2.5 Cryptosporidiosis

Etiology

Cryptosporidium parvum is an intracellular protozoan parasite. A ubiquitous pathogen, it is one of both medical and veterinary importance. *Cryptosporidium parvum* is the most prevalent species causing disease in humans. Additional species names have been given when isolated from different hosts. It is known to infect and reproduce in the epithelial cell lining of the digestive or respiratory tracts of most vertebrates. *C. parvum* is a spore forming parasite. The lifecycle is completed within a single host.

Case Definition

Confirmed Case

Laboratory confirmation of infection with or without symptoms from an appropriate clinical specimen (e.g. stool, intestinal fluid or small bowel biopsy):

- demonstration of Cryptosporidium oocysts

OR

- detection of Cryptosporidium DNA

OR

- demonstration of Cryptosporidium antigen by an approved method (e.g. EIA, immunochromatographic – ICT)

Probable Case

Clinical illness[3] in a person who is epidemiologically linked to a confirmed case.

Clinical Presentation

Asymptomatic infections with *C. parvum* are common and represent a source of infection for others. The major symptom is diarrhea, often profuse and watery, associated with abdominal cramping. Fever, malaise, anorexia, nausea, and vomiting occur but less often. The symptoms may come and go but, in general, abate within 30 days. In children, diarrhea may be preceded by anorexia and vomiting. Immunocompromised individuals (e.g., persons with AIDS) may not be able to clear the parasite. The disease can have a prolonged and fulminant course that may lead to death.

Diagnosis

Diagnosis is made through examination of stools, intestinal fluid or small bowel biopsy for oocysts or parasitic antigens. For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

[3] Clinical Illness is characterized by diarrhea (often profuse and watery), abdominal cramps, anorexia, fever, nausea, general malaise and vomiting

Epidemiology

Occurrence

The disease occurs worldwide and has become recognized as one of the most common causes of waterborne disease in humans in North America. Newfoundland Labrador has had an average of five cases per year from 2012-2015. In 2015, 8 cases were reported. The most common source of infection was related to travel. Extensive waterborne outbreaks have been associated with contamination of drinking water; exposure to contaminated recreational water including swimming pools, water slides, hot tubs, and lakes; and consumption of contaminated beverages.

Reservoir

The primary reservoir is cattle but other hosts include mammals, birds and reptiles. Cryptosporidium species are oocyst-forming protozoa. The most common species causing disease in humans are *Cryptosporidium hominis* and *Cryptosporidium parvum.*

Transmission

The mechanism of transmission is presumed to be contamination of the water supply by fecal material from cattle or other animals. Routes of transmission include animal to person, waterborne, foodborne and person-to-person.

Incubation Period

The incubation period is not known precisely; one to twelve days, with a mean of seven days.

Communicability

Oocysts, the infectious stage of the parasite, appear at the onset of the symptoms and are infectious immediately upon excretion. The oocysts may be excreted in stool for weeks beyond the symptoms of the disease however, in most cases the shedding of *C. parvum* stops within two weeks. These oocysts may remain infective outside the body for two to six months in a moist environment.

Control Measures

Management of Case

Investigations

Determine possible source of infection taking into consideration the incubation period, reservoir, and mode of transmission. Assessment may include:

- Determine contact with cattle, sheep, or other domestic animals.
- Determine recent visits to farms or petting zoos.
- Determine consumption of contaminated food or water, or other drink including unpasteurized milk.
- Obtain a food history.
- Identify recent exposure to recreational water (treated or untreated).

- If necessary, determine history of high risk sexual practices, especially contact with feces.
- Identify history of recent travel.
- Assess for history of residing in areas with poor sanitation including improper water treatment and sewage disposal and include recent immigration.
- Assess for history of daycare or institutional exposure.
- Assess for history of similar symptoms in other members of the household.
- Suspected contaminated food may be held to prevent consumption.
- Suspected contaminated food may be destroyed.
- Contact precautions are recommended when caring for the symptomatic patient.

