Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2020; 8(5): 478-480

Received: 16-07-2020
Accepted: 18-08-2020

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Intestinal obstruction and concomitant *Spirocerca lupi* infestation in a rottweiler dog

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Abstract
A one year old male Rottweiler dog was brought to the veterinary clinical complex, Veterinary College and Research Institute (VCRI), Namakkal with the history of vomition and symptomatic treatment was given for gastritis. In spite of the treatment, the dog died without responding to the treatment and the carcass was sent to Department of Veterinary Pathology for postmortem examination. Grossly, there was a distended, coiled intestine and the entire luminal mucosa was obstructed with cloth material. In addition, there was a nodule at the distal part of the esophagus with numerous worms protruding from the nodule. The worms were round and identified as *Spirocerca lupi* based on their morphometry and microscopic morphological characters. This report describes about death of a Rottweiler dog due to massive intestinal obstruction by cloth material and nodular esophagitis by round worms *viz.*, *Spirocerca lupi*.

Keywords: Intestine obstruction, foreign body, esophagus nodule, *Spirocerca lupi*

Introduction
Ingestion of foreign bodies in dog is attributed to their indiscrimate eating habits[1]. Gastrointestinal foreign bodies are commonly encountered in companion animal practice and may present with a variety of clinical signs depending on the location, the degree and the duration of the obstruction [2]. Gastrointestinal foreign bodies may cause complete or partial obstruction. In general, complete obstruction is associated with more dramatic clinical signs and a rapid deterioration whereas partial obstruction may be associated with more chronic signs of maldigestion and malabsorption [3]. *Spirocerca lupi* is a parasitic nematode which causes regurgitation, vomition and dyspnoea in affected dogs. Its larvae follow a specific migratory route, penetrating the gastric mucosa of the host, migrating along arteries, maturing in the thoracic aorta and eventually moving to the caudal oesophagus [4]. Aortic lesions and esophageal nodular granulomas are considered as pathognomic feature for spirocercosis [5].

Materials and Methods
One year old male Rottweiler dog was presented to veterinary clinical complex, VCRI, Namakkal with the history of severe vomition for two days. Clinical examination was carried out and tentatively diagnosed as gastritis. Blood and serum samples were collected to assess the haemogram and serum biochemistry respectively. Inspite of the treatment, the dog died shortly without responding to the treatment. Then the carcass was referred to Department of Veterinary Pathology, VCRI, Namakkal for postmortem examination. Detailed systematic necropsy was carried out to identify the etiology. The organs showing lesion were collected (1 cm^3 in thickness) and fixed in 10% neutral buffered formalin. The paraffin embedded tissue blocks were sectioned at 5 µm thickness and stained with hematoxylin and eosin for histopathological examination. The worm in the esophagus nodules were collected washed, filtered and then fixed in 10 per cent formalin. The parasites were identified based on the morphometry and their morphological characters.

Results and Discussion
The clinical examination of the dog exhibited dullness, dehydration and emit foul smelled yellow coloured vomit. Haematological parameters revealed increased packed cell volume (65%) and Red blood cell count (9.5 million) which indicates the dehydration. The blood

smear did not reveal any organism of etiological significance. Serum biochemistry also confirmed the dehydration status of the animal by decreased serum potassium level (2.6mg/l). It was tentatively diagnosed as gastritis based on the clinical signs, haemogram and serum biochemistry. In spite of the treatment, the dog died and referred for necropsy to identify the cause of death.

On post-mortem examination, the carcass was entirely dehydrated. The thoracic cavity and abdominal cavity contained about 50 and 100 ml of serous fluid respectively. The distal part of the thoracic esophagus revealed moderate size nodule (7-8 mm) with numerous round worms projecting from the nodular opening (Fig. 1) The worms were collected and identified as *Spirocerca lupi* worms based on its morphological characters and morphometry. The gastric mucosa showed thickened mucosal folds with severe congestion. Intestines were found to be coiled (Fig. 2), distended and the lumen revealed 60 cm length cloth piece (Fig. 3). Intestinal mucosa was severely congested. Liver and spleen were enlarged with rounded borders. Kidney capsules peeled off with difficulty and the cortical surface showed grayish white granular appearance (Fig. 4).

