Cryptosporidiosis

Summary

Cryptosporidium species are protozoa that can cause diarrheal illness in humans. The protozoa have been found in a variety of hosts such as mammals, birds, and reptiles. Outbreaks have been associated with contamination of municipal water supplies and swimming pools, as well as petting zoos.

Agent

Cryptosporidium hominis and *parvum* are the protozoan species associated with human illness.

Transmission

Reservoir:

Humans, cattle, and other domestic animals

Mode of transmission:

Fecal-oral including person-to-person, animal-to-person, waterborne, and foodborne transmission

Period of communicability:

Infectious *Cryptosporidium* oocysts appear in the stool at onset of symptoms and continue to be excreted in the stool for several weeks after symptoms resolve. Oocysts can remain infective for 2-6 months outside the body in a moist environment.

Clinical Disease

Incubation period:

Usually seven days with a range of 2-14 days.

Illness:

The most common presenting sign is frequent, non-bloody, watery diarrhea. Other signs and symptoms include abdominal cramps, fatigue, vomiting, anorexia, and weight loss. Fever and vomiting can be common in children. In immunocompetent persons, the diarrheal illness is self-limited; the infection can also be asymptomatic. In immunocompromised persons, particularly those with HIV, chronic severe diarrhea and disseminated infection can occur.

Laboratory Diagnosis

Finding oocysts on microscopic examination of fecal smears is diagnostic. Since shedding can be intermittent, at least three stool specimens collected on different days should be examined before a negative result is reported. Enzyme immunodiagnostic assay (EIA), fluorescein-conjugated monoclonal antibody, and polymerase chain reaction (PCR) techniques are diagnostic for illness and useful in detecting oocysts in both stool and environmental samples.

Culture Independent Diagnostic Testing (CIDT) is becoming a common method for diagnoses. CIDT is a molecular PCR test with a fast turn-around time (approximately 1 hour), and very high sensitivity, it is usually run as a stool GI panel and often result in detection of several conditions.

Treatment

Generally, immunocompetent people need no specific treatment, however, an FDA approved treatment for cryptosporidiosis is available. Nitazoxanide (Alinia®) is marketed in the United States for treating diarrhea caused by *Cryptosporidium* species and *Giardia lamblia*. It is licensed for treatment of patients greater than 12 months of age with healthy immune systems. Additional information on nitazoxanide and cryptosporidiosis can be found at http://www.cdc.gov/crypto/treatment.html.

Surveillance

Case Definition:

Laboratory criteria - Demonstration of *Cryptosporidium* oocysts in stool; or demonstration of *Cryptosporidium* in intestinal fluid or small bowel biopsy specimens; or demonstration of *Cryptosporidium* antigen in stool by a specific immunodiagnostic or polymerase chain reaction (PCR) tests.

Confirmed – a case that is laboratory confirmed.

Reporting:

Report all suspected or confirmed cases of cryptosporidiosis to the Epidemiology and Response Division (ERD) at 505-827-0006. Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation, and health care provider.

Case Investigation:

Use the Cryptosporidium Investigation Form to complete your investigation. Investigation information should also be entered into NM-EDSS per established procedures.

Control Measures

Control measures for CIDT cases that tested positive for more than one condition should be prioritized as follows: Vibrio> STEC> Cryptosporidium> Salmonella> Shigella> Campylobacter> Cyclospora> Giardia.

For a summary of work and daycare exclusion criteria for all enteric pathogens see Appendix 8.

1. Case management

   1.1. Isolation:

   1.1.a Exclude symptomatic persons from food handling and from direct care of infants, elderly, immunocompromised, and hospitalized or institutionalized patients. The person may be allowed to resume his/her usual duties when symptoms have resolved.

   1.1.b For hospitalized patients, enteric precautions in the handling of feces, vomitus, and contaminated clothing and bed linen.

   1.1.c People with a diagnosis of cryptosporidiosis should not use recreational waters for two weeks after symptoms resolve.

