Streptococcal Disease – Group B, Newborn

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Case Definition

**Confirmed Case**
Within the first 90 days of life, clinical illness\(^{(A)}\) in an infant, with laboratory confirmation of infection:
- Isolation of group B *Streptococcus* (*Streptococcus agalactiae*) from a normally sterile\(^{(B)}\) site.
  OR
- Detection of group B *Streptococcus* nucleic acid (e.g., PCR) in a normally sterile\(^{(B)}\) site.

**Probable case**
Within the first 90 days of life, clinical illness\(^{(A)}\) in an infant, with laboratory confirmation of infection:
- Detection of group B *Streptococcus* antigen in a normally sterile\(^{(B)}\) site.

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\(^{(A)}\) Clinical illness is defined as: early onset disease (one to seven days), characterized by sepsis, respiratory distress, apnea, shock, pneumonia and meningitis; or late onset disease (seven days to 90 days), characterized by bacteremia, meningitis and other focal infections.

\(^{(B)}\) A normally sterile site is defined as:
- blood,
- cerebrospinal fluid (CSF),
- pleural fluid,
- peritoneal fluid,
- pericardial fluid,
- deep tissue specimen taken during surgery (e.g., muscle collected during debridement for necrotizing fasciitis, abscess fluid)

**Note:** A specimen taken from a non-sterile site collected during a sterile procedure is not considered a “normally sterile site”).
- bone or
- joint fluid.
Reporting Requirements

1. **Laboratories**
   All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:
   - Chief Medical Officer of Health (CMOH) (or designate), and
   - Medical Officer of Health (or designate) of the zone.

2. **Alberta Health Services and First Nations and Inuit Health Branch**
   - Laboratory surveillance only. Completion of a Notifiable Disease Reporting Form (NDR) is not required.
Etiology
Group B streptococci (GBS) or *Streptococcus agalactiae* are gram-positive, β-hemolytic, chain forming cocci that normally reside in the vaginal flora in 10 to 30 per cent of women.(1)

Clinical Presentation
GBS disease in newborns can manifest as early-onset disease (EOD) or late-onset disease (LOD). EOD previously comprised 80% of cases in infants.(2) However because of wide-spread use of intrapartum prophylaxis there has been a relative increase in LOD.(3)

EOD occurs within a few hours to ≤ seven days of age and is usually characterized by respiratory failure due to pneumonia with bacteremia that can progress to septic shock syndrome. Meningitis is an uncommon manifestation. GBS is more likely to be fatal with EOD in comparison with LOD.(1)

LOD occurs from > seven days to 90 days of age and commonly presents as meningitis. Other presentations include isolated bacteremia, breast abscesses, skin and soft tissue infections, endocarditis, and musculoskeletal infections. The vast majority of infants survive but neurological sequelae following meningitis may include speech, hearing or visual problems, psychomotor retardation, cerebral palsy or seizure disorders.(1;3;4)

Diagnosis
Diagnosis is based on clinical presentation and laboratory confirmation of the disease.

Epidemiology
Reservoir
Humans. Approximately 30% of women are colonized with GBS in their genital and lower gastrointestinal tract (vagina, cervix, urethra).(5;6) Colonization of men is believed to be equally common.(3) GBS identified in bovine mastitis is not a cause of this disease in newborns.(4)

Transmission
Vertical transmission from mother to baby can occur in utero as a result of ascending infection. Additionally, if during delivery the neonate aspirates contaminated amniotic/vaginal fluid (1), or passes through the GBS colonized birth canal, infection may occur. Once in the neonatal lung, it causes pneumonia. Sepsis results when the bacteria enter the bloodstream of the neonate. From there the bacteria can infect multiple neonatal organs, including the brain and heart.(1;5) LOD is sometimes seen with strains of GBS that are not carried by the mother. Therefore consideration of other sources of infection may need to be addressed.(3)

Incubation Period
Symptoms of EOD appear one to seven days post delivery. Symptoms of LOD appear > seven to 90 days post delivery.(4)

Period of Communicability
GBS is transmissible throughout the perinatal and intrapartum periods.(1) Most infections can be linked to Maternal GBS colonization, however not all cases. Risk factors such as prolonged hospital stays (Neonatal Intensive Care Units) and invasive medical treatments should be indentified as possible sources of infection.
Host Susceptibility
Susceptibility of the newborn is based on both maternal and neonatal risk factors.

Maternal risk factors:(6)
- preterm labour (i.e., start prior to 37 weeks gestation),
- premature rupture of membranes (i.e., before 37 weeks gestation),
- membranes ruptured more than 18 hours before delivery,
- GBS bacteriuria during current pregnancy,
- fever higher than 38° C during labour,
- previous infant with GBS infection,
- maternal poverty,
- pre-eclampsia,
- cardiac disease and/or diabetes.

