

<http://www.pjbs.org>

**PJBS**

ISSN 1028-8880

**Pakistan  
Journal of Biological Sciences**

**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Severe and Diffuse Nodular Hyperplasia of Jejunum Due to *Eimeria* Species in an Iranian Native Kid

Hossein Nourani, Iraj Karimi and Hamidreza Azizi  
Department of Pathobiology, School of Veterinary Medicine,  
Shahrekord University, Shahrekord, Iran

**Abstract:** A six weeks old native kid from a flock with history of diarrhea with or without mucus or blood, unthriftiness, emaciation, weakness, anorexia and death was referred to Department of Pathobiology, Faculty of Veterinary Medicine, University of Shiraz. At necropsy, severe and diffuse white nodular lesions were present on the mucosal surface of jejunum. The direct smear of mucosal scrapings showed large number of oval oocysts. Histopathological examination of jejunal nodules revealed severe hyperplasia of the villous and crypt epithelial cells containing developmental stages of *Eimeria* species. In lesions exhibiting this hyperplasia, elongated crypts and long papillary fronds of villi were observed. In addition, very long extensions of tunica submucosa were seen between adenomatous mucosal surface. Gross and histopathological examination of jejunum is very important in post mortem diagnosis of intestinal coccidiosis in goats. In our study, macroscopic and microscopic lesions of coccidiosis in the jejunum were unique and very severe.

**Key words:** Coccidiosis, kid, pathology, nodular hyperplasia, jejunal nodules

### INTRODUCTION

Coccidiosis in goats is an important disease resulting from complex interactions between parasites and host, with many factors influencing the severity of disease (Koudela and Bokova, 1998). Coccidia are known to occur in organs other than the intestine including liver, bile ducts, gall bladder, hepatic and mesenteric lymph nodes in the caprine species (Dai *et al.*, 1991; Lima, 1981; Mahmoud *et al.*, 1994; Schafer *et al.*, 1995). Various *Eimeria* species were identified in fecal samples of goats but *E. arloingi* and *E. ninakohlyakimouae* were considered to be the most pathogenic species (Koudela and Bokova, 1998; Norton, 1986; Vercruysse, 1982).

A six weeks old native kid from a flock with history of diarrhea with or without mucus or blood, unthriftiness, emaciation, weakness, anorexia and death was referred to Department of Pathobiology, Faculty of Veterinary Medicine, University of Shiraz.

At necropsy, severe and diffuse white nodular lesions were present only on the mucosal surface of jejunum (Fig. 1). Duodenum, ileum, cecum and colon did not show any nodular lesions. The authors have frequently observed discrete nodular lesions due to coccidiosis (Fig. 2) in kids, but in the current case, the jejunal lesions were unique and very severe. The direct

smear of mucosal scrapings showed large number of oval oocysts that confirmed coccidiosis. For histopathological examination of jejunal nodules, tissue samples were taken and fixed in 10% neutral buffered formalin. They were processed and embedded in paraffin. Sections of 5 µm thickness were cut and stained with haematoxylin and eosin.

Histopathological examination of jejunal nodules revealed severe hyperplasia of the villous and crypt epithelial cells containing coccidia. In lesions exhibiting this hyperplasia, elongated crypts and long papillary fronds of villi were observed (Fig. 3). Different developmental stages of the *Eimeria* life cycle especially sexual cycle were readily recognized within hyperplastic villous and crypt epithelial cells (Fig. 4). In addition, very long extensions of tunica submucosa were seen between adenomatous mucosal surface. A moderate infiltration of inflammatory cells including plasma cells, lymphocytes and macrophages were present in the lamina propria.

### DISCUSSION

Coccidia are obligate intracellular parasites whose development within the cytoplasm of epithelial cells results in the death of affected cells. The total effect on the host depends on the magnitude of the initial infecting dose of oocysts, which determines the number of invaded



Fig. 1: Severe and diffuse white nodular lesions are seen on the mucosal surface of jejunum

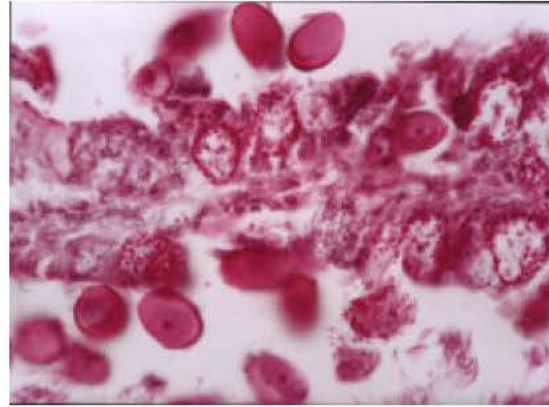


Fig. 4: Different stages of Coccidia especially oocysts are seen in the crypt epithelium and lumen (H and E,  $\times 528$ )