Histopathological examination of esophagus revealed the cross section of the parasite surrounded by extensive fibrous tissue proliferation (Fig. 5). The nodules in the esophagus composed of hyperemia, haemorrhages, tissue necrosis and infiltration of neutrophils, macrophages, lymphocytes, plasma cells and eosinophils along with proliferating fibroblasts. Intestine revealed degeneration and desquamation of superficial epithelium and severe submucosal congestion. There were proliferating fibroblasts and mononuclear infiltration in the interstitial space of the renal tissues.

The profuse vomition and severe dehydration in the present case is due to the intestinal obstruction which leads to disturbances of fluid balance, acid-base status and serum electrolyte concentrations. The gastro-intestinal obstruction leads to hypersecretion and sequestration within the gastrointestinal tract which is exacerbated by vomiting and impaired oral intake of fluid and nutrients [6]. The clinical signs were very well correlated with the increased PCV and RBC count of haemogram and hypokalemia of serum biochemistry. Foreign bodies in the digestive tract apart from partial or complete obstruction lead to severe inflammation, mucosal laceration and pressure necrosis [7] Affected animals may lose their appetite and die of starvation [8]. Similar case of foreign bodies in the lumen of stomach, small and large intestine in dogs were reported by several authors [9-12].

Typical clinical signs of Spirocercosis of dogs are regurgitation, vomiting and dyspnoea which were also noticed in the present case. The prevalence of Spirocercosis of dogs in endemic regions varies from 10% to 85% and in india, the prevalence rate is 23.5 % in stray dogs [13]. Larger breeds such as German shepherd dogs were more infected than smaller breeds [14]. The nodular / granulomatous type was situated at the distal portion of the thoracic esophagus was due to the migration of the infective larvae, continued presence of larvae and adult worms in tissue and secondary bacterial infection. The life-cycle of this worm involves an intermediate (coprophagous beetle) and a variety of paratenic hosts (lizard, rodent and wild birds).

Fig 1: Distal part of esophagus showing nodule with numerous *S. lupi* worms

Fig 2: Coiled appearance of intestine

Fig 3: Intestine lumen containing 60 cm length of cloth material

Fig 4: Kidney cortex revealing grayish white granular appearance

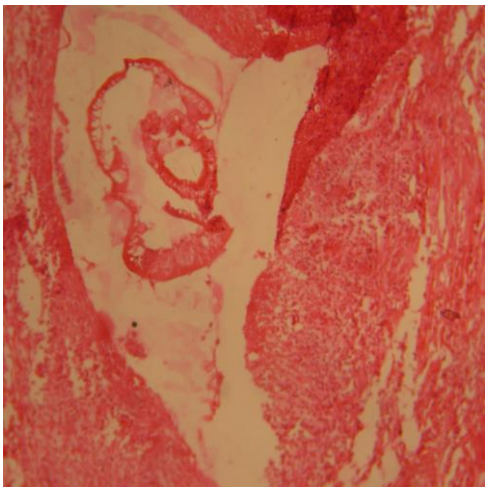

Fig 5: Cross section of the *S. lupi* worm was encircled by proliferating fibroblasts in the submucosa of esophagus (H&E, 400)

Conclusion

The above systematic observations clearly indicated that the death of dog was due to the concomitant effect of intestinal obstruction by the foreign body and esophagus nodule by *Spirocerca lupi*. Removing dog's feces from the public places, control of the beetle's population and preventing dogs from ingesting beetles and paratenic hosts, periodic fecal examination and antihelminthic preventive treatment are required measures in reducing the incidence of canine spirocercosis in endemic regions.

Acknowledgement

The authors are highly thankful to Tamil Nadu Veterinary and Animal Sciences University for providing the facilities

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