

Case Study

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Concurrent Infection of *Trichuris ovis* and *Eimeria ninakohlyakimovae* in Goat: A Case Report

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ABSTRACT

Keywords

Eimeria ninakohlyakimovae, Goat, Histopathology, Morphometric analysis *Trichuris ovis*

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The present study reports a case of co-infection with *Eimeria ninakohlyakimovae* and *Trichuris ovis* in goat kid. Clinical history demonstrated severe illness with anorexia, increased lethargy and greenish yellow diarrhoea. Necropsy examination demonstrated thickened and congested intestinal mucosa. Non-pedunculated whitish nodules were seen on the mucosa of jejunum and ileum. *Trichuris ovis* worms were embedded in the caecal mucosa by their anterior end. The intestinal contents revealed numerous coccidian oocysts of *Eimeria ninakohlyakimovae*. Eosinophilic nuclei with centrally placed nucleus in macrogamonts and basophilic nuclei in microgamonts were arranged in periphery with infiltration of lymphocytes and few plasma cells in intestine. Characteristic lesions observed were hyperplasia of intestinal epithelium and villus blunting.

Introduction

Coccidiosis is a major stress induced enteric protozoan disease causing severe losses to livestock industry. It is caused by microscopic Apicomplexon organism called Coccidia. A total of 17 *Eimeria* species have been described in goats. Coccidiosis in animals mainly depends on factors like age of animal, species of *Eimeria*, number of oocysts ingested and managemental practices. *Eimeria* in goats develops in small and large

intestine and causes enteritis eventually resulting in death of the infected animal. *Eimeria ninakohlyakimovae* has been frequently associated with caprine coccidiosis worldwide and is also regarded as pathogenic for animals of all age groups (Kanyari, 1993). Analogous to the bovine system, where the most pathogenic *Eimeria* species infect epithelial cells and develop into macromeronts, *Eimeria ninakohlyakimovae* also resides in this peculiar location and shows similar developmental features (Ruiz *et*

al., 2006) leading to severe intestinal disease characterized by catarrhal diarrhoea, weight loss, dehydration and stunted growth (Koudela and Boková, 1998). *Eimeria* parasite in goat can be located in liver, gall bladder, hepatic and mesenteric lymph nodes and small and large intestine (Nourani *et al.*, 2006).

Trichuris ovis is a commonly occurring round worm found in caecum of the hosts. The anterior end of the worm forms syncytial tunnels of epithelial cells around itself while it burrows through the host mucosa (Grencis and Laura, 2004). The posterior end protrudes into the lumen facilitating egg release. Heavy infection is usually observed in kids suffering from diphtheritic caecitis causing necrotic lesions on mucosa (Soulsby, 1982). This is the report to document mixed parasitic infection of *Trichuris ovis* and *Eimeria ninakohlyakimovae* in a goat.

A 17 day old, goat kid was received for necropsy with a history of anorexia, depressed growth rate, dullness and severe diarrhea. The clinical material was collected from goat kid at the time of postmortem at Department of Pathology, Nagpur Veterinary College, Nagpur, India. A detailed post mortem was conducted and intestinal content was collected for direct smear method and standard floatation technique. Sporulation of the separated oocysts was performed in wet chamber at 24-26°C in a 2.5% aqueous solution of potassium dichromate (You, 2014). Tissue samples of intestine were collected in 10% buffered formalin for histopathological study. The formalin-fixed tissues were subjected to histopathological processing as per standard procedures (Luna, 1968). The worms recovered from the caecal mucosa were collected, washed and stretched in normal hot saline. The worms were preserved in 70% alcohol, dehydrated in glycerine-alcohol and then placed in

desiccator at room temperature for 3-4 weeks for clearing. Dehydrated nematodes were then mounted on glass slides in anhydrous glycerine and observed under the microscope (Zainaband Wajihullah, 2016).

Grossly, the intestinal mucosa showed congestion and thickening. Direct smear and standard floatation technique of the intestinal contents revealed coccidian oocysts. The coccidian oocysts were identified on basis of its morphological features like shape of oocyst, presence of micropyle, polar cap, colour, shape of sporocyst and presence of stieda body (Soulsby, 1982). Results of the present study revealed that oocyst were sub spherical with micropyle. Micropylar cap was absent. The oocyst wall was double layered and 2.6 µm thick. The outer layer was smooth and yellowish-brown in color and 1.3 µm thick. The inner layer was light yellow with thickness of 1.2 µm. One or more polar granules were present. The micropyle measured 1 µm wide. The oocyst was identified as *Eimeria ninakohlyakimovae*. This was in congruence with earlier report of Sharma *et al.*, (2009). Prevalence studies on oocyst affections in goats have suggested that *Eimeria ninakohlyakimovae* is frequently associated with caprine coccidiosis and is regarded as the most pathogenic protozoan for goats of all ages (Kanyari, 1993).

