

***EIMERIA* SPECIES INFECTION IN SURTI GOAT KIDS**

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Abstract: Caprine coccidiosis, protozoan disease caused by *Eimeria* species, is major parasitic diseases characterized by contagious enteritis. Severity of *Eimeria spp.* infection is more in young animals. Two goat kids aged below one year died with history of mucoid to haemorrhagic yellow watery diarrhea, anorexia, emaciation, poor growth and death. At necropsy, gross lesions in intestines revealed diffuse small whitish non-pedunculated nodules of 5mm to 8mm diameter size in mucosa with focal petechial hemorrhages. Microscopic examination of intestinal content revealed numerous *Eimeria spp.* sporulated and unsporulated oocysts. In histopathological examination of intestines, enteritis was observed with denuded glandular epithelial cells, focal hyperplasia of intestinal villi and goblet cells, mild to moderate infiltration of inflammatory cells and haemorrhage. Various developmental stages of *Eimeria spp.* were also discernible in intestinal epithelial cells. Hence, caprine coccidiosis was diagnosed as the cause of death in kids.

Keywords: Coccidiosis, Kids, Surti Goat.

Introduction

Coccidiosis, one of the economically important parasitic diseases of goats with worldwide distribution (Chartier and Paraud, 2012.) is caused by the apicomplexan protozoan parasite of genus *Eimeria* (Kimbata et al. 2009). Among goats, 17 *Eimeria* species have been described of which *E. christenseni*, *E. arloingi*, *E. caprina*, and *E. ninakohlyakimovae* are considered as pathogenic species (Silva and Lima, 1998). Goats of all ages are susceptible to *Eimeria spp.* infections, but disease is more serious in 4–6 months old kids (Taylor and Catchpole, 1994). Poor managemental practices like rearing of goats in overcrowded, unhygienic houses and stressor factors such as weaning, dietary changes, transportation and cold or hot weather, etc. favors chance of this disease (Gul, 2007).

Infected animal shed oocysts of *Eimeria spp.* in the faeces and serve as foci of infection to other animal. Ingestion of sporulated oocysts leads to infection in healthy animal.

In the small intestine, sporulated oocysts release sporozoites and invade to intestinal

epithelial cells, resulting in loss of electrolytes, nutrients malabsorption and enteritis (Jubb et al., 2007; McGavin and Zachary, 2011). Clinical signs in kids range from non-hemorrhagic to severe hemorrhagic diarrhea, with accompanying weight loss, dehydration, poor growth and death (Koudela and Bokova, 1998). Hence, the disease causes significant economic losses due to high mortality, morbidity, poor growth and treatment costs (Temizel et al., 2011). This paper places on record pathology of *Eimeria* species infection in Surti goat kids.

Materials and Methods

Two goat kids of either sex (One female, one male), were presented to the Department of Veterinary pathology, College of veterinary Science and Animal Husbandry, Navsari Agricultural University, Navsari for postmortem examination in the year 2013 in September. The kids were aged below one year. The kids were raised under semi intensive management system at Livestock Research Station, Navsari Agricultural University, Navsari.

The clinical history revealed kids had mucoid to haemorrhagic yellow watery diarrhea, anorexia, emaciation, poor growth and sudden death. Postmortem examination was conducted to know the cause of death on all the kids that died. At necropsy, gross lesions were recorded and representative tissue samples were collected in neutral buffer formalin for histopathological study. During postmortem intestinal content (faecal samples) were collected from intestinal segments and subjected to direct faecal sample examination. Tissue samples were trimmed, washed thoroughly under running tap water, dehydrated in different grades of alcohol, cleared, embedded in paraffin wax and blocks were made. The cut sections of five microns were by routine Hematoxylin and Eosin (H & E) staining method (Singh and Sulochana, 1996). Stained sections were examined under a light microscopy.

Results and Discussion

Microscopic examination of intestinal content revealed 15-20 sporulated and unsporulated oocysts of *Eimeria* species per low power field in both the kids indicating infection and severity. So cause of death in kids was found to be *Eimeria spp.* infection. However *Eimeria* species was not identified in the present cases.

Gross lesions were experiential mainly in the lower jejunum, ileum and in the cecum. Intestines revealed thickened mucosa, severe diffuse small whitish non-pedunculated nodules of 5mm to 8mm diameter size in mucosa. The larger nodules were also discernible from external surface of intestine through the tunica serosa. Focal petechial hemorrhages were noted at few places in intestine. The present findings were in accordance with earlier reports (Kheirandish et al., 2014; Gazyagci et al., 2015).

Histomorphological lesions in intestines were characterized by focal desquamation, disruption and exfoliation of glandular epithelial cells with stunted villi. At few places, goblet cells hyperplasia and hyperplasia of the intestinal villi with infiltration of inflammatory cells mainly lymphocytes, eosinophils, plasma cells and polymorphonuclear cells in lamina propria were noted. In addition, congestion and haemorrhage were also discernible. Intestinal epithelial cells, crypts and intestinal glands revealed various developmental stages of *Eimeria* i.e. trophozoite, schizonts, microgamonts and macrogametes. At few places oval, double walled oocysts were seen in the mucosa.

Coccidiosis is protozoan disease caused by *Eimeria* species. The protozoan parasite infects animals and birds including goats. The disease has been reported world widely including Asia (Rehman et al., 2011; Chartier and Paraud 2012) and has high mortality rate among all the parasitic diseases (Sharma and Singh, 1997). Coccidiosis in goats is considered as disease of young animals (Jubb et al., 2007) and severity is more in kids. In this report, investigation revealed cause of death in kids was infection with *Eimeria spp.* The present report described pathology of caprine coccidiosis.

Infection to kids might have occur by ingestion of oocysts from either infected or carrier animals. Pathogenesis of infection begins as after ingestion of sporulated oocysts, the sporozoite infects intestinal lining cells, gradually increases in size and becomes trophozoite and finally schizont. The mature schizont contains many elongated spores known as merozoites. The schizont ruptures its own and resulting in destruction of epithelial cells with release of numerous merozoites. Merozoites infect more intestinal cells causing further epithelial cells destruction (Jubb et al., 2007). Destruction of intestinal mucosa by *Eimeria spp.* results in hemorrhagic enteritis. (Radad and Khalil, 2011). Occasional villous atrophy as well as hyperplasia observed might have resulted due to immunopathological response (Ghosh and Tigga, 2007).

In the present report grossly, small whitish non-pedunculated nodules of 3mm to 8mm diameter size were noted in mucosa. These observations were in agreement with earlier findings (Nourani et al., 2006). Histopathologic observations including hyperplasia of intestinal villi and different coccidial stages in intestinal epithelial cells noted in the present study were in accordance with earlier reports (Koudela and Bokova,1998; Dai et al., 2006; Khodakaram Tafti and Mansourian, 2008; McGavin and Zachary 2011; Hashemnia et al., 2012).

Conclusion

The present study demonstrates *Eimeria* species infection in Surti goat kids and its pathology. The investigation warrants regular screening of goats for presence of *Eimeria* spp. oocysts and prophylactic measures to prevent major outbreak of caprine coccidiosis.

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