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Jyothi Chatta
Assistant Professor, (Contractual), Department of Veterinary Pathology, College of Veterinary Science, Proddatur, SVVU, Tirupati, Andhra Pradesh, India

Yugandhar C
Assistant Professor, (Contractual), Department of Veterinary Pathology, College of Veterinary Science, Proddatur, SVVU, Tirupati, Andhra Pradesh, India

Srinivasa Naik H
Associate Professor and Head, Department of Veterinary Pathology, College of Veterinary Science, Proddatur, SVVU, Tirupati, Andhra Pradesh, India

Yuvaraj C
Third Professional Year, Undergraduate, College of Veterinary Science, Proddatur, SVVU, Tirupati, Andhra Pradesh, India

Hruday N
Third Professional Year Student, Undergraduate, College of Veterinary Science, Proddatur, SVVU, Tirupsati, Andhra Pradesh, India

Narmada S
Veterinary Doctor, Mobile Veterinary Clinic, Naidupeta, Andhra Pradesh, India

Corresponding Author:
Jyothi Chatta
Assistant Professor, (Contractual), Department of Veterinary Pathology, College of Veterinary Science, Proddatur, SVVU, Tirupati, Andhra Pradesh, India

Nodular lesions in the intestine of goat with coccidiosis: A case report

Jyothi Chatta, Yugandhar C, Srinivasa Naik H, Yuvaraj C, Hruday N and Narmada S

Abstract
Coccidiosis is the most economically important and highly contagious parasitic disease in goats, caused by *Eimeria* spp. A carcass of a 6-month-old female goat was presented for necropsy. Dissection of the small intestines revealed small white to grayish raised nodules throughout the length, and the mucosa of the large intestine showed congestion, hemorrhage, and blood-mixed contents in the lumen. Coccidia oocysts were observed under microscopic fecal examination. Based on history, clinical symptoms, and gross and fecal examinations, the present case was diagnosed as coccidiosis.

Keywords: Coccidiosis, goat, nodules, polyps, case report, nodular lesions

Introduction
A major hindrance that can significantly lower a small ruminant's productivity levels is gastrointestinal parasitic infection (Benavides *et al.*, 2015) [1]. Globally, intestinal coccidiosis is a significant parasitic illness affecting small ruminants. It is caused by coccidian parasites of the genus *Eimeria*. Out of 15 goat species, the ones that pose the most threat are E. christenseni, E. arloingi, E. caprina, and E. ninakohlyakimovae (Razavi and Hassanvand, 2007) [2]. The disease mainly affects young animals, and lesions arise both in the small and large intestines (Chartier 2012) [3]. Sporulated oocysts are the source of coccidiosis infection in goats. Sporozoites, which infect intestinal epithelial cells, are released by sporulated oocysts, resulting in the loss of electrolytes and nutrients that leads to malabsorption (Foreyt, 1990; Jubb *et al*., 2007) [4, 5]. There are two types of *Eimeria* parasite incidence: acute and chronic. In the former, symptoms include diarrhea, which is a common symptom that persists for three to four days and leads to weakness, anorexia, abdominal pain and weight loss (Levine *et al*., 1985) [6]. In chronic infection, the symptoms include overall weakness, weight loss, and stunted lamb growth (Deger, 2003) [7]. Coccidiosis is causing more financial losses to the goat farming community (Tafti and Mansourian, 2008) [8] because of high morbidity, mortality, poor growth and treatment cost. Weaning, sudden changes in feed, shipping, overcrowding and a damp environment are the main predisposing factors for the multiplication of coccidiosis in small ruminants (Pugh, 2002; Ballweber, 2001) [9, 10].

Case history and Observation
A female goat of 6 months old with an approximate weight of 20 kg was presented to the Department of Veterinary Pathology, College of Veterinary Science, Proddatur for necropsy. Farmer having a total number of 80 goats, rearing in the traditional free-range farming system. Out of 80, 20 animals aged between 6 months to 1-year-old were died within a week with the history of depression, loss of appetite and bloody diarrhea. Upon external post-mortem examination, the condition of the goat was emaciated and dehydrated with pale visible mucous membranes and blood mixed fecal material was adhered to the hair around the anus.

Material and Methods
Necropsy of the goat was conducted and various gross lesions were recorded in different organs. Mucosal scrapings from the affected part of the intestine were taken to determine.

The presence of oocysts in the intestinal mucosa. By analyzing the physical characteristics of the oocysts as reported by Soulsby (1986) [11], the coccidian parasites were identified.

