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RESEARCH ARTICLE

PATHOLOGY OF HAEMONCHOSIS IN A SWAMP BUFFALO CALF

***Das M[1], Deka D.K.[2] and Islam S[3]**

[1]Division of Animal Health, ICAR Research Complex for NEH Region, Umiam, Meghalaya
[2,3]Department of Parasitology, College of Veterinary Science, Khanapara, Assam

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ABSTRACT

An eight month old swamp buffalo calf has exhibited symptoms of anorexia, weakness and debility before death. Post mortem examination of gastrointestinal tract revealed presence of few parasites in the abomasum only. Abomasum is one of the specific locations for bursate nematodes of Trichostrongylidae family. Gross examination of the abomasal mucosa revealed presence of oedema, petechial haemorrhage and nematode parasites. Nematode parasites were identified as *Haemonchus contortus* after clearing in Lactophenol. For histopathological studies, tissue samples of abomasum with lesion were fixed, processed and stained by haematoxylin and eosin. Microscopic examination of stained tissue sections showed presence of degeneration, sloughing and necrosis of the lining epithelium; haemorrhage in the blood vessels of the muscular layer and infiltration of eosinophils in the sub-mucosal layer. Atrophied gastric glands and glandular degeneration were also observed.

INTRODUCTION

The indigenous buffaloes of Assam have been described as Swamp buffaloes. They are hardy, medium sized with typical body conformation and quite adaptable to the local warm and humid condition of the region. In India Swamp buffaloes are found mostly in Orissa, West Bengal, Assam and other parts of the North Eastern states. Abomasum is one of the most important sites of bursate nematodes belonging to Trichostrongylidae family. *Haemonchus contortus* (Rudolphi, 1803) is the prime species occurring in the mucosa and contents of the abomasum of sheep goats, cattle and numerous other ruminants in many parts of the world, especially important in areas with a hot and moist climate. It is a highly pathogenic blood-feeder Division of Animal Health, ICAR Research Complex for NEH Region, Umiam, Meghalaya helminth that causes anaemia, reduced productivity and can lead to death in infected animals (Burke *et al*., 2007).

In India, it is considered to be the most important intestinal parasite of ruminants (Sood, 1981; Laha *et al*., 2013). According to Gilleard (2013) members of the genus *Haemonchus* are blood-feeding parasitic nematodes that are amongst the most economically important parasites of grazing ruminants worldwide. The genus *Haemonchus* has its evolutionary origins in sub-Saharan Africa where there are a variety of species in indigenous artiodacyl hosts (Hoberg *et al*., 2004). The infective larva is of special interest because it is the form that persists on pasture, infects susceptible animals. The life cycle of *Haemonchus* is direct, blood-feeding adults produce eggs that are shed in the feces. An infective larva (L_3) develops in 3 days under optimum conditions. Following ingestion by the ruminant host, development to the fourth stage is completed in 48 hours. Larvae, situated at the surface of the abomasal mucosa, feed on blood and develop to the adult stage; the prepatent period is 18-21 days (Levine, 1980). Moreover, the fourth larval (L_4) and adult stages of this worm suck blood, move and leave the wounds resulting in hemorrhage from the abomasal wall of the host. A blood sucking *H. contortus* can suck about 0.05 ml blood per day in ovine (Ijaz *et al*., 2009). Losses due to this parasitic infection occur in the form of mortality, poor health, retarded growth and poor meat/milk production. This paper reports the histopathological changes due to presence of *H. contortus* in the abomasum of a swamp buffalo calf in Guwahati, Assam.

MATERIALS AND METHODS

Necropsy of an eight month old swamp buffalo calf was carried out in the Buffalo Farm, College of Veterinary Science, Khanapara, Guwahati, Assam as per the standard procedures. Externally the dead animal exhibited symptoms of hide bound condition, weakness and debility. Gross lesions observed were systematically recorded and the parasites were recovered. For

Corresponding author:* **Das M,
Division of Animal Health, ICAR Research Complex for NEH Region, Umiam, Meghalaya

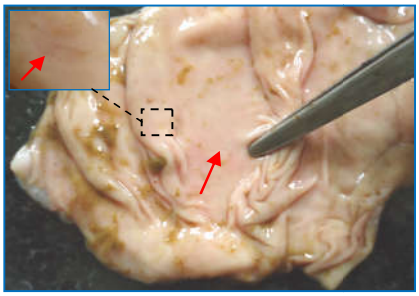

Fig 1 Abomasal mucosa having petechial hemorrhage and nematode parasites

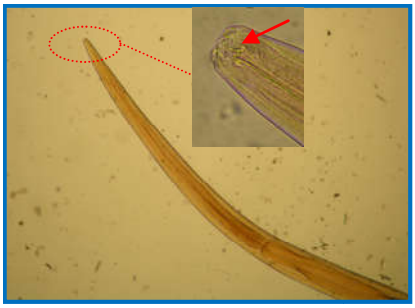

Fig 2 Anterior end of H. contortus showing dorsal lancet, slightly curved structure (100X)

