P <sub>KM</sub> =NR | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP, LRP, ORP: 5/239 (2.1)<br>1 case of disease progression (ORP)<br>4 cases of cardiovascular causes | BCR defined as PSA>0.2ng/ml  |
| Hakimi et al (2009) <sup>155</sup><br>USA    | RALP: 75<br>LRP: 75   | RALP: 9 (12.0)<br>LRP: 10 (13.3)<br><br>P=0.38  | RALP: 17 months<br>LRP: 48 months<br><br>Mean                  | RALP: 4/75 (5.3)<br>LRP: 5/75 (6.7)<br><br>P=1.00  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR  | BCR defined as PSA>0.2 ng/ml |
| Rozet et al (2009) <sup>156</sup><br>France  | RALP: 133<br>LRP: 133 | RALP: 26 (19.5)<br>LRP: 21 (15.8)<br><br>P=0.42 | NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: 0/133 (0.0)<br>LRP: 0/133 (0.0)<br><br>P=NA  |                              |
| Trabulsi et al (2008) <sup>157</sup><br>USA  | RALP: 50<br>LRP: 190  | RALP: 3 (6.0)<br>LRP: 35 (18.4)<br><br>P=0.03   | NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR  |                              |
| Ball et al (2006) <sup>116</sup><br>USA      | RALP: 82<br>LRP: 124  | RALP: NR<br>LRP: NR                             | RALP: 6 months<br>LRP: 6 months                                | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR  |                              |
| Hu et al (2006) <sup>158</sup><br>USA        | RALP: 322<br>LRP: 358 | RALP: NR<br>LRP: NR                             | NR   | RALP: NR<br>LRP: NR  | RALP: NR<br>LRP: NR      | RALP: NR<br>LRP: NR | RALP: NR<br>LRP: NR       | RALP: NR<br>LRP: NR                            | RALP: NR<br>LRP: NR         | RALP: NR<br>LRP: NR  |                              |
| Joseph et al                                 | RALP: 50              | RALP: 6.0                                       | RALP: 5.3 (2-9)  | RALP: 0/50 (0.0)   | RALP: NR                 | RALP: NR            | RALP: NR                  | RALP: NR                                       | RALP: NR                    | RALP: NR   |                              |



Table 16. Oncological and survival outcomes

| Study                                       | Sample size             | Positive margins n (%)   | Follow up  | Biochemical recurrence n/N (%)             | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)   | Prostate cancer specific survival rate n/N (%)                                      | Overall survival rate n (%)   | Mortality/ Cause of Death n/N (%)  | Notes                                     |
|---|-------------------------|--|--|--|--------------------------|---------------------|---|---|---|--|---|
| (2005) <sup>159</sup><br>USA                | LRP: 50                 | (12.0)<br>LRP: 7.0 (14)<br>P=NR  | months<br>LRP: 5.3 (2-9) months<br>Mean (range)  | LRP: 0/50 (0.0)<br>P=NA                    | LRP: NR                  | LRP: NR             | LRP: NR   | LRP: NR   | LRP: NR   | LRP: NR  |   |
| <b>RALP vs. ORP</b>                         |                         |  |  |  |                          |                     |   |   |   |  |   |
| Hu et al (2017) <sup>160</sup><br>USA       | RALP: 4164<br>ORP: 4164 | RALP: NR<br>ORP: NR  | Overall for all-cause mortality: 78.0 (61.2-94.8)<br><br>Overall for further treatment: 64.8 (50.4-63.6)<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: NR<br>ORP: NR                        | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR - ADT: NR<br>- RT: NR<br><br>ORP: NR - ADT: NR<br>- RT: NR<br><br>HR: 0.78 (95%CI: 0.70-0.86)<br><br>HR <sub>ADT</sub> : 0.84 (95%CI: 0.72-0.98)<br><br>HR <sub>RT</sub> : 0.77 (95%CI: 0.69-0.86)<br><br>P <sub>HR</sub> <0.001<br>P <sub>HR(ADT)</sub> =0.03<br>P <sub>HR(RT)</sub> <0.001 | RALP: NR<br>ORP: NR<br><br>HR: 0.85 (95%CI: 0.50-1.43)<br><br>P <sub>HR</sub> =0.54 | RALP: NR<br>ORP: NR<br><br>HR: 0.85 (95%CI: 0.72-1.01)<br><br>P <sub>HR</sub> =0.07 | RALP: NR<br>ORP: NR  |   |
| Jackson et al. (2016) <sup>117</sup><br>USA | RALP: 116<br>ORP: 63    | RALP: 31 (26.7)<br>ORP: 26 (41.3)<br><br>P <sub>unadjusted</sub> =0.05 | RALP: 60 months<br>ORP: 60 months  | RALP: 22/116 (19.0)<br>- 5yrs-BCRFS (%):NR | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR   | RALP: 7/116 (6)<br>1 case of prostate cancer<br>3 cases of other cancers | BCR defined as 2 consecutive PSA≥0.2ng/ml |

Table 16. Oncological and survival outcomes

| Study   | Sample size                 | Positive margins n (%)   | Follow up   | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)   | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)  | Notes                        |
|---|-----------------------------|--|---|---|--------------------------|---------------------|---|--|-----------------------------|--|------------------------------|
|   |                             | $P_{\text{adjusted}}=0.23$   |   | ORP: 19/63 (30.2)<br>- 5yrs- BCRFS (%) :NR<br><br>P=0.09<br>$P_{\text{KM}}=0.01$<br>$P_{\text{HR}}=0.36$  |                          |                     |   |  |                             | 3 cases of unknown reason<br><br>ORP: 4/63 (6.3)<br>1 case of other cancers<br>3 cases of unknown reason<br><br>$p=1.00$ |                              |
| Ong et al. (2016) <sup>118</sup><br>Australia | RALP: 885<br>ORP: 1117      | RALP: 202 (22.8)<br><br>ORP: 378 (33.8)<br><br>$P_{\text{unadjusted}} < 0.001$<br>$P_{\text{adjusted}} < 0.01$ | RALP: 17 (11-20) months<br><br>ORP: 19 (12-22) months<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)           | RALP: 108/885 (12.2)<br>- 1.5yrs- BCRFS (%) : 89.0<br><br>ORP: 223/1117 (20.0)<br>- 1.5yrs- BCRFS (%) : 83.0<br><br>HR: 0.79 (95%CI: 0.57-1.12)<br><br>$P_{\text{KM}}=0.003$<br>$P_{\text{HR}} \geq 0.05$ | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  | BCR defined as PSA>0.2 ng/ml |
| Pearce et al. (2016) <sup>161</sup><br>USA    | RALP: 73,131<br>ORP: 23,804 | RALP:<br>- Unmatched: 14,940 (20.5)<br>- Matched: 2,883 (21.6)<br><br>ORP:<br>- Unmatched: 5,077 (22.5)        | RALP: 4.3 (3.3-5.8) months**<br><br>ORP: 4.3 (3.3-5.8) months**<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP:<br>- RT<br>- Unmatched: 1,871/73131 (2.6)<br>- Matched: 491/13333 (3.7) | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP:<br>- Unmatched: 94/73131 (0.1)<br>- Matched: 8/13333 (0.1)<br><br>ORP:<br>- Unmatched: 97/23804 (0.4)              |                              |



Table 16. Oncological and survival outcomes

| Study  | Sample size             | Positive margins n (%)  | Follow up                       | Biochemical recurrence n/N (%) | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)  | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/Cause of Death n/N (%)   | Notes   |
|--|-------------------------|---|---------------------------------|--------------------------------|--------------------------|---------------------|--|--|-----------------------------|--|---|
|  |                         | - Matched:<br>3,179 (23.9)  | **days converted<br>in months   |                                |                          |                     | ORP:<br>- RT<br>- Unmatched:<br>1,076/23804<br>(4.6)<br>- Matched:<br>684/13333<br>(5.1) |  |                             | - Matched:<br>29/13333 (0.2)<br><br>P <sub>unmatched</sub> =0.001<br>P <sub>matched</sub> =0.001 |   |
| Suardi et al. (2016) <sup>162</sup><br>Italy     | RALP: 1790<br>ORP: 4404 | RALP: 291 (16.3)<br>ORP: 1044 (23.7)<br>P<0.001   | NR                              | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |   |
| Yaxley et al. (2016) <sup>103</sup><br>Australia | RALP: 163<br>ORP: 163   | RALP (n=157):<br>23 (15%)<br>ORP (n=157):<br>15 (10%)   | RALP: 12 weeks<br>ORP: 12 weeks | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  | Study is ongoing and further oncological outcomes will be reported on after 24 months follow-up |
| Akand et al. (2015) <sup>142</sup><br>Turkey     | RALP: 79<br>ORP: 50     | RALP: 22 (27.8)<br>ORP: 15 (30.0)<br>P=NR   | NR                              | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br>P=NA  |   |
| Antonelli et al. (2015) <sup>163</sup><br>Italy  | RALP: 291<br>ORP: 285   | RALP: 71 (24.4)<br>ORP: 91 (31.9)<br>P <sub>unadjusted</sub> =0.04<br>P <sub>adjusted</sub> =0.04 | NR                              | RALP: NR<br>ORP: NR            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |   |
| Haglund et al (2015)                             | RALP: 1847              | RALP (n=1812):<br>395 (21.4)  | RALP: 12 months                 | RALP: NR                       | RALP: NR                 | RALP: NR            | RALP: NR   | RALP: NR                                       | RALP: NR                    | RALP: 3 (0.0)  |   |



Table 16. Oncological and survival outcomes

| Study  | Sample size           | Positive margins n (%)   | Follow up  | Biochemical recurrence n/N (%)  | Local recurrence n/N (%)                                   | Metastasis n/N (%)  | Further treatment n/N (%)                 | Prostate cancer specific survival rate n/N (%)   | Overall survival rate n (%)  | Mortality/ Cause of Death n/N (%)                             | Notes                                      |
|--|-----------------------|--|--|---|--|---------------------|---|--|--|---|--|
| <sup>119</sup><br>Sweden                                 | ORP: 778              | [21.8%]<br><br>ORP (n=748):<br>156 (20.1)<br>[20.9%]<br><br>*P <sub>unadjusted</sub> =0.60<br>*P <sub>adjusted</sub> ≥0.05 | ORP: 12 months   | ORP: NR   | ORP: NR  | ORP: NR             | ORP: NR<br><br>p>0.05                     | ORP: NR  | ORP: NR  | ORP: 0 (0.0)<br><br>P=0.56                                    |  |
| Lee et al. (2015)<br><sup>164</sup><br>South Korea       | RALP: 99<br>ORP: 99   | RALP: 34 (34.3)<br>ORP: 36 (36.4)<br><br>P=0.77  | Overall: 47.9 (33.6-68.6)<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)        | RALP:<br>- 2yrs- BCRFS (%) : 35.4<br>- 5yrs- BCRFS (%) : 59.6<br><br>ORP:<br>- 2yrs- BCRFS (%) : 48.5<br>- 5yrs- BCRFS (%) : 48.5<br><br>HR: 0.73 (95%CI: 0.48-1.10)<br><br>P <sub>KM</sub> =0.13<br>P <sub>HR</sub> = 0.11 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: 0 (0.0)<br>ORP: 0 (0.0)<br><br>P=NA | RALP:<br>- 5yrs (%): 96.0<br><br>ORP:<br>- 5yrs (%): 96.0<br><br>P <sub>KM</sub> =0.85 | RALP:<br>- 5yrs (%): 92.9<br><br>ORP:<br>- 5yrs (%): 91.9<br><br>P <sub>KM</sub> =0.95 | RALP: NR<br>ORP: NR   | BCR defined as 2 consecutive PSA≥0.2 ng/ml |
| Lott et al. (2015)<br><sup>120</sup><br>Brazil           | RALP: 50<br>ORP: 34   | RALP: 16 (32.0)<br>ORP: 11 (32.3)<br><br>P=0.97  | RALP: 12 months<br>ORP: 12 months  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR   |  |
| Busch et al. (2014)<br><sup>145</sup><br>Germany and USA | RALP: 194<br>ORP: 194 | RALP: 61 (31.4)<br>ORP: 46 (23.7)<br><br>P=NR  | Overall: 35.4 (12.9-59.1) months<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: NR<br>ORP: NR   | RALP:<br>- 3yrs-LRFS (%) : 87.4<br><br>ORP:<br>- 3yrs-LRFS | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                       | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP, LRP, ORP: 5/582 (0.9)<br>No deaths from prostate cancer |  |

Table 16. Oncological and survival outcomes

| Study  | Sample size             | Positive margins n (%)  | Follow up   | Biochemical recurrence n/N (%)  | Local recurrence n/N (%)          | Metastasis n/N (%)  | Further treatment n/N (%)   | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes                        |
|--|-------------------------|---|---|---|-----------------------------------|---------------------|---|--|-----------------------------|-----------------------------------|------------------------------|
|  |                         |   |   |   | (%):85.7<br>P <sub>KM</sub> =0.88 |                     |   |  |                             |                                   |                              |
| Davison et al. (2014) <sup>121</sup><br>Canada | RALP: 78<br>ORP: 73     | RALP: NR<br>ORP: NR   | RALP: 12 months<br>ORP: 12 months                               | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR               | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Fode et al. (2014) <sup>122</sup><br>Denmark   | RALP: 585<br>ORP: 453   | RALP: 96 (16.4)<br>ORP: 116 (25.6)<br>P <sub>unadjusted</sub> <0.001<br>P <sub>adjusted</sub> =0.96 | RALP: 12 months<br>ORP: 12 months                               | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR               | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Gagnon et al. (2014) <sup>165</sup><br>Canada  | RALP: 200<br>ORP: 200   | RALP: 49 (24.5) [24.6%]<br>ORP: 62 (31.0)<br>*P=0.18  | RALP:<br>6 months<br>12 months<br>ORP:<br>6 months<br>12 months | RALP:<br>2/174 (1.1)<br>7/175 (4.0)<br>ORP:<br>8/178 (4.5)<br>14/170 (8.2)<br>P <sub>6months</sub> =0.10<br>P <sub>12months</sub> =0.12 | RALP: NR<br>ORP: NR               | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               | BCR defined as PSA >0.2ng/ml |
| Gandaglia et al (2014) <sup>166</sup><br>USA   | RALP: 3476<br>ORP: 2439 | RALP: NR<br>ORP: NR   | RALP: 6 months<br>ORP: 6 months                                 | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR               | RALP: NR<br>ORP: NR | RALP:<br>125/3476 (3.6)<br>- ADT: 49/3476 (1.4)<br>- RT: 97/3476 (2.8)<br>ORP: 154/2439 (6.3)<br>- ADT: 61/2439 (2.5)<br>- RT: 113/2439 (4.6) | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |

Table 16. Oncological and survival outcomes

| Study   | Sample size             | Positive margins n (%)                          | Follow up   | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)   | Further treatment n/N (%)                              | Prostate cancer specific survival rate n/N (%)                           | Overall survival rate n (%)  | Mortality/ Cause of Death n/N (%) | Notes  |
|---|-------------------------|---|---|---|--------------------------|--|--|--|--|-----------------------------------|--|
|   |                         |   |   |   |                          |  | P<0.001  |  |  |                                   |  |
| Hu et al (2014) <sup>167</sup><br>USA           | RALP: 5524<br>ORP: 5524 | RALP: 752 (13.6)<br>ORP: 1010 (18.3)<br>P<0.001 | RALP: 6 months<br>ORP: 6 months   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR  | RALP: 248/5524 (4.5)<br>ORP: 344/5524 (6.2)<br>P<0.001 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR               |  |
| Koo et al. (2014) <sup>168</sup><br>South Korea | RALP: 175<br>ORP: 175   | RALP: 62 (35.4)<br>ORP: 64 (36.6)<br>P=0.91     | RALP: 57.6±11.4 months<br>ORP: 60.1±11.9 months<br>Mean±SD  | RALP: 39/175 (22.3)<br>- 5yrs- BCRFS (%): 65.5<br>ORP: 39/175 (22.3)<br>- 5yrs- BCRFS (%): 67.8<br>P=1.00<br>P <sub>KM</sub> =0.65  | RALP: NR<br>ORP: NR      | RALP: - 5yrs-MFS (%): 96.8<br>ORP: - 5yrs-MFS (%): 96.7<br>P <sub>KM</sub> =0.88 | RALP: 25/175 (14.3)<br>ORP: 39/175 (22.3)<br>P=0.05    | RALP: - 5yrs (%): 96.5<br>ORP: - 5yrs (%): 98.6<br>P <sub>KM</sub> =0.08 | RALP: - 5yrs (%): 95.5<br>ORP: - 5yrs (%): 94.7<br>P <sub>KM</sub> =0.65 | RALP: NR<br>ORP: NR               | BCR defined as 2 consecutive PSA>0.2 ng/ml at least 3 months after surgery |
| Ritch et al (2014) <sup>169</sup><br>USA        | RALP: 742<br>ORP: 237   | RALP: 242 (32.6)<br>ORP: 93 (39.2)<br>P=0.06    | RALP: 42.5 (26.2-59.7) months<br>ORP: 62.8 (43.1-83.5) months<br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: 212/742 (28.6)<br>- 5yrs- BCRFS (%):63.0<br>ORP: 105/237 (44.3)<br>- 5yrs- BCRFS (%): 53.0<br>HR: 1.01 (95%CI: 0.76- 1.36)<br>P <sub>KM</sub> =0.003<br>P <sub>HR</sub> =0.93 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR  | RALP: 56/742 (7.5)<br>ORP: 34/237 (14.3)<br>P=NR       | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR               | BCR defined as PSA≥0.2ng/ml or initiation of salvage therapy               |



Table 16. Oncological and survival outcomes

| Study   | Sample size             | Positive margins n (%)                        | Follow up                         | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)           | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)  | Notes                                     |
|---|-------------------------|---|-----------------------------------|---|--------------------------|---------------------|-------------------------------------|--|-----------------------------|--|---|
| Shigemura et al. (2014) <sup>170</sup><br>Japan   | RALP: 89<br>ORP: 105    | RALP: NR<br>ORP: NR                           | NR                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |   |
| Sooriakumaran et al. (2014) <sup>146</sup><br>USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria | RALP: 7697<br>ORP: 9778 | RALP: 1062 (13.8)<br>ORP: 2229 (22.8)<br>P=NR | NR                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |   |
| Choo et al. (2013) <sup>171</sup><br>South Korea  | RALP 77<br>ORP: 176     | RALP: 30 (39.0)<br>ORP: 70 (39.8)<br>P=0.91   | RALP: 24 months<br>ORP: 24 months | RALP: 5/77 (6.5) - BCRFS (%): 93.5<br>ORP: 22/176 (12.5) - BCRFS (%): 87.5<br>P <sub>KM</sub> =0.16 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  | BCR defined as 2 consecutive PSA≥0.2ng/ml |
| Froehner et al. (2013) <sup>172</sup><br>Germany  | RALP: 317<br>ORP: 2437  | RALP: NR<br>ORP: NR                           | NR                                | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 1/317 (0.3)<br>1 case of postoperative complication<br>ORP: 1/2437 (0.0)<br>1 case of postoperative complication<br>P=0.22 |   |
| Geraerts et al. (2013) <sup>123</sup><br>Belgium  | RALP: 64<br>ORP: 116    | RALP: 19 (29.7)<br>ORP (n=115): 24 (20.9)     | RALP: 12 months<br>ORP: 12 months | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: 8/64 (12.5)<br>- RT: 8 (12.5) | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP and ORP: 1 case of sudden death   |   |



Table 16. Oncological and survival outcomes

| Study  | Sample size               | Positive margins n (%)                              | Follow up   | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)      | Further treatment n/N (%)                                    | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes |
|--|---------------------------|---|---|--|--------------------------|-------------------------|--|--|-----------------------------|-----------------------------------|-------|
|  |                           | P=0.20  |   |  |                          |                         | ORP: 15/116 (12.9)<br>- RT: 15 (12.9)<br><br>P=NA            |  |                             |                                   |       |
| Harty et al. (2013) <sup>200</sup><br>USA      | RALP: 152<br><br>ORP: 153 | RALP: 76 (50.0)<br><br>ORP: 81 (52.9)<br><br>P=0.13 | NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                      | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| Ludovico et al. (2013) <sup>124</sup><br>Italy | RALP: 82<br><br>ORP: 48   | RALP: 8 (9.8)<br><br>ORP: 14 (29.2)<br><br>P=0.01   | RALP: 12 months<br><br>ORP: 12 months                 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR                                      | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| Masterson et al (2013) <sup>173</sup><br>USA   | RALP: 669<br><br>ORP: 357 | RALP: 97 (14.5)<br><br>ORP: 63 (17.6)<br><br>P=0.09 | RALP: 17 months<br><br>ORP: 43 months<br><br>Mean     | RALP:<br>- 2yrs- BCRFS (%): 87<br>- 5yrs- BCRFS (%): 73<br><br>ORP:<br>- 2yrs- BCRFS (%): 87<br>- 5yrs- BCRFS (%): 71<br><br>P <sub>KM</sub> =0.97 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: 0 (0.0)<br><br>ORP: 0 (0.0)<br><br>P=NA                | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| Pierorazio et al. (2013) <sup>149</sup><br>USA | RALP: 105<br><br>ORP: 743 | RALP: 36 (34.3)<br><br>ORP: 218 (29.4)<br><br>P=NR  | RALP: 23.6 months<br><br>ORP: 38.4 months<br><br>Mean | RALP:<br>- 3yrs-BCRFS (%):67.8<br><br>ORP:<br>- 3yrs-BCRFS (%):56.3  | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP:<br>- ADT: 4/105 (3.8)<br>- RT: 4/105 (3.8)<br><br>ORP: | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |

Table 16. Oncological and survival outcomes

| Study                                      | Sample size           | Positive margins n (%)  | Follow up                                     | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)  | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes   |
|--|-----------------------|---|---|--|--------------------------|---------------------|--|--|-----------------------------|-----------------------------------|---|
|  |                       |   |   | HR: 0.70 (95%CI: 0.32-1.51)<br><br>P <sub>HR</sub> =0.36   |                          |                     | - ADT: 97/743 (13.1)<br>- RT: 98/743 (13.2)<br><br>P <sub>RT</sub> =NR<br>P <sub>ADT</sub> =NR   |  |                             |                                   |   |
| Punnen et al. (2013) <sup>174</sup><br>USA | RALP: 233<br>ORP: 177 | RALP: 68 (29.2)<br>ORP: 40 (22.6)<br><br>P <sub>unadjusted</sub> =0.13<br>P <sub>adjusted</sub> =0.27 | RALP: 22 months<br>ORP: 48 months<br><br>Mean | RALP: 32/233 (13.7)<br>- 2yrs-BCRFS (%): 84.0<br>- 4yrs-BCRFS (%): 68.0<br><br>ORP: 49/177 (27.7)<br>- 2yrs-BCRFS (%): 79.0<br>- 4yrs-BCRFS (%): 66.0<br><br>HR: 1.26 (95%CI: 0.61-2.61)<br><br>P=NR<br>P <sub>KM</sub> =0.52<br>P <sub>HR</sub> =0.53 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP:<br>- Adjuvant treatment: 11/233 (4.7)<br>ADT: 5<br>RT: 4<br>ADT+RT: 2<br>- Salvage treatment: 13/233 (5.6)<br>ADT: 0<br>RT: 7<br>ADT+RT: 6<br><br>ORP:<br>- Adjuvant treatment: 23/177 (13.0)<br>ADT: 6<br>RT: 9<br>ADT+RT: 8<br>- Salvage treatment: 34/177 (19.2)<br>ADT: 6<br>RT: 15<br>ADT+RT: 13<br><br>P <sub>adjuvant</sub> =0.01 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               | BCR defined as 2 consecutive PSA≥0.2 ng/ml and/ or the receipt of any salvage treatment for prostate cancer |

Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)                       | Follow up  | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)              | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)                    | Notes   |
|---|-----------------------|--|--|--|--------------------------|---------------------|--|--|-----------------------------|--|---|
|   |                       |  |  |  |                          |                     | $P_{\text{salvage}} < 0.01$            |  |                             |  |   |
| Ryu et al. (2013) <sup>175</sup><br>South Korea | RALP: 524<br>ORP: 341 | RALP: NR<br>ORP: NR                          | RALP: 3 months<br>ORP: 3 months                  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                                  |   |
| Silberstein et al. (2013) <sup>176</sup><br>USA | RALP: 493<br>ORP: 961 | RALP: 74 (15.0)<br>ORP: 147 (15.3)<br>P=NR   | RALP: 36 months<br>ORP: 36 months                | RALP:<br>- 2yrs- BCRFS (%) : 96.7<br><br>ORP:<br>- 2yrs- BCRFS (%) : 95.9<br><br>HR: 0.88 (95%CI: 0.56-2.39)<br><br>$P_{\text{HR}}=0.60$ | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                                  | BCR defined as PSA $\geq$ 0.1ng/ml or PSA $\geq$ 0.05ng/ml followed by further treatment for cancer |
| Son et al. (2013) <sup>177</sup><br>South Korea | RALP: 146<br>ORP: 112 | RALP: NR<br>ORP: NR                          | RALP: 36 months<br>ORP: 36 months                | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                                  |   |
| Bae et al (2012) <sup>178</sup><br>South Korea  | RALP: 111<br>ORP: 70  | RALP: 14 (12.6)<br>ORP: 17 (24.3)<br>P=0.04  | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0/111 (0.0)<br><br>ORP: 0/70 (0.0)<br><br>P=NA |   |
| Hong et al. (2012) <sup>8</sup><br>USA          | RALP: 182<br>ORP: 80  | RALP: 52 (28.6)<br>ORP: 46 (57.5)<br>P<0.001 | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                    | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                                  |   |
| Lumen et al. (2012) <sup>179</sup><br>Belgium   | RALP: 50<br>ORP: 50   | RALP: 4 (8.0)<br>ORP: 12 (24.0)<br>P=0.05    | RALP: 12 (1-30) months<br>ORP: 31 (1-102) months | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP:<br>- RT: 6/50 (12.0)<br><br>ORP: | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                                  |   |





Table 16. Oncological and survival outcomes

| Study   | Sample size             | Positive margins n (%)                       | Follow up                                   | Biochemical recurrence n/N (%)                 | Local recurrence n/N (%) | Metastasis n/N (%)                  | Further treatment n/N (%)  | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)       | Notes                                      |
|---|-------------------------|--|---|--|--------------------------|-------------------------------------|--|--|-----------------------------|---|--|
|   |                         |  | Median (range)                              |  |                          |                                     | - RT: 10/50 (20.0)<br>P=NR   |  |                             |   |  |
| Martinschek et al. (2012) <sup>180</sup><br>Germany | RALP: 19<br>ORP: 19     | RALP: 3 (15.8)<br>ORP: 3 (15.8)<br>P=1.0     | RALP: NR<br>ORP: NR                         | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                     |  |
| Philippou et al. (2012) <sup>125</sup><br>UK        | RALP: 50<br>ORP: 50     | RALP: 9 (18.0)<br>ORP: 10 (20.0)<br>P=0.80   | RALP: 12 months<br>ORP: 12 months           | RALP: 4/50 (8.0)<br>ORP: 6/50 (12.0)<br>P=0.50 | RALP: NR<br>ORP: NR      | RALP: 0/50 (0.0)<br>ORP: NR<br>P=NR | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                     | BCR defined as 2 consecutive PSA≥0.2 ng/ml |
| Trinh et al. (2012) <sup>181</sup><br>USA           | RALP: 7598<br>ORP: 7389 | RALP: NR<br>ORP: NR                          | NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                 | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 1 (0.0)<br>ORP: 6 (0.1)<br>P=0.09 |  |
| Wang et al. (2012) <sup>182</sup><br>USA            | RALP: 1038<br>ORP: 707  | RALP: 160 (15.4)<br>ORP: 95 (13.4)<br>P=0.25 | RALP: 11.1±0.5<br>ORP: 39.4±0.9<br>Mean± SD | RALP: 21 (2.0)<br>ORP: 70 (9.9)<br>P<0.001     | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR                 | RALP:<br>- ADT: 12/1038 (1.2)<br>- RT: 24/1038 (2.3)<br><br>ORP:<br>- ADT: 31/707 (4.4)<br>- RT: 55/707 (7.8)<br><br>P <sub>ADT</sub> <0.001<br>P <sub>RT</sub> <0.001 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                     |  |
| Di Pierro et al.                                    | RALP: 75                | RALP: 12 (16.0)                              | RALP:                                       | RALP:  | RALP: NR                 | RALP: NR                            | RALP: NR   | RALP: NR                                       | RALP: NR                    | RALP: NR                                | BCR defined as 2                           |



Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)                           | Follow up  | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes                        |
|---|-----------------------|--|--|---|--------------------------|---------------------|---------------------------|--|-----------------------------|-----------------------------------|------------------------------|
| (2011) <sup>126</sup><br>Switzerland            | ORP: 75               | ORP: 24 (32.0)<br><br>P=0.002                    | 3 months<br>12 months<br><br>ORP:<br>3 months<br>12 months | 9/75 (12.0)<br>5/45 (11.1)<br><br>ORP:<br>7/75 (9.3)<br>10/75 (13.3)<br><br>P <sub>3months</sub> =0.71<br>P <sub>12months</sub> =0.36 | ORP: NR                  | ORP: NR             | ORP: NR                   | ORP: NR  | ORP: NR                     | ORP: NR                           | consecutive<br>PSA≥0.2 ng/ml |
| Hohwu et al. (2011) <sup>183</sup><br>Denmark   | RALP: 77<br>ORP: 154  | RALP: NR<br>ORP: NR                              | RALP: 12 months<br>ORP: 12 months                          | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Kim et al. (2011) <sup>127</sup><br>South Korea | RALP: 528<br>ORP: 235 | RALP: 143 (27.1)<br>ORP: 58 (24.7)<br><br>P=0.49 | RALP: 24 months<br>ORP: 24 months                          | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Magheli et al. (2011) <sup>152</sup><br>USA     | RALP: 522<br>ORP: 522 | RALP: 102 (19.5)<br>ORP: 75 (14.4)<br><br>P=NR   | RALP: 15.6±7.2 months<br>ORP: 30.0±19.2 months             | RALP:<br>- BCRFS (%):94.0<br><br>ORP:<br>- BCRFS (%):93.0<br><br>HR: 1.02 (95%CI<br>0.13-8.36)<br><br>P <sub>HR</sub> = 0.98          | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Minniti et al. (2011) <sup>184</sup><br>Italy   | RALP: 22<br>ORP: 93   | RALP: NR<br>ORP: NR                              | NR   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |
| Mirza et al. (2011) <sup>185</sup><br>USA       | RALP: 191<br>ORP: 180 | RALP: 26 (13.6)<br>ORP: 52 (28.9)                | RALP: 12-18 months<br>ORP: 12-18                           | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |                              |