Results and Discussion

Gross and Fecal examination

According to the current study, an outbreak was identified in young animals due to decreased epithelial turnover and it brings a tremendous loss to the farmers (Mcgavin and Zachary, 2007; Tafti & Mansourian, 2008) [12, 8]. Around 250 ml of clear serous fluid (ascites) was found in the abdominal cavity during post-mortem examination; this fluid may be the result of hypoproteinemia (Dargie J.D. and Allonby E.W 1975) [13]. The target tissue of this protozoan parasite are the small and large intestines. The small intestine's mucosa was thickened and displayed tiny, slightly elevated white to grayish nodules. These nodules are 1 to 2 mm in diameter and scattered throughout the length (Fig.1). In the small intestine, the polypoid nodules were more noticeable than in the large intestine. These polypoid nodules may be the outcome of mitogenic stimuli from progamonts as well as the aggregation of various parasitic stages (Tafti & Mansourian, 2008) [8]. In sheep and goat, the nodular lesions are incidental findings. The lumen of the large intestine was completely accumulated with blood (Fig.2). In kids, because of a heavy infection, the mucosa is completely denuded, resulting in severe hemorrhage and impaired water resorption leads to diarrhea, dehydration, electrolyte imbalance and finally death. Intestinal hemorrhage leads to anemia and hyperproteinaemia. (Satish *et al.*, 2019) [14]. A severe case of anemia could be the reason for the pale heart, lung, and kidney. There was a significant enlargement of the mesenteric lymph nodes were noticed (Fig 3), (Ahmadi *et al*. 2021) [15]. Although it has been reported that oocysts and coccidial gametocytes can sporadically form in the mesenteric lymph nodes and lymphoid aggregates, can cause a moderate granulomatous reaction. Stages in lymph nodes are abnormal and these probably result from the development of sporozoites or primary merozoites that are moved from the lacteals into the lymphatic drainage (Jubb *et al*. 1993) [5]. These lesions are not consistent with the findings of Khodakaram Tafti & Mansourian 2008 [8].

Fecal examination revealed, the presence of a round to oval shaped double layered oocyst of *Eimeria* spp. (Fig.4&5). More than 1000 number of *Eimeria* oocysts per gram (OPG) were determined (Kanyari, 1988) [16]. Preventing ruminant coccidiosis is advised through pasture management, hygiene measures, and optimal nutrition. However, it is sometimes difficult to put these preventive measures into practice and the primary approach to control is typically metaphylaxis using anti coccidial drugs (Odden *et al.*, 2017) [17].

Fig 1: Mucosa of Jejunum showing multiple small white to grayish polypoid nodules

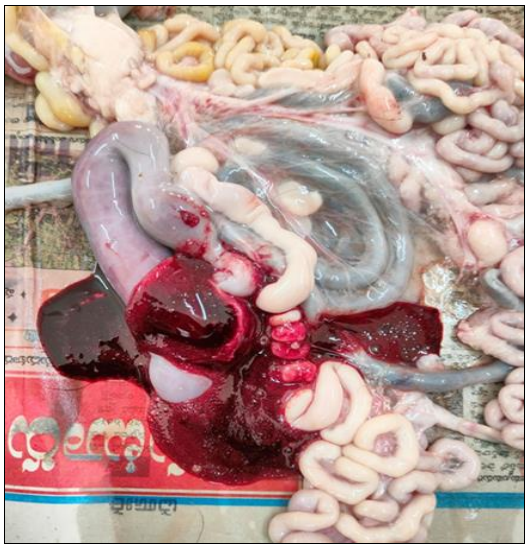

Fig 2: Large intestine showing thick unclotted blood mixed contents

Fig 3: Note extensively enlarged mesenteric lymph nodes.

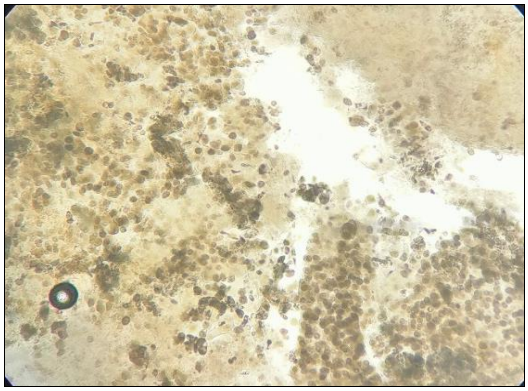

Fig 4: Note unsporulated coccidia oocyst in the intestinal scraping 10X

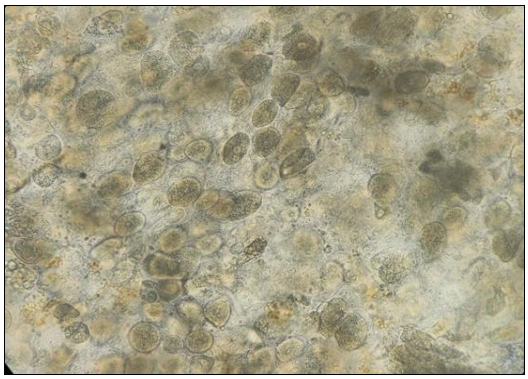

Fig 5: Coccidia oocyst in mucosa of intestinal scrapings 40 X

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Conflict of interest
None

Conclusions
Coccidiosis caused by *Eimeria* spp., is a major parasitic illness affecting small ruminants, leading to significant economic losses due to high morbidity, mortality, and treatment costs. This study presents a case of a 6-month-old goat with severe intestinal coccidiosis, characterized by bloody diarrhea, anemia, and intestinal lesions. Necropsy and fecal examinations confirmed the presence of *Eimeria* oocysts. Effective prevention includes pasture management, hygiene, and nutrition, though these are challenging to implement, necessitating the use of anticoccidial drugs for control. This case underscores the importance of proactive management in reducing the impact of coccidiosis on small ruminant productivity.

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