

Cryptosporidium parvum Infection Following Contact with Livestock

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Abstract

Context: Scours, or calf diarrhea, is an infectious gastrointestinal disease commonly found in the calves of dairy farms. It primarily presents with diarrhea that can be life threatening to the animal and is also contagious and threatening to the other livestock. *Cryptosporidium* is one of the major causes of scours and can be transmitted to humans via fecal-oral route, resulting in diarrheal illnesses. Cryptosporidiosis infection usually occurs as a waterborne outbreak with the potential to affect many people at once. **Case Report:** We report a case of a 24-year-old female farmer who presented to the emergency department with diarrhea after taking care of ill cattle with similar symptoms. Fecal cultures were positive for *Cryptosporidium parvum*. Given the patient was immunocompetent, no further treatment was warranted. **Conclusion:** Confirmed cases should be reported, however, treatment is only recommended in children and immunocompromised adults. Clinicians should educate patients on the importance of proper hygiene and handling techniques in order to decrease transmission and recurrence of the protozoan infection.

Keywords: *Cryptosporidium parvum*, diarrhea, scour's disease

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Introduction

Human-animal contact is a known cause of transmission of enteric diseases. Transmission is usually via fecal-oral route and sources are generally infectious, however, noninfectious causes are also known.^[1] Other methods of exposure include environmental exposure, direct contact, and indirect transmission through contaminated non-animal sources.^[1] The enteric pathogens *Escherichia coli* O157 and *Salmonella* species are the most common, but amongst the protozoa, *Cryptosporidium spp.* has become increasingly implicated.^[1]

Scours, also known as calf diarrhea, is a diarrheal disease that primarily affects calves in the first few days of life.^[2] It is a significant cause of mortality in

the livestock population, and control of this illness is crucial to minimizing the financial impact of livestock loss on the agricultural industry. Viruses and protozoa are the main causative agents of scours, and among them rotavirus and *Cryptosporidium* are the most common.^[2]

Transmission of the parasite occurs by the fecal-oral route via the spread of infectious oocytes. It is primarily associated with waterborne outbreaks and contaminated food, and less frequently human-to-human contact.^[3] Clinical course varies from asymptomatic to severe depending on the immune status of the host. Symptoms include stomach pain, watery diarrhea,

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nausea, vomiting, and fever, and the infection can be fatal in immunocompromised individuals.^[4] The authors report a case of a young immunocompetent farmer who contracted *Cryptosporidium* associated diarrheal illness via direct contact with a calf known to have scours.

Case Presentation

A 24-year-old female presented to the emergency department complaining of a several-day history of diarrhea. Associated symptoms included nausea, vomiting, headache, and crampy lower abdominal pain that had resolved prior to presentation. She denied any fever or blood or mucus in her stool. She reported that she only drank bottled water and denied recent history of travel or having any sick contacts. The patient's past medical history included depression which was treated with sertraline. Her social history revealed that she lived on a farm where she had been taking care of a calf with veterinary diagnosed scours disease.

Physical examination revealed the patient to be in no acute distress and vital signs were temperature of 36.8°C, blood Pressure of 106/74, pulse of 102 bpm, and respiratory rate of 18 bpm. Results of the physical exam were within normal limits and without any pertinent findings.

Laboratory testing done at the time revealed a negative urine pregnancy test and urinalysis. A comprehensive metabolic panel and complete blood cell count were done, and both the tests were unremarkable. Stool cultures were negative for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* serogroup 0157, *Yersinia*, *Vibrio*, *Aeromonas*, and *Bacillus cereus*. *Clostridium difficile* toxin B was negative, and fecal smear for white blood cells (WBCs) showed few WBCs; testing for *Giardia/Cryptosporidium* was positive for *Cryptosporidium parvum*.

