

CRYPTOSPORIDIUM SPP. IN NEW BORN LAMBS IN IRAN

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Summary

In a study conducted to investigate the causes of the death of new born lambs due to diarrhoea 237 cases were studied. In 16 of these lambs necropsied at four to 10 days old organisms considered to be *Cryptosporidia* at various stages of its life-cycle were associated with the luminal surface of the epithelium of the intestinal tract. The histopathology and the mechanism of the diarrhoea caused by the parasite and the resulting deaths are discussed.

Introduction

Cryptosporidium spp., coccidian parasites of the family *Cryptosporidiidae*, suborder *Eimeriorina* were first described by Tyzzer (1907). Contrary to the life-cycle of other coccidia *Cryptosporidium* spp. develop extracellularly in the microvillous border of the host's intestinal epithelium (Pancieri, Thomssen and Garner, 1971). *Cryptosporidial* infection is widely spread and has been incriminated in enteric disorders giving rise to diarrhoea in many species of animals such as monkeys, pigs, calves and lambs. *Cryptosporidia* either alone or in combination with other infectious agents such as enterotoxigenic *Escherichia coli*, rota virus, corna virus, etc have been blamed for diarrhoea and mortalities in new born calves and lambs (Tzipori, Campbell, Snodgrass and Whitelaw, 1980, Tzipori, Sherwood, Angus, campbell and Gordon, 1981a). The subject has been intensively studied in calves (Pancieri et al, 1971; Tzipori et al, 1980) but the data in lambs is rather scarce (Berg, Paterson and Fre-

eman, 1978; Tzipori et al, 1981a; Tzipori, Angus, Campbell and Clerihew, 1981b). As far as the authors are aware, this is the first report of Cryptosporidiosis of new born lambs in Iran.

Materials and methods

In the course of a study to investigate the causes of lamb diarrhoea 237 lambs aged four to 25 days were submitted for necropsy to the Pathology Department Razi Institute, Teheran over a period of 16 months (January 1982 to April 1983). In 166 cases the specimens were received from lambs from premises located within a 50 km radius from the centre of the investigation; the rest were from localities within a distance of 600 to 1,300 km. All the sampled cases were studied bacteriologically and histopathologically. The heart blood, bone marrow and intestinal contents were cultured aerobic and an aerobic media, samples from different parts of the intestinal tracts were taken and fixed in 10% formalin solution. Sections 6 μm thick were cut on a rotary microtome from paraffin embedded processed tissues. Sections were stained by haematoxylin and eosin and Giemsa.

Results

In 16 out of 237 new born lambs which had died of diarrhoea, cryptosporidiosis was demonstrated on histopathological studies. These lambs were four to 10 days old and had had a watery yellowish diarrhoea for two to three days. At necropsy the intestinal tract was distended and filled with yellow watery contents. The submucosal blood vessels were slightly hyperaemic. The lesions observed in the intestinal tract were generally characterised by villous stunting and atrophy, irregular mucosal height, hypercellularity of the lamina propria and the presence of various developmental forms of Cryptosporidae adhering to the brush border of the epithelium in distal portions of the small intestine (Fig. 1). Organisms were most numerous at the tip of the villi but they were also found within the crypts. This was evaluated on the basis of the density of the localised organisms on a villus. Those cases where the parasites were arranged like a rosary were considered severe. Twelve were severely and the other four mildly infested. The shape of the organisms differed with the stage of the life-cycle of the parasite. Most organisms were round or ovoid and ranged from 1.5 to 4 μm in diameter.

Structures with a small dark nucleus were interpreted as trophozoites, those with dark basophilic staining areas on their luminal side were considered to be developing schizonts. Mature merozoites on the microvillous border appeared as falciform organisms.

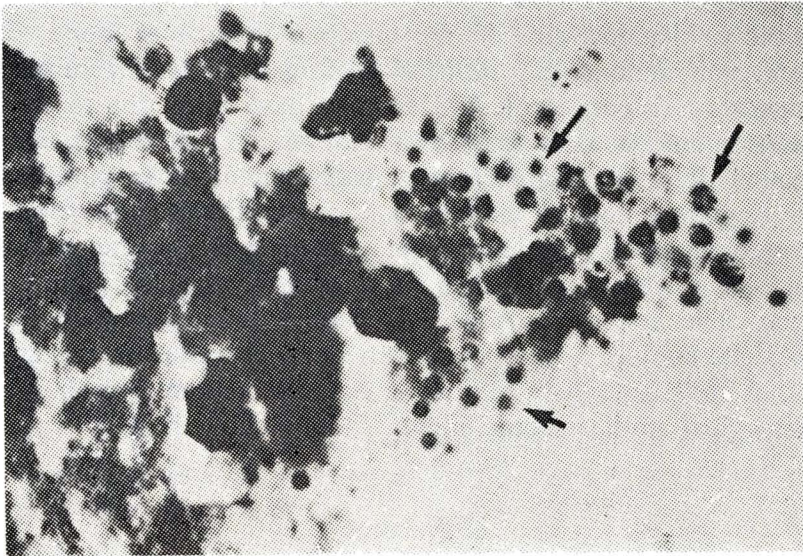


FIG. 1. Developmental stages of *Cryptosporidia* adhering to the brush border of the intestinal epithelium (arrows), $\times 620$.

The oocytes had a spherical structure with a polar halo. Infiltration of eosinophils in three cases and mononuclear cells in three cases were observed in the mucosal layer. In two out of the *E. coli* were isolated. One was severely and the other mildly infected.

Discussion

Cryptosporidium spp. as a probable cause of diarrhoea are reported in calves and lambs. The multiplicity of reported cases involving this parasite as the primary cause of diarrhoea in different species of animals makes the importance of the disease much greater than had been realised. The present report implicates cryptosporidiosis as the cause of death in these young lambs since all cases died of diarrhoea; this organism could be demonstrated in the intestinal epithelium and, apart from the two cases where *E. coli* were isolated, no other enteropathogens were isola-

ted, The fact that the parasite could not be demonstrated in other examined lambs does not exclude cryptosporidiosis because the carcasses received for necropsy were at various stages of post-mortem change. As these parasites develop mainly extracellularly at the tip of the villi they could easily have been lysed and impossible to demonstrate in the histopathological sections. The presence of mononuclear infiltration also described by other investigators (Tzipori et al, 1981a) may have been due to an infectious agent not detected by the authors. If not this is a phenomenon deserving further study. Inclusion of other parameters such as parasitological examination of the faeces and electron microscopic studies of lesions for the presence of the parasites would have been of great help in elucidating the rate of the infection. The assumption that the parasite has a broad host range makes the subject a very important one. Therefore it is suggested that in areas where the parasite is demonstrated to exist epidemiological studies should include all potential hosts.

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