A CLINICAL OUTBREAK OF *TRICHURIS DISCOLOR* INFECTION IN STABLED CALVES

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Clinical Findings

In December, 1968, a dead Holstein calf approximately ten months of age was submitted for necropsy. This animal, one of eight replacement heifers, had started to lose weight a few weeks previously. Marked diarrhea, accompanied by tenesmus, was observed during the week prior to the death of the calf. The feces were foamy and contained large amounts of mucus. In the terminal stages, the calf had shown complete anorexia and had ground its teeth. Gastrointestinal parasitism was suspected but treatment with thiabendazole[1] (TBZ) had little or no effect.

Post-mortem examination revealed a very thickened and oedematous cecum and large intestine. The mucosa was hemorrhagic with areas of ulceration. Histologically, there were many cystic spaces, lined by a single layer of cells within the lamina propria and submucosa (Figure 1). The cysts contained necrotic debris,

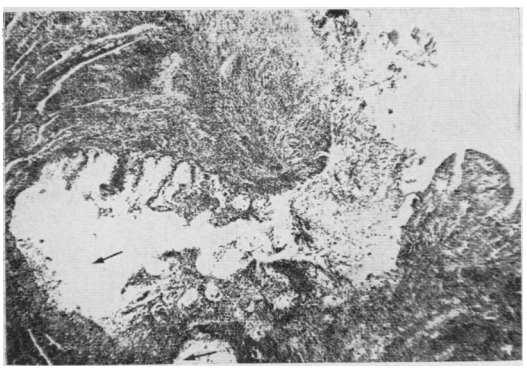

Figure 1. Photomicrograph showing several cysts (*arrows*) in the lamina propria and submucosa of the cecum. Pollak X24.

mucus, eosinophils, neutrophils, lymphocytes and double-operculated *Trichuris*-like worm eggs (Figure 2). Inflammatory cells surrounding the cysts also extended into the muscularis mucosa and submucosa.

Parasitological examination of the gastrointestinal tract revealed the presence of 1587 *Trichuris* worms. These were identified as *T. discolor* (Linstow, 1906) and differentiated from *T. ovis* and other *Trichuris* spp. on the basis of spicule length, spicule sheath morphology, egg size and other morphological characters (3, 5).

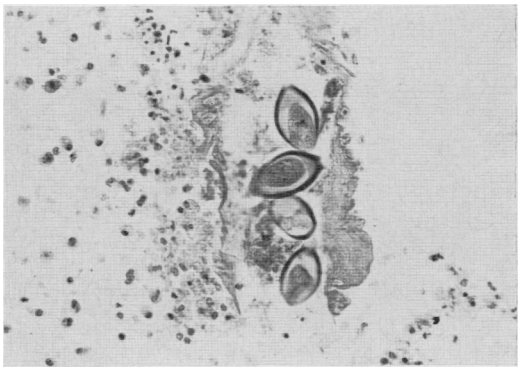

Figure 2. Photomicrograph showing exudate and double operculated *Trichuris* eggs within a cyst in the submucosa of the cecum. H & E X165.

Field Investigation

An investigation carried out on the farm of origin revealed that the eight calves had been stabled until about six to eight months of age, at which time they had been moved to a vacant barn in which feeder cattle had been housed the previous winter. The manure pack, which had remained from the previous winter, was four to five feet thick. Old, poor quality hay had been used as bedding and the calves had been observed to grub in the bedding. The owner had noticed that the calves suddenly became unthrifty and started to lose weight about four to six weeks after entering the barn. As indicated above, treatment of several of the more severely affected calves with TBZ had resulted in little or no improvement.

Fecal samples collected from the remaining calves revealed *Trichuris* egg counts up to 1200 per gram (epg) and other gastrointestinal helminth (GIH) egg counts up to 200 epg in several animals. Fecal examinations by the simple sodium nitrate flotation technique of samples taken at various levels of the manure pack showed that both *Trichuris* and other GIH eggs were present.

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[1]Thibenzole, Merck Sharp and Dohme, Montreal, Canada.

In consideration of the parasitological findings and the failure of earlier attempts at control, treatment with methyridine[2] was suggested. A marked improvement occurred in all calves except for one animal which relapsed a few days later. This animal subsequently died and post-mortem and histological examinations revealed lesions of mucosal disease. No *Trichuris* or other worms were recovered although *Trichuris* egg counts of 300 epg had been recorded prior to treatment with methyridine.

Discussion

Considering the number of *Trichuris discolor* recovered from the one animal examined prior to methyridine treatment, the pathological lesions observed in the cecum and large intestine, the *Trichuris* egg counts in several affected calves and the improvement observed following methyridine treatment, it is reasonable to suggest that the outbreak was an acute trichuriasis. It would appear that all the conditions necessary for an outbreak to occur were present. The feeder cattle kept in the barn the previous winter undoubtedly had seeded the manure pack with *T. discolor* eggs. Conditions in the closed vacant barn during the summer presumably were ideal for maturation and survival of the *Trichuris* eggs. The use of hay as bedding probably encouraged the susceptible calves to grub in the litter when they were placed in the barn and, in so doing, they ingested large numbers of infective *Trichuris* eggs within a short period of time.