   1.2. Prophylaxis: Not applicable.

   1.3. Environmental remediation: Pools, water parks, and interactive fountains associated with confirmed or probable cases should be hyper chlorinated per ERD recommendations. Report the name of the recreational water venue(s), along with the dates where a confirmed or probable case was swimming or playing, to ERD. This includes any water venue reported by the case from two weeks prior to symptom onset until two weeks after

the last episode of diarrhea. ERD will coordinate hyperchlorination through the appropriate environmental health agency that regulates the recreational water venue.

2. Contact management

   2.1. Microscopic examination of feces of household members and other suspected contacts, particularly if symptomatic.

   2.2. Prophylaxis: Not applicable.

3. Prevention

   3.1. Emphasize good hand hygiene practices (i.e., proper hand washing after using the toilet, changing diapers, caring for someone who is ill with diarrhea, handling an animal or its waste, and before and after handling food).

   3.2. People with cryptosporidiosis should avoid participation in recreational water activities, such as swimming, while ill with diarrhea and for 2 weeks after symptoms have completely resolved.

   3.3. General guidelines for preventing foodborne illness include:

   - Thoroughly cook raw food from animal sources.
   - Wash raw vegetables.
   - Avoid unpasteurized dairy products.
   - Wash hands, knives, and cutting boards after handling uncooked foods.

   3.4. Immunization: Not applicable.

Management of Cryptosporidiosis in Child Care Centers

- Exclude infected children and staff from child care facilities until diarrhea stops.
- Per child care licensing regulations, a center should notify parents or guardians in writing of a case of cryptosporidiosis in the facility (Subsection D of 8.16.2.20 NMAC). See Appendix 7 for a template of a notification letter.

Control Measures for the Child Care Setting During an Outbreak of Cryptosporidiosis

Cryptosporidiosis is a gastrointestinal illness caused by the parasite *Cryptosporidium*. This disease is a common cause of diarrhea in children, especially in child care settings. The hallmark symptom of cryptosporidiosis is watery diarrhea, which might be accompanied by stomach ache, nausea and vomiting, fever, and a general sick feeling. Healthy people who contract cryptosporidiosis almost always get better without any treatment, but treatment is available by prescription. An unusual feature of cryptosporidiosis is that some people seem to get better only to have the diarrhea come back in a few days. Signs and symptoms can come and go for up to 30 days, but usually subside in 1-2 weeks. Cryptosporidiosis can cause severe illness in persons with compromised immune systems, such as those with human immunodeficiency virus (HIV) infection or those taking drugs that suppress the immune system.

Because *Cryptosporidium* is in feces, anything that gets contaminated by feces can potentially spread the parasite. As a result, the parasite can be spread directly from person to person, through contact with contaminated objects (e.g., toys), or by swallowing contaminated food or water (drinking and recreational). Cryptosporidiosis outbreaks in child care settings are most

common during late summer/early fall (August/September) but might occur at any time. The spread of cryptosporidiosis is greatest among young children who are not toilet trained and their caregivers (those who change diapers).

Cryptosporidium is resistant to chlorine disinfection, so it is tougher to kill than most disease-causing organisms. The usual disinfectants, including most commonly used bleach solutions, have little effect on the *Cryptosporidium* parasite. An application of either hydrogen peroxide or ammonia seems to work best. Hydrogen peroxide is probably the best choice in the child care setting because ammonia has a strong odor and produces hazardous gas when mixed with bleach or other chlorinated solutions.

If an outbreak of cryptosporidiosis occurs in the child-care setting:

1. Educate staff and parents.
    a) Inform all staff about the ongoing outbreak, the signs and symptoms of cryptosporidiosis, how it is transmitted, and control measures to be followed.
    b) Inform parents about the ongoing outbreak, the signs and symptoms of cryptosporidiosis, how it is transmitted, outbreak control policies, and needed changes in hygiene and cleanliness.
    c) Notify parents of children who have been in direct contact with a child or an adult caregiver with diarrhea. Parents should contact the child's health care provider if their child develops diarrhea.
    d) Inform parents of children and staff about *Cryptosporidium*'s potential to cause severe disease in immunocompromised persons. Immunocompromised persons should consult their health care provider for further guidance.
2. Exclude any child with diarrhea from the child care setting until the diarrhea has stopped.
    a) Children who are infected with *Cryptosporidium* but who do not have diarrhea may be allowed to return.
    b) Recently returning children can be grouped together in one classroom to minimize exposure to uninfected children.
    c) Move adults with diarrhea to jobs that minimize opportunities for spreading disease (e.g., administrative work instead of food preparation.)
3. Terminate all water play or swimming activities (e.g., water tables, inflatable or rigid temporary swimming pools, public pool visits). This water can become contaminated and facilitate the spread of infections.
4. Practice good hygiene. Note**:** The measures outlined should be routine but are especially important during outbreaks.
    a) Enforce frequent hand washing and good hand washing technique for all children and adults.