Table 16. Oncological and survival outcomes

| Study   | Sample size             | Positive margins n (%)                         | Follow up   | Biochemical recurrence n/N (%)  | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%)                        | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes  |
|---|-------------------------|--|---|---|--------------------------|---------------------|--|--|-----------------------------|-----------------------------------|--|
|   |                         | P<0.001  | months  |   |                          |                     |  |  |                             |                                   |  |
| Tollefson et al. (2011) <sup>186</sup><br>USA   | RALP: 1084<br>ORP: 4824 | RALP: NR<br>ORP: NR                            | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |  |
| Barocas et al. (2010) <sup>128</sup><br>USA     | RALP: 1413<br>ORP: 491  | RALP: 281 (19.9)<br>ORP: 148 (30.1)<br>P<0.001 | RAPR: 8.0 (2.0 – 20.0)<br>ORP: 17.0 (8.0 – 34.0)<br>Median (range)              | RALP: 181/425 (42.6)<br>- 3yrs-BCRFS (%):84.0<br>ORP: 155/257 (60.3)<br>- 3yrs-BCRFS (%):83.5<br>HR: 1.01 (95% CI: 0.72-1.41)<br>P=NR<br>P <sub>KM</sub> = 0.19<br>P <sub>HR</sub> = 0.93 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               | BCR defined as PSA>0.2ng/ml  |
| Bolenz et al. (2010) <sup>153</sup><br>USA      | RALP: 262<br>ORP: 161   | RALP: NR<br>ORP: NR                            | NR  | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               |  |
| Breyer et al. (2010) <sup>129</sup><br>USA      | RALP: 293<br>ORP: 695   | RALP: 54 (18.4)<br>ORP: 108 (15.5)<br>P=0.25   | RALP: At least 12 months postoperative<br>ORP: At least 12 months postoperative | RALP: - 3yrs-BCRFS (%): 81.0<br>ORP: - 3yrs-BCRFS (%): 87.0<br>P <sub>KM</sub> =0.02  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: 4/293 (1.4)<br>ORP: 20/695 (2.9)<br>P=0.16 | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR               | BCR was defined as 2 consecutive PSA≥0.2ng/ml 8 weeks after surgery, or receipt of further treatment |
| Carlsson et al. (2010) <sup>130</sup><br>Sweden | RALP: 1253<br>ORP: 485  | RALP: NR<br>ORP: NR                            | RALP: 19 months<br>ORP: 30 months   | RALP: NR<br>ORP: NR   | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR                              | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0/1253 (0.0)                |  |

Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)                             | Follow up  | Biochemical recurrence n/N (%)                    | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)                                      | Notes                       |
|---|-----------------------|--|--|---|--------------------------|---------------------|---------------------------|--|-----------------------------|--|-----------------------------|
|   |                       |  | Median   |   |                          |                     |                           |  |                             | ORP: 1/485 (0.2)<br>1 case of postoperative complication<br><br>P≥0.05 |                             |
| Doumerc et al. (2010) <sup>131</sup><br>Australia | RALP: 212<br>ORP: 502 | RALP: 45 (21.2)<br>ORP: 84 (16.7)<br><br>P=0.18    | RALP: 11.2±9.4 months<br>ORP: 17.2±9.7 months<br><br>Mean±SD | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0 (0.0)<br>ORP: 1 (0.2)<br>1 case of CVA<br><br>P=0.51           |                             |
| Hong et al. (2010) <sup>132</sup><br>South Korea  | RALP: 26<br>ORP: 25   | RALP: NR<br>ORP: NR                                | NR   | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Kordan et al. (2010) <sup>133</sup><br>USA        | RALP: 830<br>ORP: 414 | RALP: 171 (20.6)<br>ORP: 132 (31.9)<br><br>P<0.001 | NR   | RALP: NR<br>ORP: NR                               | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Lo et al. (2010) <sup>187</sup><br>Hong Kong      | RALP: 20<br>ORP: 20   | RALP: 4 (20.0)<br>ORP: 5 (25.0)<br><br>P=0.36      | RALP: 6 months<br>ORP: 42 months<br><br>Mean                 | RALP: 0/NR (0.0)<br>ORP: NR/NR (20.0)<br><br>P=NR | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Nadler et al. (2010) <sup>188</sup><br>USA        | RALP: 50<br>ORP: 50   | RALP: 5 (10.0)<br>ORP: 12 (24.0)<br><br>P=0.06     | RALP: 27.1 months<br>ORP: 30.4 months                        | RALP: 4/50 (8.0)<br>ORP: 3/50 (6.0)<br><br>P=0.38 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  | BCR defined as PSA>0.1ng/ml |



Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)   | Follow up   | Biochemical recurrence n/N (%)   | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)  | Notes                       |
|---|-----------------------|--|---|--|--------------------------|---------------------|---------------------------|--|-----------------------------|--|-----------------------------|
| Truesdale et al. (2010) <sup>189</sup><br>USA | RALP: 99<br>ORP: 217  | RALP: NR<br>ORP: NR  | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Uvin et al. (2010) <sup>190</sup><br>Belgium  | RALP: 13<br>ORP: 9    | RALP: 1 (7.7)<br>ORP: 0 (0.0)<br>P=NR  | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Williams et al. (2010) <sup>134</sup><br>USA  | RALP: 604<br>ORP: 346 | RALP: 80 (13.2)<br>ORP: 30 (8.7)<br>P <sub>unadjusted</sub> =0.04<br>P <sub>adjusted</sub> =0.01 | NR  | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Coronato et al. (2009) <sup>191</sup><br>USA  | RALP: 98<br>ORP: 98   | RALP: 12 (12.2)<br>ORP: 29 (29.6)<br>P=0.005   | RALP: NR<br>ORP: NR                                       | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Drouin et al. (2009) <sup>154</sup><br>France | RALP: 71<br>ORP: 83   | RALP: 12 (16.9)<br>ORP: 15 (18.1)<br>P=NR  | RALP: 40.9±5.0 months<br>ORP: 57.7±19.0 months<br>Mean±SD | RALP: 7 / 71 (9.9)<br>- 5yrs-BCRFS (%): 89.6<br>ORP: 12/83 (14.5)<br>- 5yrs-BCRFS (%): 87.8<br>P= NR | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP, LRP, ORP: 5 (2.1)<br>1 case of disease progression (ORP)<br>4 cases of cardiovascular causes | BCR defined as PSA>0.2ng/ml |
| Ficarra et al. (2009) <sup>135</sup><br>Italy | RALP: 103<br>ORP: 105 | RALP: 35 (34.0)<br>ORP: 21 (20.0)<br>P=0.97  | RALP: 12 months<br>ORP: 12 months                         | RALP: NR<br>ORP: NR  | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR  |                             |
| Laurila et al.                                | RALP: 94              | RALP: 13 (13.8)  | NR  | RALP: NR   | RALP: NR                 | RALP: NR            | RALP: NR                  | RALP: NR                                       | RALP: NR                    | RALP: NR   |                             |

Table 16. Oncological and survival outcomes

| Study                                       | Sample size               | Positive margins n (%)   | Follow up                             | Biochemical recurrence n/N (%)                          | Local recurrence n/N (%) | Metastasis n/N (%)      | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes |
|---|---------------------------|--|---------------------------------------|---|--------------------------|-------------------------|---------------------------|--|-----------------------------|-----------------------------------|-------|
| (2009) <sup>192</sup><br>USA                | ORP: 98                   | ORP: 17 (17.3)<br><br>P=NR   |                                       | ORP: NR   | ORP: NR                  | ORP: NR                 | ORP: NR                   | ORP: NR  | ORP: NR                     | ORP: NR                           |       |
| Ou et al. (2009) <sup>193</sup><br>Taiwan   | RALP: 30<br><br>ORP: 30   | RALP: 15 (50.0)<br><br>ORP: 6 (20.0)<br><br>P<0.05   | RALP: 15 months<br><br>ORP: 15 months | RALP: 6/30 (20.0)<br><br>ORP: 5/30 (16.7)<br><br>P≥0.05 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| Rocco et al. (2009) <sup>136</sup><br>Italy | RALP: 120<br><br>ORP: 240 | RALP: 26 (21.7)<br><br>ORP: 61 (25.4)<br><br>P <sub>unadjusted</sub> =0.41<br>P <sub>adjusted</sub> =0.77  | RALP: 12 months<br><br>ORP: 12 months | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| White et al. (2009) <sup>194</sup><br>USA   | RALP: 50<br><br>ORP: 50   | RALP: 11 (22.0)<br><br>ORP: 18 (36.0)<br><br>P=0.01  | RALP: NR<br><br>ORP: NR               | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |
| Chan et al. (2008) <sup>195</sup><br>USA    | RALP: 660<br><br>ORP: 340 | RALP: 118 (17.9)<br>- LP (n=81): 8 (9.9)<br>- SP (n=579): 110 (19.0)<br><br>ORP: 116 (34.1)<br>- LP (n=27): 5 (19)<br>- SP (n=313): 111 (35.5)<br><br>P <sub>LP</sub> =0.291 | RALP: NR<br><br>ORP: NR               | RALP: NR<br><br>ORP: NR                                 | RALP: NR<br><br>ORP: NR  | RALP: NR<br><br>ORP: NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR           |       |



Table 16. Oncological and survival outcomes

| Study  | Sample size           | Positive margins n (%)  | Follow up   | Biochemical recurrence n/N (%)   | Local recurrence n/N (%)                              | Metastasis n/N (%)                                    | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)   | Notes  |
|--|-----------------------|---|---|--|---|---|---------------------------|--|-----------------------------|---|--|
|  |                       | $P_{SP} < 0.001$  |   |  |   |   |                           |  |                             |   |  |
| Krambeck et al. (2008) <sup>196</sup><br>USA | RALP: 294<br>ORP: 588 | RALP: 46 (15.6)<br>ORP: 100 (17.0)<br><br>P=0.61  | RALP: 15.6 (14.4 – 26.4) months<br>ORP: 15.6 (14.4 – 28.8) months<br><br>Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile) | RALP: 14/248 (5.6)<br>- 3yrs- BCRFS (%): 92.4<br><br>ORP: 32/492 (6.5)<br>- 2yrs- BCRFS (%): 92.2<br><br>P=NR<br>$P_{KM}=0.69$                     | RALP: 3/248 (1.2)<br><br>ORP: 5/492 (1.0)<br><br>P=NR | RALP: 1/248 (0.4)<br><br>ORP: 0/492 (0.0)<br><br>P=NR | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: 4/248 (1.6)<br>No deaths from prostate cancer<br><br>ORP: 4/492 (0.8)<br>No deaths from prostate cancer<br><br>P=NR | BCR defined as PSA>0.4ng/ml<br>Local recurrence was defined as the development of a palpable nodule on a DRE, or pelvic lesion identified on MRI in conjunction with a detectable serum PSA level<br>Death from prostate cancer was defined as death from metastatic prostate adenocarcinoma |
| Schroeck et al. (2008) <sup>197</sup><br>USA | RALP: 362<br>ORP: 435 | RALP: 106 (29.3)<br>ORP: 122 (28.0)<br><br>$P_{unadjusted}=0.70$<br>$P_{adjusted}=0.09$ | RALP: 13.1 months<br>ORP: 16.4 months<br><br>Mean   | RALP: 29/362 (8.0)<br>- BCRFS (%): NR<br><br>ORP: 54/435 (12.4)<br>- BCRFS (%): NR<br><br>HR: 0.94 (95%CI: 0.55-1.61)<br><br>P=NR<br>$P_{KM}=0.28$ | RALP: NR<br><br>ORP: NR                               | RALP: NR<br><br>ORP: NR                               | RALP: NR<br><br>ORP: NR   | RALP: NR<br><br>ORP: NR                        | RALP: NR<br><br>ORP: NR     | RALP: NR<br><br>ORP: NR   | BCR defined as PSA≥0.2 ng/ml 30 days after surgery   |



Table 16. Oncological and survival outcomes

| Study   | Sample size           | Positive margins n (%)                     | Follow up  | Biochemical recurrence n/N (%)                     | Local recurrence n/N (%) | Metastasis n/N (%)  | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%)             | Notes                                     |
|---|-----------------------|--|--|--|--------------------------|---------------------|---------------------------|--|-----------------------------|---|---|
|   |                       |  |  | $P_{HR}=0.82$                                      |                          |                     |                           |  |                             |   |   |
| Miller et al. (2007) <sup>137</sup><br>USA          | RALP: 42<br>ORP: 120  | RALP: NR<br>ORP: NR                        | RALP: 14 months<br>ORP: 14 months                | RALP: NR<br>ORP: NR                                | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                           |   |
| Nelson et al. (2007) <sup>138</sup><br>USA          | RALP: 629<br>ORP: 374 | RALP: NR<br>ORP: NR                        | NR   | RALP: NR<br>ORP: NR                                | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                           |   |
| Ball et al. (2006) <sup>116</sup><br>USA            | RALP: 82<br>ORP: 135  | RALP: NR<br>ORP: NR                        | RALP: 6 months<br>ORP: 6 months                  | RALP: NR<br>ORP: NR                                | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                           |   |
| Ahlering et al. (2004) <sup>198</sup><br>USA        | RALP: 60<br>ORP: 60   | RALP: 10 (16.7)<br>ORP: 12 (20.0)<br>P=NR  | RALP: 3months<br>ORP: 3 months                   | RALP: NR/NR (5.3)<br>ORP: NR/NR (5.5)<br>P=NR      | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: NR<br>ORP: NR                           | BCR defined as PSA>0.1ng/ml               |
| Tewari et al. (2003) <sup>139</sup><br>USA          | RALP: 200<br>ORP: 100 | RALP: 18 (9.0)<br>ORP: 23 (23.0)<br>P<0.05 | RALP: 33.7 months<br>ORP: 79.5 months<br>Mean    | RALP: 16/200 (8.0)<br>ORP: 15/100 (15.0)<br>P≥0.05 | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0/200 (0.0)<br>ORP: 0/100 (0.0)<br>P=NA | BCR defined as 2 consecutive PSA>0.2ng/ml |
| Menon et al. (2002) <sup>140</sup><br>USA           | RALP: 30<br>ORP: 30   | RALP: 8 (26)<br>ORP: 9 (29)<br>P≥0.05      | NR   | RALP: NR<br>ORP: NR                                | RALP: NR<br>ORP: NR      | RALP: NR<br>ORP: NR | RALP: NR<br>ORP: NR       | RALP: NR<br>ORP: NR                            | RALP: NR<br>ORP: NR         | RALP: 0/30 (0.0)<br>ORP: 0/30 (0.0)<br>P=NA   |   |
| <b>RALP vs. BT</b>                                  |                       |  |  |  |                          |                     |                           |  |                             |   |   |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>BT: 29    | RALP: NR<br>BT: NA                         | RALP: 21.0 (12.0-54.4) months<br>BT: 40.0 (12.3- | RALP: NR<br>BT: NR                                 | RALP: NR<br>BT: NR       | RALP: NR<br>BT: NR  | RALP: NR<br>BT: NR        | RALP: NR<br>BT: NR                             | RALP: NR<br>BT: NR          | RALP: NR<br>BT: NR                            |   |



Table 16. Oncological and survival outcomes

| Study   | Sample size          | Positive margins n (%)            | Follow up  | Biochemical recurrence n/N (%)                  | Local recurrence n/N (%) | Metastasis n/N (%)                           | Further treatment n/N (%)                    | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes   |
|---|----------------------|-----------------------------------|--|---|--------------------------|--|--|--|-----------------------------|-----------------------------------|---|
|   |                      |                                   | 169.1) months<br>Median (range)                              |   |                          |  |  |  |                             |                                   |   |
| Baena et al (2013) <sup>141</sup><br>Spain          | RALP: 153<br>BT: 160 | RALP: NR<br>BT: NA                | NR   | RALP: NR/NR (15.0)<br>BT: NR/NR (8.0)<br>P=NR   | RALP: NR<br>BT: NR       | RALP: NR<br>BT: NR                           | RALP: NR<br>BT: NR                           | RALP: NR<br>BT: NR                             | RALP: NR<br>BT: NR          | RALP: NR<br>BT: NR                |   |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>BT: 118  | RALP: NR<br>BT: NA<br>P=NA        | RALP: 6 months<br>BT: 6 months                               | RALP: NR<br>BT: NR                              | RALP: NR<br>BT: NR       | RALP: NR<br>BT: NR                           | RALP: NR<br>BT: NR                           | RALP: NR<br>BT: NR                             | RALP: NR<br>BT: NR          | RALP: NR<br>BT: NR                |   |
| <b>RALP vs. Radiotherapy</b>                        |                      |                                   |  |   |                          |  |  |  |                             |                                   |   |
| Hung et al (2015) <sup>199</sup><br>Taiwan          | RALP: 43<br>RT: 96   | RALP: 22 (51.2)<br>RT: NA<br>P=NA | RALP: 12 months<br>RT: 12 months                             | RALP: 9/43 (20.9)<br>RT: 23/96 (24.0)<br>P=0.69 | RALP: NR<br>RT: NR       | RALP: 0/43 (0.0)<br>RT: 6/96 (6.3)<br>P=0.09 | RALP: 0/43 (0.0)<br>RT: 1/96 (1.0)<br>P=0.50 | RALP: NR<br>RT: NR                             | RALP: NR<br>RT: NR          | RALP: NR<br>RT: NR                | BCR defined as 2 PSA>0.2ng/ml in RALP cases and as PSA≥2 ng/ml above the nadir in RT cases<br>Metastasis defined as bone metastasis |
| <b>RALP vs. Cryoablation</b>                        |                      |                                   |  |   |                          |  |  |  |                             |                                   |   |
| Ball et al (2006) <sup>116</sup><br>USA             | RALP: 82<br>CRY: 39  | RALP: NR<br>CRY: NA               | RALP: 6 months<br>CRY: 6 months                              | RALP: NR<br>CRY: NR                             | RALP: NR<br>CRY: NR      | RALP: NR<br>CRY: NR                          | RALP: NR<br>CRY: NR                          | RALP: NR<br>CRY: NR                            | RALP: NR<br>CRY: NR         | RALP: NR<br>CRY: NR               |   |
| <b>RALP vs. Active Surveillance</b>                 |                      |                                   |  |   |                          |  |  |  |                             |                                   |   |
| Acar et al (2014) <sup>201</sup><br>The Netherlands | RALP: 65<br>AS: 50   | RALP: NR<br>AS: NA                | RALP: 21.0 (12.0-54.4) months<br>AS: 29.7 (12.0-75.5) months | RALP: NR<br>AS: NR                              | RALP: NR<br>AS: NR       | RALP: NR<br>AS: NR                           | RALP: NR<br>AS: NR                           | RALP: NR<br>AS: NR                             | RALP: NR<br>AS: NR          | RALP: NR<br>AS: NR                |   |



Table 16. Oncological and survival outcomes

| Study | Sample size | Positive margins n (%) | Follow up      | Biochemical recurrence n/N (%) | Local recurrence n/N (%) | Metastasis n/N (%) | Further treatment n/N (%) | Prostate cancer specific survival rate n/N (%) | Overall survival rate n (%) | Mortality/ Cause of Death n/N (%) | Notes |
|-------|-------------|------------------------|----------------|--------------------------------|--------------------------|--------------------|---------------------------|--|-----------------------------|-----------------------------------|-------|
|       |             |                        | Median (range) |                                |                          |                    |                           |  |                             |                                   |       |

ADT = Androgen Deprivation Therapy; AS= Active Surveillance; BCR = Biochemical Recurrence; BCRFS = Biochemical Recurrence-Free Survival; BT= Brachytherapy; CI = Confidence Interval; CRY= Cryoablation; CVA = Cerebrovascular Accident; DRE = Digital Rectal Exam; EBL= Estimated Blood Loss; HR = Hazard Ratio; KM = Kaplan Meier; LP = Large Prostate; LRFS = Local Recurrence-Free Survival; LRP = Laparoscopic Radical Prostatectomy; MRI = Magnetic Resonance Imaging; NA = Not Applicable; NR = Not Reported; ORP = Open Radical Prostatectomy; PSA = Prostate-Specific Antigen; RALP = Robot-Assisted Radical Prostatectomy; RT = Radiotherapy; SD = Standard Deviation; SP = Small Prostate

## Economic evaluation (E)

### Review of published economic studies of RALP

#### *General description of included economic evaluations*

A total of six cost-utility analyses and one cost-minimization analysis were included in this review.<sup>4,56,57,59,105,211-213</sup> Studies were published between 2007 and 2017 and conducted in the UK<sup>59,211</sup>, Ireland<sup>57</sup>, Canada<sup>4,56</sup>, US<sup>105</sup>, Denmark<sup>212</sup> and Australia<sup>213</sup>. Where reported, each study described different economic models, transition states and underlining assumptions. Further, the studies used various time horizons, ranging from hospital stay to lifetime based on criteria such as robot lifetime, epidemiology of prostate cancer and data availability. Two studies compared RALP and LRP<sup>4,59,211</sup>, four compared RALP with ORP<sup>4,56,212,213</sup>, one defined the comparison group as a mix of patients undergoing LRP or ORP<sup>57</sup> and one compared different surgical approaches (RALP, LRP and ORP) with radiation therapy options.<sup>105</sup>

Details of these studies are summarized in Table 17.

All studies included direct costs and two of them, based on a societal perspective, included indirect costs measured through wage losses and absence from work.<sup>105,212</sup> All but one of the studies included the capital costs of robot acquisition and maintenance services.<sup>105</sup> However, the robot lifetime and number of procedures within a year differed across studies.

Four studies retrieved utility measures from published literature in order to calculate QALYs.<sup>56,57,59,105,211</sup>

One obtained results from a cohort study, but included utilities for the handful of patients who completed one year of follow up.<sup>212</sup> One study comprised a cost-minimization analysis conducted following the completion of a literature review, which concluded that the clinical benefits of RALP were comparable to those of LRP and ORP.<sup>4</sup> All six studies mentioned the lack of high quality clinical studies available for the economic analyses.



Nonetheless, studies from the UK and Australia reported incremental cost effectiveness ratios (ICERs) of £18,329/QALY and AUS\$24,457/QALY for RALP compared with LRP and ORP, respectively.<sup>212,213</sup> The study from Ireland reported an ICER of €26,647/QALY with an 85% probability that RALP was cost-effective at a €40,000/QALY threshold.<sup>57</sup> The study from Denmark did not provide an ICER, since the authors found no gain in QALYs associated with RALP at one year. Instead, they calculated ICER per successful surgical treatment, defined as urinary continence, erectile function and no residual cancer.<sup>212</sup> This definition may be interpreted as overly restrictive to observe differences between surgery types and long term outcomes. The study reported an ICER of €64,343 and €13,514 per successful treatment RALP compared to ORP, with the inclusion of direct and indirect costs, respectively.<sup>212</sup>

One study reported on costs and QALYs for patients with low, intermediate and high risk prostate cancer. The study concluded that there were modest differences among treatment methods in terms of QALYs and that radiotherapy methods were consistently more expensive than surgical methods, though the study did not include capital costs related to RALP.<sup>105</sup>

A recent Canadian study reported that RALP was more costly and slightly more effective than ORP and does not appear to be cost effective. This study considered differences in the functional outcomes only for 12 weeks following surgery resulting in a very small incremental QALY for RALP compared to ORP. A small gain of 0.0012 was reported for RALP, leading to a high ICER of CDN\$ 5.2 million.<sup>56</sup>

The cost-minimization study found RALP was CDN\$3,809 and CDN\$4,573 more costly than ORP and LRP, respectively. RALP was associated with lower hospitalization costs than both ORP and LRP, but the saving was insufficient to compensate for the high costs attributable to the robot purchase, maintenance fees and surgical supplies.<sup>4</sup>

A sensitivity analysis performed in one study found that the ICER was sensitive to positive surgical margin rates and volume of cases, favoring RALP when compared to LRP.<sup>59,211</sup>



Where reported, studies suggested that the ICER for RALP was below the willingness to pay threshold most of the time.<sup>59,211,213</sup> However, there is considerable uncertainty, given the lack of high quality data from randomized controlled trials, and differences in included costs, economic models, time horizon and comparators.

### ***Critical appraisal of economic evaluations***

Based on the 75% cut-off on the CHEERS checklist, five economic evaluations<sup>4,56,57,59,105,211</sup> were considered of good quality, while the remaining studies were of acceptable<sup>212</sup> and poor quality<sup>213</sup>.

A limitation to this checklist is that it simply gives an indication of how many items have been included or excluded within an article, not the relative importance.

Details on the critical appraisal are described in Appendix E.

### ***Source of funding***

Six studies reported on source of funding and one study declared “no declaration of funding”.<sup>4,56,57,59,105,211,212</sup> Four of them declared receiving funds from the government<sup>4,56,57,59,211</sup>, since they were part of an HTA. However, one study was funded by Intuitive Surgical and potentially at risk of bias.<sup>105</sup>

## **Review of published cost studies**

### ***General description of included cost studies***

A total of fifteen cost studies on patients undergoing prostatectomy were included in this review (Table 17).<sup>153,165,214-226</sup> They were published between 2004 and 2015, with eleven conducted in the US<sup>153,217-226</sup> and one each in Canada<sup>165</sup>, Japan<sup>216</sup>, Italy<sup>214</sup> and Australia<sup>215</sup>. Seven studies compared RALP with ORP<sup>165,214,215,217,218,223,225</sup>, six studies compared different surgical procedures (RALP, LRP and ORP)



<sup>153,216,219,221,222,226</sup>, one study compared ORP, LRP and cryoablation<sup>224</sup> and one assessed costs on RALP before and after modifications in the operative process<sup>220</sup>.

All studies were based on hospital payer's perspective and included only direct costs. While five took into account the capital costs of the robotic surgical system and maintenance services, most failed to include or report them.<sup>165,214,215,218,226</sup> With two exceptions, which included readmission costs 30 days and 2 years after prostatectomy, studies used hospital stay or operating time as the time horizon.<sup>215,219</sup>

The single study on cryoablation reported that this approach was less costly than ORP and LRP mainly because of lower nonsurgical costs.<sup>224</sup>

All studies found that RALP was the most costly surgical approach, followed by LRP. Despite the capital costs associated with robotic surgery, most studies identified surgical supplies and OR time as the main reasons for the higher costs of RALP. Further, they demonstrated that ORP was the least expensive. However, they did not take into account outpatient, long-term and indirect costs. Also, given differences in settings and methodologies used across studies, the magnitude of the difference in costs of RALP and other approaches remains unclear.

