Short Communication

HISTOPATHOLOGICAL CHANGES IN VISCERAL SCHISTOSOMOSIS CAUSED BY *Schistosoma spindale* IN CATTLE

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ABSTRACT

Bovine visceral schistosomosis is an important economic, chronic wasting blood fluke illness caused primarily by Schistosoma spindale. The abattoir samples of mesenteric veins, mesenteric lymph nodes and mesenteric fat of S. spindale infected cattle were subjected to histopathological studies. Microscopically it was observed that the mesenteric veins had a cross section of Schistosoma spindale adult worms with mild intimal proliferation and slight thickening of tunica media layer. Mesenteric lymph node revealed mild lymphoid cell depletion and thickening of the medullary trabeculae. The macrophage laden with hemosiderin pigment in cortical and paracortical area of lymph node was confirmed by Perl's Prussian blue staining. Fat necrosis with mononuclear cell infiltration and venous thrombosis were also observed in the mesenteric fat.

Key words: Cattle, Histopathology, Mesenteric fat, Mesenteric lymph node, Mesenteric vein, *Schistosoma spindale*

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Visceral schistosomosis caused by *Schistosoma spindale* is a neglected chronic wasting blood fluke illness of livestock in the Indian subcontinent and adjacent Southeast Asian countries (Jones *et al.,* 2020). The disease is characterized by emaciation and frequent blood tinged diarrhea in cattle (Jeyathilakan *et al.,* 2008). Only limited reports exist on the pathology of *S. spindale* in cattle (Rao, 1934; Agrawal and Southgate, 2000) and ironically, almost all the pathological studies were carried out in early nineties (Fransen *et al.,* 1990). Since then, there are no published reports on the pathological changes in cattle infected with *S. spindale* (Agrawal,

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2012). The present study was undertaken to understand the histopathological changes in the mesenteric vein, lymph node and fat of cattle infected *with S. spindale*.

A total of 180 mesentery samples were collected during evisceration of cattle slaughtered at the Slaughter house in Perambur, Chennai, Tamil Nadu, India. The mesenteric veins were examined for presence of *S. spindale* infection if any. Randomly selected eleven *S. spindale* positive mesentery samples with intact adult worm in the mesenteric vein, adjacent lymph nodes and mesenteric fat were fixed in 10% neutral buffered formalin for histological processing. Tissues embedded in paraffin wax were sectioned 4 to 6 µm thickness and dewaxed sections were stained with Haematoxylin and Eosin (H&E) and Perl's Prussian blue staining. Staining was also done to confirm the haemosiderin pigment. The slides were examined for any histopathological changes such as inflammatory reaction, changes in the architecture of mesenteric vein, lymph node and fat under light microscope.

The slaughter house samples of mesenteric veins, mesenteric lymph nodes and mesenteric fat infected with *S. spindale* in cattle were subjected to histopathological studies. Mesenteric vein when examined revealed a cross section of adult worm of *S. spindale* measuring 2520.69 x 441.44 µm and mild intimal proliferation with mild thickening of tunica media layer (Fig. 1a and 1b). The vein also had a corrugated appearance (Fig. 1c). Sastry (2007) had reported phlebitis and venous thrombosis occasionally in visceral schistosomosis. In mesenteric lymph node, a variety of changes were observed in the present study which included mild lymphoid cell depletion (Fig. 2a), thickening of the medullary trabeculae and periphlebitis (Fig. 2b). Eosinophils, mononuclear cells and a few giant cell were observed. The macrophages laden with hemosiderin pigment in cortical and paracortical area of lymph node were confirmed by Perl's Prussian blue staining (Fig.2c). However, Fransen *et al.* (1990) did not find any such changes in mesenteric lymph nodes. Sastry (2007) pointed out that pseudo tubercles may be found in mesenteric lymph glands and liver however, we did not find any pseudotubercles in the present study. Fat necrosis with mononuclear cell infiltration and venous thrombus were also observed in the mesenteric fat (Fig.3a and 3b). Earlier reports have described the histopathological changes in liver, small intestine (Rao, 1934; Kalapesi and Purohit,1954; Sastry, 2007; Fransen *et al.,* 1990), large intestine, lung (Rao, 1934; Fransen *et al.,* 1990), spleen and urinary bladder (Fransen *et al.,* 1990) of cattle infected with *S. spindale.* In the present study, we have confirmed and recorded the histopathological changes in the mesenteric vein, lymph node and fat of cattle affected with *S. spindale*.

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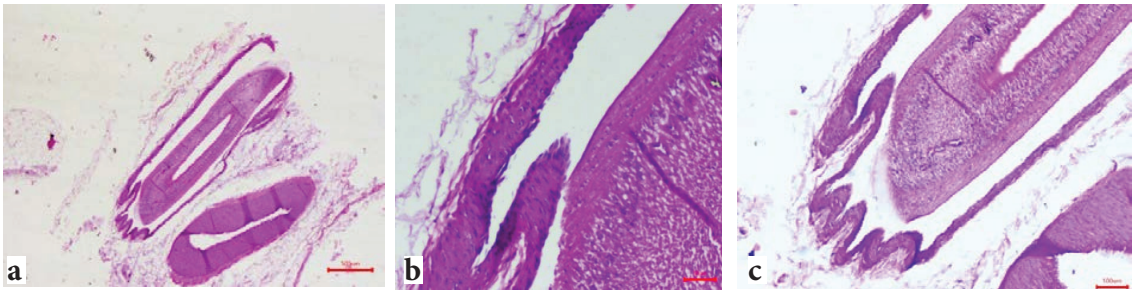

Fig. 1. Histopathological changes in mesenteric vessels. a) Cross section of *Schistosoma spindale* in blood vessel. (H&E,Scale bar 500µm). b). Mild intimal proliferation and mild thickening of tunica media layer (H&E, Scale bar 50 µm) c) Corrugated blood vessel (H&E, Scale bar 100 µm).

