Cryptosporidiosis in Calves

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Introduction

Cryptosporidium parvum, commonly referred to as *Crypto,* is a protozoan (a one-celled organism) that causes diarrhea in calves (as well as other mammals). This extracytoplasmic organism invades enterocytes (cells that line the intestines) in the distal small intestine and large intestine; therefore, intestinal pathology is worst in these portions of the intestines.

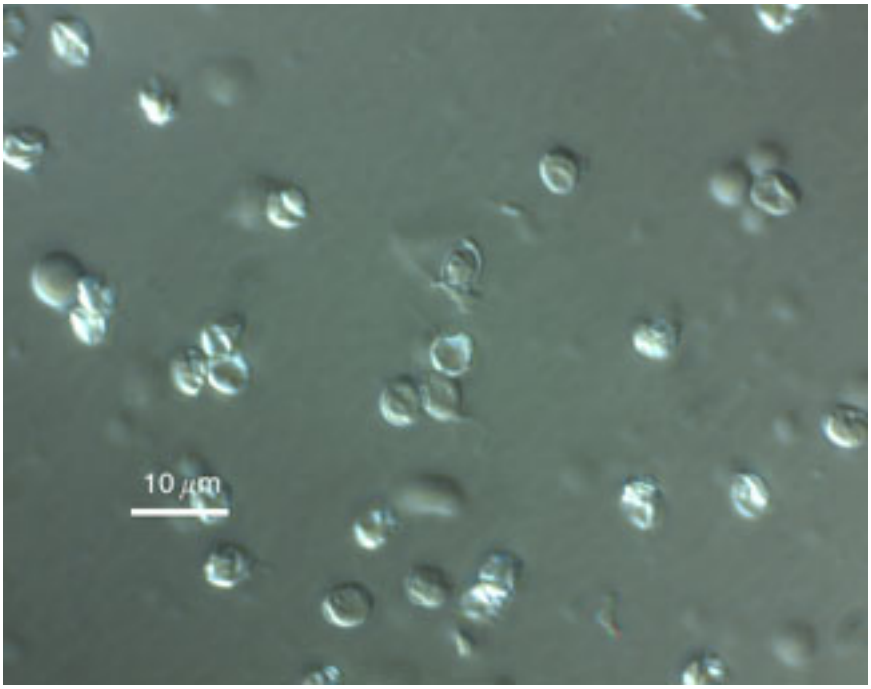

Photo Credit: H.D.A. Lindquist, U.S. EPA

Cryptosporidium parvum oocysts (shown above) are spheroid and 4-6 microns in diameter.

Life Cycle

The infective stage of the life cycle of *Crypto* is the oocyst which is passed in the feces and which contains four sporozoites. When the oocyst is ingested the sporozoites are released. These sporozoites invade the cells in the intestine. These sporozoites go through several life stages and ultimately produce more oocysts.

Both thick-walled and thin-walled oocysts are produced. The thick-walled organisms are passed in the feces. The thin-walled oocysts can rupture and the sporozoites can infect new host enterocytes resulting in autoinfection which may lead to relapses or protracted disease. Infection of cells leads to cell destruction and results in atrophy and fusion of intestinal villi (finger-like projections extending from the intestinal lumen that are primarily responsible for nutrient absorption).

Presentation/Clinical Signs

Calves affected with *Crypto* are usually one to four weeks of age. These calves become weak and lethargic and present with loose to watery stool that may be mild or severe in intensity. Feces can contain mucus, blood, undigested milk, or bile. Tenesmus (straining to defecate) may be seen. Oocyst shedding typically begins with diarrhea and continues for a few days passed resolution of clinical signs. This is important to remember when determining the time to return previously isolated ill calves to a healthy herd.

Diagnosis

A presumptive diagnosis of Cryptosporidiosis can be made based on signalment, history, and clinical signs. Definitive diagnosis can be made by doing a fecal floatation and Giemsa or acid-fast stains. Infections in recently dead calves can be diagnosed via microscopic examination of ileal mucosal scrapings or fixed tissue secretions.

Treatment

There is no affective or approved treatment for Cryptosporidiosis. Morbidity is high with this disease but mortality is generally low. However, calves do need intensive supportive care. Sick calves should be housed in a clean, warm, and dry environment. They need fluid therapy to counteract and prevent further dehydration as well as electrolytes to replace those lost due to diarrhea. They also need nutritional support to give them energy to fight disease and repair their bodies. A recent study showed no clinical benefit to administering decoquinate as a preventative treatment for cryptosporidiosis.(Moore,D.)

Economic Loss

Mortality with this disease is generally low. However, calves that suffer from cryptosporidiosis usually have a slower growth rate than other calves. There is also increased cost in the labor involved in supporting these calves through their disease and in the cost of rehydration fluids.

Transmission

Infection with this organism is caused by ingestion of infectious oocysts. Crypto is very resistant to disinfectants (even chlorine bleach) and can survive in the environment for very long periods of time. Oocysts can be killed at temperatures in excess of 160^{o} F (hotter than most domestic tap water). Oocysts can also be desiccated and killed by thorough drying in a clothes dryer.

Prevention

Although the organism is very resistant, moving unaffected calves to a clean area and away from affected calves may prevent the spread of disease on the farm. General sanitation practices are also a primary control method that yields high results.

Although it has been shown that calves that do not receive colostrum are not more likely to get cryptosporidiosis that calves that do receive colostrum, efforts should always be made to ensure adequate colostrum intake by calves. However, receiving adequate

colostrum immediately after birth helps prevent invasion of opportunistic pathogens which can worsen or compound the severity of disease in calves with cryptosporidiosis.

Studies have been done to test trial vaccines. Some of these vaccines have been shown to be clinically significant (no field trial have been done) not only in preventing clinical disease but in reducing environmental contamination with the organism. However, there is currently no vaccine commercially available to prevent the disease.

Zoonosis

Crypto can also infect humans as well as most mammals. Anyone handling an animal with cryptosporidiosis should take great care to practice good personal hygiene. Crypto is most commonly spread to humans through contact with a contaminated water source such as a contaminated well or recreational water source (lake or swimming pool). The disease may also be spread through contamination of food through an infected food service worker.

References

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