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)   | Purpose of study  | Study methods  | Costs  | Outcomes measured  | Findings  | Comments  |
|--|---|--|--|--|---|---|
| <b>Economic evaluations</b>  |   |  |  |  |   |   |
| Ontario Health Technology Advisory Committee: Health Quality Ontario <sup>56</sup> | To assess the cost-effectiveness of RALP compared to ORP in patients with clinically localized prostate cancer in Ontario | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost-utility analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•60-year-old men with newly diagnosed low or intermediate prostate cancer risk with life expectancy of over 10 years.</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Markov Model</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Payer</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•1 year</li> </ul> <p><i>Sensitivity analysis:</i></p> <ul style="list-style-type: none"> <li>•One-way and probabilistic sensitivity analysis</li> </ul> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, robot maintenance service, consumables, hospital's overhead, operating room, hospital stay, recovery room time, transfusion, readmission</li> <li>•Robot lifetime assumed to be 9 years</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Manufacturer, published literature, Ontario Case Costing Initiative</li> </ul> <p><i>Other:</i></p> <ul style="list-style-type: none"> <li>•Costs reported in 2016 Canadian dollars (CDN\$)</li> </ul> | <p><i>Main outcome:</i></p> <ul style="list-style-type: none"> <li>•QALYs</li> </ul> | <ul style="list-style-type: none"> <li>•RALP (CDN\$ 6,234) more costly than ORP.</li> <li>•RALP more effective than ORP by 0.0012 QALY.</li> <li>•ICER: CDN\$ 5,200,894 per QALY</li> <li>•ICER was sensitive to utility changes after 12 weeks or 1 year of surgery, robot lifetime, the volume of surgeries per robot, cost of consumables</li> </ul> | <ul style="list-style-type: none"> <li>•Time horizons of 12 weeks and 1 year are short</li> <li>•Utilities and probabilities of cancer recurrence, urinary incontinence and erectile dysfunction are based on data from published literature</li> </ul>       |
| Close et al, 2013 (UK) <sup>211</sup> ; Ramsay et al, 2012 (UK) <sup>59</sup>      | To determine the cost-effectiveness of RALP compared with LRP   | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost-utility analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•Hypothetical cohort of men, assuming 200 procedures annually</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Model based economic evaluation using discrete event simulation</li> </ul>  | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, instruments, consumables, operating room, hospital stay, pathology</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Manufacturer, NHS, Newcastle upon Tyne NHS Foundation Trust</li> </ul> <p><i>Other:</i></p> <ul style="list-style-type: none"> <li>•Costs reported in 2009</li> </ul>   | <p><i>Main outcome:</i></p> <ul style="list-style-type: none"> <li>•QALYs</li> </ul> | <ul style="list-style-type: none"> <li>•RALP (£1,412 (95% CI: £1,304 to £1,516)) more costly than LRP.</li> <li>•RALP more effective than LRP by 0.08 QALY (95% CI: 0.01 to .015).</li> <li>•ICER: £18,329, with 80% probability that RALP is cost-effective at a £30,000 threshold.</li> <li>•ICER was sensitive to case</li> </ul>                    | <ul style="list-style-type: none"> <li>•RALP costs may be offset by modest health gains due to lower risk of early harms and positive surgical margin rate, provided &gt;150 cases are done annually. But there is still considerable uncertainty.</li> </ul> |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                      | Purpose of study  | Study methods  | Costs   | Outcomes measured   | Findings   | Comments  |
|---|---|--|---|---|--|---|
|   |   | <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Payer</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•10 years</li> </ul> <p><i>Sensitivity analysis:</i></p> <ul style="list-style-type: none"> <li>•Varied positive margin rate, lower throughput of cases, extending time horizon to lifetime.</li> </ul>   | £Sterling   |   | throughput and positive surgical margin rate, favouring RALP.  |   |
| Cooperberg et al, 2013 (USA) <sup>105</sup> | To determine cost-effectiveness of surgery (RALP, ORP and LRP) compared to radiotherapy (RT-radiotherapy, brachytherapy or a combination) for localized prostate cancer | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost- utility analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•Hypothetical cohort of men with clinically localized prostate cancer</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Markov model</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Societal</li> </ul> <p><i>Time horizon:</i> •Lifetime</p> <p><i>Sensitivity analysis:</i></p> <ul style="list-style-type: none"> <li>•One-way and multi-way sensitivity analyses performed</li> </ul> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Office visits, hospitalizations, medications, imaging and laboratory services, wage losses</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•US Medicare Fee Schedules, 2009 Drug Topics Redbook, expert panel</li> </ul> <p><i>Other:</i></p> <ul style="list-style-type: none"> <li>•Costs reported in 2009 US\$</li> </ul> | <p><i>Main outcomes:</i></p> <ul style="list-style-type: none"> <li>•Complications, radiation-related toxicity, new-onset erectile dysfunction, urinary incontinence, biochemical recurrence</li> </ul> | <p><i>Low-risk group:</i></p> <ul style="list-style-type: none"> <li>•RT: Costs: US\$25,067 to US\$40,588 QALYs: 10.3 to 10.8.</li> <li>•Surgery: Costs: US\$19,901 to US\$20,497 QALYs: 11.3</li> </ul> <p><i>Intermediate risk group:</i></p> <ul style="list-style-type: none"> <li>•RT: Costs: US\$30,838 to US\$44,639 QALYs: 9.6 to 10.1.</li> <li>•Surgery: Costs: US\$28,017 to US\$29,041 QALYs: 10.4 to 10.5.</li> </ul> <p><i>High risk group:</i></p> <ul style="list-style-type: none"> <li>•RT: Costs: US\$42,397 to US\$53,539 QALYs: 7.8 to 9.1.</li> <li>•Surgery: Costs: US\$35,014 to US\$36,279</li> </ul> | <ul style="list-style-type: none"> <li>•The reference strategy is not reported, and ICERs are not calculated</li> </ul> |





Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                          | Purpose of study  | Study methods  | Costs   | Outcomes measured   | Findings   | Comments  |
|---|---|--|---|---|--|---|
|   |   |  |   |   | QALYs: 9.2 to 9.3.   |   |
| Hohwu et al, 2011 (Denmark) <sup>212</sup>      | To determine the cost-effectiveness of RALP compared with ORP | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost- effectiveness and cost-utility analyses</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•231 men between 50 and 69 years of age undergoing prostatectomy in a single hospital from 2004 to 2007.</li> <li>•Patients were matched (1:2 on procedure) by age. 77 underwent RALP and 154 underwent ORP.</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Study done alongside a retrospective cohort-control study</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Societal</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•1 year</li> </ul> <p><i>Sensitivity analysis:</i></p> <ul style="list-style-type: none"> <li>•Not performed</li> </ul> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system (assumed 110 procedures annually), instruments, physician and nursing costs, hospital stay, blood transfusions, absence from work, radiation therapy, treatment for erectile dysfunction and recurrence.</li> <li>•Robot lifetime assumed to be 5 years and depreciating at 5% annually.</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Aarhus University hospital, Danish Board of Health, Danish Medical Association, Statistics Denmark, Manufacturers</li> </ul> <p><i>Other:</i></p> <ul style="list-style-type: none"> <li>•Costs reported in 2008 Euros</li> </ul> | <p><i>Main outcomes:</i></p> <ul style="list-style-type: none"> <li>•Successful surgical treatment (SST)(defined as no residual cancer, urinary continence and erectile function with or without treatment); QALYs</li> </ul> | <p>QALYs: 9.2 to 9.3.</p> <ul style="list-style-type: none"> <li>•ICER of €64,343/SST (direct costs) and €13,514/SST (indirect cost)</li> <li>•QALY gain in RALP was 0.0103 (95% CI: -0.2895 to 0.3100) compared to 0.0116 (95% CI: -0.3172 to 0.3727) for ORP; no gain in QALYs for RALP over ORP.</li> </ul> | <ul style="list-style-type: none"> <li>•Time horizon of 1 year is short</li> </ul>  |
| O'Malley et al, 2007 (Australia) <sup>213</sup> | To determine the cost-effectiveness of RALP compared with ORP | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost- utility analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•278 consecutive patients from an Australian hospital;</li> </ul>   | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, robot maintenance service, consumables, surgeon's fees, reduction in length of stay.</li> </ul>   | <p><i>Main outcomes:</i></p> <ul style="list-style-type: none"> <li>•Incontinence, erectile dysfunction</li> </ul>  | <ul style="list-style-type: none"> <li>•Duration of incontinence: RALP: 1.47 months; ORP: 5.26 months</li> <li>•Duration of erectile dysfunction: RALP: 5.79 months; ORP: 14.46</li> </ul>   | <ul style="list-style-type: none"> <li>•Very poorly reported study.</li> <li>•Time horizon and setting are not reported.</li> <li>•QALY and ICER calculations are not transparent and difficult to follow.</li> </ul> |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                    | Purpose of study  | Study methods   | Costs  | Outcomes measured | Findings  | Comments   |
|---|---|---|--|-------------------|---|--|
|   |   | <p>patients undergoing prostate cancer surgery over a 4 year period at a US hospital</p> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Data from retrospective series of patients.</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Payer</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•Not specified</li> </ul> <p><i>Sensitivity analysis:</i></p> <ul style="list-style-type: none"> <li>•Not performed</li> </ul>   | <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Epworth hospital Australia</li> </ul>   |                   | <p>months</p> <p>Cost/QALY: AUS\$24,457</p>   |  |
| <b>Cost studies</b>                       |   |   |  |                   |   |  |
| Fabbro et al, 2015 (Italy) <sup>214</sup> | To compare costs of RALP and ORP at a high-volume university hospital | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•103 patients with clinically localized prostate cancer undergoing prostatectomy in one centre between Dec 2009 and Dec 2010</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Hospital</li> </ul> <p><i>Time horizon:</i></p> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>• Robot system, robot maintenance service, anesthesia, blood transfusions, consumables, hospital stay, operating room, staff (surgeons, nurses, healthcare assistant, anesthetist, anesthetist nurse), surgical supply</li> <li>• Robot lifetime assumed to be 11 years</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•University Hospital of Udine, Control Department</li> </ul> | NA                | <p>Overall hospitalization costs per case:</p> <p>RALP:<br/>€11,271.50 (total cost)<br/>€6,046.08 (without robot system and maintenance services costs)</p> <p>ORP:<br/>€4,834.11</p> | <ul style="list-style-type: none"> <li>• The main difference derives from the high cost of surgical supply associated with RALP.</li> <li>• No long term costs are included</li> </ul> |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                      | Purpose of study   | Study methods  | Costs  | Outcomes measured | Findings   | Comments  |
|---|--|--|--|-------------------|--|---|
|   |  | <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul>   |  |                   |  |   |
| Gagnon et al, 2014 (Canada) <sup>165</sup>  | To evaluate the additional cost associated with RALP compared to ORP | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•400 patients undergoing prostatectomy in one academic centre</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Hospital</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul>                            | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, robot maintenance service, consumables, operating room</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•University of British Columbia</li> </ul>   | NA                | <p>Overall hospitalization costs per case:</p> <ul style="list-style-type: none"> <li>•RALP was \$5,629 more costly than ORP</li> </ul>  | <ul style="list-style-type: none"> <li>• Cost analysis poorly reported</li> <li>• Only description of the added costs associated with RALP</li> <li>• No long term costs are included</li> <li>• Study period and currency are not reported</li> </ul>                |
| Hall et al, 2014 (Australia) <sup>215</sup> | To compare direct costs between RALP and ORP                         | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•200 consecutive patients undergoing prostatectomy in one centre between Feb 2007 and Oct 2009</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Hospital</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•2 years</li> </ul> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, robot maintenance service, consumables, hospital stay, medications, operating room, pathology, surgical supply</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Royal Brisbane Hospital database</li> </ul> | NA                | <p>Overall hospitalization costs per case:</p> <p>RALP:<br/>AUS\$17,582 (range: AUS\$13,786 to AUS\$24,512)</p> <p>ORP:<br/>AUS\$13,605 (range: AUS\$3,458 to AUS\$34,283)</p> <p>Total cost for readmissions:</p> <p>RALP: AUS\$7,160 (2 cases)</p> <p>ORP:<br/>AUS\$ 70,487 (19 cases)</p> | <ul style="list-style-type: none"> <li>• RALP was associated with higher costs, but the range of costs for ORP was greater</li> <li>• All RALP patients followed the same care pathway while it varied for ORP patients depending on the surgeon in charge</li> </ul> |
| Sugihara et al,                             | To compare costs   | <i>Study type:</i>   | <i>Costs included:</i>   | NA                | Overall hospitalization costs  | • Cost analysis poorly reported   |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                 | Purpose of study   | Study methods   | Costs  | Outcomes measured | Findings   | Comments   |
|--|--|---|--|-------------------|--|--|
| 2014 (Japan) <sup>216</sup>            | of different surgical procedures to radical prostatectomy (RALP, ORP and LRP)                                | <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <i>Patient population:</i> <ul style="list-style-type: none"> <li>•12,992 patients undergoing prostatectomy in Japan between Apr 2012 and Mar 2013</li> </ul> <i>Analysis:</i> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <i>Perspective:</i> <ul style="list-style-type: none"> <li>•Hospitals</li> </ul> <i>Time horizon:</i> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul>                               | <ul style="list-style-type: none"> <li>•NR</li> </ul> <i>Information sources:</i> <ul style="list-style-type: none"> <li>•Japanese Diagnosis Procedure Combination Database</li> </ul> <i>Other:</i> <ul style="list-style-type: none"> <li>•Currency rate of ¥100=US\$1</li> </ul>  |                   | per case:<br><br>RALP:<br>US\$15,676 (IQR: US\$14,984 to US\$16,495)<br><br>ORP:<br>US\$10,946 (IQR: US\$10,098 to US\$12,035)<br><br>LRP:<br>US\$14,160 (IQR: US\$13,409 to US\$15,121) | <ul style="list-style-type: none"> <li>• The main difference derives from the high cost of the official fee for RALP</li> <li>• No long term data</li> </ul>   |
| Hyams et al, 2013 (USA) <sup>217</sup> | To compare costs between RALP and ORP and to evaluate the effect of surgeon and hospital volume on the costs | <i>Study type:</i> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <i>Patient population:</i> <ul style="list-style-type: none"> <li>•4,064 consecutive patients undergoing prostatectomy in Maryland (USA) between 2008 and 2011</li> </ul> <i>Analysis:</i> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <i>Perspective:</i> <ul style="list-style-type: none"> <li>•Hospital</li> </ul> <i>Time horizon:</i> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul> | <i>Costs included:</i><br>Consumables, hospital stay, medications, operating room, laboratory tests, radiology, other hospitalization costs<br><br><i>Information sources:</i><br>Health Service Cost Review Commission billing data<br><br><i>Other:</i> <ul style="list-style-type: none"> <li>•Costs reported in 2011 US\$</li> </ul> | NA                | Overall hospitalization costs per case:<br><br>RALP:<br>US\$14,000<br><br>ORP:<br>US\$10,100   | <ul style="list-style-type: none"> <li>• High surgeon volume was associated with lower costs for prostatectomy</li> <li>• High hospital volume was only associated with lower costs for RALP</li> <li>• Even at high surgical volume, RALP was more costly than ORP</li> <li>• The main costs derived from consumables and operating room</li> <li>• No costs associated with maintenance services and purchase of robot system were included</li> <li>• No long term costs were included</li> </ul> |
| Kim et al, 2013(USA) <sup>227</sup>    | To describe total hospitalization  | <i>Study type:</i> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul>   | <i>Costs included:</i> <ul style="list-style-type: none"> <li>•Overall hospitalization</li> </ul>  | NA                | “Adjusted” hospitalization cost:   | <ul style="list-style-type: none"> <li>•Robotic system acquisition and maintenance fees were not</li> </ul>  |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                       | Purpose of study  | Study methods   | Costs   | Outcomes measured | Findings  | Comments  |
|--|---|---|---|-------------------|---|---|
|  | costs of ORP and RALP   | <i>Patient population:</i><br>•29,837 consecutive patients undergoing radical prostatectomy in the US between 2006 and 2008<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospitals<br><br><i>Time horizon:</i><br>•30 days  | costs, calculated using cost-to-charge ratios<br><br><i>Information sources:</i><br>•Nationwide Inpatient Sample survey<br><br><i>Other:</i><br>•Costs reported in 2008 US\$  |                   | RALP:<br>US\$11,932 (95% CI: US\$11,336 to US\$12,528)<br><br>ORP:<br>US\$9,390 (95% CI: US\$8,876 to US\$9,905)                      | included<br>•Complications within 30 days treated in outpatient settings were not included  |
| Tomaszewski et al, 2012 (USA) <sup>218</sup> | To compare hospital costs between RALP and ORP at a single academic institution | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•473 consecutive patients with biopsy-proven prostate cancer undergoing prostatectomy between Jul 2009 and Oct 2010<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospital<br><br><i>Time horizon:</i><br>•Hospital stay | <i>Costs included:</i><br>Robot system, robot maintenance service, ancillary, cardiology, clinical administration, clinics, dietary, imaging, hospital stay, laboratory tests, operating room, pharmacy, physician services, surgical supply<br><br><i>Information sources:</i><br>•Financial Department, University of Pittsburgh Medical Centre | NA                | Overall hospitalization costs per case:<br><br>RALP (mean± SD):<br>US\$14,006±US\$1,641<br><br>ORP (mean± SD):<br>US\$8,686±US\$1,989 | •The main difference derives from the high cost of surgical supply and longer operating time associated with RALP<br>•ORP was associated with greater hospital stay cost<br>•No long term costs were included |
| Yu et al, 2012 (USA) <sup>219</sup>          | To compare inpatient costs of   | <i>Study type:</i><br>•Cost analysis  | <i>Costs included:</i><br>•Overall hospitalization  | NA                | “Adjusted” hospitalization cost:  | • Surgeon fees, robotic system acquisition and robot  |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                  | Purpose of study  | Study methods  | Costs  | Outcomes measured | Findings   | Comments   |
|---|---|--|--|-------------------|--|--|
|   | different procedures to radical prostatectomy (RALP, ORP and LRP)   | <i>Patient population:</i><br>•21,834 patients undergoing prostatectomy during the last quarter of 2008<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospitals<br><br><i>Time horizon:</i><br>•30 days | costs, calculated using cost-to-charge ratios<br><br><i>Information sources:</i><br>•Nationwide Inpatient Sample survey<br><br><i>Other:</i><br>•Costs reported in 2008 US\$ |                   | RALP:<br>US\$10,804 (IQR: US\$8,289 to US\$13,640)<br><br>ORP:<br>US\$9,693 (IQR: US\$7,600 to US\$12,113)<br><br>LRP:<br>US\$10,082 (IQR: US\$8,084- US\$12,631)                                  | maintenance service were not included<br>•Complications within 30 days treated in outpatient settings were not included                              |
| Rebuck et al, 2011 (USA) <sup>220</sup> | To determine whether simple modifications in operating room processes would reduce costs associated with RALP | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•200 consecutive patients undergoing RALP between Aug 2008 and Nov 2009<br><br><i>Analysis:</i><br>•Only operative costs included<br><br><i>Time horizon:</i> •Hospital stay   | <i>Costs included:</i><br>•Anesthesia, operating room, staff wages, surgical supply<br><br><i>Information sources:</i><br>•Northwest University Feinberg School of Medicine  | NA                | Overall hospitalization costs per case:<br><br>RALP:<br>US\$11,806 (range: US\$3,265 to US\$28,704) (before modifications)<br><br>US\$9,258 (range: US\$5,429 to US\$24,472) (after modifications) | •It is unclear if costs were converted to the year of analysis<br>•Only costs associated with operating room process likely to change were included  |
| Bolenz et al, 2010(USA) <sup>153</sup>  | To compare costs of different approaches to radical prostatectomy (RALP, ORP and LRP)                         | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•643 consecutive patients undergoing prostatectomy in one centre between Sept  | <i>Costs included:</i><br>•Anesthesia, hospital stay, laboratory, medication, operating room, surgical supply<br>•Robot lifetime assumed to be 7 years                       | NA                | Overall hospitalization costs per case:<br><br>RALP:<br>US\$6,572 (IQR: US\$6,283 to US\$7,369)<br><br>ORP:  | •RALP is associated with higher cost, predominantly due to increased surgical supply and operating room costs.<br>•No longer term costs are included |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                  | Purpose of study   | Study methods   | Costs   | Outcomes measured | Findings  | Comments  |
|---|--|---|---|-------------------|---|---|
|   |  | 2003 and Apr 2008<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospital<br><br><i>Time horizon:</i> •Hospital stay  | <i>Information sources:</i><br>•Hospital billing<br><br><i>Other:</i><br>•Costs reported in 2007 US\$                                     |                   | US\$4,437 (IQR: US\$3,989 to US\$5,141)<br><br>LRP:<br>US\$5,687 (IQR: US\$4,941 to US\$5,905)  |   |
| Lotan et al, 2010 (USA) <sup>221</sup>  | To compare the profit margins of different surgical approaches to radical prostatectomy (RALP, ORP and LRP)  | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•617 patients undergoing prostatectomy in one private hospital between 2003 and 2008<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospital<br><br><i>Time horizon:</i> •Hospital stay | <i>Costs included:</i><br>•NR<br><br><i>Information sources:</i><br>•Hospital billing   | NA                | Overall hospitalization costs per case:<br><br>RALP:<br>US\$10,269 (range: US\$5,494 to US\$40,401)<br><br>ORP:<br>US\$6,473 (range: US\$3,677 to US\$16,490)<br><br>LRP:<br>US\$8,557 (range: US\$6,074- US\$13,239) | •RALP was associated with higher cost primarily due to surgical supply<br>•Robot system acquisition and maintenance service costs were not included<br>•No information on costs included and whether costs were converted to a single year currency |
| Joseph et al, 2008 (USA) <sup>222</sup> | To compare the operative costs of different surgical approaches to radical prostatectomy (RALP, ORP and LRP) | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•233 patients undergoing prostatectomy in one centre  | <i>Costs included:</i><br>•Anesthesia, consumables, staff wages, surgical supply<br><br><i>Information sources:</i><br>•Hospital database | NA                | Overall operating costs per case:<br><br>RALP: \$5,410<br><br>ORP: \$1,870<br><br>LRP: \$3,876  | •Surgical supply accounted for the majority of the total cost<br>•No information on study period time and currency<br>•Robot system acquisition and maintenance service costs were not included   |

Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                     | Purpose of study                               | Study methods   | Costs   | Outcomes measured | Findings   | Comments  |
|--|--|---|---|-------------------|--|---|
|  |  | <i>Analysis:</i><br>•Only operating costs included<br><br><i>Perspective:</i><br>•Hospital<br><br><i>Time horizon:</i> •Hospital stay   |   |                   |  |   |
| Prewitt et al, 2008 (USA) <sup>223</sup>   | To describe costs associated with RALP and ORP | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•Patients undergoing RALP or ORP in one academic centre between Jul 2000 and Feb 2007<br><br><i>Analysis:</i><br>•Only hospitalization costs included<br><br><i>Perspective:</i><br>•Hospital<br><br><i>Time horizon:</i><br>•Hospital stay | <i>Costs included:</i><br>•Hospital stay, operating room, staff wages, surgical supply, patient care supply, post anesthesia care unit<br><br><i>Information sources:</i><br>•University of Nebraska Medical Center | NA                | Overall hospitalization costs per case:<br><br>RALP: \$9,579<br><br>ORP: \$5,911   | •Study poorly reported<br>•No information on currency<br>•Unclear whether robot system acquisition and maintenance service costs were included            |
| Mouraviev et al, 2007 (USA) <sup>224</sup> | To compare costs of LRP, CRY and ORP           | <i>Study type:</i><br>•Cost analysis<br><br><i>Patient population:</i><br>•452 consecutive patients with clinically localized prostate cancer undergoing treatment between Jan 2002 and Jul 2005  | <i>Costs included:</i><br>•Blood transfusions, cardiology, hospital stay, laboratory, operating room, pathology, pharmacy, post anesthesia care unit, radiology, respiratory, surgical supply                       | NA                | Overall hospitalization costs per case:<br><br>ORP:<br>- RRP: \$10,704<br>- RPP: \$10,536<br><br>LRP: \$10,047<br><br>CRY: \$9,195 | •CRY was associated with the highest surgical expenses but the lowest nonsurgical costs<br>•No information on currency<br>•No long term cost was included |



Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country)                   | Purpose of study  | Study methods   | Costs   | Outcomes measured | Findings  | Comments  |
|--|---|---|---|-------------------|---|---|
|  |   | <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Perspective:</i></p> <ul style="list-style-type: none"> <li>•Hospital</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul>  | <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•NR</li> </ul>  |                   |   |   |
| Burgess et al, 2006 (USA) <sup>225</sup> | To describe the charges incurred by patients for RALP and ORP   | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•110 consecutive patients undergoing prostatectomy at one centre between Feb 2002 and Dec 2004</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul> | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Costs related to hospital charges</li> </ul> <p><i>Information sources:</i></p> <ul style="list-style-type: none"> <li>•Hospital billing</li> </ul>   | NA                | <p>Overall hospitalization costs per case:</p> <p>RALP: US\$39,315 (range: US\$25,281 to US\$81,263)</p> <p>ORP:</p> <ul style="list-style-type: none"> <li>- RRP: US\$31,518 (range: US\$25,670 to US\$40,495)</li> <li>- RPP: US\$29,771 (range: US\$19,917 to US\$41,463)</li> </ul> | <ul style="list-style-type: none"> <li>•Poorly reported</li> <li>•No long term cost was included</li> <li>•No information on currency conversion</li> </ul>   |
| Lotan et al, 2004 (USA) <sup>226</sup>   | To evaluate and compare costs of different surgical approaches to radical prostatectomy (RALP, ORP and LRP) | <p><i>Study type:</i></p> <ul style="list-style-type: none"> <li>•Cost analysis</li> </ul> <p><i>Patient population:</i></p> <ul style="list-style-type: none"> <li>•Hypothetical model</li> </ul> <p><i>Analysis:</i></p> <ul style="list-style-type: none"> <li>•Only hospitalization costs included</li> </ul> <p><i>Time horizon:</i></p> <ul style="list-style-type: none"> <li>•Hospital stay</li> </ul>  | <p><i>Costs included:</i></p> <ul style="list-style-type: none"> <li>•Robot system, robot maintenance service, blood transfusions, hospital stay, infusion pump, operating room, pharmacy, surgeon fee, surgical supply</li> <li>•Robot lifetime assumed to be 7 years with 3,000 cases per year</li> </ul> | NA                | <p>Overall hospitalization costs per case:</p> <p>RALP: \$7,280 (with robot purchase cost) \$6,709 (donated robot)</p> <p>ORP: \$5,554</p> <p>LRP: \$6,041</p>  | <ul style="list-style-type: none"> <li>•No decrease in length of hospital stay or operative time would make RALP equivalent to ORP in cost</li> <li>•RALP would only be equivalent in ORP costs if robotic equipment costs were less than \$550</li> <li>•No long term data were included</li> <li>•No information on currency</li> </ul> |



Table 17. Description and findings of economic evaluation and cost studies

| Author, year (Country) | Purpose of study | Study methods  | Costs   | Outcomes measured | Findings | Comments |
|------------------------|------------------|--|---|-------------------|----------|----------|
|                        |                  | <i>Sensitivity analysis:</i><br>•One way and two way sensitivity analysis<br>varying robot costs, hospital stay, operative time and laparoscopic equipment | <i>Information sources:</i><br>•Literature review, county hospital, University of Texas Southwestern Medical Center, Mayo Clinic and Medicare |                   |          |          |

95%CI= 95% Confidence Interval; CRY= Cryoablation; ICER= Incremental Cost-effectiveness Ratio; IQR= Interquartile Range; LRP= Laparoscopic Radical Prostatectomy; NA= Not Applicable; NR= Not Reported; ORP= Open Radical Prostatectomy; QALY= Quality-adjusted Life Years; RALP= Robot-assisted Radical Prostatectomy; RPP= Radical Perineal Prostatectomy; RRP= Radical Retropubic Prostatectomy; RT= Radiotherapy; SD= Standard Deviation; SST= Successful Surgical Treatment



### **Budget impact analysis**

The total cost to the healthcare system for the treatment of localized prostate cancer in Alberta over a 5 year period, including all costs associated with the *da Vinci*<sup>®</sup> system is \$140,251,635 (Table 18). If robotic technology acquisition costs are removed (but maintenance fees and the cost of disposables are included), the amount decreases to \$131,477,829. If only the cost of disposables is included, it becomes \$127,616,829.

Over 5 years, RALP had the highest total (\$65,096,949) and per patient cost (\$26,679) among the treatment options considered. Even when acquisition of the robotic system, service contract fees and disposable costs are excluded, RALP remains the most expensive strategy, when compared to ORP, RT and BT. With the annual caseload of 79 patients, BT had the smallest budget impact of \$3,107,261, with the lowest per case cost of \$7,866.

An analysis of the cost per patient undergoing RALP at the three current locations offering this procedure in Alberta demonstrated that hospitals with higher caseloads had lower per case costs over 5 years (Table 19).



Table 18. Total costs and BIA of each treatment for prostate cancer scenario

| RALP provision scenario                         | Treatment    | Cost (CDN\$)      |                   |                   |                   |                   |                    | 5 year per patient cost |
|---|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------------|
|   |              | Year 1            | Year 2            | Year 3            | Year 4            | Year 5            | Over 5 years       |                         |
| Scenario 1: "all cost"                          | RALP         | 17,894,617        | 10,589,200        | 11,452,892        | 12,187,831        | 12,972,409        | 65,096,949         | 26,679                  |
|   | ORP          | 2,675,719         | 3,034,186         | 3,410,550         | 3,806,322         | 4,222,554         | 17,149,331         | 14,232                  |
|   | RT           | 8,773,113         | 9,597,941         | 10,737,773        | 12,097,441        | 13,691,825        | 54,898,093         | 17,970                  |
|   | BT           | 433,577           | 510,075           | 606,814           | 715,500           | 841,295           | 3,107,261          | 7,866                   |
|   | <i>Total</i> | <i>29,777,026</i> | <i>23,731,402</i> | <i>26,208,028</i> | <i>28,807,095</i> | <i>31,728,083</i> | <i>140,251,635</i> | <i>19,768</i>           |
| Scenario 2: exclusion of robot system purchase  | RALP         | 9,120,811         | 10,589,200        | 11,452,892        | 12,187,831        | 12,972,409        | 56,323,143         | 23,083                  |
|   | ORP          | 2,675,719         | 3,034,186         | 3,410,550         | 3,806,322         | 4,222,554         | 17,149,331         | 14,232                  |
|   | RT           | 8,773,113         | 9,597,941         | 10,737,773        | 12,097,441        | 13,691,825        | 54,898,093         | 17,970                  |
|   | BT           | 433,577           | 510,075           | 606,814           | 715,500           | 841,295           | 3,107,261          | 7,866                   |
|   | <i>Total</i> | <i>21,003,220</i> | <i>23,731,402</i> | <i>26,208,028</i> | <i>28,807,095</i> | <i>31,728,083</i> | <i>131,477,829</i> | <i>18,531</i>           |
| Scenario 3: inclusion of robot disposables only | RALP         | 9,120,811         | 9,757,600         | 10,443,092        | 11,178,031        | 11,962,609        | 52,462,143         | 21,501                  |
|   | ORP          | 2,675,719         | 3,034,186         | 3,410,550         | 3,806,322         | 4,222,554         | 17,149,331         | 14,232                  |
|   | RT           | 8,773,113         | 9,597,941         | 10,737,773        | 12,097,441        | 13,691,825        | 54,898,093         | 17,970                  |
|   | BT           | 433,577           | 510,075           | 606,814           | 715,500           | 841,295           | 3,107,261          | 7,866                   |
|   | <i>Total</i> | <i>21,003,220</i> | <i>22,899,80</i>  | <i>25,198,228</i> | <i>27,797,295</i> | <i>30,718,283</i> | <i>127,616,829</i> | <i>17,987</i>           |

BT= Brachytherapy; ORP= Open Radical Prostatectomy; RALP= Robot-assisted; Radical Prostatectomy; RT= Radiotherapy

Table 19. Cost of RALP per location offering treatment in Alberta

| RALP provision scenario                         | Hospital (caseload/ year)   | Cost (CDN\$) |            |            |            |            |            | Over 5 years | 5 year per patient cost |
|---|-----------------------------|--------------|------------|------------|------------|------------|------------|--------------|-------------------------|
|   |                             | Year 1       | Year 2     | Year 3     | Year 4     | Year 5     |            |              |                         |
| Scenario 1: "all cost"                          | RGH (205/ year)             | 6,486,045    | 4,376,192  | 4,723,554  | 5,032,289  | 5,361,876  | 25,979,957 | 25,346       |                         |
|   | RAH (200/ year)             | 7,202,730    | 4,276,216  | 4,616,556  | 4,917,760  | 5,239,308  | 26,252,571 | 26,253       |                         |
|   | UAH (83/ year)              | 4,205,842    | 1,936,792  | 2,112,782  | 2,237,782  | 2,371,224  | 12,864,421 | 30,999       |                         |
|   | Total in Alberta (488/year) | 17,894,617   | 10,589,200 | 11,452,892 | 12,187,831 | 12,972,409 | 65,096,949 | 26,679       |                         |
| Scenario 2: exclusion of robot system purchase  | RGH (205/ year)             | 3,831,488    | 4,376,192  | 4,723,554  | 5,032,289  | 5,361,876  | 23,325,400 | 22,756       |                         |
|   | RAH (200/ year)             | 3,738,037    | 4,276,216  | 4,616,556  | 4,917,760  | 5,239,308  | 22,787,878 | 22,788       |                         |
|   | UAH (83/ year)              | 1,551,285    | 1,936,792  | 2,112,782  | 2,237,782  | 2,371,224  | 10,209,864 | 24,602       |                         |
|   | Total in Alberta (488/year) | 9,120,811    | 10,589,200 | 11,452,892 | 12,187,831 | 12,972,409 | 56,323,143 | 23,083       |                         |
| Scenario 3: inclusion of robot disposables only | RGH (205/ year)             | 3,831,488    | 4,098,992  | 4,386,954  | 4,695,689  | 5,025,276  | 22,038,400 | 21,501       |                         |
|   | RAH (200/ year)             | 3,738,037    | 3,999,016  | 4,279,956  | 4,581,160  | 4,902,708  | 21,500,878 | 21,501       |                         |
|   | UAH (83/ year)              | 1,551,285    | 1,659,592  | 1,776,182  | 1,901,182  | 2,034,624  | 8,922,864  | 21,501       |                         |
|   | Total in Alberta (488/year) | 9,120,811    | 9,757,600  | 10,443,092 | 11,178,031 | 11,962,609 | 52,462,143 | 21,501       |                         |

BT= Brachytherapy; ORP= Open Radical Prostatectomy; RALP= Robot-assisted; Radical Prostatectomy; RAH=Royal Alexandra Hospital; RGH= Rockyview General Hospital; RT= Radiotherapy; UAH= University of Alberta Hospital

### Cost-effectiveness analysis

Base case estimates of the cost and effectiveness of each of the available treatment options in Alberta for localized prostate cancer are presented in Table 20. ICERs were calculated between neighboring non-dominated strategies (Table 21).

