Tetanus

Revision Dates

Case Definition	August 2011
Reporting Requirements	May 2018
Remainder of the Guideline (i.e., Etiology to References sections inclusive)	June 2005

Case Definition

Confirmed Case

Clinical illness[(A)] without other apparent medical cause:

- with or without laboratory evidence of *Clostridium tetani*

AND

- with or without history of injury.

[(A)] Clinical illness is characterized by acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck), and generalized muscle spasms without other apparent medical cause.

Reporting Requirements

1. **Physicians, Health Practitioners and others**
   Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

2. **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
   - MOH (or designate) of the zone.

3. **Alberta Health Services and First Nations and Inuit Health Branch**
   - The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   - For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two business days) including:
     - name,
     - date of birth,
     - out-of-province health care number,
     - out-of-province address and phone number,
     - positive laboratory report, and
     - other relevant clinical / epidemiological information.

Etiology

Tetanus is caused by the tetanus bacilli, *Clostridium tetani.* It exists in two forms: an anaerobic bacteria which lives in the bowels of humans and animals, and spores which are produced by the bacteria in the intestines and are excreted in feces. The spores are in a protective pod. They do not multiply outside of the body but are hardy and survive for many years in soil and dust. The organism is ubiquitous, occurring freely in nature.

Clinical Presentation

Tetanus is an acute neurologic disease induced by an exotoxin of the tetanus bacillus which grows anaerobically at the site of an injury. The process begins with the introduction of spores into the tissue. The spores change into bacteria in the absence of oxygen. As the bacteria multiply and die they produce a toxin that is released into the tissue. The toxin may enter the CNS along peripheral motor nerves or may be bloodborne traveling to the nervous tissue. History of an injury or apparent portal of entry is not always present.

The clinical manifestations of tetanus are divided into four clinical types: generalized, localized, cephalic, and neonatal. The type reflects host factors and site of inoculation.

Generalized disease is characterized by painful trismus (the most characteristic sign) and severe muscle spasms primary of the masseter and neck muscles, and secondarily of the trunk muscles. Abdominal rigidity may be present. The individual experiences severe pain during spasms which are often triggered by sensory stimuli. Typical features of generalized tetanus include the position of opisthotonos and the facial expression known as “risus sardonicus” (fixed smile and elevated eyebrows).

Localized tetanus involves spasticity or rigidity of muscles associated with the site of spore inoculation. It may be mild and persistent, lasting for weeks and often resolving spontaneously. This type is often the prodrome of generalized tetanus which occurs when sufficient toxin gains entry to the CNS.

Cephalic tetanus is a rare and unique form of localized disease that affects the cranial nerve musculature. It may be associated with chronic otitis media. All cranial nerves may be involved, especially the seventh. Facial nerve weakness is often apparent.

Neonatal tetanus, arising from contamination of the umbilical cord, is a common cause of infant mortality in developing countries. This generally results from a lack of passive immunity, that is, mother being inadequately immunized. Clinical manifestations include generalized weakness and failure to nurse. Apnea is the most prominent cause of death in the first week of life and sepsis in the second week. Rigidity and spasms occur later in survivors.

Complications from tetanus include laryngospasm and spasm of the respiratory muscles interfering with breathing. Fractures of the spine or long bones may occur as a result of sustained contractions and convulsions. Nosocomial infections are common due to prolonged hospitalization. Aspiration pneumonia is a common late complication occurring in more than half of autopsied cases.

Diagnosis

History of injury or portal of entry may not be apparent. The organism is rarely recovered from the site of infection; therefore, culturing infected wounds is not generally helpful. The diagnosis is generally made based on symptoms.

Epidemiology

Reservoir

The reservoir is the intestines of horses and other animals (including humans) in which the organism is a harmless normal inhabitant. The source is soil or fomites contaminated with animal and human feces containing spores. The spores are ubiquitous in the environment and can contaminate wounds of all types.

Transmission

Spores are introduced into the body through puncture wounds or lacerations contaminated with soil, street dust or the feces of animals or humans, burns, trivial or unnoticed wounds, contaminated street drugs paraphernalia, and contaminated skin.

Incubation Period

The incubation period is typically 3–21 days but it may range from one day to several months with an average of 10 days. The period of time depends on the character, extent, and location of the wounds i.e., a shorter incubation period is associated with heavily contaminated wounds, more severe disease, and a worse prognosis.

Period of Communicability

Tetanus is not directly transmitted from person to person.

Host Susceptibility

Susceptibility is general. Immunity is induced by tetanus toxoid and lasts for at least 10 years after complete immunization. Passive immunity follows injection with tetanus immune globulin (TIG) or tetanus antitoxin (equine origin). Infants of actively immunized mothers acquire passive immunity that protects them from neonatal tetanus. Recovery from tetanus infection may not result in immunity.

Occurrence

General (1-3)

There is worldwide occurrence with approximately 50,000 deaths annually but disease is relatively uncommon in industrialized countries. An average of 50 cases per year is reported in the United States.

Two cases were reported in the United Kingdom in 2002. Both cases were female and 61 years of age with history of incomplete immunization. Both had sustained injuries.

A total of 14 cases of clinical tetanus in IDUs, including one death, have been reported in England (11 cases), Scotland (two cases), and Wales (one case) between July 2003 and January 2004. The nine women and five men were between the ages of 20 and 53 years. Three were known to be unimmunized. The presentation ranged from mild trismus to severe illness and respiratory arrest.

The disease is more common in agricultural regions and in underdeveloped areas where immunization may not be adequate and there may be contact with animal feces. Tetanus is an important cause of death in rural and tropical areas in countries of Asia, Africa, and South America. Neonatal tetanus accounts for approximately 50% of all tetanus deaths in developing countries. The worldwide tetanus mortality rate is 50% with the highest rates in young and old patients, and IDU.