        Note**:** *Cryptosporidium* is not killed by alcohol gels and hand sanitizers, so these are of little use in controlling an outbreak.
    b) Use disposable towels.
    c) Good hand washing means:
    d) Wet your hands with clean running water and apply soap.

e) Rub hands together to a lather and scrub all surfaces.

f) Continue rubbing hands for 20 seconds (imagine singing “Happy Birthday” twice.)

g) Rinse hands well with water.

h) Dry hands with paper towels or an air dryer. If possible, use a paper towel to turn off the faucet.

For children:

- Observe hand washing or assist when needed. Wash children’s hands when they arrive at the child care facility, after they use the toilet, after having their diapers changed, and before eating snacks or meals.

For adults:

- Wash hands after using the toilet, after helping a child use the toilet, after diapering a child, and before preparing or serving food. (Note**:** Where staffing permits, people who change diapers should not prepare or serve food).

5. Improve diaper changing practice.
   a. Separate diaper changing areas from children’s play and food preparation areas.
   b. Use disposable gloves and change them after each diaper change.
   c. Use disposable paper over the diaper changing surfaces and change it after each diaper change.
   d. Ensure children wear clothing over their diapers to reduce the opportunity for leakage.
   e. Ideally institute and maintain a system of stool monitoring (i.e., diaper logs) for all infants and children who are not toilet trained. Diaper logs are not required by regulation but are recommended whenever a day care attendee is diagnosed with an enteric pathogen. At a minimum, diaper logs should document the quality (e.g., formed, loose, watery, blood present, mucus present) and time of each diaper change. The log should be reviewed each day with the center director, or their designated personnel, and personnel from NMDOH who are being consulted and/or investigating individual cases, clusters, or outbreaks at the center. The purpose of the log is to assist in the identification of potential new cases, to prioritize testing recommendations, and assist in determining if exclusion of the infant or child is necessary until infection can be ruled out.
   f. Wash hands: both yours and the child’s hands.
6. Disinfect surfaces and objects
   a. No disinfectant is guaranteed to be completely effective against *Cryptosporidium*. However, hydrogen peroxide is usually effective.
      - Instead of a bleach solution, use a 3% (99% kill rate) or, if available, 6% (99.9% kill rate) concentration of hydrogen peroxide to soak contaminated surfaces for 20 minutes.
      - Ammonia can also be used (5% solution for 18 hours) but it has a strong odor and, if accidentally mixed with bleach or other chlorine containing solutions, produces hazardous chlorine gas.

b. Disinfect bathrooms, diaper areas, and food preparation surfaces daily.

c. Disinfect toys, tabletops, and high chairs more frequently than usual (at least twice daily.)

   - Dishwasher-safe toys can be disinfected in a commercial dishwasher that has a dry cycle or a final rinse that exceeds 113°F for 20 minutes or 122°F for five minutes or 162°F for one minute. Cloth toys may be washed and heat-dried on the highest clothes dryer heat setting for 30 minutes.

d. These are not routine measures, but may be necessary if an outbreak occurs, which is defined as two or more cases in the same child care group.

7. Notify ERD about an excessive level of diarrhea or any *Cryptosporidium* infections in a daycare. *Cryptosporidium* is a reportable disease.

References

American Academy of Pediatrics. In: Kimberlin, DW, et al eds. Red Book: 2018 Report of the Committee on Infectious Diseases. 31st ed. Itasca, IL: American Academy of Pediatrics; 2018.

Heymann, DL, ed. Control of Communicable Diseases Manual. 19th edition. Washington, DC: American Public Health Association; 2008.

See Cryptosporidiosis Fact Sheets (English) (Spanish).