Compared with ORP, RALP was associated with higher costs (\$8,541 per patient) but an additional 0.19 QALYs gained over a time horizon of 9 years. The ICER was \$44,471 per QALY.

RT, the most costly treatment option for prostate cancer, was associated with a small QALY gain when compared to RALP. Therefore, the ICER was high (\$73,806).

The model found that BT was the most cost-effective intervention, with the lowest cost (\$27,283 per patient) and highest QALYs gained (5.62). Even when discounting was not applied or when a short time horizon was used (1 year), BT was less costly and more effective than all other interventions.

Table 20. Cost and QALY of treatments for localized prostate cancer

| Scenario  | Treatment | Cost (CDN\$) | QALYs |
|---|-----------|--------------|-------|
| Base scenario:<br>5% discount applied;<br>9 year time horizon | RALP      | 43,422       | 5.52  |
|   | ORP       | 34,881       | 5.33  |
|   | RT        | 48,654       | 5.59  |
|   | BT        | 27,283       | 5.62  |
| Scenario:<br>0% discount applied;<br>9 year time horizon      | RALP      | 48,843       | 6.58  |
|   | ORP       | 40,624       | 6.35  |
|   | RT        | 57,965       | 6.68  |
|   | BT        | 33,063       | 6.71  |
| Scenario:<br>5% discount applied;<br>1 year time horizon      | RALP      | 22,344       | 0.84  |
|   | ORP       | 12,200       | 0.81  |
|   | RT        | 15,114       | 0.84  |
|   | BT        | 6,177        | 0.84  |



Table 21. Base case discounted incremental values and ICERs

| Compared options | Incremental cost (CDN\$) | Incremental QALYs | ICER (CDN\$ per QALYs) |
|------------------|--------------------------|-------------------|------------------------|
| RALP vs ORP      | 8,541                    | 0.192             | 44,471                 |
| RT vs RALP       | 5,232                    | 0.071             | 73,806                 |

Based on the economic model BT was the least costly and most effective intervention. Therefore ICER was not calculated

***Sensitivity analysis***

The results of one-way and probabilistic sensitivity analyses demonstrated the robustness of the model. BT remained the least costly with highest QALY gains, dominating all other treatment options.

One-way sensitivity analysis revealed that parameters with the greatest influence on the ICER were utility associated with the ‘no evidence of disease’ (NED) health state, cost of RALP, and probabilities of ED and BCR. When the probability of BCR was assumed to be the same for ORP and RALP, the ICER was \$51,735/QALY. When the probability of BCR was taken from the results of the meta-analysis, rather than local data, the ICER was \$28,800/QALY.

The mean values generated in the probabilistic sensitivity analysis were similar to the deterministic results. The cost-effectiveness scatterplots were dense, indicating minimal uncertainty in the ICER, and the ‘eye of the cloud’ was close to the deterministic ICER.

**Conclusions**

The economic model suggests that BT is the most cost effective treatment option for early prostate cancer in men. The base case ICER for RALP versus ORP was below a willingness to pay (WTP) threshold of \$50,000 per QALY. Therefore, RALP is a cost effective treatment option for early prostate cancer, if a cost-effectiveness threshold of \$50,000 per QALY is assumed.

## Appendices

### Appendix A. Literature search

#### Limits: English, Humans

##### Databases

1. PubMed
2. Embase
3. Web of Science
4. Cochrane Library
5. CINAHL
6. EconLit
8. PsycINFO

#### PubMed

|     |   |      |
|-----|---|------|
| #15 | Search (((((((("Video-Assisted Surgery"[Mesh]) OR "Surgery, Computer-Assisted"[Mesh]) OR da vinci) OR "da vinci") OR "robotic surgery") OR "robot assisted surgery") OR "Robotic Surgical Procedures"[Mesh])) AND (prostatectomy OR prostatectomies) Filters: Humans; English | 2482 |
| #14 | Search (((((((("Video-Assisted Surgery"[Mesh]) OR "Surgery, Computer-Assisted"[Mesh]) OR da vinci) OR "da vinci") OR "robotic surgery") OR "robot assisted surgery") OR "Robotic Surgical Procedures"[Mesh])) AND (prostatectomy OR prostatectomies) Filters: Humans          | 2775 |
| #13 | Search (((((((("Video-Assisted Surgery"[Mesh]) OR "Surgery, Computer-Assisted"[Mesh]) OR da vinci) OR "da vinci") OR "robotic surgery") OR "robot assisted surgery") OR "Robotic Surgical Procedures"[Mesh])) AND ( prostatectomy OR prostatectomies)                         | 2916 |
| #12 | Search (((((((("Video-Assisted Surgery"[Mesh]) OR "Surgery, Computer-Assisted"[Mesh]) OR davinci) OR "da vinci") OR "robotic surgery") OR "robot assisted surgery") OR "Robotic Surgical Procedures"[Mesh])) AND (prostatectomy OR prostatectomies)                           | 498  |



|     |   |       |
|-----|---|-------|
|     | Search ((((((("Video-Assisted Surgery"[Mesh]) OR "Surgery, Computer-Assisted"[Mesh]) OR davinci) OR "da vinci") OR "robotic surgery") OR "robot assisted surgery") OR "Robotic Surgical Procedures"[Mesh] | 30076 |
| #11 |   |       |
| #10 | Search "Video-Assisted Surgery"[Mesh]   | 7419  |
| #9  | Search "Surgery, Computer-Assisted"[Mesh]   | 15981 |
| #8  | Search davinci  | 352   |
| #7  | Search "da vinci"   | 4263  |
| #6  | Search "robotic surgery"  | 4484  |
| #5  | Search "robot assisted surgery"   | 618   |
| #4  | Search "Robotic Surgical Procedures"[Mesh]  | 2747  |
| #3  | Search prostatectomy OR prostatectomies   | 36401 |
| #2  | Search prostatectomies  | 36401 |
| #1  | Search prostatectomy  | 36141 |

**Embase**

|  |       |       |
|--|-------|-------|
| 1. exp robot assisted surgery/               | 3112  |       |
| 2. "robotic surgery".mp.                     | 6703  |       |
| 3. "Robotic Surgical Procedures".mp.         | 148   |       |
| 4. davinci.mp.                               | 1030  |       |
| 5. exp computer assisted surgery/            |       | 9806  |
| 6. "video assisted surgery".mp.              | 352   |       |
| 7. 1 or 2 or 3 or 4 or 5 or 6                |       | 19409 |
| 8. exp prostatectomies/                      | 2183  |       |
| 9. "prostatectomy".mp.                       | 54070 |       |
| 10. 8 or 9                                   | 54239 |       |
| 11. 7 and 10                                 | 1647  |       |
| 12. limit 11 to (human and english language) |       | 1365  |

**Web of Science**





|     |  |        |
|-----|--|--------|
| #12 | #11 AND #8                             | 666    |
| #11 | #10 OR #9                              | 41,949 |
| #10 | TOPIC: ("prostatectomies")             | 41,949 |
| #9  | TOPIC: ("prostatectomy")               | 41,470 |
| #8  | #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 | 10,286 |
| #7  | TOPIC: ("video assisted surgery")      | 227    |
| #6  | TOPIC: ("computer assisted surgery")   | 1,727  |
| #5  | ("da vinci")                           | 3,455  |
| #4  | TOPIC: (davinci) 778                   |        |
| #3  | TOPIC: ("robotic surgical procedure*") | 157    |
| #2  | TOPIC: ("robotic surgery")             | 4,503  |
| #1  | TOPIC: ("robot assisted surgery")      | 765    |

### Cochrane Library

|     |  |      |
|-----|--|------|
| 1.  | MeSH descriptor: [Robotic Surgical Procedures] explode all trees | 29   |
| 2.  | "robotic surgery"  | 270  |
| 3.  | "robot assisted surgery"   | 255  |
| 4.  | davinci  | 31   |
| 5.  | "da vinci"   | 173  |
| 6.  | MeSH descriptor: [Video-Assisted Surgery] explode all trees      | 331  |
| 7.  | MeSH descriptor: [Surgery, Computer-Assisted] explode all trees  | 824  |
| 8.  | #1 or #2 or #3 or #4 or #5 or #6 or #7                           | 1605 |
| 9.  | "prostatectomy":ti,ab,kw (Word variations have been searched)    | 2906 |
| 10. | "prostatectomies"  | 71   |
| 11. | #10 or #9  | 2919 |
| 12. | #11 and #8   | 236  |

### CINAHL

|     |  |       |
|-----|--|-------|
| S12 | S8 AND S11                             | 240   |
| S11 | S9 OR S10                              | 5,136 |
| S10 | "prostatectomies"                      | 69    |
| S9  | "prostatectomy"                        | 5,136 |
| S8  | S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 | 3,797 |
| S7  | "video assisted surgery"               | 88    |
| S6  | "computer assisted surgery"            | 211   |
| S5  | "da vinci"                             | 334   |
| S4  | davinci                                | 34    |



|    |                               |       |
|----|-------------------------------|-------|
| S3 | "robotic surgical procedure*" | 1,181 |
| S2 | "robotic surgery"             | 730   |
| S1 | "robot assisted surgery"      | 1,099 |

**EconLit**

|     |  |     |    |
|-----|--|-----|----|
| S12 | S10 AND S11                            | 1   |    |
| S11 | S8 OR S9                               | 10  |    |
| S10 | S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 | 245 |    |
| S9  | "prostatectomy"                        |     | 10 |
| S8  | "prostatectomies"                      | 1   |    |
| S7  | "video assisted surgery"               | 2   |    |
| S6  | "computer assisted surgery"            | 6   |    |
| S5  | "da vinci"                             | 27  |    |
| S4  | davinci                                | 0   |    |
| S3  | "robotic surgical procedure"           | 4   |    |
| S2  | "robotic surgery"                      | 3   |    |
| S1  | "robot assisted surgery"               |     | 13 |

**7. PsychINFO**

|    |                                   |     |   |
|----|-----------------------------------|-----|---|
| 1  | "robot assisted surgery".mp.      | 3   |   |
| 2  | "robotic surgery".mp.             | 20  |   |
| 3  | "Robotic Surgical Procedures".mp. | 0   |   |
| 4  | davinci.mp.                       | 9   |   |
| 5  | "da vinci".mp.                    | 274 |   |
| 6  | "computer assisted surgery".mp.   |     | 6 |
| 7  | "video assisted surgery".mp.      | 2   |   |
| 8  | 1 or 2 or 3 or 4 or 5 or 6 or 7   | 309 |   |
| 9  | "prostatectomy".mp.               | 440 |   |
| 10 | "prostatectomies".mp.             | 5   |   |
| 11 | 9 or 10                           | 442 |   |
| 12 | 8 and 11                          | 0   |   |

**8. CRD, DARE, NHS EED**

|   |   |    |
|---|---|----|
| 1 | MeSH DESCRIPTOR Robotic Surgical Procedures EXPLODE ALL TREES<br>Delete | 21 |
| 2 | ("robot assisted surgery")  | 24 |



|    |  |     |
|----|--|-----|
| 3  | ("robotic surgery")                    | 58  |
| 4  | (davinci)                              | 3   |
| 5  | ("da vinci")                           | 39  |
| 6  | ("computer assisted surgery")          | 28  |
| 7  | ("video assisted surgery")             | 17  |
| 8  | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 | 148 |
| 9  | ("prostatectomy")                      | 293 |
| 10 | ("prostatectomies")                    | 6   |
| 11 | #9 OR #10                              | 296 |
| 12 | #8 AND #11                             | 36  |

**9. Clinical Trials.gov**

67 studies found for: (prostatectom\* AND "robot assisted surgery" OR "robotic surgery" OR "robotic assisted surgery" OR "davinci" OR "da vinci")

**Google** ([www.google.ca](http://www.google.ca))

(prostatectom\* AND "robot assisted surgery" OR "robotic surgery" OR "robotic assisted surgery" OR "davinci" OR "da vinci")

**Appendix B. Included studies**
**Table B1. Key Characteristics of Included Studies**

| Study                                   | Study Period (country)   | Design                            | Number of Centers   | Studies from the Same Center(s) | Number of Participants | Matching Variables   | Follow-up (months)                                   | Endpoints  |
|---|--|-----------------------------------|---|---------------------------------|------------------------|--|--|--|
| <b>RALP vs. LRP</b>                     |  |                                   |   |                                 |                        |  |  |  |
| Akand et al (2015) <sup>142</sup>       | RALP: 2010-2012<br>LRP: 2004-2010<br>(Turkey)                        | Retrospective cohort              | Single  |                                 | RALP: 79<br>LRP: 308   | Unmatched  | NR   | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> </ul>  |
| Papachristos et al(2015) <sup>143</sup> | RALP: Apr 2008 – Mar 2011<br>LRP: Sep 2007 – Jan 2011<br>(Australia) | Retrospective cohort, consecutive | Multiple:<br>RALP: 1 private hospital (Australia)<br>LRP: 1 private and 1 public hospital (Australia) | Ong et al 2016                  | RALP: 100<br>LRP: 100  | Unmatched  | 12 months postoperative                              | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Sexual function</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul> |
| Asawabharuj et al (2014) <sup>144</sup> | RALP and LRP: 2005-2010<br>(Thailand)                                | Retrospective cohort, consecutive | Single  |                                 | RALP: 486<br>LRP: 561  | Age<br>Estimated blood loss<br>Lower urinary tract symptoms<br>Nerve-sparing<br>Operative time<br>Pathological tumor stage<br>Prostate weight<br>Transurethral resection of prostate gland | 12 months postoperative                              | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Urinary function</li> </ul>   |
| Busch et al (2014) <sup>145</sup>       | RALP and LRP: NR<br>(Germany and USA)                                | Retrospective cohort              | Multiple:<br>USA and  |                                 | RALP: 194<br>LRP: 194  | Propensity matching<br>RALP: LRP - 1:1   | Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile] | <ul style="list-style-type: none"> <li>• Local recurrence</li> <li>• Positive surgical margins</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                                     | Study Period (country)   | Design                          | Number of Centers  | Studies from the Same Center(s)                               | Number of Participants  | Matching Variables  | Follow-up (months)  | Endpoints   |
|---|--|---------------------------------|--|---|-------------------------|---|---|---|
|   |  |                                 | Germany  |   |                         | Age<br>Clinical tumor stage<br>Gleason score<br>Nerve-sparing<br>Preoperative PSA<br>Surgeon experience   | Overall: 35.4 (12.9-59.1)   | <ul style="list-style-type: none"> <li>Survival/ mortality</li> </ul>   |
| Ploussard et al (2014) <sup>111</sup>     | RALP and LRP: Jul 2001 – Dec 2011 (France)   | Prospective cohort, consecutive | Single   |   | RALP: 1009<br>LRP: 1377 | Age<br>Gleason score<br>Nerve-sparing<br>Pathological tumor stage<br>Positive biopsy (>33%)<br>Preoperative PSA<br>Surgeon<br>Surgeon experience<br>Year of surgery | Mean<br>RALP: 15.4<br>LRP: 39.0<br>P<0.001  | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Catheterization time</li> <li>Complications</li> <li>Estimated blood loss</li> <li>Further treatment</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Survival/ mortality</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Sooriakumaran et al (2014) <sup>146</sup> | Jan 2000- Oct 2011<br>RALP: NR<br>LRP: NR<br>(USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria) | Retrospective cohort            | Multiple*:<br>USA x5, Belgium, France, UK x2, Sweden, Australia, Hungary, Austria x2 | Kasraeian et al 2011<br>Bolenz et al 2010<br>Rozet et al 2009 | RALP: 7697<br>LRP: 4918 | Age<br>Gleason score<br>Pathological tumor stage<br>Preoperative PSA<br>Year of surgery   | NR  | <ul style="list-style-type: none"> <li>Positive surgical margins</li> </ul>   |
| Tozawa et al (2014) <sup>147</sup>        | Jan 1999 – Sep 2012<br>RALP: NR<br>LRP: NR<br>(Japan)  | Cohort, consecutive             | Single   |   | RALP: 157<br>LRP: 551   | Unmatched   | NR  | <ul style="list-style-type: none"> <li>Estimated blood loss</li> <li>Operative time</li> <li>Positive surgical margins</li> </ul>   |
| Asimakopoulus et al (2013) <sup>112</sup> | RALP and LRP: Jan 2008 – Dec 2010 (Italy)  | Prospective cohort, consecutive | Single   | Asimakopoulus et al 2011                                      | RALP: 136<br>LRP: 91    | Unmatched (cT1-cT2 tumors, PSA≤10ng/mL, Gleason score ≤ 7, bilateral nerve-sparing)   | Median [25 <sup>o</sup> -75 <sup>o</sup> Percentile]<br>RALP: 18 (14-24)<br>LRP: 21 (15-32)<br>P=0.07 | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Complications</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Urinary function</li> </ul>   |
| Berge et al (2013) <sup>113</sup>         | RALP: Nov 2007 – Dec 2008  | Prospective cohort,             | Single   |   | RALP: 210<br>LRP: 210   | Age<br>BMI  | 36 months postoperative   | <ul style="list-style-type: none"> <li>Estimated blood loss</li> <li>Further treatment</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                  | Study Period (country)                            | Design               | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables  | Follow-up (months)          | Endpoints   |
|--|---|----------------------|-------------------|---------------------------------|------------------------|---|-----------------------------|---|
|  | LRP: May 2006 – Nov 2007<br>(Norway)              | consecutive          |                   |                                 |                        | Nerve-sparing<br>Pathological tumor stage<br>Preoperative erectile function<br>Preoperative PSA<br>Prostate volume<br>Surgeon<br>Surgical margins status  |                             | <ul style="list-style-type: none"> <li>• HRQOL</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>   |
| Harty et al (2013) <sup>200</sup>      | Jan 2000-Mar 2010<br>RALP: NR<br>LRP: NR<br>(USA) | Retrospective cohort | Single            |                                 | RALP: 152<br>LRP: 140  | Unmatched   | NR                          | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |
| Pierorazio et al (2013) <sup>149</sup> | RALP: 2005-2011<br>LRP: 2002-2011<br>(USA)        | Retrospective cohort | Single            | Magheli et al 2011              | RALP: 105<br>LRP: 65   | Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Surgeon experience<br>Surgical margins status<br>Tumor location (high-risk prostate cancer: PSA>20ng/mL, cT2 or cT3 tumors, or Gleason score≥8) | RALP: 23.6**<br>LRP: 23.4** | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Further treatment</li> <li>• Positive surgical margins</li> </ul>  |
| Porpiglia et al (2013) <sup>109</sup>  | RALP and LRP: Jan 2010-Jan 2012<br>(Italy)        | RCT                  | Single            |                                 | RALP: 60<br>LRP: 60    | NA  | 12 months postoperative     | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul> |
| Koutlidis et al                        | RALP and LRP: Mar                                 | Prospective          | Single            |                                 | RALP: 175              | Age   | NR                          | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                     | Study Period (country)  | Design                 | Number of Centers | Studies from the Same Center(s)              | Number of Participants  | Matching Variables   | Follow-up (months)   | Endpoints  |
|---|---|------------------------|-------------------|--|-------------------------|--|--|--|
| (2012) <sup>114</sup>                     | 2004 – Jan 2009<br>(France)   | cohort,<br>consecutive |                   |  | LRP: 104                | BMI<br>Clinical tumor stage<br>Gleason score<br>Positive biopsy (>33%)<br>Preoperative PSA<br>Prostate weight  |  |  |
| Park et al (2012) <sup>150</sup>          | RALP: Jan 2008-May 2011<br>LRP: Oct 2007- May 2011<br>(South Korea) | Retrospective cohort   | Single            |  | RALP: 183<br>LRP: 144   | Age<br>BMI<br>Catheter duration<br>Gleason score<br>Operative time<br>Nerve-sparing<br>Pathological tumor stage<br>Preoperative erectile function<br>Preoperative PSA<br>Prostate volume | Median (range)<br>RALP: 13 (1-41)<br>LRP: 19 (1-42)<br><br>P=0.005 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Pain</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul> |
| Asimakopoulus et al (2011) <sup>110</sup> | RALP and LRP: Oct 2007-Oct 2008<br>(Italy)                          | RCT                    | Single            | Asimakopoulus et al 2013                     | RALP: 52<br><br>LRP: 60 | NA   | 12 months postoperative  | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>  |
| Kasraeian et al (2011) <sup>151</sup>     | RALP: Jul 2005 – Jan 2008<br>LRP: May 2007 – Jan 2008<br>(France)   | Retrospective cohort   | Single            | Sooriakumaran et al 2014<br>Rozet et al 2009 | RALP: 200<br>LRP: 200   | Age<br>BMI<br>Gleason score<br>Nerve-sparing<br>Pathological tumor stage<br>Preoperative PSA   | NR   | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                               | Study Period (country)                     | Design                            | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables  | Follow-up (months)                             | Endpoints   |
|-------------------------------------|--|-----------------------------------|-------------------|---------------------------------|------------------------|---|--|---|
| Magheli et al (2011) <sup>152</sup> | RALP: 2003-2008<br>LRP: 2000-2008<br>(USA) | Retrospective cohort              | Single            | Pierorazio et al 2013           | RALP: 522<br>LRP: 522  | Prostate weight<br>Propensity score<br>RALP:LRP 1:1<br>Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Race<br>Analysis:<br>Surgeon experience<br>Tumor location<br>Surgical margins status | Mean ± SD**<br>RALP: 15.6±7.2<br>LRP: 16.8±8.4 | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Positive surgical margins</li> </ul>   |
| Willis et al (2011) <sup>115</sup>  | RALP and LRP: 2003-2007 (USA)              | Prospective cohort, consecutive   | Single            |                                 | RALP: 121<br>LRP: 161  | Unmatched   | 12 months postoperative                        | <ul style="list-style-type: none"> <li>Estimated blood loss</li> <li>HRQOL</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Urinary function</li> </ul>  |
| Bolenz et al (2010) <sup>153</sup>  | RALP and LRP: Sep 2003 – Apr 2008 (USA)    | Retrospective cohort, consecutive | Single            | Sooriakumaran et al 2014        | RALP: 262<br>LRP: 220  | Unmatched   | NR   | <ul style="list-style-type: none"> <li>Hospital stay</li> <li>Transfusion</li> </ul>  |
| Drouin et al (2009) <sup>154</sup>  | RALP and LRP: 2000-2004 (France)           | Retrospective cohort              | Single            |                                 | RALP: 71<br>LRP: 85    | Gleason score<br>Preoperative PSA<br>Surgical margins status<br>(cT1-cT2 tumors)  | Mean± SD<br>RALP: 40.9±5.0<br>LRP: 48.4±11.0   | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Catheterization time</li> <li>Complications</li> <li>Conversion</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Survival/ mortality</li> <li>Transfusion</li> </ul> |
| Hakimi et al (2009) <sup>155</sup>  | RALP: NR<br>LRP: NR<br>(USA)               | Retrospective cohort              | Single            | Sooriakumaran et al 2014        | RALP: 75<br>LRP: 75    | Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative erectile   | 12 months postoperative                        | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Complications</li> <li>Conversion</li> <li>Equipment failure</li> </ul>  |



**Table B1. Key Characteristics of Included Studies**

| Study                                | Study Period (country)                                      | Design               | Number of Centers | Studies from the Same Center(s)                  | Number of Participants | Matching Variables   | Follow-up (months)     | Endpoints   |
|--------------------------------------|---|----------------------|-------------------|--|------------------------|--|------------------------|---|
|                                      |   |                      |                   |  |                        | function<br>Preoperative PSA   |                        | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>  |
| Rozet et al (2009) <sup>156</sup>    | RALP and LRP: May 2003 – May 2005 (France)                  | Retrospective cohort | Single            | Sooriakumaran et al 2014<br>Kasraeian et al 2011 | RALP: 133<br>LRP: 133  | Age<br>ASA score<br>BMI<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Previous abdominal surgery | NR                     | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> </ul> |
| Trabulsi et al (2008) <sup>157</sup> | RALP: Oct 2005-Aug 2006<br>LRP: Mar 2000 – Dec 2005 (USA)   | Retrospective cohort | Single            |  | RALP: 50<br>LRP: 190   | Unmatched  | NR                     | <ul style="list-style-type: none"> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Positive surgical margins</li> </ul>   |
| Ball et al (2006) <sup>116</sup>     | Jan 2000-Apr 2005<br>RALP: NR<br>LRP: NR (USA)              | Prospective cohort   | Single            |  | RALP: 82<br>LRP: 124   | Unmatched  | 6 months postoperative | <ul style="list-style-type: none"> <li>• HRQOL</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>  |
| Hu et al (2006) <sup>158</sup>       | RALP: Jun 2003 – Jun 2004<br>LRP: Oct 2000 – Jan 2003 (USA) | Retrospective cohort | Single            |  | RALP: 322<br>LRP: 358  | Unmatched  | NR                     | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Conversion</li> <li>• Equipment failure</li> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Transfusion</li> </ul>   |
| Joseph et al (2005) <sup>159</sup>   | RALP: NR<br>LRP: NR (USA)                                   | Retrospective cohort | Single            |  | RALP: 50<br>LRP: 50    | Unmatched  | 3 months postoperative | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Positive surgical margins</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                                | Study Period (country)                      | Design                            | Number of Centers                | Studies from the Same Center(s)                           | Number of Participants      | Matching Variables   | Follow-up (months)   | Endpoints   |
|--------------------------------------|---|-----------------------------------|----------------------------------|---|-----------------------------|--|--|---|
|                                      |   |                                   |                                  |   |                             |  |  | <ul style="list-style-type: none"> <li>Sexual function</li> <li>Transfusion</li> <li>Urinary function</li> </ul>  |
| <b>RALP vs. ORP</b>                  |   |                                   |                                  |   |                             |  |  |   |
| Hu et al (2017) <sup>160</sup>       | RALP and ORP: 2003-2012 (USA)               | Retrospective cohort              | Multiple: SEER-Medicare database | Studies from USA<br>Gandaglia et al 2014<br>Hu et al 2014 | RALP: 4164<br>ORP: 4164     | Propensity matching<br>RALP: ORP – 1:1<br>Age<br>Comorbidities<br>Lymph node involvement<br>Marital status<br>Pathological tumor stage<br>Population density<br>Race<br>Socioeconomic status<br>Surgeon volume<br>US region<br>Year of surgery | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>Overall for all-cause mortality: 78.0 (61.2-94.8)**<br>Overall for further treatment: 64.8 (50.4-63.6)** | <ul style="list-style-type: none"> <li>Further treatment</li> <li>Survival/ mortality</li> </ul>  |
| Jackson et al. (2016) <sup>117</sup> | RALP and ORP: 2004-2014 (USA)               | Prospective cohort                | Single                           |   | RALP: 116<br>ORP: 63        | Clinical tumor stage<br>Gleason score<br>Preoperative PSA  | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>RALP: 121.2 (115.2-126.0)**<br>ORP: 123.6 (116.4 – 128.4)**<br>P=0.191                                   | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Complications</li> <li>Conversion</li> <li>HRQOL</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Survival/ mortality</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Ong et al (2016) <sup>118</sup>      | RALP and ORP: Jan 2009-Jun 2012 (Australia) | Prospective cohort                | Multiple                         | Papachristos et al 2015                                   | RALP: 885<br>ORP: 1117      | Unmatched  | 24 months postoperative  | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>HRQOL</li> <li>Positive surgical margins</li> </ul>  |
| Pearce et al. (2016) <sup>161</sup>  | 2010 – 2011<br>RALP: NR<br>ORP: NR<br>(USA) | Retrospective cohort, consecutive | Multiple                         | Studies from institutions included in the National Cancer | RALP: 73,131<br>ORP: 23,804 | Propensity matching<br>RALP:ORP – 1:1<br>Age<br>Race   | 30 days  | <ul style="list-style-type: none"> <li>Complications</li> <li>Further treatment</li> <li>Hospital stay</li> <li>Positive surgical margins</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                               | Study Period (country)                           | Design                            | Number of Centers | Studies from the Same Center(s) | Number of Participants  | Matching Variables  | Follow-up (months)      | Endpoints  |
|-------------------------------------|--|-----------------------------------|-------------------|---------------------------------|-------------------------|---|-------------------------|--|
|                                     |  |                                   |                   | Data Base                       |                         | CCI<br>PSA<br>AJCC<br>clinical/pathological stage<br>Biopsy/pathological<br>Gleason score<br>D'Amico risk category<br>Lymph node dissection<br>performance<br>Facility type<br>Hospital volume<br>Year of diagnosis |                         | <ul style="list-style-type: none"> <li>Survival/ mortality</li> </ul>  |
| Suardi et al. (2016) <sup>162</sup> | RALP: 2006 – 2014<br>ORP: 1992 – 2014<br>(Italy) | Retrospective cohort, consecutive | Single            |                                 | RALP: 1790<br>ORP: 4404 | D'Amico classification<br>Nerve-sparing<br>Prostate volume<br>Tumor volume<br>Year of surgery   | NR                      | <ul style="list-style-type: none"> <li>Positive surgical margins</li> </ul>  |
| Yaxley et al. (2016) <sup>103</sup> | RALP and ORP: 2010 – present<br>(Australia)      | RCT                               | Single            |                                 | RALP: 163<br>ORP: 163   | NA  | 24 months postoperative | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Catheterization time</li> <li>Complications</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>HRQOL</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Akand et al. (2015) <sup>142</sup>  | RALP: 2010-2012<br>ORP: 1999- 2003<br>(Turkey)   | Retrospective cohort              | Single            |                                 | RALP: 79<br>ORP: 50     | Unmatched   | NR                      | <ul style="list-style-type: none"> <li>Catheterization time</li> <li>Complications</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Transfusion</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                  | Study Period (country)                    | Design                            | Number of Centers     | Studies from the Same Center(s)                   | Number of Participants | Matching Variables   | Follow-up (months)  | Endpoints   |
|--|---|-----------------------------------|-----------------------|---|------------------------|--|---|---|
|  |   |                                   |                       |   |                        |  |   | <ul style="list-style-type: none"> <li>• Survival/ mortality</li> </ul>   |
| Antonelli et al. (2015) <sup>163</sup> | RALP and ORP: 2008-NR (Italy)             | Retrospective cohort, consecutive | Single                |   | RALP: 291<br>ORP: 285  | Gleason score<br>Nerve-sparing<br>Pathological tumor stage<br>Tumor volume   | NR  | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |
| Haglund et al (2015) <sup>119</sup>    | RALP and ORP: Sep 2008-Nov2011            | Prospective cohort, consecutive   | Multiple*: Sweden x14 | Sooriakumaran et al. 2014<br>Carlsson et al. 2010 | RALP: 1847<br>ORP: 778 | Unmatched  | 12 months postoperative   | <ul style="list-style-type: none"> <li>• Complications‡</li> <li>• Estimated blood loss</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Pain‡</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Survival/ mortality</li> <li>• Urinary function</li> </ul> <p>‡Data taken from Wallerstedt et al (2015)</p> |
| Lee et al. (2015) <sup>164</sup>       | RALP and ORP: 2007-2013 (South Korea)     | Retrospective cohort              | Single                | Ryu et al 2013<br>Kim et al 2011                  | RALP: 99<br>ORP: 99    | Propensity matching<br>RALP:ORP – 1:1<br>Age<br>Clinical tumor stage<br>Gleason score<br>Positive biopsy<br>Preoperative PSA<br>Prostate volume<br>Surgeon experience (high-risk prostate cancer: PSA>20ng/mL, ≥cT3a tumors, or Gleason score≥8) | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>Overall: 47.9 (33.6-68.6) | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> </ul>  |
| Lott et al. (2015) <sup>120</sup>      | RALP and ORP: Jun 2012- Sep 2013 (Brazil) | Prospective cohort                | Single                |   | RALP: 50<br>ORP: 34    | Unmatched  | 12 months postoperative   | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                | Study Period (country)                     | Design                            | Number of Centers         | Studies from the Same Center(s) | Number of Participants | Matching Variables   | Follow-up (months)  | Endpoints  |
|--------------------------------------|--|-----------------------------------|---------------------------|---------------------------------|------------------------|--|---|--|
|                                      |  |                                   |                           |                                 |                        |  |   | <ul style="list-style-type: none"> <li>• Sexual function</li> <li>• Urinary function</li> </ul>  |
| Busch et al. (2014) <sup>145</sup>   | RALP and ORP: NR (Germany and USA)         | Retrospective cohort              | Multiple: USA and Germany |                                 | RALP: 194<br>ORP: 194  | Propensity matching<br>RALP: ORP - 1:1<br>Age<br>Clinical tumor stage<br>Gleason score<br>Nerve-sparing<br>Preoperative PSA<br>Surgeon experience  | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>Overall: 35.4 (12.9-59.1) | <ul style="list-style-type: none"> <li>• Local recurrence</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> </ul>   |
| Davison et al. (2014) <sup>121</sup> | RALP and ORP: Nov 2007- Jun 2009 (Canada)  | Prospective cohort, consecutive   | Single                    | Gagnon et al. 2014              | RALP: 78<br>ORP: 73    | Propensity score<br>Age<br>Gleason score<br>Nerve-sparing<br>Preoperative HRQOL<br>Preoperative PSA<br>Use of PDE5   | 12 months postoperative   | <ul style="list-style-type: none"> <li>• HRQOL</li> </ul>  |
| Fode et al. (2014) <sup>122</sup>    | RALP and ORP: Apr 2008- May 2012 (Denmark) | Prospective cohort, consecutive   | Single                    |                                 | RALP: 585<br>ORP: 453  | Age<br>D'Amico classification<br>Gleason score<br>Nerve-sparing<br>Pathological tumor stage<br>Preoperative continence<br>Preoperative erectile function<br>Prostate volume<br>Surgeon<br>Tumor size | 12 months postoperative   | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>   |
| Gagnon et al. (2014) <sup>165</sup>  | RALP: NR<br>ORP: NR (Canada)               | Retrospective cohort, consecutive | Single                    | Davison et al. 2014             | RALP: 200<br>ORP: 200  | Unmatched  | 12 months postoperative   | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> </ul> |