The various species of *Trichuris* in domestic animals normally are not associated with any pathological condition (1, 8). Usually only low numbers of these worms are recovered from infected animals (8). Thus, only a few reports are available indicating that *Trichuris* spp. may assume a pathogenic role, especially in ruminants. Farleigh, in 1966 (4), attributed anorexia, diarrhea, loss of condition and deaths to the heavy *T. ovis* burdens found in sheep fed grain on the ground under drought conditions in Australia. Chandler, in 1930 (3), attributed the death of a camel, which had chronic diarrhea and dysentery for several weeks, to the large burden of *T. tenuis* found at necropsy. In 1960, Powers *et al* (6) were able to produce clinical manifestations of anorexia, dysentery and pronounced loss of weight in pigs experimentally infected with *T. suis*. The present outbreak of trichuriasis in calves appears to be another instance of the pathogenicity of *Trichuris* spp. under conditions favorable for a massive build-up and ingestion of infective *Trichuris* eggs by susceptible animals.

It is interesting to note that signs of anorexia, diarrhea, loss of condition and loss of weight have been observed in the clinical cases of trichuriasis described to date in sheep, swine and a camel (3, 4, 6), including the present one in calves. The pathological lesions also were similar to those previously described for trichuriasis in other species (6, 8).

The prompt recovery of the calves following treatment with methyridine, an anthelmintic known to be effective against *Trichuris* spp. (9), supported the diagnosis and the role of *Trichuris discolor* in the present outbreak. The fact that TBZ failed to bring about an appreciable improvement in the calves suggests that only small numbers of other gastrointestinal worms were present. Previous work has shown that TBZ has good efficacy against the common GIH parasites found in calves in this area (7). This also probably accounts for the complete absence of GIH parasites other than *Trichuris* in the first calf necropsied.

In addition to the identification of *T. discolor* as the cause of the present clinical outbreak of trichuriasis, one of the few cases reported in ruminants, it would also appear to be the first report of this species in Canadian cattle. The previously known distribution of this species in North America was Alabama, Florida, Georgia, Idaho, Louisiana and Maryland (2). It is suggested that perhaps this species has a wider distribution in cattle than reports indicate. It seems that these worms have attracted little attention, probably because of the low numbers normally found in cattle and other livestock. It also may be that specific identifications have not always been made.

Summary

A clinical outbreak of trichuriasis in stabled calves caused by a heavy infestation with *Trichuris discolor* is described. It would appear that the present report is the first recorded clinical outbreak in cattle and one of the few reports of clinical trichuriasis in ruminants. Trichuriasis and the unusual circumstances which permitted the present outbreak to develop are discussed.

Résumé

Description d'une éclosion de trichuriase chez des veaux en stabulisation causée par une infestation grave de *Trichuris discolor*. Il semble que ce rapport soit le premier concernant une

[2]Mintic, Ayerst Laboratories, Montreal, Canada.

telle infestation chez le bétail. Il n'existe que quelques rapports de Trichuriase chez les ruminants. Suit une discussion sur la mortalité et les circonstances exceptionnelles à l'origine de son apparition.

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ABSTRACTS

Harris, D. L. & Switzer, W. P. (1968). Turbinate atrophy in young pigs exposed to Bordetella bronchiseptica, Pasteurella multocida, and combined inoculum.—Am. J. vet. Res. 29, 777–785 (Vet. Med. Res. Inst., Ames, Iowa 50010).

Pateurella multocida type D became established and persisted in the nasal cavities of pigs after preconditioning of the nasal epithelium by *Bordetella bronchiseptica* rhinitis. *Pasteurella multocida* was incapable of becoming established in the normal nasal cavities of pigs. Only mild microscopic turbinate lesions resulted from the transient *P. multocida* infection. Although atrophy was not any more severe macroscopically, the concurrent infection of *P. multocida* and *B. bronchiseptica* increased in the intensity of the microscopic changes as compared with changes in turbinates of pigs with *B. bronchiseptica* alone.

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Vera, T., Grumbles, L. C., Franklin, T. E. & Jungerman, P. F. (1968). Effect of lysogenicity on the virulence of Bacillus anthracis.—Am. J. vet. Res. 29, 1059–1066 (Coll. Vet. Med., College Station, Texas 77843).

The virulence of lysogenic strains AM1 and AM2 did not depend on the presence of phage. Spore preparations of the non-lysogenic and artificially produced lysogenic derivatives did not differ significantly from each other or from the parent strains in their lethality to mice.

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Larsen, A. B. & Merkal, R. S. (1968). The effect of management on the incidence of clinical Johne's disease.—J. Am. vet. med. Ass. 152, 1771–1773 (Natn. Anim. Dis. Lab., USDA, Ames, Iowa 50010).

The incidence of Johne's disease and the ages at which clinical signs were observed were compared in two herds, one kept under poor (herd A) and the other under good sanitary conditions (herd B). In herd A, 62% of the calves developed a sensitivity of johnin compared with 6.2% of the calves in herd B. The annual incidence of clinical Johne's disease was 4.2% in herd A and 1.4% in herd B. The highest incidence of clinical disease was observed at 6 and 7 years of age in herd A and 6, 8, and 9 years in herd B. In both herds, clinical signs of disease were first observed at more advanced ages than previous studies had reported.

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