The caeca revealed anterior end of *Trichuris ovis* embedded in the mucosa. The worms isolated from intestinal segments had morphological characteristics of transversally striated cuticle. In males, the posterior end was spirally coiled with a single spicule, having slightly expanded proximal and a pointed distal end. In case of female, posterior extremity was slightly curved. On the basis of morphological features, worms were identified as *Trichuris ovis* (Soulsby, 1982). Histopathological examination of intestine revealed *Eimeria ninakohlyakimovae* residing

in the lower small intestine and large intestinal segments. Developmental stages including microgamonts and macrogamonts infecting the segment of small intestine were observed. Eosinophilic nuclei with centrally placed nucleus in macrogamonts and basophilic nuclei in microgamonts were arranged in periphery with infiltration of lymphocytes and few plasma cells in the infected area (Fig. 1). Hyperplasia of intestinal epithelium and chronic enteritis characterized by infiltration of lymphocytes in enterocytes of intestinal villi were the characteristic pathological lesions (Fig. 2). Villus blunting and necrosis of intestinal villi was observed due to the embedded attenuated anterior end of *Trichuris ovis* (Fig. 3). The histopathological lesions were in agreement with results of Hashemnia *et al.*, (2012). Overall, it is proposed that the subclinical

coccidiosis poses economic losses which might be higher than the ones caused by clinical coccidiosis (Cornelissen *et al.*, 1995). Hence, this study cautions the goat husbandry professionals about the significance of preliminary screening of the samples and consideration about the possibility of the prevalence of mixed infection. This will help in the prompt identification of the disease and ensure early and appropriate management strategies along with an effective therapeutic regime.

On the basis of parasitological and histopathological findings, the case was diagnosed to be a mixed infection of *Trichuris ovis* and *Eimeria ninakohlyakimovae* in goat. Proper managemental strategy is the need of the hour to curb the growing mishap of parasitic infestation in goats worldwide.

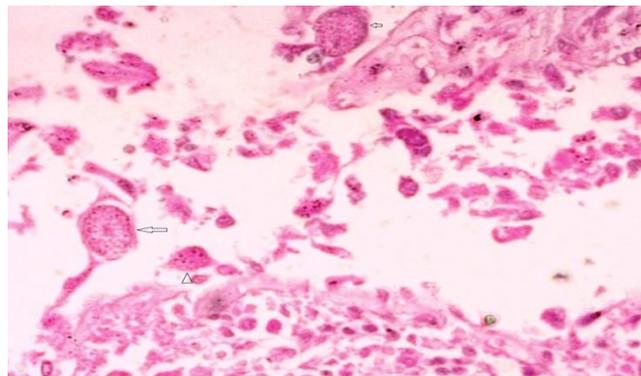


Fig.1 Developmental stages including microgamonts (arrow) and macrogamonts (arrowhead) infecting the segment of small intestine (H & E, 20X)

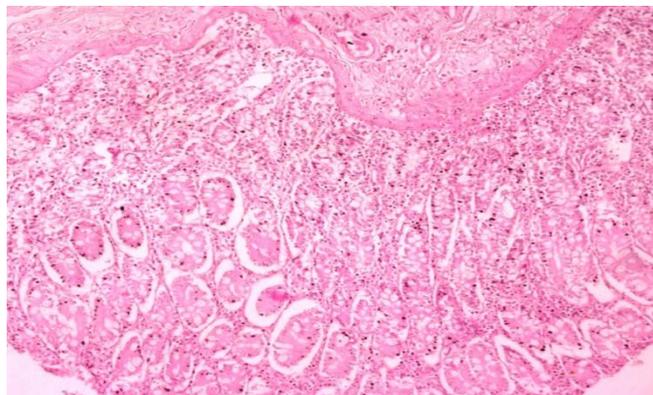


Fig.2 Hyperplasia of intestinal epithelium and infiltration of lymphocytes in between enterocytes of intestinal villi. (H & E, 20X)

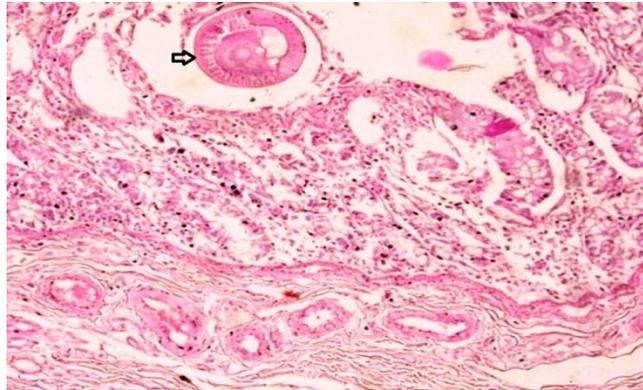


Fig.3 Villus blunting and necrosis of enterocytes at tip of intestinal villi due to the embedded anterior end of *Trichuris ovis* (arrow). (H & E, 20X)

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