The results were discussed with a gastroenterologist who felt no treatment was needed at that time because of the patient's immunocompetent state. The results were relayed to the patient who stated the following day that her symptoms were improved and resolving. She was told to return if the symptoms persisted beyond a week and follow-up with her primary care physician was encouraged. The importance of proper hygiene techniques was also discussed.

Discussion

Cryptosporidium is a protozoan parasite that causes diarrheal illnesses and is among the most common parasites to cause human enteric illness, which affects 748,000 people a year.^[5,6] Its fecal-oral oocyte transmission occurs mostly by exposure to infected drinking or recreational water sources and has had

many reported instances of waterborne outbreaks.^[3] However, other methods such as direct and indirect contact or infected food exposure can also cause transmission.^[1] Contaminated water supplies can cause illness in mass quantities and have a large infectious potential. Cryptosporidiosis is a nationally reportable disease and reporting to the National Notifiable Diseases Surveillance System is encouraged.^[3]

The mode of infection by *Cryptosporidium* in our case was suspected to be via direct contact between the patient and an infected animal. Our patient admitted to direct contact with calves known to have scours disease on her farm. Direct contact transmission of *Cryptosporidium* scours disease is less common but is a known mode of transmission. Among animal-to-human transmitted enteric diseases, *Cryptosporidium* remains one of the most common infections.^[1]

Clinicians should be aware of the risk of Cryptosporidiosis outbreaks in their areas. In general, Cryptosporidiosis is found in crowded and unsanitary locations, however, is also reported in rural North America where crowding and sanitation is not a primary concern.^[7] The National Notifiable Diseases Surveillance System received reports of Cryptosporidiosis cases from all 50 states in 2011 and 2012 totaling 9313 and 8008 respectively.^[3] Categorized by states, most cases were reported in Ohio, Wisconsin, and Pennsylvania. This particular case was reported in Pennsylvania that also reported 5.7% of all cases in 2011 and 5.2% of all cases in 2012.^[3]

The severity of infection and the symptoms produced can vary widely including watery diarrhea, abdominal pain, nausea, vomiting, fever, dehydration, and weight loss.^[3] More severe cases are related to an immunocompromised state, which could result in life threatening and long-term illness.

Treatment for *Cryptosporidium* infections are usually not warranted for immunocompetent adults. Nitazoxanide is an antiparasitic medication that has shown to improve clinical symptoms faster and remove oocytes from stool faster than placebo, and hence can be used to treat children under age 11 or immunocompetent adults with recurrent or severe disease.^[8] Treatment is important for immunocompromised individuals because the risk of opportunistic infections in HIV-positive individuals include biliary and respiratory involvement.^[3] These patients should begin Highly active antiretroviral therapy and consult with their physician, understanding that the infection may be incurable.^[4]

The patient in this case was counseled on the importance of proper hand washing. This is a crucial step in the process of prevention and control of the illness because

infected sources can excrete oocytes for up to 2 months after resolution of the symptoms.^[9] The Center for Disease Control has made official recommendations regarding *Cryptosporidium* including hand washing, travel considerations, and avoiding contaminated water sources. Recommendations involve using soap and running water, avoiding isolated use of alcohol based sanitizers (do not kill oocytes), avoiding public swimming pools within 2 weeks of being diagnosed with *Cryptosporidium* diarrheal infection, and keeping infected children away from child care centers to prevent the spread of the illness.^[4] Special mention is made to immunocompromised individuals highlighting the importance of care and risk of severe illness for this specific group.

Conclusion

Cryptosporidiosis is an easily transmittable disease with a high potential for morbidity that should be reported to the respective state departments once confirmed. Clinicians should have heightened vigilance for common and uncommon sources of enteric disease, especially in geographical locations where pathogens may be more prevalent. A thorough history, including any contact with animals, is essential to properly diagnosing zoonotic infections. Treatment should be based primarily on the immune status of the patient. Every patient should be educated on disease prevention with proper hygiene technique and on the importance of steps to limit the spread of infection.

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Conflicts of interest

There are no conflicts of interest.

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