**Table B1. Key Characteristics of Included Studies**

| Study                                 | Study Period (country)                             | Design                            | Number of Centers                | Studies from the Same Center(s)   | Number of Participants  | Matching Variables   | Follow-up (months)   | Endpoints   |
|---------------------------------------|--|-----------------------------------|----------------------------------|---|-------------------------|--|--|---|
|                                       |  |                                   |                                  |   |                         |  |  | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>   |
| Gandaglia et al (2014) <sup>166</sup> | RALP and ORP: Oct 2008-Dec 2009 (USA)              | Retrospective cohort              | Multiple: SEER-Medicare database | Studies from USA<br>Hu et al 2017<br>Hu et al 2014                                  | RALP: 3476<br>ORP: 2439 | Unmatched  | 6 months postoperative   | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Transfusion</li> </ul>  |
| Hu et al (2014) <sup>167</sup>        | RALP and ORP: Jan 2004-Dec 2010 (USA)              | Retrospective cohort              | Multiple: SEER-Medicare database | Studies from USA<br>Hu et al 2017<br>Gandaglia et al 2014                           | RALP: 5524<br>ORP: 5524 | Propensity score matching 1:1 RALP: ORP<br>Age<br>Charlson comorbidity index<br>Clinical tumor stage<br>Gleason score<br>Marital status<br>Population density<br>Preoperative PSA<br>Race<br>US region<br>Socioeconomic status<br>Surgeon volume | 24 months postoperative  | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> <li>• Further treatment</li> </ul>  |
| Koo et al. (2014) <sup>168</sup>      | 1992- 2008<br>RALP: NR<br>ORP: NR<br>(South Korea) | Retrospective cohort, consecutive | Single                           | Hong et al. 2010  | RALP: 175<br>ORP: 175   | Propensity matching RALP: ORP – 1:1<br>Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA  | Mean± SD<br>RALP: 57.6±11.4<br>ORP: 60.1±11.9<br>P=0.014   | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Further treatment</li> <li>• Metastasis</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> <li>• Urinary function</li> </ul> |
| Ritch et al. (2014) <sup>169</sup>    | RALP and ORP: Jun 2003-Jun 2009 (USA)              | Retrospective cohort, consecutive | Single                           | Barocas et al. 2010<br>Kordan et al. 2010<br>Chan et al. 2008<br>Nelson et al. 2007 | RALP: 742<br>ORP: 237   | (intermediate, high risk prostate cancer: PSA>10ng/ml, ≥cT2b tumor or Gleason score ≥7)  | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>RALP: 42.5 (26.2-59.7)<br>ORP: 62.8 (43.1-83.5)<br>P<0.001 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Further treatment</li> <li>• Positive surgical margins</li> </ul>  |
| Shigemura et al.                      | RALP: Oct 2010-Sep                                 | Retrospective                     | Single                           |   | RALP: 89                | Unmatched  | NR   | <ul style="list-style-type: none"> <li>• Complications</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                      | Study Period (country)   | Design                            | Number of Centers  | Studies from the Same Center(s)  | Number of Participants  | Matching Variables   | Follow-up (months)      | Endpoints   |
|--|--|-----------------------------------|--|--|-------------------------|--|-------------------------|---|
| (2014) <sup>170</sup>                      | 2012<br>ORP: Mar 2008-May 2012<br>(Japan)  | cohort                            |  |  | ORP: 105                |  |                         | <ul style="list-style-type: none"> <li>Estimated blood loss</li> </ul>  |
| Sooriakumaran et al. (2014) <sup>146</sup> | Jan 2000- Oct 2011<br>RALP: NR<br>ORP: NR<br>(USA, Belgium, France, UK, Sweden, Australia, Hungary, Austria) | Retrospective cohort              | Multiple*:<br>USA x5, Belgium, France, UK x2, Sweden, Australia, Hungary, Austria x2 | Haglund et al. 2015<br>Kasraeian et al. 2011<br>Bolenz et al. 2010<br>Carlsson et al. 2010<br>Doumerc et al. 2010<br>Rozet et al. 2009<br>Ahlering et al. 2004 | RALP: 7697<br>ORP: 9778 | Age<br>Gleason score<br>Pathological tumor stage<br>Preoperative PSA<br>Year of surgery              | NR                      | <ul style="list-style-type: none"> <li>Positive surgical margins</li> </ul>   |
| Choo et al. (2013) <sup>171</sup>          | Sep 2003-Apr 2010<br>RALP: NR<br>ORP: NR<br>(South Korea)  | Retrospective cohort, consecutive | Single   |  | RALP: 77<br>ORP: 176    | Unmatched  | 24 months postoperative | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Estimated blood loss</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Froehner et al. (2013) <sup>172</sup>      | Jan 2006- Jun 2012<br>RALP: NR<br>ORP: NR<br>(Germany)   | Retrospective cohort              | Single   |  | RALP: 317<br>ORP: 2437  | Unmatched  | NR                      | <ul style="list-style-type: none"> <li>Complications</li> <li>Hospital stay</li> <li>Survival/ mortality</li> <li>Transfusion</li> </ul>  |
| Geraerts et al. (2013) <sup>123</sup>      | RALP and ORP: Sep 2009- Jul 2011<br>(Belgium)  | Prospective cohort                | Single   | Uvin et al. 2010   | RALP: 64<br>ORP: 116    | Age<br>BMI<br>D'Amico classification<br>Nerve-sparing<br>Preoperative continence<br>Surgical margins | 12 months postoperative | <ul style="list-style-type: none"> <li>Catheterization time</li> <li>Complications</li> <li>Conversion</li> <li>Further treatment</li> <li>HRQOL</li> <li>Positive surgical margins</li> <li>Survival/ mortality</li> </ul>               |

**Table B1. Key Characteristics of Included Studies**

| Study                                   | Study Period (country)                                       | Design                            | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables   | Follow-up (months)                   | Endpoints  |
|---|--|-----------------------------------|-------------------|---------------------------------|------------------------|--|--------------------------------------|--|
|   |  |                                   |                   |                                 |                        | status   |                                      | <ul style="list-style-type: none"> <li>• Urinary function</li> </ul>   |
| Harty et al. (2013) <sup>200</sup>      | Jan 2000-Mar 2010<br>RALP: NR<br>ORP: NR<br>(USA)            | Retrospective cohort              | Single            |                                 | RALP: 152<br>ORP: 153  | Unmatched  | NR                                   | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>  |
| Ludovico et al. (2013) <sup>124</sup>   | RALP and ORP: Jan 2004- Dec 2008<br>(Italy)                  | Prospective cohort, consecutive   | Single            |                                 | RALP: 82<br>ORP: 48    | Unmatched<br>(bilateral nerve-sparing, cT1-cT2a tumors)  | 12 months postoperative              | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul> |
| Masterson et al (2013) <sup>173</sup>   | RALP: Jan 2004 – Oct 2010<br>ORP: Apr 1999-Oct 2010<br>(USA) | Retrospective cohort, consecutive | Single            |                                 | RALP: 669<br>ORP: 357  | Unmatched  | Mean±SD<br>RALP: 17±NR<br>ORP: 43±NR | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Positive surgical margins</li> </ul>  |
| Pierorazio et al. (2013) <sup>149</sup> | RALP: 2005-2011<br>ORP: 2002-2011<br>(USA)                   | Retrospective cohort              | Single            | Magheli et al. 2011             | RALP: 105<br>ORP: 743  | Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Surgeon experience<br>Surgical margins status<br>Tumor location<br>(high-risk prostate cancer: PSA>20ng/mL, cT2 or cT3 tumors, or Gleason score≥8) | RALP: 23.6**<br>ORP: 38.4**          | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Further treatment</li> <li>• Positive surgical margins</li> </ul>   |
| Punnen et al. (2013) <sup>174</sup>     | RALP and ORP: 2002-2011<br>(USA)                             | Retrospective cohort              | Single            | Breyer et al. 2010              | RALP: 233<br>ORP: 177  | Age<br>Lymph node involvement<br>Neck-sparing<br>Pathological tumor stage<br>Preoperative PSA  | Mean<br>RALP: 22.0<br>ORP: 48.0      | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Estimated blood loss</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> </ul>   |



**Table B1. Key Characteristics of Included Studies**

| Study                                    | Study Period (country)  | Design                            | Number of Centers | Studies from the Same Center(s)  | Number of Participants   | Matching Variables  | Follow-up (months)  | Endpoints   |
|--|---|-----------------------------------|-------------------|----------------------------------|--------------------------|---|---|---|
|  |   |                                   |                   |                                  |                          | Secondary treatment<br>Surgeon<br>Surgical margins status<br>Year of surgery (high-risk prostate cancer: PSA>20ng/mL, ≥cT3a tumors, or Gleason score≥8) |   |   |
| Ryu et al. (2013) <sup>175</sup>         | RALP and ORP: Jul 2007- Aug 2012 (South Korea)                  | Retrospective cohort              | Single            | Lee et al 2015<br>Kim et al 2011 | RALP: 524<br>ORP: 341    | Unmatched   | 3 months postoperative‡   | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Transfusion</li> </ul>   |
| Silberstein et al. (2013) <sup>176</sup> | RALP and ORP: Jan 2007- Dec 2010 (USA)                          | Retrospective cohort              | Single            |                                  | RALP: 493<br>ORP: 961    | Clinical tumor stage<br>Positive biopsy<br>Preoperative PSA   | 36 months postoperative**   | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Positive surgical margins</li> </ul>   |
| Son et al. (2013) <sup>177</sup>         | RALP: Jul 2008-Jun 2009<br>ORP: Sep 2006-Oct 2007 (South Korea) | Retrospective cohort, consecutive | Single            |                                  | RALP: 146<br>ORP: 112    | Unmatched   | 36 months postoperative   | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Urinary function</li> </ul>  |
| Bae et al (2012) <sup>178</sup>          | Apr 2008-May 2011<br>RALP: NR<br>ORP: NR (South Korea)          | Retrospective cohort study        | Single            |                                  | RALP: 111<br><br>ORP: 70 | Unmatched   | NR  | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> </ul>   |
| Hong et al. (2012) <sup>8</sup>          | RALP and ORP: Aug 2007- Mar 2010 (USA)                          | Retrospective cohort, consecutive | Single            |                                  | RALP: 182<br>ORP: 80     | Unmatched   | NR  | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |
| Lumen et al. (2012) <sup>179</sup>       | RALP: Aug 2009-Oct 2011<br>ORP: NR (Belgium)                    | Retrospective cohort              | Single            |                                  | RALP: 50<br><br>ORP: 50  | Unmatched   | Median (range)<br>RALP: 12 (1-30)<br>ORP: 31 (1-102)<br><br>P<0.001 | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Further treatment</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> </ul> |

**Table B1. Key Characteristics of Included Studies**

| Study                                    | Study Period (country)  | Design                          | Number of Centers                   | Studies from the Same Center(s) | Number of Participants  | Matching Variables  | Follow-up (months)   | Endpoints   |
|--|---|---------------------------------|-------------------------------------|---------------------------------|-------------------------|---|--|---|
|  |   |                                 |                                     |                                 |                         |   |  | <ul style="list-style-type: none"> <li>• Urinary function</li> </ul>  |
| Martinschek et al. (2012) <sup>180</sup> | RALP: July 2008 – July 2010<br>ORP: January 2006 – July 2010<br>(Germany) | Case-control study              | Single                              |                                 | RALP: 19<br>ORP: 19     | Age<br>Clinical stage<br>Level of preoperative total PSA<br>Biopsy Gleason score<br>ASA classification score<br>Prostate volume | NR   | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> </ul>   |
| Philippou et al. (2012) <sup>125</sup>   | RALP: Nov 2008 – Jan 2010<br>ORP: Oct 2007 – Dec 2008<br>(UK)             | Prospective cohort, consecutive | Single                              |                                 | RALP: 50<br>ORP: 50     | Unmatched   | Mean± SD<br>RALP: 19.5 ± 4.3<br>ORP: 32.5 ± 4.2<br>P<0.001 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Pain</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul> |
| Trinh et al. (2012) <sup>181</sup>       | RALP and ORP: Oct 2008- Dec 2009<br>(USA)                                 | Retrospective cohort            | Multiple: >1000 community hospitals | Studies from USA                | RALP: 7598<br>ORP: 7389 | Age<br>Charlson comorbidity index<br>Hospital characteristics<br>Insurance status<br>Race<br>Year of surgery                    | NR   | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Hospital stay</li> <li>• Transfusion</li> </ul>   |
| Wang et al. (2012) <sup>182</sup>        | RALP and ORP: Sep 2001-Dec 2009<br>(USA)                                  | Retrospective cohort            | Single                              |                                 | RALP: 1038<br>ORP: 707  | Unmatched   | Mean± SD<br>RALP: 11.1±0.5<br>ORP: 39.4±0.9<br>P<0.001     | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Further treatment</li> <li>• Operative time</li> <li>• Positive surgical margins</li> </ul>   |
| Di Pierro et al. (2011) <sup>126</sup>   | Nov 2007 – Dec 2009<br>RALP: NR<br>ORP: NR                                | Prospective cohort, consecutive | Single                              |                                 | RALP: 75<br>ORP: 75     | Unmatched   | 12 months postoperative                                    | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Operative time</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                | Study Period (country)                                     | Design                            | Number of Centers | Studies from the Same Center(s)   | Number of Participants | Matching Variables   | Follow-up (months)                              | Endpoints  |
|--------------------------------------|--|-----------------------------------|-------------------|-----------------------------------|------------------------|--|---|--|
|                                      | (Switzerland)  |                                   |                   |                                   |                        |  |   | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>                        |
| Hohwu et al. (2011) <sup>183</sup>   | Jan 2004 – Dec 31 2007<br>RALP: NR<br>ORP: NR<br>(Denmark) | Retrospective cohort, consecutive | Single            |                                   | RALP: 77<br>ORP: 154   | RALP:ORP 1:2<br>Age<br>D'Amico Risk Classification   | 12 months                                       | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>  |
| Kim et al. (2011) <sup>127</sup>     | RALP and ORP: Jul 2007- Dec 2010<br>(South Korea)          | Prospective cohort, consecutive   | Single            | Lee et al.2015<br>Ryu et al. 2013 | RALP: 528<br>ORP: 235  | Unmatched  | 24 months postoperative                         | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>                      |
| Magheli et al. (2011) <sup>152</sup> | RALP: 2003-2008<br>ORP: 2000-2008<br>(USA)                 | Retrospective cohort              | Single            | Pierorazio et al. 2013            | RALP: 522<br>ORP: 522  | Propensity score<br>RALP:ORP 1:1<br>Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Race<br>Analysis:<br>Surgeon experience<br>Tumor location<br>Surgical margins status | Mean ± SD**<br>RALP: 15.6±7.2<br>ORP: 30.0±19.2 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Positive surgical margins</li> </ul>  |
| Minniti et al. (2011) <sup>184</sup> | RALP and ORP: Aug 2007- May 2008<br>(Italy)                | Retrospective cohort              | Single            |                                   | RALP: 22<br>ORP: 93    | Propensity score:<br>Age<br>BMI<br>Clinical tumor stage<br>Hypertension<br>Neck-sparing<br>Nerve-sparing   | NR  | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Urinary function</li> </ul>  |
| Mirza et al. (2011) <sup>185</sup>   | RALP and ORP: Mar 2005- Feb 2009<br>(USA)                  | Retrospective cohort, consecutive | Single            |                                   | RALP: 191<br>ORP: 180  | Unmatched  | 12 to 18 months postoperative                   | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• HRQOL</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> </ul> |
| Tollefson et al.                     | RALP and ORP: 2003-  | Retrospective                     | Single            | Krambeck et al.                   | RALP: 1084             | Unmatched  | NR  | <ul style="list-style-type: none"> <li>• Complications</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                                 | Study Period (country)                         | Design                            | Number of Centers | Studies from the Same Center(s)                 | Number of Participants | Matching Variables  | Follow-up (months)   | Endpoints   |
|---------------------------------------|--|-----------------------------------|-------------------|---|------------------------|---|--|---|
| (2011) <sup>186</sup>                 | 2008 (USA)                                     | cohort                            |                   | 2008  | ORP: 4824              |   |  |   |
| Barocas et al. (2010) <sup>128</sup>  | RALP and ORP: Jun 2003- Jan 2008 (USA)         | Prospective cohort, consecutive   | Single            | Kordan et al. 2010<br>Nelson et al. 2007        | RALP: 1413<br>ORP: 491 | Clinical tumor stage<br>Extracapsular extension<br>Gleason score<br>Preoperative PSA<br>Seminal vesicle invasion<br>Surgical margins status | Median (IQR)<br>RAPR: 8.0 (2.0 – 20.0)<br>ORP: 17.0 (8.0 – 34.0)<br>P<0.01 | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Positive surgical margins</li> </ul>   |
| Bolenz et al. (2010) <sup>153</sup>   | RALP and ORP: Sep 2003 – Apr 2008 (USA)        | Retrospective cohort, consecutive | Single            | Sooriakumaran et al. 2014                       | RALP: 262<br>ORP: 161  | Unmatched   | NR   | <ul style="list-style-type: none"> <li>Hospital stay</li> <li>Transfusion</li> </ul>  |
| Breyer et al. (2010) <sup>129</sup>   | RALP and ORP: 2002-2008 (USA)                  | Prospective cohort                | Single            | Punnen et al. 2013                              | RALP: 293<br>ORP: 695  | Age<br>Gleason score<br>Preoperative PSA<br>Year of surgery   | At least 12 months postoperative   | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Complications</li> <li>Further treatment</li> <li>Positive surgical margins</li> <li>Transfusion</li> </ul>  |
| Carlsson et al. (2010) <sup>130</sup> | RALP and ORP: Jan 2002- Aug 2007 (Sweden)      | Prospective cohort, consecutive   | Single            | Haglund et al 2015<br>Sooriakumaran et al. 2014 | RALP: 1253<br>ORP: 485 | Unmatched   | Median<br>RALP: 19<br>ORP: 30  | <ul style="list-style-type: none"> <li>Complications</li> <li>Conversion</li> <li>Survival/ mortality</li> <li>Transfusion</li> <li>Urinary function</li> </ul>   |
| Doumerc et al. (2010) <sup>131</sup>  | RALP and ORP: Feb 2006-Dec 2008 (Australia)    | Prospective cohort, consecutive   | Single            | Sooriakumaran et al. 2014                       | RALP: 212<br>ORP: 502  | Unmatched   | Mean± SD<br>RALP: 11.2±9.4<br>ORP: 17.2±9.7                                | <ul style="list-style-type: none"> <li>Catheterization time</li> <li>Complications</li> <li>Conversion</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Survival/ mortality</li> <li>Transfusion</li> </ul> |
| Hong et al. (2010) <sup>132</sup>     | RALP and ORP: Mar 2007- Nov 2007 (South Korea) | Prospective cohort, consecutive   | Single            | Koo et al. 2014                                 | RALP: 26<br>ORP: 25    | Unmatched   | NR   | <ul style="list-style-type: none"> <li>Estimated blood loss</li> <li>Operative time</li> <li>Transfusion</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                  | Study Period (country)                                       | Design                          | Number of Centers | Studies from the Same Center(s)           | Number of Participants | Matching Variables  | Follow-up (months)             | Endpoints   |
|--|--|---------------------------------|-------------------|---|------------------------|---|--------------------------------|---|
| Kordan et al. (2010) <sup>133</sup>    | RALP and ORP: Jun 2003- July 2006 (USA)                      | Prospective cohort, consecutive | Single            | Barocas et al. 2010<br>Nelson et al. 2007 | RALP: 830<br>ORP: 414  | Age<br>Extracapsular extension<br>Gleason score<br>Preoperative PSA               | NR                             | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> </ul>  |
| Lo et al. (2010) <sup>187</sup>        | RALP: NR<br>ORP: NR (Hong Kong)                              | Retrospective cohort            | Single            |   | RALP: 20<br>ORP: 20    | Unmatched   | Mean<br>RALP: 6.0<br>ORP: 42.0 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Conversion</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>   |
| Nadler et al. (2010) <sup>188</sup>    | RALP: Oct 2005-Oct 2006<br>ORP: Jul 2002-Feb 2006 (USA)      | Retrospective cohort            | Single            |   | RALP: 50<br>ORP: 50    | (cT1-CT2c tumors)   | RALP: 27.1<br>ORP: 30.4        | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul> |
| Truesdale et al. (2010) <sup>189</sup> | RALP and ORP: Jan 2005- Nov 2009 (USA)                       | Retrospective cohort            | Single            |   | RALP: 99<br>ORP: 217   | Unmatched   | NR                             | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• Operative time</li> </ul>  |
| Uvin et al. (2010) <sup>190</sup>      | RALP: Jan 2008-Nov 2008<br>ORP: Jan 2004- Jan 2008 (Belgium) | Retrospective cohort            | Single            | Geraerts et al. 2013                      | RALP: 13<br>ORP: 9     | Unmatched   | NR                             | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Hospital stay</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> </ul>   |
| Williams et al. (2010) <sup>134</sup>  | RALP and ORP: 2005-2008 (USA)                                | Prospective cohort, consecutive | Single            |   | RALP: 604<br>ORP: 346  | Age<br>Clinical tumor stage<br>Gleason score<br>Nerve-sparing<br>Preoperative PSA | NR                             | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |
| Coronato et al.                        | 2000-2008  | Retrospective                   | Multiple: USA x2  |   | RALP: 98               | Unmatched   | NR                             | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                | Study Period (country)                    | Design                            | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables  | Follow-up (months)                           | Endpoints   |
|--------------------------------------|---|-----------------------------------|-------------------|---------------------------------|------------------------|---|--|---|
| (2009) <sup>191</sup>                | RALP: NR<br>ORP (RRP and RPP): NR (USA)   | cohort, consecutive               |                   |                                 | ORP: 98                |   |  |   |
| Drouin et al. (2009) <sup>154</sup>  | RALP and ORP: 2000-2004 (France)          | Retrospective cohort              | Single            |                                 | RALP: 71<br>ORP: 83    | Gleason score<br>Preoperative PSA<br>Surgical margins status (cT1-cT2 tumors) | Mean± SD<br>RALP: 40.9±5.0<br>ORP: 57.7±19.0 | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Catheterization time</li> <li>Complications</li> <li>Conversion</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Survival/ mortality</li> <li>Transfusion</li> </ul>   |
| Ficarra et al. (2009) <sup>155</sup> | RALP and ORP: Feb 2006- Apr 2007 (Italy)  | Prospective cohort                | Single            |                                 | RALP: 103<br>ORP: 105  | Unmatched   | 12 months postoperative                      | <ul style="list-style-type: none"> <li>Catheterization time</li> <li>Complications</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Transfusion</li> <li>Urinary function</li> </ul>                                 |
| Laurila et al. (2009) <sup>192</sup> | RALP: 2006<br>ORP: 2005 (USA)             | Retrospective cohort, consecutive | Single            |                                 | RALP: 94<br>ORP: 98    | Unmatched   | NR   | <ul style="list-style-type: none"> <li>Conversion</li> <li>Positive surgical margins</li> </ul>   |
| Ou et al. (2009) <sup>193</sup>      | RALP and ORP: Apr 2004- Apr 2007 (Taiwan) | Retrospective cohort, consecutive | Single            | Hung et al. 2015                | RALP: 30<br>ORP: 30    | Unmatched   | 15 months postoperative                      | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Catheterization time</li> <li>Complications</li> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Rocco et al.                         | RALP: Nov 2006- Dec                       | Prospective                       | Single            |                                 | RALP: 120              | Age   | 12 months                                    | <ul style="list-style-type: none"> <li>Catheterization time</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                                 | Study Period (country)                            | Design                            | Number of Centers | Studies from the Same Center(s)  | Number of Participants | Matching Variables  | Follow-up (months)  | Endpoints  |
|---------------------------------------|---|-----------------------------------|-------------------|--|------------------------|---|---|--|
| (2009) <sup>136</sup>                 | 2007<br>ORP: May 2004- Feb 2007<br>(Italy)        | cohort                            |                   |  | ORP: 240               | Pathological tumor stage<br>Preoperative PSA<br>Surgeon   | postoperative   | <ul style="list-style-type: none"> <li>Estimated blood loss</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Urinary function</li> </ul>  |
| White et al. (2009) <sup>194</sup>    | Dec 2005-Mar 2008<br>RALP: NR<br>ORP: NR<br>(USA) | Retrospective cohort, consecutive | Single            |  | RALP: 50<br>ORP: 50    | Age<br>Clinical tumor stage<br>Gleason score<br>Pathological tumor stage<br>Positive biopsy<br>Preoperative PSA               | NR  | <ul style="list-style-type: none"> <li>Conversion</li> <li>Positive surgical margins</li> </ul>  |
| Chan et al. (2008) <sup>195</sup>     | RALP and ORP: May 2003 – Aug 2006<br>(USA)        | Retrospective cohort, consecutive | Single            | Barocas et al. 2010<br>Kordan et al. 2009<br>Nelson et al. 2007<br>Ritch et al. 2014 | RALP: 660<br>ORP: 340  | Unmatched   | NR  | <ul style="list-style-type: none"> <li>Conversion</li> <li>Hospital stay</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Transfusion</li> </ul>  |
| Krambeck et al. (2008) <sup>196</sup> | RALP and ORP: Aug 2002- Dec 2005<br>(USA)         | Retrospective cohort              | Single            | Tollefson et al. 2011  | RALP: 294<br>ORP: 588  | Propensity matching<br>RALP: ORP – 1:2<br>Age<br>Clinical tumor stage<br>Gleason score<br>Preoperative PSA<br>Year of surgery | Median (25 <sup>o</sup> -75 <sup>o</sup> Percentile)<br>RALP: 15.6 (14.4 – 26.4)<br>ORP: 15.6 (14.4 – 28.8) | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Complications</li> <li>Hospital stay</li> <li>Local recurrence</li> <li>Metastasis</li> <li>Operative time</li> <li>Positive surgical margins</li> <li>Sexual function</li> <li>Survival/ mortality</li> <li>Transfusion</li> <li>Urinary function</li> </ul> |
| Schroeck et al. (2008) <sup>197</sup> | RALP and ORP: Aug 2003- Jan 2007<br>(USA)         | Retrospective cohort, consecutive | Single            |  | RALP: 362<br>ORP: 435  | Age<br>BMI<br>Clinical tumor stage<br>D'Amico classification<br>Gleason score<br>Preoperative PSA                             | Mean<br>RALP: 13.1**<br>ORP: 16.4**   | <ul style="list-style-type: none"> <li>Biochemical recurrence</li> <li>Hospital stay‡</li> <li>Operative time‡</li> <li>Pain‡</li> <li>Pain medication‡</li> <li>Estimated blood loss</li> </ul>   |

