

CRYPTOSPORIDIOSIS

Ivan E. Berg

Cryptosporidium sp. is a protozoan organism frequently recognized as an intestinal parasite, especially in neonatal animals.

The organism is a coccidian but is much smaller than the more common coccidia. Cryptosporidia range in size from 2-6 microns in diameter while *Eimeria zurnii*, the common bovine coccidian, for example, measures 15-22 by 13-18 microns (9).

Their small size coupled with the fact that they disappear from the intestine quite rapidly post mortem probably explains why cryptosporidia are not recognized more frequently. Oocysts are also difficult to recognize in feces and require special techniques.

Cryptosporidia have been recognized in a variety of different animal species including cattle, swine, sheep, rabbits, mice, guinea pigs, monkeys, birds, and snakes (3). Humans may become infected (2) and the organisms have also been reported in an immunodeficient Arabian foal (10).

The clinical significance of cryptosporidial infections has centered around its role in the neonatal diarrhea complex. *Cryptosporidium* sp. has been incriminated as the etiologic agent of diarrheal disease in calves, lambs and goat kids (1, 4, 6, 7, 8, 11, 12). In one report, enteric cryptosporidia were found in 26 percent of the scouring calves studied over a 32-month period (8).

At the North Dakota Veterinary Diagnostic Laboratory we have identified cryptosporidia in calves, lambs, pigs and a foal during the last five years. In 1982 the organism was seen in 22 of a total of 257 calf scour cases.

Cryptosporidia were formerly considered host specific but recent reports (5) have indicated cross infection between different species. In the one horse case we have seen in our laboratory, the colt had been housed in an area which previously held scouring calves.

The possibility of cross transmission brings up obvious public health ramifications. People working with this organism in animals have themselves become infected and suffered an episode of diarrhea and other flu-like symptoms.

The disease in calves is quite mild. Unless complicating factors are involved, most calves are able to handle the infection and suffer few adverse effects.

The organism does not invade intestinal epithelial cells, as do the coccidia, but resides on the surface intimately associated with the microvilli (Fig. 1). The organisms may be seen in histologic sections of both the small and large intestine. In the small intestine they are usually seen only on villous epithelial cells but in the large bowel they may be attached to both villous and crypt epithelium (5).

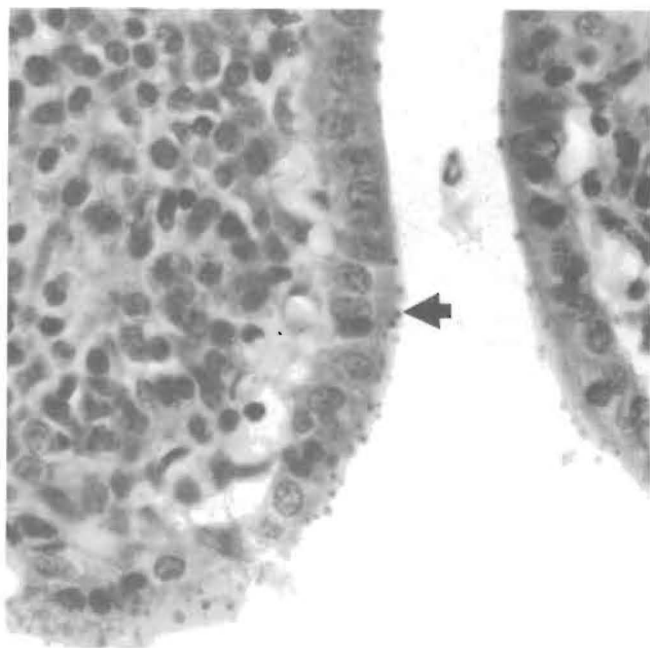


Figure 1. This is a photomicrograph of a villous in the ileum. The arrow points to cryptosporidia attached to the microvillous border. The magnification is 400 times.

Intestinal pathologic changes associated with cryptosporidiosis include villous atrophy. Villi are stunted, swollen, and often fused. Inflammatory cells infiltrate the intestinal lamina propria (8).

Diarrhea in cryptosporidiosis results from intestinal malabsorption due to villous atrophy and alteration of the epithelial microvilli (brush border) (8).

