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Diagnosis and therapeutic management of *Schistosoma indicum* infestation in a Bullock: A case report

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Abstract

A seven year old bullock was presented to the Department of Veterinary Clinical Complex, Veterinary College, Bidar with the history of blood mixed watery diarrhoea, reduced feed and water intake and abdominal pain since three days. Clinical examination revealed dysentery, rectal temperature of around 104 °F, pale Conjunctival mucus membrane, dehydration, tenesmus and colic signs. Faecal sample examination revealed characteristic *Schistosoma indicum* egg and haematological examination showed anaemia with eosinophilia. The infested bullock was treated with Closantel @10mg/kg BW along with other supportive medication. On 21st day post treatment no eggs were traced upon faecal sample examination and haematological examination showed return of haematological parameters to normal range indicating uneventful recovery.

Keywords: Dysentery, faecal examination, haemological examination, *Schistosoma indicum* egg, closantel

1. Introduction

Schistosomiasis is a trematode infestation of domestic and wild animals observed in different parts of Asian and African subcontinent. In the Indian subcontinent, schistosomiasis is the fifth most common helminthosis affecting domestic animals (Sumanth *et al.*, 2004) [1]. Schistosomes are elongate and unisexual trematodes which inhabit the blood vessels of their definitive hosts and are called as blood flukes. These adult flatworms parasitize the blood capillaries of the nasal mucosa (*Schistosoma nasale*), urinary bladder plexus (*Schistosoma haematobium*), and mesenteries (*Schistosoma indicum*, *Schistosoma spindale*, and *Schistosoma incognitum*). In the Indian subcontinent, *S. indicum*, *S. spindale*, *S. nasale*, and *S. incognitum* are common and cause significant economic losses for the farming community (Bulbul *et al.* 2022) [3]. Among several species visceral schistosomiasis in cattle is commonly caused by *Schistosoma indicum* and *Schistosoma spindale* (Kumar and Burbure, 1986) [7]. Ruminants are usually infected with cercariae through skin penetration, although infection may be acquired orally while animals are drinking water. The females of *Schistosoma indicum* have many oval shaped eggs with a terminal spine and contain well developed miracidium while the adult males have a mildly tuberculated cuticle (Soulsby, 2012) [10].

S. indicum is tuberculated blood fluke that inhabits in mesenteric capillaries of horse, camel, cattle, buffalo, sheep and goat in Indian subcontinent (Bhatia *et al.*, 2006) [1]. Due to the presence of spine in eggs, mesenteric veins, intestinal mucosa, lamina propria, and intestinal submucosa are mechanically traumatized, resulting in acute intestinal syndrome (visceral schistosomiasis), which is characterized by inflammation and hemorrhage of these layers and the development of granulomatous lesions in chronic conditions (Bhatia *et al.*, 2010) [2]. Routine diagnosis of the *Schistosoma indicum* infection depends on clinical symptoms and faecal examination of an infected animal. Present study reports about the diagnosis and therapeutic management of *S. indicum* infestation in a bullock.

2. Materials and Methods

2.1 Case history and observations: A 7-year old non-descript bullock was presented to the Department of Veterinary Clinical Complex, Veterinary College, Bidar with a history of foul

smelling blood mixed watery faeces, reduced feed and water intake and abdominal pain since three days. Clinical examination revealed rectal temperature of around 104°F, pale conjunctival mucus membrane, dysentery, dehydration, tenesmus along with colic signs. Blood and faecal samples were collected and examined. The haematological parameters found were as shown in Table 1.

Table 1: Haematological parameters

Parameters	Before treatment (0 th day)	After treatment (21 st day)
Haemoglobin (g/dL)	8.10	11
PCV (%)	25.10	36
Total erythrocyte count($\times 10^6/\mu\text{L}$)	3.9	5.2
Total leucocyte count($\times 10^3/\mu\text{L}$)	6.7	6.5
Differential leucocyte count		
Neutrophils (%)	54	34
Eosinophils (%)	7	1
Basophils (%)	01	1
Lymphocytes (%)	37	62
Monocytes (%)	01	2

The faecal sample examination by sedimentation technique showed an oval thin shelled egg possessing terminal spine and miracidium (Fig.1), identified as *Schistosoma indicum*, based on its morphological characteristics (Bhatia *et al.* 2006)^[1].

3. Results and Discussion

On first day of presentation the affected bullock was treated with Closantel @ 10 mg/kg BW P/O. Supportive treatment included Ranitidine-10 mL IM, Metronidazole @ 25 mg/kg BW IV, Fluid therapy (Intalyle-1000 mL and RL 1000 mL IV), Meloxicam @ 0.2 mg/kg BW IM, Chlorpheniramine Maleate @ 0.5 mg/kg BW IM, Streptochrome-10 mL IM. On second day animal showed improvement and follow-up therapy for 2nd and 3rd day included Metronidazole @ 25 mg/kg BW IV, Tribivet-15 mL IM, Meloxicam @ 0.2 mg/kg BW IM, Chlorpheniramine Maleate @ 0.5 mg/kg BW IM, Streptochrome-10 mL IM. Ancillary treatment included for Haematinics (Sharkoferrol) for 3 weeks. On 21st day of treatment, no eggs were traced in faecal sample. Haematological examination showed return of parameters to normal range (Table 1).



Fig 1: Oval thin shelled egg of *S. indicum* showing terminal spine (arrow) and miracidium (40X)

The eggs of *S. indicum* are oval thin shelled with a terminal spine and miracidium. They are expelled out through faeces of infected animals. The eggs immediately hatch when these come in contact with water. After hatching the miracidium comes out and enter into *Indoplanorbis exustus* snail, which

acts as intermediate host. In the snail two generation of sporocysts develop the second forming cercaria. The cercaria is actively motile and is infective stage in schistosoma life cycle that penetrates through the skin of final host thus resulting in infection (Soulsby, 2012)^[10]. The *S. indicum* infested bullock showed diarrhoea mixed with mucus and blood, elevated rectal temperature, pale mucus membranes, abdominal pain, anal spasms and tenesmus. Similar clinical findings were reported by Digraskar *et al.* (2018)^[5] and Deepak *et al.* (2022)^[4]. Haematological examination revealed decrease in Hb, PCV, TEC and elevated eosinophil count indicating anaemia and eosinophilia, respectively. Similar findings were reported by Digraskar *et al.* (2018)^[5] and Giri *et al.* (2018)^[6]. Faecal sample examination revealed *S. indicum* egg with terminal spine and miracidium inside the egg (Fig. 1). Diagnosis of hepato-intestinal schistosomosis can be made by examination of fresh faeces (Bhatia *et al.*, 2006; Soulsby, 2012; Digraskar *et al.*, 2018; Giri *et al.*, 2018^[6]; Deepak *et al.*, 2022)^[1, 10, 5, 6, 4]. Single dose of closantel @ 10 mg/kg BW PO along with supportive treatment was found to be effective in the treatment of *S. indicum* infestation in bullock. Closantel uncouples the oxidative phosphorylation in the mitochondria, which leads to energy depletion of parasites (Sandhu, 2013)^[9]. The anthelmintic activity of the flukicide, closantel, is due to the drug's ability to interfere with the proton gradient in the parasite's mitochondria that in turn inhibits the generation of ATP by the parasite (Pax and Bannette, 1989)^[8].

4. Conclusion

Based on case history, clinical findings, haematological examination and identification of *Schistosoma indicum* egg in faeces and its therapeutic management using closantel in a bullock is discussed.

5. Acknowledgement

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6. Conflict of interest: The Authors declares that there is no conflict of interest.

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