THE PATHOLOGY OF COCCIDIOSIS IN SUDANESE GOATS, A MIXED INFECTION WITH EIMERIA ARLOINGI AND *EIMERIA PARVA* — PART 1

Halima M. Osman, A.M. Shommein
A.Y. El Gazuli and K.S. El Badawi
Veterinary Research Administration Khartoum Soba

Introduction

Little is known in literature about coccidiosis in goats but it is generally assumed that coccidia species that affect sheep might as well cause the disease in goats, Mugera (1968). Although the disease in goats has been frequently reported all over the Sudan it was not regarded to be of importance until recently when several out-breaks killed a substantial number of both sheep and goats in some of the fattening centres near Khartoum North, Annual Report (1977).

Material and Methods

Ten male goats, 1—2 months old naturally infected with coccidiosis, were used in this study. These animals were kept in clean disinfected pens within the premises of the Central Veterinary Research Laborateries at Soba. They were fed green lucern. Faecal samples were taken daily and examined for the presence of coccidial oocysts using the flotation technique. Identification of the coccidia species was based on morphology, measurements and sporulation time of oocysts according to the methods described by Pout, (1974). Body temperature of experimental animals were recorded daily. The condition of the animals, the clinical signs and the postmortem picture of the animals that died were observed. Their intestines were examined according to the method discribed by Pout, (1970). Samples of the intestines were obtained from uninfected young goats of the same age for comparison. Tissue samples of both infected and non-infected goats were fixed in 10% neutral formalin, sectioned at 4—6 microns thick and subsequently stained with haematoxylin and eosion for histopathological examination.

Results

The course of the disease lasted for 8—12 days from the on set of symptoms till death. Clinically some of the infected animals were diarrhic with soiling of the hind quarters. But in most cases the faeces were normal except for the content of oocysts. In still other cases blood tinged faeces were present. The body temperature was normal throughout the course of the disease except that it became subnormal in animals which became recumbent shortly before death. Affected animals showed progressive emaciation, lacked vigour and their appetite gradually lost. Their movement was staggering and incoordinated. Their eyes were sunken and the mucus membranes of the mouth and eyes were pale and dry. Finally the infected animals became recumbent for a short time usually for a few hours, preceding death.

Examination of faecal samples in all cases reveald large number of oocysts. More than 85% of the oocysts were identified as those of *Emieria arloingi* while the remaining 15% belong to *E. Parva*. In all cases examined postpartem the anterior part of the intestine viz, the duodenum, and jejnum were severly affected. They were red, swollen and filled with numberous whitish lesions which were visible through the serosa of unopened intestines. These whitish focal lesions were found in greater numbers in the duodenum and jejenum and less so in the ileum. The caecum and the rest of the large intestines showed very few white spots. The large intestines contained little faeces paste-like in consistency and mingled with flaskes of blood and mucus.

Tissue sections revealed large infiltration of leucocytes mainly eosinophils in lamina propria of the small intestines particulary in the duodenum and jejenum (Fig. 1). The superfical epithelium was desquamated. The intestinal glands were denuded of epithelium andwere filled with macro and microgametocytes, oocysts and cell debris (Fig. 2). The ileum and large intestines showed the same histological changes. Sections of mesenteric lymph nodes revealed the presence of coccidial schizonts. They were seen just beneath the capsule andmeasured about 30—105 microns. They resembled schizonts seen in small intestines (Fig. 3). The schizont in mesentric lymph nodes were surrounded with lymphoid and reticuloendothetial cells.

Discussion

The results of this study showed clearly that a mixed infection of *E. arloingi* and *E. Parva* provokes a severe enteritis in the anterior part of the small intestine.

The most characteristic pathological change was severe proliferation of glandular epithlium. The epithelia of the intestinal glands were thickened and some were completely sloughed out. These findings are in agreement with Sivadas (1965) and Mugera (1968). The macroscopic and microscopic lesions seemed to be restricted to the proximal portion of the small intestines and became less pronounced as one examined the distal part of the intestines. This is in accordance with what Pout noticed in sheep (1969 — 1974). The white spots lesions in the anterior part of the small intestines were believed by Pout (1973) to be caused by *E. arloingi* in sheep. Smith and Davis (1965) reported that similar lesions could be produced by *E. ahasta* in lambs. *E. parva* seems to cause lesions in this work in the ileum and large intestines. From the lesions described in this work and according to the literature cited it could be concluded that in mixed infection of *E. arloingi* with *E. parva* the pathological changes are mainly produced by *E. arloingi*. This may be attributed to the fact that *E. arloingi* infection is acute and the organism is more virulent than *E. parva*. It may also due to the fact that sporulation time and formation of gametocytes are shorter in *E. arloingi* than in *E. parva* and hence intestinal damage has already been done before *E. parva* schizonts invade the intestinal mucosa. The general Pattern of the intestinal reaction to coccidial infection seems to be similar in goats, sheep, and fowls as reported in the literature. The role of the intestinal reaction to acute infection with either *E. arloingi* or *E. parva*. in goats needs further investigations.

Summary

Ten male goats, 1—3 months old naturally infected with coccidiosis were used in this study.

Indentification of the coccidia species reaveld *E. arloingi* and *E. parva*. Clinical symptoms showed diarrhoea, emaciation and incordination of movements.mucus membranes were pale and dry. The duodenum and jejenum were severely affected while ileum and the large intestines were less so. Histopathologically a large infiltration of leucocytes mainly eosinophils in the lamina propria of the small intestines were observed. The intestinal glands denuded of epithlium were filled with macro and microgametocysts, oocysts and cell debris.

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Reference

Anon, (1977) Annual Report, Veterinary Research Administration.

Mugera G.M. (1968). Bull epithzoot Dis. Afr. 16, 101—106.

Pout, D.D. (1969) Vet. Bull 39, 609—617.

Pout, D.D. (1970) Br. Vet. J. 126, 357.

Pout, D.D (1973) Br. Vet. J. 129, 555.

Pout, D.D. (1974) Br. Vet. J. 130 45—53.

Sivades, C.G. Rajan, A. and Krishnan Nair, M (1965). Indian Vet. J. 42, 1974.

Smith, W.N. and Davis, L.R. (1965). Am. J. Vet. Res. **26,** 273.

The attached photos show the following.

1. Figure number (1) infiltration of leucocytes.
2. Figure number (2) the intestinal glands were denuded of epithelium and filled with macro, and microgametocytes, oocysts and cell oebris.
3. Figure number (3) coccidial Schizont in the mesentric lymph node.