**Table B1. Key Characteristics of Included Studies**

| Study                                 | Study Period (country)   | Design               | Number of Centers | Studies from the Same Center(s)           | Number of Participants | Matching Variables                         | Follow-up (months)                          | Endpoints  |
|---------------------------------------|--|----------------------|-------------------|---|------------------------|--|---|--|
|                                       |  |                      |                   |   |                        | Prostate weight<br>Race<br>Year of surgery |   | <ul style="list-style-type: none"> <li>• Positive surgical margins</li> <li>• Transfusion‡</li> </ul> ‡Data taken from D'Alonzo et al. (2009) <sup>210</sup>   |
| Miller et al. (2007) <sup>137</sup>   | RALP: Feb 2005 – Aug 2006<br>ORP: Jul 2002 – Jan 2005<br>(USA)         | Prospective cohort   | Single            |   | RALP: 42<br>ORP: 120   | Age<br>Estimated blood loss                | 1.4 months postoperative‡                   | <ul style="list-style-type: none"> <li>• Estimated blood loss</li> <li>• HRQOL</li> </ul>  |
| Nelson et al. (2007) <sup>138</sup>   | Jan 2003- Mar 2006<br>RALP: May 2003- NR<br>ORP: Jan 2003- NR<br>(USA) | Prospective cohort   | Single            | Barocas et al. 2010<br>Kordan et al. 2010 | RALP: 629<br>ORP: 374  | Unmatched                                  | NR  | <ul style="list-style-type: none"> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Transfusion‡</li> </ul> ‡Data taken from Farnham et al. (2006) <sup>209</sup>   |
| Ball et al. (2006) <sup>116</sup>     | Jan 2000-Apr 2005<br>RALP: NR<br>ORP: NR<br>(USA)                      | Prospective cohort   | Single            |   | RALP: 82<br>ORP: 135   | Unmatched                                  | 6 months postoperative                      | <ul style="list-style-type: none"> <li>• HRQOL</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>   |
| Ahlering et al. (2004) <sup>198</sup> | 2001-NR<br>RALP: NR<br>ORP: NR<br>(USA)                                | Retrospective cohort | Single            | Sooriakumaran et al. 2014                 | RALP: 60<br>ORP: 60    | Unmatched                                  | 3 months postoperative                      | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Positive surgical margins</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul> |
| Tewari et al. (2003) <sup>139</sup>   | 1999-2002<br>RALP: NR<br>ORP: NR<br>(USA)                              | Prospective cohort   | Single            | Menon et al. 2002                         | RALP: 200<br>ORP: 100  | Unmatched                                  | Mean<br>RALP: 33.7‡<br>ORP: 79.5‡<br>P<0.05 | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> </ul>   |



**Table B1. Key Characteristics of Included Studies**

| Study                              | Study Period (country)                               | Design                          | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables | Follow-up (months)  | Endpoints   |
|------------------------------------|--|---------------------------------|-------------------|---------------------------------|------------------------|--------------------|---|---|
|                                    |  |                                 |                   |                                 |                        |                    |   | <ul style="list-style-type: none"> <li>• Operative time</li> <li>• Pain</li> <li>• Positive surgical margins</li> <li>• Sexual function</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> <li>• Urinary function</li> </ul>  |
| Menon et al. (2002) <sup>140</sup> | RALP and ORP: Mar 2001–Aug 2001 (USA)                | Prospective cohort              | Single            | Tewari et al. 2003              | RALP: 30<br>ORP: 30    | Unmatched          | NR  | <ul style="list-style-type: none"> <li>• Catheterization time</li> <li>• Complications</li> <li>• Conversion</li> <li>• Estimated blood loss</li> <li>• Hospital stay</li> <li>• Operative time</li> <li>• Pain</li> <li>• Positive surgical margins</li> <li>• Survival/ mortality</li> <li>• Transfusion</li> </ul> |
| <b>RALP vs. BT</b>                 |  |                                 |                   |                                 |                        |                    |   |   |
| Acar et al (2014) <sup>201</sup>   | 2004-2011<br>RALP: NR<br>BT: NR<br>(the Netherlands) | Prospective cohort              | Single            |                                 | RALP: 65<br>BT: 29     | Unmatched          | Median (range)<br>RALP: 21.0 (12.0-54.4)<br>BT: 40.0 (12.3-169.1)<br><br>P=NR | <ul style="list-style-type: none"> <li>• HRQOL</li> </ul>   |
| Baena et al (2013) <sup>141</sup>  | RALP and BT: NR<br>(Spain)                           | Prospective cohort, consecutive | NR                |                                 | RALP: 153<br>BT: 160   | Unmatched          | NR  | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> </ul>   |
| Ball et al (2006) <sup>116</sup>   | Jan 2000-Apr 2005<br>RALP: NR<br>BT: NR<br>(USA)     | Prospective cohort              | Single            |                                 | RALP: 82<br>BT: 118    | Unmatched          | 6 months postoperative  | <ul style="list-style-type: none"> <li>• HRQOL</li> <li>• Sexual function</li> <li>• Urinary function</li> </ul>  |
| <b>RALP vs. Radiotherapy</b>       |  |                                 |                   |                                 |                        |                    |   |   |
| Hung et al (2015) <sup>199</sup>   | RALP and RT: Jun 2007-Dec 2013 (Taiwan)              | Retrospective cohort            | Single            | Ou et al 2009                   | RALP: 43<br>RT: 96     | Unmatched          | 12 months postoperative   | <ul style="list-style-type: none"> <li>• Biochemical recurrence</li> <li>• Complications</li> <li>• Estimated blood loss</li> <li>• Metastasis</li> <li>• Positive surgical margins</li> </ul>  |

**Table B1. Key Characteristics of Included Studies**

| Study                                      | Study Period (country)                               | Design             | Number of Centers | Studies from the Same Center(s) | Number of Participants | Matching Variables | Follow-up (months)   | Endpoints  |
|--|--|--------------------|-------------------|---------------------------------|------------------------|--------------------|--|--|
|  |  |                    |                   |                                 |                        |                    |  | • Survival/ mortality                              |
| <b><i>RALP vs. Cryoablation</i></b>        |  |                    |                   |                                 |                        |                    |  |  |
| Ball et al (2006) <sup>116</sup>           | Jan 2000-Apr 2005 (USA)                              | Prospective cohort | Single            |                                 | RALP: 82<br>CRY: 39    | Unmatched          | 6 months postoperative   | • HRQOL<br>• Sexual function<br>• Urinary function |
| <b><i>RALP vs. Active Surveillance</i></b> |  |                    |                   |                                 |                        |                    |  |  |
| Acar et al (2014) <sup>201</sup>           | 2004-2011<br>RALP: NR<br>AS: NR<br>(the Netherlands) | Prospective cohort | Single            |                                 | RALP: 65<br>AS: 50     | Unmatched          | Median (range)<br>RALP: 21.0 (12.0-54.4)<br>AS: 29.7 (12.0-75.5)<br><br>P=NR | • HRQOL  |

AJCC = American Joint Committee on Cancer; AS= Active Surveillance; ASA= American Society of Anesthesiologists; BMI= Body Mass Index; BT= Brachytherapy; CCI = Charlson Comorbidity Index; CRY= cryoablation; HRQOL= Health-related Quality of Life; LRP= Laparoscopic Radical Prostatectomy; NA= Not Applicable; NR= Not Reported; ORP= Open Radical Prostatectomy; PDE-5: Phosphodiesterase-5; PSA= prostate-specific antigen; RALP= Robot-assisted Radical Prostatectomy; RCT= Randomized Controlled Trial; RPP= Radical Perineal Prostatectomy; RRP= Radical Retropubic Prostatectomy; RT= Radiotherapy; SD= Standard Deviation

\*Not all centers performed both, RALP and ORP, surgical procedures

\*\* Years converted to months

‡Days converted to months

**Appendix C. Excluded studies.**
**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                             |
|--|------------------------------------|
| Ahlering TE. A Prospective Controlled Nonrandomized Trial of Robotic Versus Open Radical Prostatectomy: On Point but Still Missed? <i>European Urology</i> 2015 Aug; 68(2): 226-227.   | Reference                          |
| Akand M, Erdogru T, Avci E, Ates M. Transperitoneal versus extraperitoneal robot-assisted laparoscopic radical prostatectomy: A prospective single surgeon randomized comparative study. <i>International Journal of Urology</i> 2015 Oct; 22(10): 916-921.  | Comparator not relevant            |
| Albadine R, Hyndman ME, Chaux A, Jeong JY, Saab S, Tavora F, Epstein JI, Gonzalgo ML, Pavlovich CP, Netto GJ. Characteristics of positive surgical margins in robotic-assisted radical prostatectomy, open retropubic radical prostatectomy, and laparoscopic radical prostatectomy: a comparative histopathologic study from a single academic center. <i>Hum Pathol</i> 2012 Feb; 43(2): 254-260.  | Population not relevant            |
| Alemezaffar M, Sanda M, Yecies D, Mucci LA, Stampfer MJ, Kenfield SA. Benchmarks for operative outcomes of robotic and open radical prostatectomy: results from the Health Professionals Follow-up Study. <i>Eur Urol</i> 2015 Mar; 67(3):432-8.   | Population unclear                 |
| Antonelli A, Sodano M, Peroni A, Mittino I, Palumbo C, Furlan M, Carobbio F, Tardanico R, Fisogni S, Simeone C. Positive surgical margins and early oncological outcomes of robotic vs open radical prostatectomy at a medium case-load institution [Abstract]. <i>Minerva Urol Nefrol</i> 2016 Mar [Epub ahead of print].   | Patients included in another study |
| Autorino R, Zargar H, Mariano MB, Sanchez-Salas R, Sotelo RJ, Chlosta PL, Castillo O, Matei DV, Celia A, Koc G, Vora A, Aron M, Parsons JK, Pini G, Jensen JC, Sutherland D, Cathelineau X, Nuñez Bragayrac LA, Varkarakis IM, Amparore D, Ferro M, Gallo G, Volpe A, Vuruskan H, Bandi G, Hwang J, Nething J, Muruve N, Chopra S, Patel ND, Derweesh I, Champ Weeks D, Spier R, Kowalczyk K, Lynch J, Harbin A, Verghese M, Samavedi S, Molina WR, Dias E, Ahallal Y, Laydner H, Cherullo E, De Cobelli O, Thiel DD, Lagerkvist M, Haber GP, Kaouk J, Kim FJ, Lima E, Patel V, White W, Motttrie A, Porpiglia F. Perioperative Outcomes of Robotic and Laparoscopic Simple Prostatectomy: A European-American Multi-institutional Analysis. <i>Eur Urol</i> 2015 Jul; 68(1): 86-94. | Population not relevant            |
| Baena Villamarin C, Conde Sánchez JM, Congregado Ruiz CB, Osman García I, Pena Outeriño JM, Argüelles Salido E, Medina López RA. Functional and quality of life analysis in a prospective series of 51 brachytherapies and 42 robotic prostatectomies [Abstract]. <i>European Urology Supplements</i> 2013 Nov; 12(6).   | Patients included in another study |
| Barry MJ, Gallagher PM, Skinner JS, Fowler FJ Jr. Adverse effects of robotic-assisted laparoscopic versus open retropubic radical prostatectomy among a nationwide random sample of medicare-age men. <i>J Clin Oncol</i> 2012 Feb 10; 30(5): 513-518.   | Population not relevant            |
| Barton MK. No cost or safety advantage to robot-assisted radical prostatectomy compared with open-procedure surgery for patients with prostate cancer. <i>CA Cancer J Clin</i> 2014 Sep-Oct; 64(5):293-294   | Reference                          |
| Berger AK, Chopra S, Desai MM, Aron M, Gill IS. Outpatient Robotic Radical Prostatectomy: Matched-Pair Comparison with Inpatient Surgery. <i>J Endourol</i> 2016 May; 30 Suppl 1:S52-6.  | Comparator not relevant            |
| Bier S, Hennenlotter J, Rausch S, Aufderklamm S, Martzog JC, Stenzl A, Schwentner C, Todenhöfer T. Return to Work and Normal Daily Life Activity after Open and Robot-Assisted Radical Prostatectomy - A Single Surgeon Analysis. <i>Urol Int</i> 2016; 96(3):280-6.   | Outcome not relevant               |
| Binbay M, Yuruk E, Ozgor F, Akbulut F, Erbin A, Muslumanotlu AY. Laparoscopic radical prostatectomy using 3-DHD vision system. <i>J Endourol</i> 2012 Aug; 26(S1): p1-A572.  | Reference                          |
| Björklund J, Folkvaljon Y, Cole A, Carlsson S, Robinson D, Loeb S, Stattin P, Akre O. Postoperative mortality 90 days after robot-assisted laparoscopic prostatectomy and retropubic radical prostatectomy: a nationwide population-based study. <i>BJU Int</i> 2016 Aug; 118(2):302-6.  | Population unclear                 |
| Boccon-Gibod, L. Radical prostatectomy: open? Laparoscopic? Robotic? <i>Euro Urol</i> 2006 Apr; 49(4): 598-599.  | Reference                          |
| Boris RS, Kaul SA, Sarle RC, Stricker HJ. Radical prostatectomy: a single surgeon comparison of retropubic, perineal, and robotic approaches. <i>Can J Urol</i> 2007 Jun; 14(3): 3566-70.  | Outcome unclear                    |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                                     |
|--|--|
| Buron C, Le Vu B, Cosset JM, Pommier P, Peiffert D, Delannes M, Flam T, Guerif S, Salem N, Chauveinc L, Livartowski A. Brachytherapy versus prostatectomy in localized prostate cancer: results of a French multicenter prospective medico-economic study. <i>Int J Radiat Oncol Biol Phys</i> 2007 Mar; 67(3): 812-22.  | Intervention not relevant                  |
| Busch J, Gonzalgo ML, Leva N, Ferrari M, Cash H, Kempkensteffen C, Hinz S, Miller K, Magheli A. Matched comparison of robot-assisted, laparoscopic and open radical prostatectomy regarding pathologic and oncologic outcomes in obese patients. <i>World J Urol</i> 2015 Mar; 33(3): 397-402.   | Duplicate                                  |
| Busch J, Magheli A, Leva N, Hinz S, Ferrari M, Friedersdorff F, Florian Fuller T, Miller K, Gonzalgo ML. Matched comparison of outcomes following open and minimally invasive radical prostatectomy for high-risk patients. <i>World J Urol</i> 2014 Dec; 32(6): 1411-1416.  | Patients included in another study         |
| Carmignani L, Pavesi M, Picozzi S. Comparison of transfusion requirements between open and robotic-assisted laparoscopic radical prostatectomy. <i>BJU Int</i> 2011 Mar; 107(5): 853-4.  | Reference                                  |
| Chino J, Schroeck FR, Sun L, Lee WR, Albala DM, Moul JW, Koontz BF. Robot-assisted laparoscopic prostatectomy is not associated with early postoperative radiation therapy. <i>BJU Int</i> 2009 Nov; 104(10): 1496-500.  | Patients included in another study         |
| Choi D, Kim D, Kyung YS, Lim JH, Song SH, You D, Jeong IG, Kim CS. Clinical experience with limited lymph node dissection for prostate cancer in Korea: single center comparison of 247 open and 354 robot-assisted laparoscopic radical prostatectomy series. <i>Korean J Urol</i> 2012 Nov; 53(11): 755-760.   | Patients included in another study         |
| Choo MS, Cho SY, Jeong CW, Lee SB, Ku JH, Hong SK, Byun SS, Kwak C, Kim HH, Lee SE, Jeong H. Predictors of positive surgical margins and their location in Korean men undergoing radical prostatectomy. <i>Int J Urol</i> 2014 Sep; 21(9): 894-8.  | Patients included in another study         |
| Chughtai B, Isaacs AJ, Mao J, Lee R, Te A, Kaplan S, Sedrakyan A. Safety of robotic prostatectomy over time: a national study of in-hospital injury. <i>J Endourol</i> 2015 Feb;29(2):181-5.   | intervention not relevant                  |
| Close A, Robertson C, Rushton S, Shirley M, Vale L, Ramsay C, Pickard R. Comparative cost-effectiveness of robot-assisted and standard laparoscopic prostatectomy as alternatives to open radical prostatectomy for treatment of men with localised prostate cancer: a Health Technology Assessment from the perspective of the UK National Health Service (Structured abstract) <i>Eur Urol</i> 2013 Sep; 64(3): 361-9. | Review                                     |
| Close A, Robertson C, Rushton S, Shirley M, Vale L, Ramsay C, Pickard R. Comparative cost-effectiveness of robot-assisted and standard laparoscopic prostatectomy as alternatives to open radical prostatectomy for treatment of men with localised prostate cancer: a Health Technology Assessment from the perspective of the UK National Health Service. <i>Eur Urol</i> 2013 Sep; 64(3): 361-9.                      | Review                                     |
| Baena Villamarin C, Conde Sánchez JM, Congregado Ruiz CB, Osman García I, Argüelles Salido E, Pena Outeriño JM, Medina López RA. Comparative analysis of a consecutive series of 160 brachytherapies and 153 robotic prostatectomies. <i>European Urology Supplements</i> 2015 Nov; 12(6): 159.  | Patients already included in another study |
| Cooperberg MR, Kane CJ, Cowan JE, Carroll PR. Adequacy of lymphadenectomy among men undergoing robot-assisted laparoscopic radical prostatectomy. <i>BJU Int</i> 2010 Jan; 105(1): 88-92.  | Outcome not relevant                       |
| D'Alonzo RC, Gan TJ, Moul JW, Albala DM, Polascik TJ, Robertson CN, Sun L, Dahm P, Habib AS. A retrospective comparison of anesthetic management of robot-assisted laparoscopic radical prostatectomy versus radical retropubic prostatectomy. <i>J Clin Anesth</i> 2009 Aug; 21(5) :322-8.  | Patients included in another study         |
| Silberstein JL, Su D, Glickman L, Kent M, Keren-Paz G, Vickers AJ, Coleman JA, Eastham JA, Scardino PT, Laudone VP. A case-mix-adjusted comparison of early oncological outcomes of open and robotic prostatectomy performed by experienced high volume surgeons. <i>BJU Int</i> 2013 Feb; 111(2): 206-12.   | Patients included in another study         |
| Davis JW, Kreaden US, Gabbert J, Thomas R. Learning curve assessment of robot-assisted radical prostatectomy compared with open-surgery controls from the premier perspective database. <i>J Endourol</i> 2014 May 1; 28(5): 560-566.  | population unclear                         |
| Duffey B, Varda B, Konety B. Quality of evidence to compare outcomes of open and robot-assisted laparoscopic prostatectomy. <i>Curr Urol Rep</i> 2011 Jun; 12(3): 229-36.  | Review                                     |
| Ellimoottil C, Roghmann F, Blackwell R, Kadlec A, Greco K, Quek ML, Sun M, Trinh QD, Gupta G. Open Versus Robotic Radical Prostatectomy in Obese Men. <i>Curr Urol</i> 2015 Sep; 8(3): 156-61.   | population unclear                         |
| Eom BW, Yoon HM, Ryu KW, Lee JH, Cho SJ, Lee JY, Kim CG, Choi IJ, Lee JS, Kook MC, Rhee JY, Park SR, Kim YW. Comparison of surgical performance and  | population not                             |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                                     |
|--|--|
| short-term clinical outcomes between laparoscopic and robotic surgery in distal gastric cancer. <i>Eur J Surg Oncol</i> 2012 Jan; 38(1): 57-63.  | relevant                                   |
| Faiena I, Dombrovskiy VY, Modi PK, Patel N, Patel R, Salmasi AH, Parihar JS, Singer EA, Kim IY. Regional Cost Variations of Robot-Assisted Radical Prostatectomy Compared With Open Radical Prostatectomy. <i>Clin Genitourin Cancer</i> 2015 Oct; 13(5): 447-52.  | Outcome not relevant                       |
| Farnham SB, Webster TM, Herrell SD, Smith JA Jr. Intraoperative blood loss and transfusion requirements for robotic-assisted radical prostatectomy versus radical retropubic prostatectomy. <i>Urology</i> 2006 Feb; 67(2): 360-3.   | Patients already included in another study |
| Ficarra V, Iannetti A, Mottrie A. Urinary continence recovery after open and robot-assisted radical prostatectomy. <i>BJU Int</i> 2013 Nov; 112(7): 875-6.   | Reference                                  |
| Finkelstein J, Eckersberger E, Sadri H, Taneja SS, Lepor H, Djavan B. Open Versus Laparoscopic Versus Robot-Assisted Laparoscopic Prostatectomy: The European and US Experience. <i>Rev Urol</i> 2010 Winter; 12(1): 35-43.  | Reference                                  |
| Fiori C, Morra I, Manfredi M, Mele F, Bertolo R, Cattaneo G, Poggio M, Amparore D, De Cillis S, Checcucci E, De Luca S, Porpiglia F. Laparoscopic versus robot-assisted radical prostatectomy: Four-year results of a prospective randomised trial. <i>The Journal of Urology</i> 2016 Apr; 195(4): e858.  | Patients included in another study         |
| Fiori C, Morra I, Manfredi M, Mele F, Bertolo R, Cattaneo G, Poggio M, Ragni F, Amparore D, De Cillis S, Checcucci E, De Luca S, Porpiglia F. Four-year outcome of a prospective randomised trial comparing laparoscopic versus robot assisted radical prostatectomy. <i>European Urology Supplements</i> 2016 Mar; 15(3): e442.                                 | Patients included in another study         |
| Fracalanza S, Ficarra V, Cavalleri S, Galfano A, Novara G, Mangano A, Plebani M, Artibani W. Is robotically assisted laparoscopic radical prostatectomy less invasive than retropubic radical prostatectomy? Results from a prospective, nonrandomized, comparative study. <i>BJU Int</i> 2008 May 101(9): 1145-1149.  | Patients already included in another study |
| Froehner M, Koch R, Leike S, Novotny V, Twelker L, Wirth MP. Urinary tract-related quality of life after radical prostatectomy: open retropubic versus robot-assisted laparoscopic approach. <i>Urol Int</i> 2013; 90(1): 36-40.   | Unclear outcome                            |
| Frota R, Turna B, Barros R, Gill IS. Comparison of radical prostatectomy techniques: open, laparoscopic and robotic assisted. <i>Int Braz J Urol</i> 2008 May-Jun; 34(3): 259-68   | Review                                     |
| Frydenberg M, Murphy DG, Moon DA, Lawrentschuk N. Robotic assisted radical prostatectomy versus open retropubic radical prostatectomy: Where do we stand in 2015? <i>Cancer Forum</i> 2015 Nov; 39(3): 173-177.  | Reference                                  |
| Fu Q, Moul JW, Sun L. Contemporary radical prostatectomy. <i>Prostate Cancer</i> 2011. <a href="http://dx.doi.org/10.1155/2011/645030">http://dx.doi.org/10.1155/2011/645030</a>   | Reference                                  |
| Gainsburg DM, Wax D, Reich DL, Carlucci JR, Samadi DB. Intraoperative management of robotic-assisted versus open radical prostatectomy. <i>JSL</i> 2010 Jan-Mar; 14(1): 1-5.   | population unclear                         |
| Garcia-Sanchez C, Conde-Sanchez JM, Congregado-Ruiz CB, Medina-Lopez, R.A. Functional and quality of life analysis in a prospective series of 51 brachytherapies and 42 robotic prostatectomies. Comparative analysis. <i>European Urology Supplements</i> 2013 Mar; 12(1):e804.   | population unclear                         |
| Gardiner RA, Yaxley J, Coughlin G, Dungleison N, Occhipinti S, Younie S, Carter R, Williams S, Medcraft RJ, Bennett N, Lavin MF, Chambers SK. A randomised trial of robotic and open prostatectomy in men with localised prostate cancer. <i>BMC Cancer</i> 2012 May 25; 12: 189.  | Protocol                                   |
| Gellhaus PT, Monn MF, Leese J, Flack CK, Lingeman JE, Koch MO, Boris RS. Robot-Assisted Radical Prostatectomy in Patients with a History of Holmium Laser Enucleation of the Prostate: Feasibility and Evaluation of Initial Outcomes. <i>J Endourol</i> 2015 Jul; 29(7): 764-9.   | Population not relevant                    |
| Gershman B, Psutka SP, McGovern FJ, Dahl DM, Tabatabaei S, Gettman MT, Frank I, Carlson RE, Rangel LJ, Barry MJ, Blute ML, Karnes RJ. Patient-reported Functional Outcomes Following Open, Laparoscopic, and Robotic Assisted Radical Prostatectomy Performed by High-volume Surgeons at High-volume Hospitals. <i>European Urology</i> 2016 Jun; 2(2): 172-179. | Population not relevant                    |
| Gettman MT, Blute ML. Critical comparison of laparoscopic, robotic, and open radical prostatectomy: techniques, outcomes, and cost. <i>Curr Urol Rep</i> 2006 May; 7(3): 193-9.  | Reference                                  |
| Ghavamian R. Robotic and open radical prostatectomy: is there reason to be receptive to change now and in the future? <i>Expert Rev Anticancer Ther</i> 2009 Jul; 9(7): 863-5.   | Reference                                  |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                                     |
|--|--|
| Ghavamian R. The urologic oncologist, robotic, and open radical prostatectomy: the need to look through the hype and propaganda and serve our patients. <i>Urol Oncol</i> 2009 May-Jun; 27(3): 233-5.  | Reference                                  |
| Giberti C, Gallo F, Schenone M, Cortese P, Gastaldi E, Becco D. Prospective randomized study comparing robotic prostatectomy versus brachytherapy for the treatment of low risk prostate cancer. <i>European Urology Supplements</i> 2016 Mar; 15(3).  | population unclear                         |
| Gillatt D, Waive E. Salvage radical prostatectomy: Comparing outcomes of a single surgeon series in the advent of a robotic approach. <i>BJU International</i> 2013 August; 112 (51): 3-29   | Reference                                  |
| Gomella LG. Robotic and Open Radical Prostatectomy: Celebrating Oncologic Equivalence. <i>Can J Urol</i> 2015 October; 22(5): 7942-7943  | Reference                                  |
| Good DW, Stewart GD, Laird A, Stolzenburg JU, Cahill D, McNeill SA. A Critical Analysis of the Learning Curve and Postlearning Curve Outcomes of Two Experience- and Volume-Matched Surgeons for Laparoscopic and Robot-Assisted Radical Prostatectomy. <i>J Endourol</i> 2015 August; 29(8): 939-947                | population unclear                         |
| Goonewardene S, Douek N, Dasgupta P, Brown M, Popert R. Robotic versus open salvage radical prostatectomies-what is the better procedure? <i>BJU International</i> 2015 April; 115 (S4): 38-107  | Reference                                  |
| Goonewardene S; Mcmeekin F, Brown M, Popert R, Gillatt D. Robotic versus open salvage radical prostatectomies: A two centre study. <i>BJU International</i> 2015 March; 115 (S4): 1-37   | population unclear                         |
| Guru KA, Kuvshinoff BW, Pavlov-Shapiro S, Bienko MB, Aftab MN, Brady WE, Mohler JL. Impact of robotics and laparoscopy on surgical skills: A comparative study. <i>J Am Coll Surg</i> 2007 January; 204 (1): 96-101  | Outcome not relevant                       |
| Hakimi AA, Ghavamian R. Urinary and Urologic Complications of Laparoscopic and Robotic Urologic Procedures. <i>Complications of laparoscopic and Robotic Urologic Surgery</i> 2010 May: Springer New York: 59-71   | Reference                                  |
| Healy KA, Gomella LG. Retropubic, laparoscopic, or robotic radical prostatectomy: is there any real difference? <i>Semin Oncol</i> 2013 June; 40(3): 286-296   | Reference                                  |
| Hegarty NJ, Kaouk JH. Radical prostatectomy: a comparison of open, laparoscopic and robot-assisted laparoscopic techniques. <i>Can J Urol</i> 2006 February; 13 (S1): 56-61  | Review                                     |
| Hemal AK, Menon M. Laparoscopy, robot, telesurgery and urology: Future perspective. <i>J Postgrad Med</i> 2002; 48 (1): 39-41  | Reference                                  |
| Hermesen ED, Hinze T, Sayles H, Sholtz L, Rupp ME. Incidence of Surgical Site Infection Associated with Robotic Surgery. <i>Infect Control Hosp Epidemiol.</i> 2010 August; 31 (8):822-827   | population unclear                         |
| Herrmann TR, Rabenalt R, Stolzenburg JU, Liatsikos EN, Imkamp F, Tezval H, Gross AJ, Jonas U, Burchardt M. Oncological and functional results of open, robot-assisted and laparoscopic radical prostatectomy: does surgical approach and surgical experience matter? <i>World J Urol.</i> 2007 April; 25(2): 149-160 | Review                                     |
| Hohwü L, Akre O, Pedersen KV, Jonsson M, Nielsen CV, Gustafsson O. Open retropubic prostatectomy versus robot-assisted laparoscopic prostatectomy: a comparison of length of sick leave. <i>Scand J Urol Nephrol.</i> 2009;43 (4): 259-264   | Outcome not relevant                       |
| Hohwu, L, Borre, M, Ehlers, L, Venborg PK. A short-term cost-effectiveness study comparing robot-assisted laparoscopic and open retropubic radical prostatectomy (Provisional abstract). <i>Journal of Medical Economics</i>   | Patients already included in another study |
| Huang KH, Carter SC, Shih YC, Hu JC. Robotic and standard open radical prostatectomy: oncological and quality-of-life outcomes. <i>J Comp Eff Res.</i> 2013 May; 2 (3): 293-299  | Review                                     |
| Hughes D, Camp C, O'Hara J, Adshead J. Health resource use after robot-assisted surgery vs open and conventional laparoscopic techniques in oncology: analysis of English secondary care data for radical prostatectomy and partial nephrectomy. <i>BJU International</i> 2016 June; 117 (6): 940-947                | Outcome not relevant                       |
| Hung CF, Yang CK, Ou YC. Robotic assisted laparoscopic radical prostatectomy following transurethral resection of the prostate: perioperative, oncologic and functional outcomes. <i>Prostate Int.</i> 2014; 2(2): 82-89   | Noncomparison study                        |
| Ilic D, Evans S, Murphy D, Frydenberg M. Laparoscopic versus open prostatectomy for the treatment of localised prostate cancer. <i>Cochrane Database of Systematic Review</i> February 2012. DOI: 10.1002/14651858.CD009625  | intervention not relevant                  |
| Jacobs BL, Montgomery JS, Dunn RL, Weizer AZ, Miller DC, Wood DP, Wolf JS Jr, Zhang Y, Wei JT, Hollenbeck BK. A comparison of extraperitoneal and  | comparator not                             |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies  | Reason                    |
|---|---------------------------|
| intraperitoneal approaches for robotic prostatectomy. <i>Surg Innov.</i> 2012 September; 19 (3): 268-274  | relevant                  |
| Jacobsen A, Berg KD, Iversen P, Brasso K, Røder MA. Anastomotic complications after robot-assisted laparoscopic and open radical prostatectomy. <i>Scand J Urol.</i> 2016 August; 50 (4) :274-279   | population not relevant   |
| Joo EY, Moon YJ, Yoon SH, Chin JH, Hwang JH, Kim YK. Comparison of Acute Kidney Injury After Robot-Assisted Laparoscopic Radical Prostatectomy Versus Retropubic Radical Prostatectomy: A Propensity Score Matching Analysis. <i>Medicine (Baltimore).</i> 2016 February; 95 (5): e2650   | population unclear        |
| Kenney PA, Nawaf CB, Mustafa M, Wen S, Wszolek MF, Pettaway CA, Ward JF, Davis JW, Pisters LL. Robotic-assisted laparoscopic versus open salvage radical prostatectomy following radiotherapy. <i>Can J Urol.</i> 2016 June; 23 (3): 8271-8277  | population not relevant   |
| Kim B, Chang A, Kaswick J, Derboghossians A, Jung H, Slezak J, Wuerstle M, Williams SG, Chien GW. Achieving proficiency with robot-assisted radical prostatectomy: Laparoscopic-trained versus robotics-trained surgeons. <i>Can Urol Assoc J.</i> 2013 November- December;7 (11-12): E711-E715   | comparator not relevant   |
| Kim DK, Alabdulaali I, Alatawi A, Sheikh A, Raheem AA, Choi YD, Rha KH. Comparative peri-operative, oncologic and continence study after 300 cases of Retziussparing robot-assisted radical prostatectomy. <i>European Urology Supplements</i> 2016 March; 15 (3): e450   | Noncomparison study       |
| Kim SP, Shah ND, Karnes RJ, Weight CJ, Shippee ND, Han LC, Boorjian SA, Smaldone MC, Frank I, Gettman MT, Tollefson MK, Thompson RH. Hospitalization costs for radical prostatectomy attributable to robotic surgery. <i>Eur Urol.</i> 2013 July; 64 (1): 11-16   | Outcome not relevant      |
| Koch MO. Robotic versus Open Prostatectomy: End of the Controversy. <i>J Urol.</i> 2016 July; 196(1): 9-10  | Reference                 |
| Korets R, Weinberg AC, Alberts BD, Woldu SL, Mann MJ, Badani KK. Utilization and timing of blood transfusions following open and robot-assisted radical prostatectomy. <i>J Endourol.</i> 2014 December; 28 (12): 1418-1423   | population unclear        |
| Kowalczyk KJ, Yu HY, Ulmer W, Williams SB, Hu JC. Outcomes assessment in men undergoing open retropubic radical prostatectomy, laparoscopic radical prostatectomy, and robotic-assisted radical prostatectomy. <i>World J Urol.</i> 2012 February; 30(1): 85-89   | Review                    |
| Ku JY, Ha HK. Learning curve of robot-assisted laparoscopic radical prostatectomy for a single experienced surgeon: comparison with simultaneous laparoscopic radical prostatectomy. <i>World J Mens Health.</i> 2015 April; 33 (1):30-35   | population unclear        |
| Lallas CD, Pe ML, Thumar AB, Chandrasekar T, Lee FC, McCue P, Gomella LG, Trabulsi EJ. Comparison of lymph node yield in robot-assisted laparoscopic prostatectomy with that in open radical retropubic prostatectomy. <i>BJU International</i> 2011 April; 107 (7): 1136-1140  | Outcome not relevant      |
| Laviana AA, Hu JC. A comparison of the robotic-assisted versus retropubic radical prostatectomy. <i>Minerva Urol Nefrol.</i> 2013 September; 65 (3): 161-170  | Review                    |
| Laviana AA, Ilg AM, Veruttipong D, Tan HJ, Burke MA, Niedzwiecki DR, Kupelian PA, King CR, Steinberg ML, Kundavaram CR, Kamrava M, Kaplan AL, Moriarity AK, Hsu W, Margolis DJ, Hu JC, Saigal CS. Utilizing time-driven activity-based costing to understand the short- and long-term costs of treating localized, low-risk prostate cancer. <i>Cancer.</i> 2016 February; 122 (3): 447-455                                     | Outcome not relevant      |
| Le CQ, Gettman MT. Laparoscopic and robotic radical prostatectomy. <i>Expert Rev Anticancer Ther.</i> 2006 July; 6(7): 1003-1011  | Reference                 |
| Leow JJ, Chang SL, Meyer CP, Wang Y, Hanske J, Sammon JD, Cole AP, Preston MA, Dasgupta P, Menon M, Chung BI, Trinh QD. Robot-assisted Versus Open Radical Prostatectomy: A Contemporary Analysis of an All-payer Discharge Database. <i>Eur Urol.</i> 2016 November; 70 (5): 837-845   | population unclear        |
| Lepor H. Open versus laparoscopic radical prostatectomy. <i>Rev Urol.</i> 2005; 7(3): 115-127   | intervention not relevant |
| Lepor H. Open versus robotic radical prostatectomy. <i>Urol Oncol.</i> March- April 2006; 24 (2); 91-93   | intervention not relevant |
| Leroy TJ, Thiel DD, Duchene DA, Parker AS, Igel TC, Wehle MJ, Goetzl M, Thrasher JB. Safety and peri-operative outcomes during learning curve of robot-assisted laparoscopic prostatectomy: a multi-institutional study of fellowship-trained robotic surgeons versus experienced open radical prostatectomy surgeons incorporating robot-assisted laparoscopic prostatectomy. <i>J Endourol.</i> 2010 October;24(10):1665-1669 | comparator not relevant   |
| Leyh-Bannurah SR, Hansen J, Isbarn H, Steuber T, Tennstedt P, Michl U, Schlomm T, Haese A, Heinzer H, Huland H, Graefen M, Budäus L. Open and robot-assisted radical retropubic prostatectomy in men receiving ongoing low-dose aspirin medication: revisiting an old paradigm? <i>BJU International</i>  | Outcome not relevant      |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies  | Reason                                     |
|---|--|
| 2014 September; 114 (3): 396-403  |  |
| Lim SK, Kim KH, Shin TY, Rha KH. Current status of robot-assisted laparoscopic radical prostatectomy: how does it compare with other surgical approaches? <i>Int J Urol.</i> 2013 March; 20 (3): 271-284  | Review                                     |
| Liu CL, Li CC, Yang CR, Yang CK, Wang SS, Chiu KY, Su CK, Ho HC, Cheng CL, Ou YC. Trends in treatment for localized prostate cancer after emergence of robotic-assisted laparoscopic radical prostatectomy in Taiwan. <i>J Chin Med Assoc</i> 2011 March; 74 (4), 155-158   | Outcome not relevant                       |
| Loeb S, Epstein JI, Ross AE, Schultz L, Humphreys EB, Jarow JP. Benign prostate glands at the bladder neck margin in robotic vs open radical prostatectomy. <i>BJU International</i> 2010 May; 105 (10): 1446-1449  | population not relevant                    |
| Lotan Y, Cadeddu JA, Gettman MT. The new economics of radical prostatectomy: cost comparison of open, laparoscopic and robot assisted techniques. <i>J Urol.</i> 2004 October; 172(4):1431-1435   | Outcome not relevant                       |
| Lowrance WT, Elkin EB, Jacks LM, Yee DS, Jang TL, Laudone VP, Guillonneau BD, Scardino PT, Eastham JA. Comparative effectiveness of prostate cancer surgical treatments: a population based analysis of postoperative outcomes. <i>J Urol.</i> 2010 April;183 (4): 1366-1372  | intervention not relevant                  |
| Maded R, Golijanin D, Knopf J, Nicholson C, Cramer S, Tonetti F, Piccone K, Valvo JR, Eichel L. Transition from open to robotic-assisted radical prostatectomy is associated with a reduction of positive surgical margins amongst private-practice-based urologists. <i>J Robot Surg.</i> 2007 March; 1(2): 145-149  | population unclear                         |
| Madi R, Greene G. Robotic and laparoscopic prostatectomy. <i>J Ark Med Soc.</i> 2008 September; 105 (3): 58-59  | Reference                                  |
| Malcolm JB, Fabrizio MD, Barone BB, Given RW, Lance RS, Lynch DF, Davis JW, Shaves ME, Schellhammer PF. Quality of life after open or robotic prostatectomy, cryoablation or brachytherapy for localized prostate cancer. <i>J Urol.</i> 2010 May; 183 (5):1822-1828  | Patients already included in another study |
| Marberger M. Is robot-assisted radical prostatectomy safer than other radical prostatectomy techniques? <i>Eur Urol.</i> 2011 May; 59 (5): 699-700  | Reference                                  |
| McIntosh H, Clifton E. Open, laparoscopic and robot-assisted laparoscopic radical prostatectomy for localised prostate cancer (Structured abstract). Glasgow: Healthcare Improvement Scotland. Evidence note 49. 2013   | Review                                     |
| Menon M, Shrivastava A, Tewari A. Laparoscopic radical prostatectomy: conventional and robotic. <i>Urology.</i> 2005 November; 66 (S5): 101-104   | Patients already included in another study |
| Musch M, Roggenbuck U, Klevecka V, Loewen H, Janowski M, Davoudi Y, Kroepfl D. Does changeover by an experienced open prostatic surgeon from open retropubic to robot-assisted laparoscopic prostatectomy mean a step forward or backward? <i>ISRN Oncol.</i> 2013. doi: 10.1155/2013/768647  | Noncomparison study                        |
| Mustafa M, Pettaway CA, Davis JW, Pisters L. Robotic or open radical prostatectomy after previous open surgery in the pelvic region. <i>Korean J Urol.</i> 2015 February; 56 (2): 131-137   | population not relevant                    |
| Nikiteas N, Roukos D, Kouraklis G. Robotic versus laparoscopic surgery: Perspectives for tailoring an optimal surgical option. <i>Expert Rev Med Devices.</i> 2011 May; 8(3): 295-298   | Reference                                  |
| Niklas C, Saar M, Berg B, Steiner K, Janssen M, Siemer S, Stöckle M, Ohlmann CH. da Vinci and Open Radical Prostatectomy: Comparison of Clinical Outcomes and Analysis of Insurance Costs. <i>Urol Int.</i> 2016 April; 96 (3): 287-294   | population unclear                         |
| O'Neil B, Koyama T, Alvarez J, Conwill RM, Albertsen PC, Cooperberg MR, Goodman M, Greenfield S, Hamilton AS, Hoffman KE, Hoffman RM, Kaplan SH, Stanford JL, Stroup AM, Paddock LE, Wu XC, Stephenson RA, Resnick MJ, Barocas DA, Penson DF. The Comparative Harms of Open and Robotic Prostatectomy in Population Based Samples. <i>J Urol.</i> 2016 February; 195 (2): 321-329 | intervention not relevant                  |
| O'Shaughnessy PK, Laws TA, Pinnock C, Moul JW, Esterman A. Differences in self-reported outcomes of open prostatectomy patients and robotic prostatectomy patients in an international web-based survey. <i>Eur J Oncol Nurs.</i> 2013 December; 17 (6): 775-780  | population unclear                         |
| Pan XW, Cui XM, Teng JF, Zhang DX, Wang ZJ, Qu FJ, Gao Y, Cui XG, Xu DF. Robot-Assisted Radical Prostatectomy vs. Open Retropubic Radical   | Review                                     |