Canada (4)

Tetanus is rare in Canada. The number of cases reported annually ranged from 1–7 (average five) from the years 1990 to 2000. The immunization status of most cases was unknown. Males over the age of 50 years accounted for the majority of reported cases.

Alberta (5,6)

Immunization with tetanus vaccine began in Alberta in 1947. In 1948 it was combined with and most commonly given with diphtheria. Tetanus is an uncommon disease in Alberta. Ten cases were reported from 1983 to 2003, the most recent cases were reported in 2000 (one case) and 2001 (one case). Both were diagnosed in males over the age of 50 living in rural settings. One individual was uncertain of previous immunization; the other individual had received a series and booster while in school (more than 30 years prior).

Key Investigation

Single Case/Household Cluster

- Assess immunization history.
- Identify recent injury i.e., puncture wound or laceration.
- Assess for recent history of IDU.

Control

Management of a Case

- Hospitalization.
- Routine practices are recommended for hospitalized patients.(7)
- Supportive care and medications to control tetanic spasms.

Treatment of a Case

- Tetanus immune globulin (TIG), given intramuscularly, is recommended as it may shorten the course of tetanus and may lessen the severity.
- For persons with incomplete or no immunization, a primary series or booster dose of tetanus-containing vaccine is recommended.
- Wounds should be properly cleaned and debrided.
- Metronidazole (oral or IV) for 10–14 days is the antibiotic of choice. Parenteral penicillin G is an alternative therapy.

Management of Contacts

- No follow-up is required as tetanus is not transmitted person to person.

Preventive Measures

- Educate the public about the hazards of tetanus infection and that the disease is vaccine preventable.
- Educate the public on proper wound care.
- Primary immunization with a tetanus-containing vaccine should be provided to all individuals as per the current Alberta Immunization Manual. Herd immunity plays no role in tetanus control.
- Opportunistic vaccination should include groups such as those born before vaccination programs were implemented, immigrants with uncertain or incomplete vaccination histories, and individuals who inject nonprescription drugs.(1)
- Health programs e.g., needle exchange programs, should promote immunization with tetanus-containing vaccines and provide on-site immunization.

- Adults should receive a booster of a tetanus-containing vaccine every 10 years, or alternatively immunization status should be reviewed at least once during adult life and a single dose of a tetanus-containing vaccine offered to those who have not been immunized within the previous 10 years.(4)
- When traveling to a developing country, if a booster dose has not been administered within the last five years offer an early booster.
- Wound Management:(4)
  - See Table 1: Summary Guide to Tetanus Prophylaxis in Wound Management.
  - Tetanus prophylaxis in persons with wounds is based on careful assessment of whether the wound is clean or dirty, the immunization status of the individual, proper use of a tetanus-containing vaccine and/or TIG, wound cleaning and, where required, surgical debridement and the proper use of antibiotics.
  - Prophylaxis should be administered on the day the wound occurred. Penicillin given for seven days may kill *C. tetani* in the wound.
  - Prompt treatment and appropriate immunization are still essential. Refer to the current *Canadian Immunization Guide*.

Table 1: Summary Guide to Tetanus Prophylaxis in Wound Management [4]

History of tetanus immunization (doses)	Clean, minor wounds		All other Wounds*	
	Td♦	TIG	Td	TIG**
Uncertain or < 3	Yes‡	No	Yes‡	Yes
3 or more	No†	No	No¶	No

* All other wounds include: major wounds, those contaminated with dirt, animal excreta, other foreign bodies, or saliva; puncture wounds; or wounds with devitalized tissue.

♦ For children, a formulation of tetanus and diphtheria-containing vaccine should be used depending on past immunization history and age according to the Alberta Childhood Immunization Schedule. For adults, the tetanus booster should include diphtheria toxoid unless it is specifically contraindicated.

** Passive immunization. When tetanus-containing vaccine and TIG are given concurrently, separate syringes and separate sites must be used.

‡ The primary immunization series with tetanus and diphtheria-containing vaccines should be completed.

† Yes, if more than 10 years have elapsed since the last dose. Children should have their immunization brought up to date according to the appropriate childhood schedule.

¶ Yes, if more than five years have elapsed since the last dose. Children should have their immunization brought up to date according to the appropriate childhood schedule.

References

(1) Public Health Agency of Canada. *Two recent cases of severe tetanus – United Kingdom.* Ottawa: CCDR 2002;28-24. http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02vol28/dr2824eb.html

(2) *Ongoing outbreak of tetanus in injecting drug users in the United Kingdom*. Health Protection Agency. CDR Weekly. January 2004. http://www.hpa.org.uk/archive04/news0304.htm#tetanus

(3) *Cluster of cases of tetanus in injecting drug users in England*. Health Protection Agency. CDR Weekly. November 2003. http://www.hpa.org.uk/cdr/archives/2003/cdr4803.pdf

(4) Public Health Agency of Canada. *Canadian Immunization Guide.* Sixth Edition. 2002. http://www.phac-aspc.gc.ca/publicat/cig-gci

(5) Alberta Health and Wellness, Disease Control and Prevention. *Communicable Disease Reporting System*. August 2003.

(6) Alberta Health and Wellness, Disease Control and Prevention. *Notifiable Diseases – Alberta*. Communicable Disease Reporting System Mid Year Population. March 2003.

(7) Public Health Agency of Canada. *Routine practices and additional precautions for preventing the transmission of infection in health care*. Ottawa: CCDR 1999;25S4. http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html