Treatment

- General supportive therapy should always be considered, particularly in immunocompromised patients.
- Rehydration and electrolyte replacement if indicated.
- Drug therapy may be considered in some cases.
- There is no treatment of known value. For chronic cases, consultation with an infectious diseases physician who may consider experimental or unproven therapies is recommended**.**

Exclusion

Exclusion (staying away from school or work) should be considered for symptomatic persons who are:

- Food handlers whose work involves
  - Touching unwrapped food to be consumed raw or without further cooking and/or
  - Handling equipment or utensils that touch unwrapped food to be consumed raw or without further cooking.
- Healthcare, daycare or other staff who have contact through serving food, with highly susceptible patients or persons, in whom an intestinal infection would have particularly serious consequences.
- Involved in patient care or care of young children, elderly or dependent persons.
- Children attending daycares or similar facilities who are diapered or unable to implement good standards of personal hygiene.
- Older children or adults who are unable to implement good standards of personal hygiene (e.g., mentally or physically challenged).
- Exclusion applies until at least 48 hours after normal stools have resumed.
- Asymptomatic individuals who are included in the above categories are generally not excluded from work or daycare. However, the decision to exclude will be made by the MOH.
- Reassignment to a low risk area may be used as an alternative to exclusion.
- When possible, people taking immunosuppressive therapy are advised to reduce or stop under the guidance of an infectious diseases physician.

Management of Contacts

- Contacts should be instructed in disease transmission, appropriate personal hygiene, routine practices, and contact precautions.
- Symptomatic contacts should be assessed by a physician.
- Contacts who are symptomatic may be excluded from daycare or similar facilities or occupations involving food handling, patient care or care of young, elderly or dependent persons as per MOH assessment.
- Asymptomatic contacts, in general, are not excluded from work or daycare.

Management of Outbreaks

An outbreak management team should be established to direct and coordinate the investigation as well as address infection prevention and control measures. If the outbreak is limited to one region the region is responsible to manage the outbreak; if more than one region is involved the outbreak will be managed by the province or in consultation with the province.

Education and Preventive Measures

- Prompt involvement of community health is essential.
- Education of case/s and contacts on the importance of hygienic measures including
  - Hand hygiene – Wash hands thoroughly with soap and water (Note: Cryptosporidium are not killed by alcohol gels and hand sanitizers) before and after eating and after using the toilet Safe disposal of feces – feces is highly infectious. Cases must avoid swimming in recreational water for at least two weeks after the diarrhea stops.
- If necessary, educate about the risk of sexual practices that permit fecal-oral contact.
- Avoid water that might be contaminated.
- Do not drink untreated water from shallow wells, lakes, rivers, and streams.
- Boil water for one minute to make it safe.
- Avoid food that might be contaminated.
- Use safe, uncontaminated water to wash all food that is to be eaten raw.
- Strict attention to the cleaning and disinfection of swimming pools.
- Travelers need to be advised about the risks involved in traveling to areas where sanitation may be questionable.
- Avoid eating uncooked foods when traveling in countries with minimal water treatment systems
- Provide fact sheet available at: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/giardia_cryptosporidium-eng.php

Reporting Requirements and Procedures

- The laboratory (hospital or public health laboratories) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- The MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and infection control practitioners (ICP), in the particular region as required for follow-up and case investigation.
- EHO will conduct an investigation of the case under the direction of the MOH and provide case details as per the food history.
- CDCN enters the case details into the electronic reporting system and uses the CNPHI tool, if indicated, for alerts or outbreak summaries.

Provincial Disease Control

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health website
- Coordinates the response if an outbreak across RHAs (CMOH will likely coordinate an outbreak across RHAs with input from disease control and environmental health.)

References

US Food and Drug Administration Centre for Food Safety and Applied Nutrition. *Foodborne Pathogenic Microorganisms and Natural Toxins.* Bad Bug Book. 1992. Retrieved June 6th, 2013 from http://www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook/ucm070753.htm