**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                                     |
|--|--|
| Prostatectomy for Prostate Cancer: A Systematic Review and Meta-analysis. <i>Indian J Surg.</i> 2015 December; 77 (S3): 1326-1333  |  |
| Park J, Yoo DS, Song C, Park S, Park S, Kim SC, Cho Y, Ahn H. Comparison of oncological outcomes between retropubic radical prostatectomy and robot-assisted radical prostatectomy: an analysis stratified by surgical experience. <i>World J Urol.</i> 2014 February; 32 (1): 193-199   | Patients already included in another study |
| Park JW, Won Lee H, Kim W, Jeong BC, Jeon SS, Lee HM, Choi HY, Seo SI. Comparative assessment of a single surgeon's series of laparoscopic radical prostatectomy: conventional versus robot-assisted. <i>J Endourol.</i> 2011 April; 25 (4): 597-602   | population not relevant                    |
| Parsons JK, Bennett JL. Outcomes of retropubic, laparoscopic, and robotic-assisted prostatectomy. <i>Urology.</i> 2008 August; 72(2): 412-416  | Review                                     |
| Patel HR, Arya M, Joseph JV. Robotic versus nonrobotic surgery: experts, toys and prostatectomy. <i>Expert Rev Anticancer Ther.</i> 2008 June; 8 (6): 843-847  | Reference                                  |
| Patel HR, Linares A, Joseph JV. Robotic and laparoscopic surgery: cost and training. <i>Surg Oncol.</i> 2009 September; 18 (3): 242-246.   | Reference                                  |
| Patil K, Kirby R, Hicks J, Stolzenburg JU. Laparoscopy or robotics: Where does the future lie? <i>BJU International</i> 2009 December; 104 (11): 1551-1553   | Reference                                  |
| Pavan N, Zargar H, Sanchez-Salas R, Castillo O, Celia A, Gallo G, Sivaraman A, Cathelineau X, Autorino R. Robot-assisted Versus Standard Laparoscopy for Simple Prostatectomy: Multicenter Comparative Outcomes. <i>Urology.</i> 2016 May; 91:104-110  | population not relevant                    |
| Perer E, Lee DI, Ahlering T, Clayman RV. Robotic revelation: laparoscopic radical prostatectomy by a nonlaparoscopic surgeon. <i>J Am Coll Surg.</i> 2003 October; 197 (4): 693-696  | Case report                                |
| Pilecki MA, McGuire BB, Jain U, Kim JY, Nadler RB. National multi-institutional comparison of 30-day postoperative complication and readmission rates between open retropubic radical prostatectomy and robot-assisted laparoscopic prostatectomy using NSQIP. <i>J Endourol.</i> 2014 April; 28 (4): 430-436  | population unclear                         |
| Ploussard G, Xylinas E, Paul A, Gillion N, Salomon L, Allory Y, Vordos D, Hoznek A, Yiou R, Abbou CC, de la Taille A. Is robot assistance affecting operating room time compared with pure retroperitoneal laparoscopic radical prostatectomy? <i>J Endourol.</i> 2009 June; 23 (6): 939-943   | Patients already included in another study |
| Polcari AJ, Hugen CM, Sivarajan G, Woods ME, Paner GP, Flanigan RC, Quek ML. Comparison of open and robot-assisted pelvic lymphadenectomy for prostate cancer. <i>J Endourol.</i> 2009 August; 23 (8): 1313-1317   | Outcome not relevant                       |
| Porpiglia F, Fiori C, Chiarissi ML, Bertolo R, Ragni F, Morra I, Poggio M, Grande S, Scarpa RM. Pure or robotic-assisted laparoscopic prostatectomy? Results of a prospective randomized study. <i>J Endourol.</i> 2012 September; 26 (S1): P1-A572  | Patients already included in another study |
| Pow-Sang J. Pure and robotic-assisted laparoscopic radical prostatectomy: technology and techniques merge to improve outcomes. <i>Expert Rev Anticancer Ther.</i> 2008 January; 8 (1): 15-19   | Reference                                  |
| Pow-Sang JM, Velasquez J, Myers MD, Rodriguez AR, Kang LC. Pure laparoscopic and robotic-assisted laparoscopic radical prostatectomy in the management of prostate cancer. <i>Cancer Control.</i> 2007 July; 14 (3): 250-257   | Review                                     |
| Ratchanon S, Apiwattanasawee P, Prasopsanti K. A cost-utility analysis of laparoscopic radical prostatectomy and robotic-assisted laparoscopic radical prostatectomy in men with localized prostate cancer in Thailand. <i>J Med Assoc Thai.</i> 2015 January; 98 (S1): S14-S20  | Review                                     |
| Robertson C , Close A, Fraser C, Gurung T, Jia X, Sharma P, Vale L, Ramsay C, Pickard R. Relative effectiveness of robot-assisted and standard laparoscopic prostatectomy as alternatives to open radical prostatectomy for treatment of localised prostate cancer: a systematic review and mixed treatment comparison meta-analysis (Provisional abstract) <i>BJU International</i> 2013: 798-812 | Review                                     |
| Robertson C , Close A, Fraser C, Gurung T, Jia X, Sharma P, Vale L, Ramsay C, Pickard R. Relative effectiveness of robot-assisted and standard laparoscopic prostatectomy as alternatives to open radical prostatectomy for treatment of localised prostate cancer: a systematic review and mixed treatment comparison meta-analysis. <i>BJU International</i> 2013 October; 112(6): 798-812       | Review                                     |
| Rozet F, Harmon J, Cathelineau X, Barret E, Vallancien G. Robot-assisted versus pure laparoscopic radical prostatectomy. <i>World J Urol.</i> 2006 June; 24(2):171-179   | Review                                     |
| Sammon JD, Karakiewicz PI, Sun M, Sukumar S, Ravi P, Ghani KR, Bianchi M, Peabody JO, Shariat SF, Perrotte P, Hu JC, Menon M, Trinh QD. Robot-   | Patients already                           |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies  | Reason  |
|---|---|
| assisted versus open radical prostatectomy: the differential effect of regionalization, procedure volume and operative approach. J Urol. 2013 April; 189 (4): 1289-1294   | included in another study                                 |
| Schiffmann J, Haese A, Lenz J, Heinzer H, Salomon G, Steuber T, Beyer B, Boehm K, Tilki D, Michl U, Tennstedt P, Huland H, Graefen M, Karakiewicz PI. Differences in Patient Characteristics Among Men Choosing Open or Robot-Assisted Radical Prostatectomy in Contemporary Practice at a European High-Volume Center. Urol Int. 2016 July; 97 (1): 8-15 | Outcome not relevant                                      |
| Seo HJ, Lee NR, Son SK, Kim DK, Rha KH, Lee SH. Comparison of Robot-Assisted Radical Prostatectomy and Open Radical Prostatectomy Outcomes: A Systematic Review and Meta-Analysis. Yonsei Med J. 2016 Sep; 57 (5): 1165-1177  | Review  |
| Shapiro EY, Scarberry K, Patel T, Bergman A, Ahn JJ, Sahi N, RoyChoudhury A, Deutch I, McKiernan JM, Benson MC, Badani KK. Comparison of robot-assisted and open retropubic radical prostatectomy for risk of biochemical progression in men with positive surgical margins. J Endourol. 2014 February; 28 (2): 208-213                                   | Study cohort not representative of population of interest |
| Shikanov S, Woo J, Al-Ahmadie H, Katz MH, Zagaja GP, Shalhav AL, Zorn KC. Extrafascial versus interfascial nerve-sparing technique for robotic-assisted laparoscopic prostatectomy: comparison of functional outcomes and positive surgical margins characteristics. Urology. 2009 September; 74 (3): 611-616   | comparator not relevant                                   |
| Silberstein JL, Vickers AJ, Power NE, Parra RO, Coleman JA, Pinochet R, Touijer KA, Scardino PT, Eastham JA, Laudone VP. Pelvic lymph node dissection for patients with elevated risk of lymph node invasion during radical prostatectomy: comparison of open, laparoscopic and robot-assisted procedures. J Endourol. 2012 June; 26 (6): 748-753         | Outcome not relevant                                      |
| Singh I. Robotics in urological surgery: review of current status and maneuverability, and comparison of robot-assisted and traditional laparoscopy. Comput Aided Surg. 2011 January; 16 (1): 38-45   | Review  |
| Singh P, Desai P, Arora S, Pham AH, Wernicke AG, Smith M, Nori D, Clifford Chao KS, Parashar B. Comparison of primary radiation versus robotic surgery plus adjuvant radiation in high-risk prostate cancer: a single center experience. J Cancer Res Ther. 2015 January-March; 11 (1): 191-194   | intervention not relevant                                 |
| Smith JA Jr, Chan RC, Chang SS, Herrell SD, Clark PE, Baumgartner R, Cookson MS. A comparison of the incidence and location of positive surgical margins in robotic assisted laparoscopic radical prostatectomy and open retropubic radical prostatectomy. J Urol. 2007 December; 178 (6): 2385-2389  | Patients already included in another study                |
| Steuber T, Heinzer H, Graefen M, Haese A. Continence and 30 day morbidity of da vinci robotic assisted vs. open prostatectomy in obese men (BMI > 30) - Results from a propensity score matched pair analysis of 230 prostate cancer patients. BJU International 2012 September; 110 (S3): 1-163  | population unclear  |
| Student VJ, Grepj M, Hartmann A, Vidlar V, Student Jr. Biochemical recurrence rates after radical prostatectomy: Robotic versus open, a single institution experience. Eur Uro J. 2013 October; 12 (4): e1206   | population unclear  |
| Sugihara T, Yasunaga H, Horiguchi H, Matsui H, Fujimura T, Nishimatsu H, Fukuhara H, Kume H, Changhong Y, Kattan MW, Fushimi K, Homma Y. Robot-assisted versus other types of radical prostatectomy: population-based safety and cost comparison in Japan, 2012-2013. Cancer Sci. 2014 November; 105 (11): 1421-1426                                      | Outcome not relevant                                      |
| Suh YS, Jang HJ, Song W, Lee HW, Kim HS, Jeon HG, Jeong BC, Seo SI, Jeon SS, Choi HY, Lee HM. Location of positive surgical margin and its association with biochemical recurrence rate do not differ significantly in four different types of radical prostatectomy. Korean J Urol. 2014 December; 55 (12): 802-807                                      | population not relevant                                   |
| Sumitomo M, Kanao K, Kato Y, Yoshizawa T, Watanabe M, Zennami K, Nakamura K. Comparative investigation on clinical outcomes of robot-assisted radical prostatectomy between experienced open prostatic surgeons and novice open surgeons in a laparoscopically naive center with a limited caseload   | comparator not relevant                                   |
| Sundi D, Reese AC, Mettee LZ, Trock BJ, Pavlovich CP. Laparoscopic and robotic radical prostatectomy outcomes in obese and extremely obese men. Urology. 2013 September; 82 (3): 600-605  | Unclear outcome   |
| Tewari A, Divine G, Chang P, Shemtov MM, Milowsky M, Nanus D, Menon M. Long-term survival in men with high grade prostate cancer: a comparison  | intervention not  |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                                     |
|--|--|
| between conservative treatment, radiation therapy and radical prostatectomy--a propensity scoring approach. J Urol. 2007 March; 177 (3): 911-915   | relevant                                   |
| Tewari AK, Jhaveri JK, Surasi K, Patel N, Tan GY. Benefit of robotic assistance in comparing outcomes of minimally invasive versus open radical prostatectomy. J Clin Oncol. 2008 October; 26 (30): 4999-5000  | Reference                                  |
| Thompson JE, Egger S, Böhm M, Haynes AM, Matthews J, Rasiah K, Stricker PD. Superior quality of life and improved surgical margins are achievable with robotic radical prostatectomy after a long learning curve: a prospective single-surgeon study of 1552 consecutive cases. Eur Urol. 2014 March; 65 (3): 521-531  | population unclear                         |
| Thorsteinsdottir T, Stranne J, Carlsson S, Anderberg B, Björholt I, Damber JE, Hugosson J, Wilderäng U, Wiklund P, Steineck G, Haglind E. LAPPRO: a prospective multicentre comparative study of robot-assisted laparoscopic and retropubic radical prostatectomy for prostate cancer. Scand J Urol Nephrol. 2011 March; 45 (2): 102-112                       | Protocol                                   |
| Tobias-Machado M, Mitre AI, Rubinstein M, Costa EF, Hidaka AK. Robotic-assisted radical prostatectomy learning curve for experienced laparoscopic surgeons: does it really exist? Int Braz J Urol. 2016 January- February; 42 (1): 83-89   | population unclear                         |
| Tokas T, Gozen AS, Avgeris M, Tschada A, Rassweiler J. Direct comparison of an ergonomic laparoscopic system with robotic surgery, in terms of operating speed, in an inanimate experimental laparoscopic radical prostatectomy setting. Euro Urol. 2016 March; 15 (3): 360  | comparator not relevant                    |
| Tomaszewski JJ, Matchett JC, Davies BJ, Jackman SV, Hrebinko RL, Nelson JB. Comparative hospital cost-analysis of open and robotic-assisted radical prostatectomy. Urology. 2012 July; 80 (1): 126-129   | Outcome not relevant                       |
| Tosoian JJ, Loeb S. Radical retropubic prostatectomy: comparison of the open and robotic approaches for treatment of prostate cancer. Rev Urol. 2012; 14 (1-2): 20-27  | Review                                     |
| Touijer K. Positive surgical margin rate, location, and size following laparoscopic versus robotic-assisted laparoscopic radical prostatectomy. BJU Int. 2011 October; 108 (7): 1178-1179  | Reference                                  |
| Tozawa K, Kojima Y, Yasui T, Umemoto Y, Hamakawa T, Kawai N, Kohri K. A comparison of laparoscopic and robotic-assisted laparoscopic radical prostatectomy: A single surgeon experience. J Endourol. 2011 November; 25 (S1): A232  | Patients already included in another study |
| Tyritzis SI, Wallerstedt A, Steineck G, Nyberg T, Hugosson J, Bjartell A, Wilderäng U, Thorsteinsdottir T, Carlsson S, Stranne J, Haglind E, Wiklund NP. Prevalence and predictors of thromboembolic events in patients undergoing lymph node dissection during radical prostatectomy. Eur Urol. 2014 September; 13 (S3): 3                                    | Patients already included in another study |
| Tyritzis SI, Wallerstedt A, Steineck G, Nyberg T, Hugosson J, Bjartell A, Wilderäng U, Thorsteinsdottir T, Carlsson S, Stranne J, Haglind E, Wiklund NP; LAPPRO Steering Committee. Thromboembolic complications in 3,544 patients undergoing radical prostatectomy with or without lymph node dissection. J Urol. 2015 January; 193 (1): 117-125              | Patients already included in another study |
| Vora AA, Agarwal V, Singh P, Patel R, Rivas R, Nething J, Muruve N. Single-institution comparative study on the outcomes of salvage cryotherapy versus salvage robotic prostatectomy for radio-resistant prostate cancer. Prostate Int. 2016 March; 4 (1): 7-10  | population not relevant                    |
| Vora AA, Marchalik D, Kowalczyk KJ, Nissim H, Bandi G, McGeagh KG, Lynch JH, Ghasemian SR, Verghese M, Venkatesan K, Borges P, Uchio EM, Hwang JJ. Robotic-assisted prostatectomy and open radical retropubic prostatectomy for locally-advanced prostate cancer: multi-institution comparison of oncologic outcomes. Prostate Int. 2013 January; 1 (1): 31-36 | intervention unclear                       |
| Wagenhoffer R, Gruner M, Schymik J, Schachtner L, Neagoe L, Berg C, Schlichter A, Manseck A. Switching from Endoscopic Extraperitoneal Radical Prostatectomy to Robot-Assisted Laparoscopic Prostatectomy: Comparing Outcomes and Complications. Urol Int. 2015 December; 95 (4): 380-385  | comparator not relevant                    |
| Wallerstedt A, Tyritzis SI, Thorsteinsdottir T, Carlsson S, Stranne J, Gustafsson O, Hugosson J, Bjartell A, Wilderäng U, Wiklund NP, Steineck G, Haglind E, LAPPRO steering committee. Short-term results after robot-assisted laparoscopic radical prostatectomy compared to open radical prostatectomy. Eur Urol. 2015 April; 67 (4): 660-670               | Patients already included in another study |
| Ward J, Sandoval MF. Robotic vs. open retropubic prostatectomy: A history of prostate cancer. OR Nurses 2015 July; 8 (4): 30-38  | Reference                                  |

**Table C1. Summary of excluded studies and rationale for exclusion**

| Excluded studies   | Reason                  |
|--|-------------------------|
| Webb DR, Sethi K, Gee K. An analysis of the causes of bladder neck contracture after open and robot-assisted laparoscopic radical prostatectomy. <i>BJU Int.</i> 2009 April; 103 (7): 957-963  | population unclear      |
| Webster TM, Herrell SD, Chang SS, Cookson MS, Baumgartner RG, Anderson LW, Smith JA Jr. Robotic assisted laparoscopic radical prostatectomy versus retropubic radical prostatectomy: a prospective assessment of postoperative pain. <i>J Urol.</i> 2005 September; 174 (3): 912-914   | population unclear      |
| Weinberg A, Woldu S, Wen T, Deibert C, Badani K. Use of the robotic surgical platform for radical nephrectomy: A national comparison of utilization and complications for open, laparoscopic, and robotic approaches. <i>J Urol.</i> 2014 April; 191 (S4): e397  | population not relevant |
| Weinberg A, Whalen MJ, Paulucci DJ, Woldu S, Deibert CM, Korets R, Badani KK. Utilization of the Robotic Surgical Platform for Radical Nephrectomy: A National Comparison of Trends for Open, Laparoscopic and Robotic Approaches. <i>Urology Practice</i> 2016 May; 3 (3): 187-194  | Population not relevant |
| Weizer AZ, Strobe S, Wood DP Jr. Margin control in robotic and laparoscopic prostatectomy: what are the REAL outcomes? <i>Urol Oncol.</i> 2010 March-April; 28(2): 210-214   | population unclear      |
| Wilcox SW, Aherne NJ, McLachlan CS, McKay MJ, Last AJ, Shakespeare TP. Is modern external beam radiotherapy with androgen deprivation therapy still a viable alternative for prostate cancer in an era of robotic surgery and brachytherapy: a comparison of Australian series. <i>J Med Imaging Radiat Oncol.</i> 2015 February; 59(1): 125-133 | Review                  |
| Wilson T, Torrey R. Open versus robotic-assisted radical prostatectomy: which is better? <i>Curr Opin Urol.</i> 2011 May; 21 (3): 200-205  | Reference               |
| Wood DP, Schulte R, Dunn RL, Hollenbeck BK, Saur R, Wolf JS Jr, Montie JE. Short-term health outcome differences between robotic and conventional radical prostatectomy. <i>Urology.</i> 2007 November; 70 (5):945-949   | population unclear      |
| Yanamadala S, Chung BI, Hernandez-Boussard TM. Robot-assisted versus open radical prostatectomy utilization in hospitals offering robotics. <i>Can J Urol.</i> 2016 June; 23 (3): 8279-8284.   | Outcome not relevant    |
| Yu HY, Hevelone ND, Lipsitz SR, Kowalczyk KJ, Hu JC. Use, costs and comparative effectiveness of robotic assisted, laparoscopic and open urological surgery (Structured abstract). <i>J Urol.</i> 2012 April; 187 (4): 1392-1398   | Population not relevant |
| Yu HY, Hevelone ND, Lipsitz SR, Kowalczyk KJ, Hu JC. Use, costs and comparative effectiveness of robotic assisted, laparoscopic and open urological surgery. <i>J Urol.</i> 2012 April; 187 (4): 1392-1398   | Population not relevant |
| Yu J, Wang Y, Li Y, Li X, Li C, Shen J. The safety and effectiveness of Da Vinci surgical system compared with open surgery and laparoscopic surgery: a rapid assessment. <i>J Evid Based Med.</i> 2014 May; 7 (2): 121-134  | Review                  |

Appendix D. Quality of included studies.