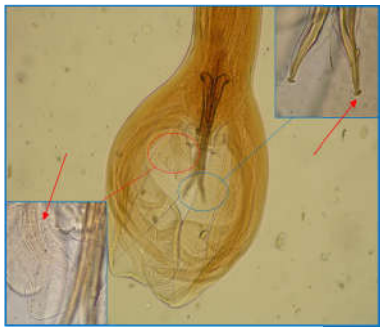

Fig 3 Posterior end of male *H. contortus* showing bursa and spicule (400X).

Fig 4 Female H. contortus showing linguiform vulvar flap (400X).

morphological studies, all parasites (n=14) were cleared in lactophenol for overnight and examined under a light microscope. For histopathological studies, tissue sample with lesion was fixed in 10% formalin. Formalin fixed tissue sample was processed for histopathological study by conventional paraffin embedding technique. Tissue sections of 4-5 micron thickness was cut and stained by haematoxylin and eosin (H&E) as per the standard procedure (Luna, 1968). The stained sections were examined under microscope and the histopathological alterations, if any, was recorded.

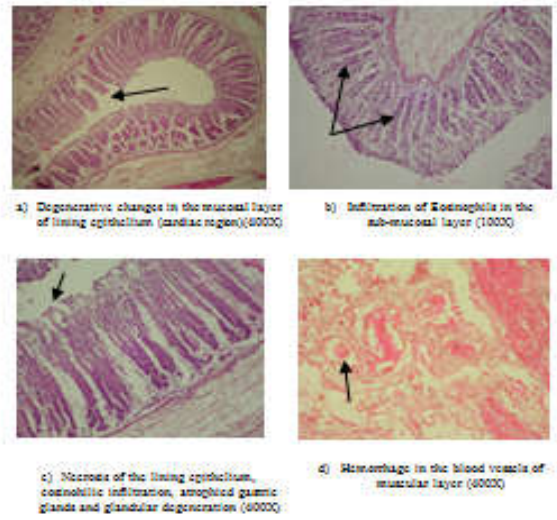

Fig 5 a-d Histopathological changes in the abomasums of swamp buffalo infected with Haemonchus contortus H&E (400X).

RESULTS AND DISCUSSION

Necropsy findings revealed presence of petechial hemorrhage and nematode parasites (n=14) in the mucous membrane of abomasum (Fig. 1). Both male (n=4) and female (n=10) *H. contortus* were identified under light microscope (Soulsby, 1982). Anterior end of *H. contortus* showed presence of a single dorsal lancet in the buccal cavity, a slightly curved structure (Fig. 2). Posterior end of the male *H. contortus* showed presence of a bursa. The elongated lateral lobes of the bursa are supported by long rays while asymmetrical dorsal lobe is supported by Y-shaped dorsal bursal rays (Fig. 3). The spicules of the male have a small barb near its extremity at unequal distance from the tip. The vulva of the female is covered by a linguiform vulvar flap (Fig. 4).

Histopathologically, cardiac region of abomasum showed degenerative changes in the mucosal layer of lining epithelium. Infiltration of eosinophils in the sub-mucosal layer, necrosis of the lining epithelium, atrophied gastric glands and glandular degeneration was also observed. There was hemorrhage in the blood vessels of muscular layer (Fig. 5a-d). These changes were more or less similar to the finding of Tehrani *et al.* (2012) like infiltration of mononuclear cells and eosinophils in gastric glands, periglandular hyperemia and haemorrhage, mucous gland hyperplasia, connective tissue proliferation and necrosis in the abomasum of sheep infected with *H. contortus*. Similarly, Ahmed *et al.* (2007) observed severe mucosal and submucosal haemorrhages, degeneration of epithelial cells and infiltration of eosinophils in the abomasum of sheep infected with *H. contortus*. According to Onyenwe *et al.* (2005) debilitating infection with this parasite is most commonly seen in young animals while resistance to infection develops, with exposure, in older animals.

The present finding has significance because the presence of *H. contortus* in the abomasum of a swamp buffalo calf causes histopathological changes and in severe infection may lead to death. Thus, it is important to minimize the infection by treating infected animals. So far our knowledge is concerned; there is no report on histopathology of *H. contortus* infection in

swamp buffalo calf of North East region of India and this may be considered as the first report on histopathology of *H. contortus* infection in a swamp buffalo calf from Assam.

CONCLUSION

In this study, post-mortem examination of a buffalo calf revealed presence of *H. contortus* in the abomasum and its histopathological changes indicates that this is a highly pathogenic parasite.

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