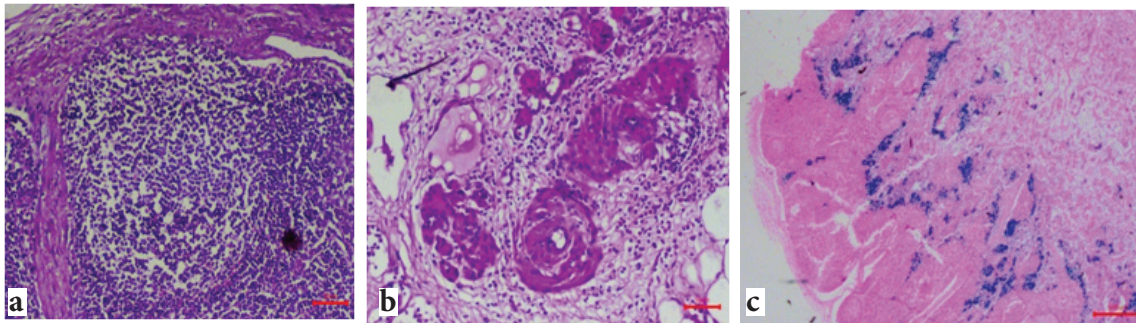

Fig. 2. Histopathological changes in mesenteric lymph node. a). Mild lymphoid cell depletion (H&E Scale bar 50µm); b). Periphlebitis, (H&E Scale bar 50µm); c). Blue colored haemosiderin laden macrophages in mesenteric lymph node (Perl's stain, Scale bar 50µm)

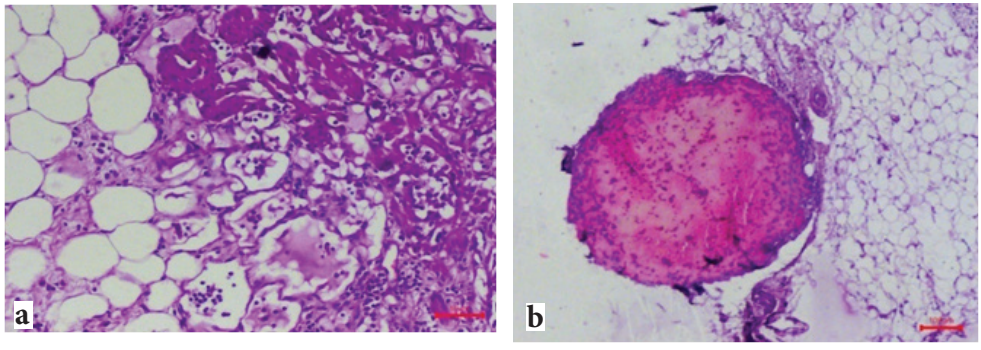

Fig. 3. Changes in Mesenteric fat. a). Fat necrosis with mononuclear cell infiltration in the mesenteric fat (H&E, Scale bar 50µm). b).Venous thrombosis (H&E, Scale bar 100 µm)

REFERENCES

Agrawal, M.C. (2012). Schistosomes and Schistosomiasis in South Asia. Springer publications, New Delhi. Pp 151 – 154**.**

Agrawal. M.C. and Southgate, V.R. (2000). *Schistosoma spindale* and bovine schistosomosis. *Journal of Veterinary Parasitology*, **14(2)**: 95 -107

Fransen, J., De Bont, J., Vercruysse, J., Van Aken, D., Southgate, V. R. and Rollinson, D. (1990). Pathology of Natural Infections of *Schistosoma spindale* Montgomery, 1906, in Cattle. *Journal of Comparative Pathology,* **103**: 447 – 455**.**

Jeyathilakan, N., Latha, B.R. and Abdul Basith, S. (2008). Seasonal prevalence of *Schistosoma spindale* in ruminants at Chennai. *Tamil Nadu Journal of Veterinary and Animal Sciences,* **4(**4**)**: 135-138.

Jones, B.P., Norman, B.F., Borrett, H.E., Attwood, S.W., Mondal, M.M.H., Walker, A.J., Webster, J.P., Rajapakse, R.P.V.J. and Lawton, S.P. (2020). Divergence across mitochondrial genomes of sympatric members of the *Schistosoma indicum* group and clues into the evolution of *Schistosoma spindale*. *Scientific Reports (Nature)*. **10**:2480.

Kalapesi, R. M. and Purohit, B.L. (1954). Observations on histopathology of morbid tissues from a case of natural infection with *Schistosoma spindalis* in a bovine. *Indian Veterinary Journal*, **30**:336-340.

Rao, M.A.N. (1934). A comparative study of *Schistosoma spindalis* Montgomery 1906 and *Schistosoma nasalis nsp*. *Indian Journal of Veterinary Science and Animal Husbandry,* **4:**1-28

Sastry, G.A. (2007). Veterinary Pathology, 7th ed, CBS Publishers & Distributors, India. pp 720-722.