Neonatal risk factors:(7)
- prematurity (i.e., < 37 weeks gestation),
- very low birth weight infants (1000–1499 gm) are at much greater risk with up to 3% infected and mortality rate of up to 30%,
- prolonged neonatal hospitalization,
- endotracheal intubation, assisted ventilation and/or surgery (presence of surgical wounds and drains).

Note: Approximately half of infected neonates have none of these risk factors.(3)

Occurrence
General
It is estimated that between 10 to 30 per cent of women are vaginally colonized with GBS.

Canada
Incidence in Canada and the United States has decreased with the introduction intrapartum chemoprophylaxis. One Canadian population-based study indicated that the overall incidence was 0.64 per 1,000 live births, with 57% of the cases being early-onset disease. The case-fatality rate was nine per cent with another 11 per cent ending in stillbirth.(5) This is a dramatic decrease compared to the fatality rate of 70% three decades ago(2). GBS disease of the newborn has been nationally reportable since 2006. The national incidence of GBS in the newborn from 2006 – 2008 were 70, 59 and 74 cases respectively.(8)

Alberta
GBS is a newly notifiable disease in Alberta. No comprehensive rates specific to Alberta are currently available.

Key Investigation
Single Case/Household Contact
- Confirm diagnosis through collection of an appropriate clinical specimen.
- Review maternal and neonatal risk factors.
- Review prenatal and intrapartum treatment of mother.
- Review post delivery treatment and medication administration of neonate.
- With late onset disease, consider source of infection outside maternal transmission.
Control
Management of a Case(2)
- Consultation with a pediatric infectious diseases specialist for case management is recommended.
- Canadian Pediatric Society suggests assessment and treatment of neonates at risk for sepsis (see algorithm).(9)

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**Figure 1** Algorithm for the management of newborn babies who may be at risk for neonatal sepsis. Source: Canadian Paediatric Society, 2007

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GBS Group B streptococcus
IAP Intrapartum prophylaxis with penicillin or ampicillin
Close observation = 4 h check of pulse rate, respiratory rate and temperature at mother’s bedside
Full diagnostic evaluation = blood culture, spinal tap + chest x-ray (urine culture not indicated)
Risk factors for sepsis = maternal fever or signs of chorioamnionitis, ruptured membranes > 18 h, previous child with GBS sepsis or preterm labour (< 36 weeks)
Treatment of a Case
- If left untreated, GBS in the newborn can be fatal.
- All infants should receive high dose penicillin. Addition of gentamicin until blood and CSF culture are negative may improve the prognosis. Duration of therapy depends on the severity of disease, but is typically three weeks or longer if meningitis is present. (3)

Management of Contacts
- Investigation of contacts is not required.

Preventive Measures (2;10)
- Development of a vaccine against GBS has been researched for many years, however, the multivalent capsular coating of this bacteria has made development challenging.
- Perinatal recommendations include the following:
  - Offer all women screening for group B streptococcal disease at 35 to 37 weeks gestation with culture done from swab to the vaginal then rectal area.
  - Treat the following women intrapartum at time of labour or rupture of membranes with IV antibiotics:
    - all women positive by GBS culture screening done at 35 to 37 weeks,
    - any women with an infant previously infected with GBS, and/or
    - any women with documented GBS bacteriuria (regardless of the number of colony-forming units per ml) in this pregnancy.
  - Treat women at less than 37 weeks gestation with IV antibiotics unless there has been a negative GBS vaginal/rectal swab culture within 5 weeks.
  - Treat women with intrapartum fever with IV antibiotics (i.e., chorioamnionitis must be treated; broader spectrum antibiotics would be advised).
  - If a woman is GBS-positive by culture screening or by history of bacteriuria and with pre-labour rupture of membranes at term, treat with GBS antibiotic prophylaxis and initiate induction of labour with IV oxytocin.
  - If GBS culture result is unknown and the woman has ruptured membranes at term for greater than 18 hours, treat with GBS antibiotic prophylaxis.
- Recommended Antibiotics for Intrapartum Prophylaxis (2)
  - Penicillin G 5 million units IV, then 2.5 million every 4 hours.
  - If the woman is penicillin allergic but not at risk of anaphylaxis, recommend Cefazolin 2 g IV then 1 g every 8 hours.
  - If the woman is penicillin allergic and at risk of anaphylaxis, recommend Clindamycin 900 mg IV every 8 hours or erythromycin 500 mg IV every 6 hours.

Note: If GBS resistance is demonstrated to clindamycin or erythromycin by culture and sensitivity or if sensitivity is not available (3) then give IV vancomycin 1 g every 12 hours.
References


(3) Robinson J. Pediatric Infectious Disease Specialist, University of Alberta; Personal Communication. 1-12-2010.


(9) Canadian Pediatric Society. Algorithm for the management of newborn babies who may be at risk for neonatal sepsis. Canadian Pediatric Society 2007 October 12 http://www.cps.ca/English/statements/FN/fn07-03.htm