Concurrent infections are common. We seldom see cryptosporidiosis in an uncomplicated form. Usually bacteria such as *E. coli* and/or viruses such as corona and/or rota are also involved. Concurrent infections are much more serious and life threatening.

The diagnosis of cryptosporidiosis depends upon the microscopic identification of the organism. They may be found either in microscopic sections of intestinal tissue from animals submitted for post mortem examination or in smears of feces.

As indicated earlier, the organism disappears from the intestine rapidly (within six hours) after death (7). Unless tissues are collected and placed in preservative quickly, they will not be seen. We have been most successful in finding cryptosporidia in scouring animals received live at the laboratory. By using special staining procedures on fecal smears, the time during which the organism can be identified is extended. Therefore, it is quite routine to examine feces from scouring calves for cryptosporidia.

What has been said about the disease in calves applies equally to lambs. Preliminary information suggests that cryptosporidia constitute an incidental finding and are of no consequence in pigs. Future study may prove otherwise. We have seen cryptosporidia in only one foal and in that case we had limited tissues and were unable to do a complete scours study.

Since cryptosporidial oocysts are passed in the feces, prevention of the disease depends upon strict sanitation in the calving yard, calf hutches, lambing pens or nursery.

No specific treatment is known, but some report at least some benefit, at least as a preventative measure, from the use of sulfamethazine, amprolium and deco-
quinate (8).

REFERENCES

1. Berg, I.E., A.C. Peterson and T.P. Freeman. **Ovine Cryptosporidiosis**. Journal of the American Veterinary Medical Association. Vol. 173. p. 1586-1587. 1978.
2. Current, W.L., et al. **Human Cryptosporidiosis in Immunocompetent and Immunodeficient Persons**. New England Journal of Medicine. Vol. 308. p. 1252-1257. 1983.
3. Jones, T.C. and R.D. Hunt. **Veterinary Pathology**. 5th Edition. Lea and Febiger. Philadelphia, PA. 1983. p. 744-745.
4. Meuten, D.J., H.J. Van Kruiningen and D.H. Lein. **Cryptosporidiosis in a Calf**. Journal of the American Veterinary Medical Association. Vol. 165. p. 914-917. 1974.
5. Moon, H.W. and W.J. Bemrick. **Fecal Transmission of Calf Cryptosporidia Between Calves and Pigs**. Veterinary Pathology. Vol. 18. p. 248-255. 1981.
6. Morin, M., et al. **Neonatal Calf Diarrhea: Pathology and Microbiology of Spontaneous Cases in Dairy Herds and Incidence of the Enteropathogens Implicated as Etiological Agents**. Proceedings of the 2nd International Symposium on Neonatal Diarrhea. Saskatoon. 1978. p. 347-369.
7. Pohlenz, J., H.W. Moon, N.F. Cheville, and W.J. Bemrick. **Cryptosporidiosis as a Probable Factor in Neonatal Diarrhea of Calves**. Journal of the American Veterinary Medical Association. Vol. 172. p. 452-457. 1978.
8. Sanford, S.E. and G.K.A. Josephson. **Bovine Cryptosporidiosis: Clinical and Pathological Findings in Forty-two Scouring Neonatal Calves**. The Canadian Veterinary Journal. Vol. 23. p. 343-347. 1982.
9. Sloss, Margaret W. **Veterinary Clinical Parasitology**. 4th Edition. The Iowa State University Press, Ames, IA. p. 32.
10. Snyder, S.P., J.J. England, and A.E. McChesney. **Cryptosporidiosis in Immunodeficient Arabian Foals**. Veterinary Pathology. Vol. 15. p. 12-17. 1978.
11. Tzipori, S., I. Campbell, D. Sherwood, D.R. Snodgrass and A. Whitelaw. **An Outbreak of Calf Diarrhea Attributed to Cryptosporidial Infection**. The Veterinary Record. Vol. 107. p. 579-580. 1980.
12. Tzipori, S., J. Larsen, M. Smith and R. Luefl. **Diarrhoea in Goat Kids Attributed to Cryptosporidium Infection**. The Veterinary Record. Vol. III. p. 35-36. 1982.