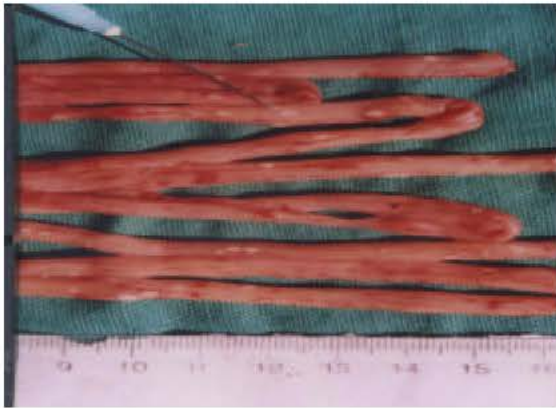


Fig. 2: Discrete nodular lesions due to coccidiosis

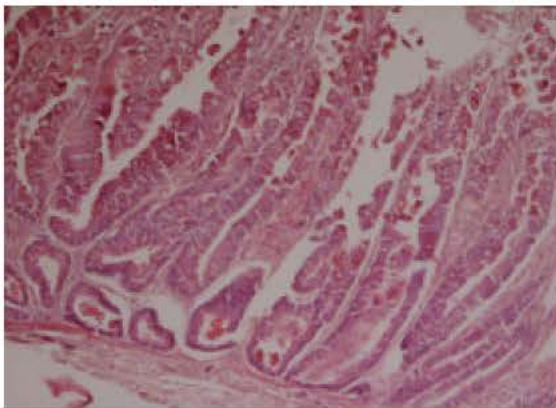


Fig. 3: Note elongated crypts lined with hyperplastic, tall columnar cells containing coccidia (H and E,  $\times 92.5$ )

cell and the spread of infection during schizogony, which is affected to a great extent by immunity acquired by the host (Jones *et al.*, 1997).

In this study, severe gross and histopathological lesions of coccidiosis were observed in the jejunum. Koudela and Bokova (1998) diagnosed clinical coccidiosis in kids 2 to 4 weeks after weaning and mortality rate reached 30%. At necropsy, macroscopic pathological lesions included mucosal hemorrhages and nodular polyps were found in the jejunum. *E. arloingi* and *E. ninakohlyakimouae* were identified as clinical coccidiosis cause (Koudela and Bokova, 1998). In our study, the causative Eimeria species was not identified. Jejunal lesions and well-delineated, coalescing area of hepatic coccidiosis were described in a case of naturally occurring coccidiosis in a goat (Schafer *et al.*, 1995). Mahmoud *et al.* (1994) reported a hepatobiliary coccidiosis in a dairy goat, but intestinal lesions were observed only microscopically (Mahmoud *et al.*, 1994).

In this case, histopathological examination of jejunal nodules showed different developmental stages of the Eimeria life cycle especially sexual cycle within hyperplastic villous and crypt epithelial cells. This finding is in agreement with Jones *et al.*, 1997. In hyperplastic lesions, coccidia in various stages of gametogenesis are most numerous. This is in contrast to the erosive, hemorrhagic stages, in which organisms in various stages of schizogony are most common (Jones *et al.*, 1997).

Gross and histopathological examination of jejunum is very important in post mortem diagnosis of intestinal coccidiosis in goats. In our study, macroscopic and

microscopic lesions of coccidiosis in the jejunum were unique and very severe.

#### **ACKNOWLEDGMENTS**

The authors thank Mr. Shirvani and Mr. Khatami for their technical assistance.

#### **REFERENCES**

- Dai, Y.B., M.C. Lin, S.X. Zhang and A.Q. Fu, 1991. Hepatic coccidiosis in the goat. *Intl. J. Parasitol.*, 21: 381-382.
- Jones, T.C., R.D. Hunt and N.W. King, 1997. *Veterinary Pathology*. Lippincott William and Wilkins.
- Koudela, B. and A. Bokova, 1998. Coccidiosis in goats in the Czech Republic. *Vet. Parasitol.*, 76: 261-267.
- Lima, J.D., 1981. Life cycle of *Eimeria christenseni* Levine, Ivens and Fritz, 1962 form the domestic goat, *Capra hircus* L. *J. Protozool.*, 28: 59-64.
- Mahmoud, O.M., E.M. Haroun and A. Sulman, 1994. Hepatobiliary coccidiosis in a dairy goat. *Vet. Parasitol.*, 53: 15-21.
- Norton, C.C., 1986. Coccidia of the domestic goat *Capra hircus*, with notes on *Eimeria ovinoidalis* and *E. bakuensis* (*E. ovina*) from the sheep *Ovis aries*. *Parasitol.*, 92: 279-289.
- Schafer, K.A., G.W. Stevenson and K.R. Kazacos, 1995. Hepatic coccidiosis associated with hepatic necrosis in a goat. *Vet. Pathol.*, 32: 723-727.
- Vercruysse, J., 1982. The Coccidia of sheep and goat in Sengal. *Vet. Parasitol.*, 10: 297-306.