Figure D1. Cochrane risk of bias summary.

|                    | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of participants and personnel (performance bias) | Blinding of outcome assessment (detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) | Other bias |
|--------------------|---|---|---|---|--|--------------------------------------|------------|
| Asimakopoulus 2011 | +   | ?                                       | ?   | ?   | -  | +                                    | ?          |
| Porpiglia 2013     | +   | ?                                       | ?   | ?   | +  | +                                    | +          |
| Yaxley 2016        | +   | +                                       | -   | +   | ?  | +                                    | -          |

Figure D2. Risk of bias graph with each risk of bias item presented as percentage across all included RCTs.

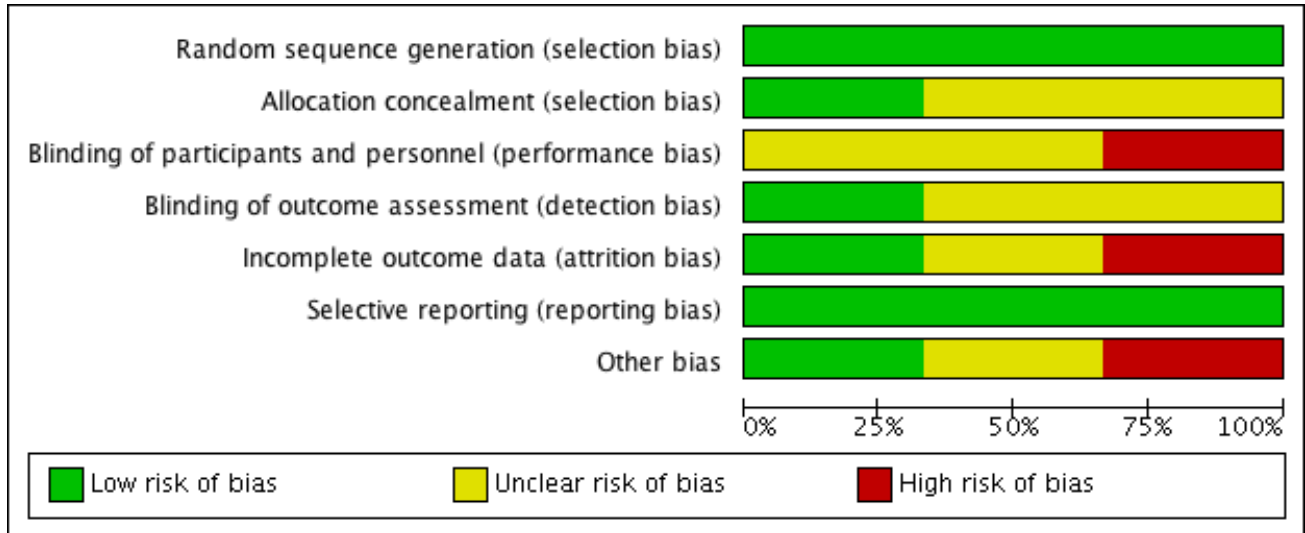


Figure D3. Chart of Downs and Black scores by domain for nonrandomized studies from 2002 to 2010.

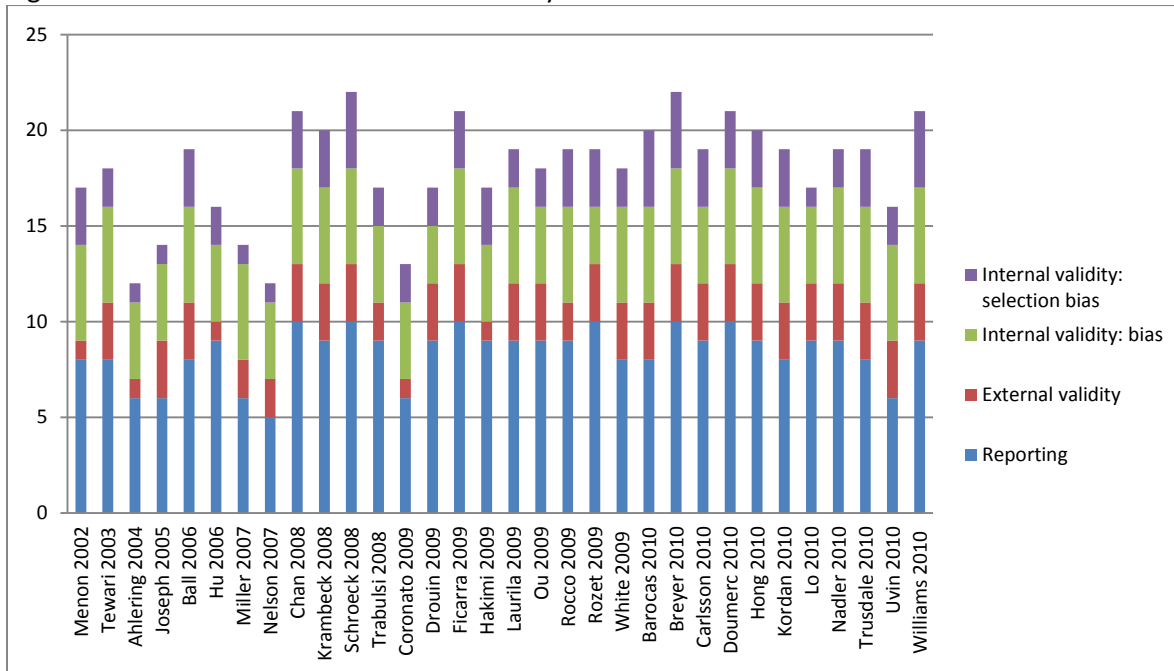


Figure D4. Chart of Downs and Black scores by domain for nonrandomized studies from 2011-2013.

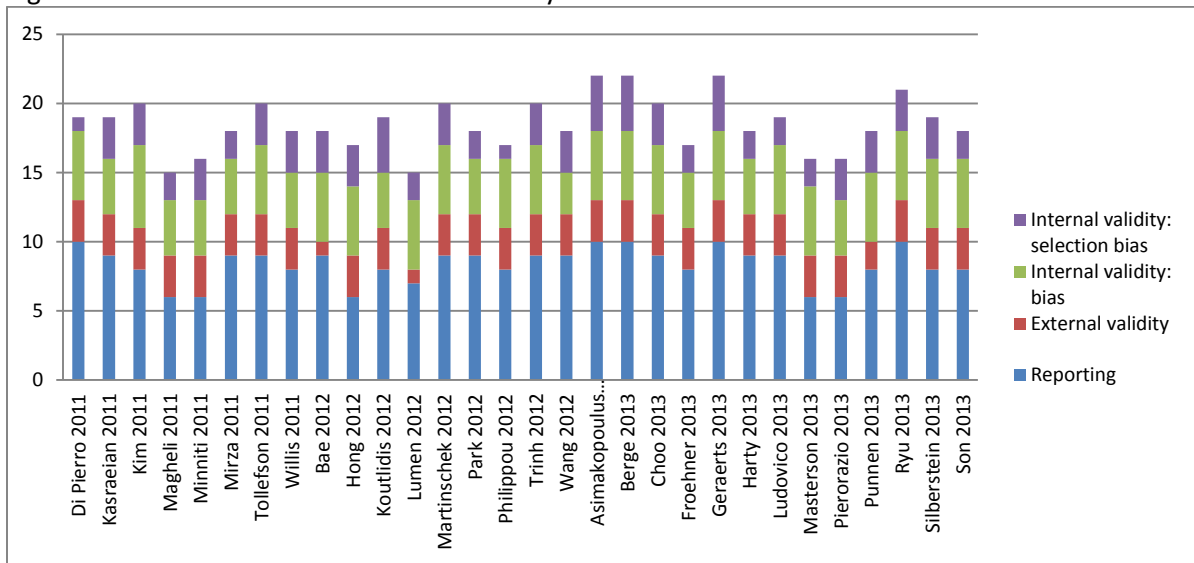


Figure D5. Chart of Downs and Black scores by domain for nonrandomized studies from 2014-2017.

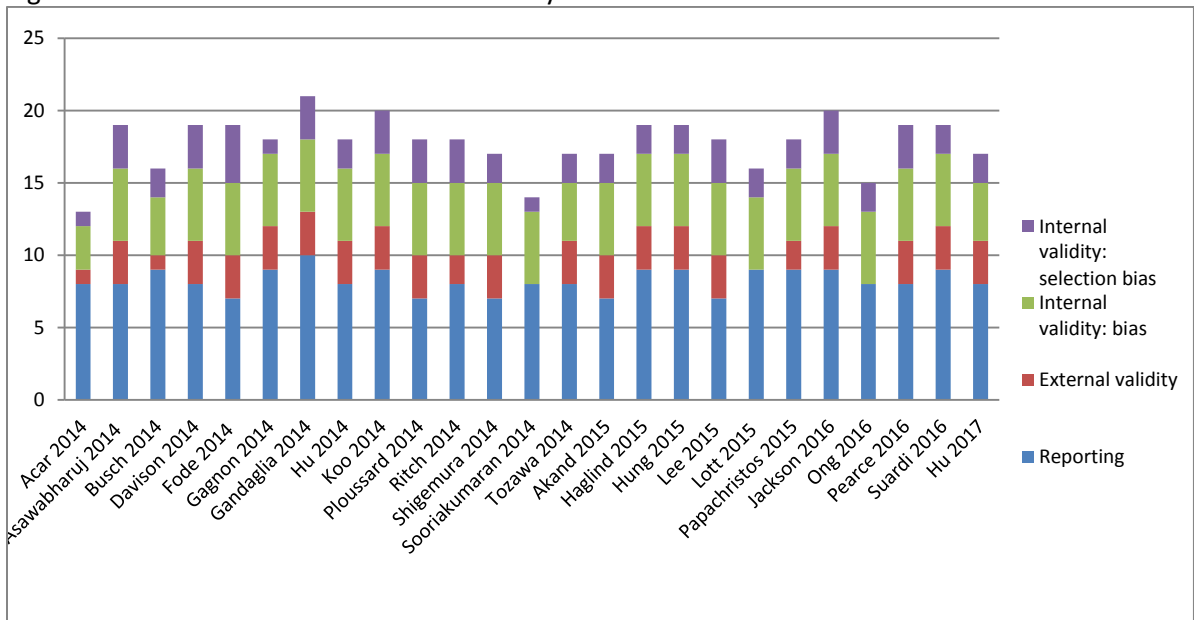


Table D1. GRADE assessment of RALP vs LRP comparative studies

| Outcomes                                       | No of participants (studies)   | Quality of the evidence (GRADE) | Relative effect (95% CI)         | Anticipated absolute effects                 |   |
|--|--------------------------------|---------------------------------|----------------------------------|--|---|
|  |                                |                                 |                                  | Risk with laparoscopic radical prostatectomy | Risk difference with Robot-assisted                 |
| Local recurrence follow up: median 35.4 months | 388 (1 observational study)    | ⊕⊕○○<br>LOW                     | not estimable                    | 0 per 1,000                                  | <b>0 fewer per 1,000</b><br>(0 fewer to 0 fewer)    |
| Biochemical recurrence at 12 months            | 215 (2 RCTs)                   | ⊕⊕○○<br>LOW <sup>a</sup>        | <b>RR 0.88</b><br>(0.11 to 7.23) | 53 per 1,000                                 | <b>6 fewer per 1,000</b><br>(47 fewer to 331 more)  |
| Urinary function/ continence at 12 months      | 232 (2 RCTs)                   | ⊕⊕⊕○<br>MODERATE <sup>b</sup>   | <b>RR 1.14</b><br>(1.04 to 1.24) | 833 per 1,000                                | <b>117 more per 1,000</b><br>(33 more to 200 more)  |
|  | 544 (2 observational studies)  | ⊕○○○<br>VERY LOW <sup>c</sup>   | <b>RR 1.00</b><br>(0.93 to 1.08) | 817 per 1,000                                | <b>0 fewer per 1,000</b><br>(57 fewer to 65 more)   |
| Sexual function/ potency at 12 months          | 421 (3 observational studies)  | ⊕○○○<br>VERY LOW <sup>d,e</sup> | <b>RR 1.17</b><br>(0.98 to 1.40) | 473 per 1,000                                | <b>80 more per 1,000</b><br>(9 fewer to 189 more)   |
| Positive surgical margins in pT2 tumors        | 171 (2 RCTs)                   | ⊕⊕⊕○<br>MODERATE <sup>a</sup>   | <b>RR 0.86</b><br>(0.36 to 2.06) | 111 per 1,000                                | <b>16 fewer per 1,000</b><br>(71 fewer to 118 more) |
|  | 1832 (3 observational studies) | ⊕⊕○○<br>LOW                     | <b>RR 1.14</b><br>(0.92 to 1.41) | 154 per 1,000                                | <b>21 more per 1,000</b><br>(12 fewer to 63 more)   |
| Positive surgical margins in pT3, pT4 tumors   | 61 (2 RCTs)                    | ⊕⊕⊕○<br>MODERATE <sup>a</sup>   | <b>RR 1.93</b><br>(0.97 to 3.83) | 267 per 1,000                                | <b>248 more per 1,000</b><br>(8 fewer to 755 more)  |
|  | 1100 (3 observational studies) | ⊕⊕○○<br>LOW                     | <b>RR 1.31</b><br>(0.97 to 1.76) | 398 per 1,000                                | <b>123 more per 1,000</b><br>(12 fewer to 302 more) |
| Postoperative complications                    | 2613 (2 observational studies) | ⊕○○○<br>VERY LOW <sup>f</sup>   | <b>RR 1.18</b><br>(0.84 to 1.64) | 45 per 1,000                                 | <b>8 more per 1,000</b><br>(7 fewer to 29 more)     |
| Blood transfusion                              | 112 (1 RCT)                    | ⊕⊕○○<br>LOW <sup>a</sup>        | <b>RR 0.16</b><br>(0.01 to 3.11) | 50 per 1,000                                 | <b>42 fewer per 1,000</b><br>(50 fewer to 106 more) |
|  | 2806 (2 observational studies) | ⊕○○○<br>VERY LOW <sup>f</sup>   | <b>RR 0.78</b><br>(0.38 to 1.58) | 45 per 1,000                                 | <b>10 fewer per 1,000</b><br>(28 fewer to 26 more)  |

\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval; RR: Risk ratio

a. Imprecision: insufficiently powered and wide 95% confidence interval

b. Unclear presence of performance and detection bias that are likely to lower the confidence in the estimates

c. Presence of performance bias likely to influence the results; one study had choice of surgical procedure based on economic reasons

d. Presence of performance bias likely to influence the results; studies at high risk of selection bias

e. Imprecision: insufficiently powered

f. Studies with presence of confounding variables





Table D2. GRADE assessment of RALP vs ORP comparative studies

| Outcomes   | No of participants (studies)   | Quality of the evidence (GRADE) | Relative effect (95% CI)         | Anticipated absolute effects         |   |
|--|--------------------------------|---------------------------------|----------------------------------|--------------------------------------|---|
|  |                                |                                 |                                  | Risk with open radical prostatectomy | Risk difference with robotic-assisted                 |
| Local recurrence follow up: range 16 months to 60 months | (2 observational studies)      | ⊕⊕○○<br>LOW                     | not pooled                       | not pooled                           | not pooled  |
| Biochemical recurrence at 12 months                      | 220 (2 observational studies)  | ⊕○○○<br>VERY LOW <sup>a,b</sup> | <b>RR 0.76</b><br>(0.35 to 1.65) | 128 per 1,000                        | <b>31 fewer per 1,000</b><br>(83 fewer to 83 more)    |
| Urinary function/ continence at 12 months                | 2322 (9 observational studies) | ⊕○○○<br>VERY LOW <sup>e</sup>   | <b>RR 1.01</b><br>(0.97 to 1.05) | 836 per 1,000                        | <b>8 more per 1,000</b><br>(25 fewer to 42 more)      |
| Sexual function/ potency at 12 months                    | 1263 (6 observational studies) | ⊕○○○<br>VERY LOW <sup>f</sup>   | <b>RR 1.59</b><br>(1.32 to 1.91) | 333 per 1,000                        | <b>196 more per 1,000</b><br>(106 more to 303 more)   |
| Positive surgical margins in pT2 tumors                  | 204 (1 RCT)                    | ⊕⊕○○<br>LOW <sup>b</sup>        | <b>RR 1.67</b><br>(0.41 to 6.79) | 29 per 1,000                         | <b>20 more per 1,000</b><br>(17 fewer to 170 more)    |
|  | 1443 (6 observational studies) | ⊕○○○<br>VERY LOW <sup>c,d</sup> | <b>RR 1.03</b><br>(0.73 to 1.44) | 124 per 1,000                        | <b>4 more per 1,000</b><br>(34 fewer to 55 more)      |
| Positive surgical margins in pT3, pT4 tumors             | 104 (1 RCT)                    | ⊕⊕○○<br>LOW <sup>b</sup>        | <b>RR 1.34</b><br>(0.72 to 2.49) | 245 per 1,000                        | <b>83 more per 1,000</b><br>(69 fewer to 365 more)    |
|  | 819 (6 observational studies)  | ⊕○○○<br>VERY LOW <sup>c</sup>   | <b>RR 1.25</b><br>(0.91 to 1.72) | 343 per 1,000                        | <b>86 more per 1,000</b><br>(31 fewer to 247 more)    |
| Postoperative complications                              | 308 (1 RCT)                    | ⊕⊕○○<br>LOW <sup>b</sup>        | <b>RR 0.41</b><br>(0.16 to 1.04) | 93 per 1,000                         | <b>55 fewer per 1,000</b><br>(78 fewer to 4 more)     |
|  | 1357 (6 observational studies) | ⊕○○○<br>VERY LOW <sup>c,d</sup> | <b>RR 1.00</b><br>(0.75 to 1.35) | 82 per 1,000                         | <b>0 fewer per 1,000</b><br>(20 fewer to 29 more)     |
| Blood transfusion  | 308 (1 RCT)                    | ⊕⊕○○<br>LOW <sup>b</sup>        | <b>RR 0.16</b><br>(0.02 to 1.32) | 40 per 1,000                         | <b>33 fewer per 1,000</b><br>(39 fewer to 13 more)    |
|  | 4684 (9 observational studies) | ⊕○○○<br>VERY LOW <sup>g</sup>   | <b>RR 0.18</b><br>(0.11 to 0.30) | 131 per 1,000                        | <b>108 fewer per 1,000</b><br>(117 fewer to 92 fewer) |

\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval; RR: Risk ratio

a. One study at high risk of selection bias; no control for confounding variables

b. Imprecision: insufficiently powered and wide 95% confidence interval

c. Studies with presence of confounding variables

d. Imprecision: insufficiently powered

e. 5 studies at high risk of selection bias; 2 studies with lack of control of confounding variables; unclear presence of performance and detection bias that are likely to lower the confidence in the estimates

f. Presence of confounding variables; performance bias

g. Two studies at high risk of selection bias; studies with presence of confounding variables



Table D3. GRADE assessment of RALP vs radiotherapy comparative studies

| Outcomes                                       | No of participants (studies) Follow-up | Quality of the evidence (GRADE) | Relative effect (95% CI) | Anticipated absolute effects |   |
|--|--|---------------------------------|--------------------------|------------------------------|---|
|  |  |                                 |                          | Risk with radiotherapy       | Risk difference with Robot-assisted radical prostatectomy |
| Local recurrence - not reported                | -                                      | -                               | -                        | -                            | -   |
| Biochemical recurrence at 12 months            | 139 (1 observational study)            | ⊕○○○ VERY LOW <sup>a,b</sup>    | not estimable            | 240 per 1,000                | <b>240 fewer per 1,000</b> (240 fewer to 240 fewer)       |
| Urinary continence at 12 months - not measured | -                                      | -                               | -                        | -                            | -   |
| Sexual function at 12 months - not measured    | -                                      | -                               | -                        | -                            | -   |
| Post-treatment complications                   | 139 (1 observational study)            | ⊕○○○ VERY LOW <sup>a,b</sup>    | not estimable            | 802 per 1,000                | <b>802 fewer per 1,000</b> (802 fewer to 802 fewer)       |

\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval

a. Study with presence of confounding variables; study excluded participants who were lost to follow up

b. Imprecision: insufficiently powered

Table D4. GRADE assessment of RALP vs brachytherapy comparative studies

| Outcomes   | No of participants (studies) Follow-up | Quality of the evidence (GRADE) | Relative effect (95% CI) | Anticipated absolute effects |   |
|--|--|---------------------------------|--------------------------|------------------------------|---|
|  |  |                                 |                          | Risk with brachytherapy      | Risk difference with robot-assisted radical prostatectomy |
| Local recurrence - not measured                    | -                                      | -                               | -                        | -                            | -   |
| Biochemical recurrence at 12 months - not measured | -                                      | -                               | -                        | -                            | -   |
| Urinary continence - not reported                  | -                                      | -                               | -                        | -                            | -   |
| Sexual function - not reported                     | -                                      | -                               | -                        | -                            | -   |
| Post-treatment complications                       | 313 (1 observational study)            | ⊕○○○ VERY LOW <sup>a</sup>      | not estimable            | 31 per 1,000                 | <b>31 fewer per 1,000</b> (31 fewer to 31 fewer)          |

\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval

a. Imprecision: insufficiently powered



Appendix E. Quality of studies included in the economic review

Table E1. Critical appraisal of economic evaluations – CHEERS checklist

| Section/ item  | Item # | HQO 2017 <sup>56</sup> | Close 2013 <sup>211</sup> ; Ramsay 2012 <sup>59</sup> | Cooperberg 2013 <sup>105</sup> | HIQA 2012 <sup>57</sup> | Ho 2011 <sup>4</sup> | Hohwu 2011 <sup>212</sup> | O'Malley 2007 <sup>213</sup> , 11200 |
|--|--------|------------------------|---|--------------------------------|-------------------------|----------------------|---------------------------|--------------------------------------|
| <b>Title and abstract</b>                                  |        |                        |   |                                |                         |                      |                           |                                      |
| Title  | 1      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | NR                                   |
| Abstract   | 2      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | FR                                   |
| <b>Introduction</b>  |        |                        |   |                                |                         |                      |                           |                                      |
| Background and objectives                                  | 3      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | PR                                   |
| <b>Methods</b>   |        |                        |   |                                |                         |                      |                           |                                      |
| Target population and subgroups                            | 4      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | PR                                   |
| Setting and location                                       | 5      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | FR                                   |
| Study perspective  | 6      | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | FR                                   |
| Comparators  | 7      | FR                     | PR  | FR                             | PR                      | FR                   | FR                        | PR                                   |
| Time horizon   | 8      | PR                     | FR  | PR                             | FR                      | FR                   | PR                        | NR                                   |
| Discount rate  | 9      | FR                     | FR  | PR                             | FR                      | FR                   | NR                        | NR                                   |
| Choice of health outcomes                                  | 10     | FR                     | FR  | FR                             | FR                      | FR                   | PR                        | PR                                   |
| Measurement of effectiveness                               | 11     | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | NR                                   |
| Measurement and valuation of preference based outcomes     | 12     | NA                     | NA  | NA                             | NA                      | NA                   | FR                        | NA                                   |
| Estimating resources and costs                             | 13     | FR                     | FR  | FR                             | PR                      | PR                   | FR                        | FR                                   |
| Currency, price data, and conversion                       | 14     | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | PR                                   |
| Choice of model  | 15     | FR                     | FR  | FR                             | FR                      | FR                   | PR                        | NR                                   |
| Assumptions  | 16     | FR                     | FR  | FR                             | FR                      | FR                   | NR                        | NR                                   |
| Analytical methods   | 17     | FR                     | FR  | FR                             | FR                      | FR                   | PR                        | NR                                   |
| <b>Results</b>   |        |                        |   |                                |                         |                      |                           |                                      |
| Study parameters   | 18     | PR                     | FR  | FR                             | FR                      | FR                   | PR                        | NR                                   |
| Incremental costs and outcomes                             | 19     | FR                     | FR  | PR                             | FR                      | FR                   | FR                        | PR                                   |
| Characterising uncertainty                                 | 20     | FR                     | FR  | PR                             | FR                      | FR                   | FR                        | NR                                   |
| Characteristics of heterogeneity                           | 21     | NR                     | FR  | FR                             | NR                      | NR                   | NR                        | NR                                   |
| <b>Discussion</b>  |        |                        |   |                                |                         |                      |                           |                                      |
| Study findings, limitations, generalisability, and current | 22     | FR                     | FR  | FR                             | FR                      | PR                   | FR                        | NR                                   |

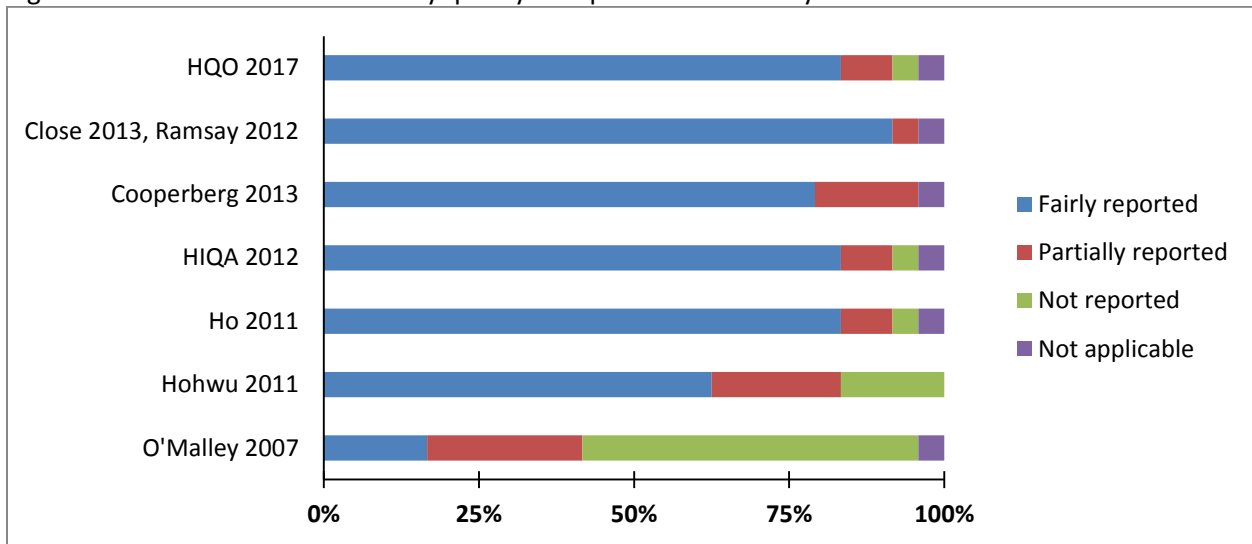


Table E1. Critical appraisal of economic evaluations – CHEERS checklist

| Section/ item        | Item # | HQO 2017 <sup>56</sup> | Close 2013 <sup>211</sup> ; Ramsay 2012 <sup>59</sup> | Cooperberg 2013 <sup>105</sup> | HIQA 2012 <sup>57</sup> | Ho 2011 <sup>4</sup> | Hohwu 2011 <sup>212</sup> | O'Malley 2007 <sup>213</sup> 11200 |
|----------------------|--------|------------------------|---|--------------------------------|-------------------------|----------------------|---------------------------|------------------------------------|
| knowledge            |        |                        |   |                                |                         |                      |                           |                                    |
| <b>Other</b>         |        |                        |   |                                |                         |                      |                           |                                    |
| Source of funding    | 23     | FR                     | FR  | FR                             | FR                      | FR                   | FR                        | NR                                 |
| Conflict of interest | 24     | FR                     | FR  | FR                             | FR                      | FR                   | NR                        | NR                                 |

CHEERS= Consolidated Health Economic Evaluation Reporting Standards; FR= Fairly Reported; HIQA= Health Information and Quality Authority; HQO= Health Quality Ontario; NA= Not Applicable; NR= Not Reported; PR= Partially Reported

Figure E1. CHEERS checklist score by quality of report for cost-utility and minimization studies





**Appendix F. List of organizations participating in the jurisdictional scan**

| <b>Organization</b>                    | <b>City</b>   | <b>Province/state</b> |
|--|---------------|-----------------------|
| Vancouver Coastal Health Authority     | Vancouver     | British Columbia      |
| Royal Alexandra Hospital               | Edmonton      | Alberta               |
| University of Alberta Hospital         | Edmonton      | Alberta               |
| St. Joseph’s Healthcare Hamilton       | Hamilton      | Ontario               |
| St. Joseph’s Healthcare London         | London        | Ontario               |
| Toronto East General                   | Toronto       | Ontario               |
| Windsor Regional Hospital              | Windsor       | Ontario               |
| Glen – McGill University Health Centre | Montreal      | Quebec                |
| Hôpital du Sacré-Cœur                  | Montreal      | Quebec                |
| Jewish General Hospital                | Montreal      | Quebec                |
| L’Hôtel-Dieu de Québec et CRCEO        | Quebec City   | Quebec                |
| Intuitive Surgical Inc.                | Sunnyvale     | California            |
| MedTronic                              | Minneapolis   | Minnesota             |
| Minogue Medical Inc.                   | Montreal      | Quebec                |
| Titan Medical                          | Toronto       | Ontario               |
| TransEnterix                           | Morrisville   | North Carolina        |
| Verb Surgical                          | Mountain View | California            |



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