

Occurrence and Pathology of Fatal Oesophageal Spirocercosis in a Doberman Dog

Bhupesh Kamdi*, Krishnendu Kundu, Vitthal Dhaygude and Chandrashekhar Mote

Krantisinh Nana Patil, College of Veterinary Science, Shirwal, Maharashtra, India

[Received: 19.3.2020; Accepted: 12.5.2022]

{DOI 10.29005/IJCP.2022.14.1.35-37}

ABSTRACT

*The present study reports the spirocercosis in a Doberman dog. A carcass of a ten year old female Doberman dog was received for necropsy at the Department of Veterinary Pathology, KNP College of Veterinary Science, Shirwal, Maharashtra. The dog with the history of anorexia and vomition was treated for gastritis by a veterinary clinician before it succumbed. Systemic necropsy revealed a large esophageal tumour like nodule at the distal oesophageal wall. The inner cavity of the nodule had six, 2 cm to 6 cm long reddish spirally coiled nematodes embedded in muco-purulent exudate. Histopathology of the nodule showed the presence of an inflammatory reaction consisting mostly of plasma cells and hemosiderin laden macrophages. The inflammatory reaction was mainly centered around transverse and longitudinal sections of adult nematodes. The nematode parasites were identified as *S. lupi* based on its morphological characteristics.*

Key words: Dog, Esophagus, Helminth, Spirocercosis

INTRODUCTION

Spirocerca lupi, a spirurid nematode, parasitises oesophageal wall of canine hosts and some other carnivores like felids. *S. lupi* infestation leads to large, thick-walled, cystic granulomas in submucosa of distal oesophagus (Rinas *et al.*, 2009). Dung beetle or coprophagous beetles act as intermediate host. Lizards, snakes, frogs, birds, rodents and rabbits may act as paratenic hosts of the parasite (Da Fonseca *et al.*, 2012). Clinical cases are frequently encountered from tropical and subtropical climatic areas (McGavin and Zachary, 2007). This parasite is potentially zoonotic and can establish infection in human beings, characterised by nodule formation in caudal oesophagus and thoracic aorta (Yogeshpriya, 2016). Spirocercosis is frequently associated with scarring and aneurysm of aorta, spondylitis of thoracic vertebrae and nodule formation in the caudal part of oesophagus. The typical clinical signs associated with oesophageal nodules due to spirocercosis are regurgitation, vomition, dysphagia, weight loss and some non-specific signs like pyrexia (Sasani *et al.*, 2014). *S. lupi* may induce malignant transformation in oesophageal wall characterised by formation of mesenchymal neoplasms like fibrosarcoma and osteosarcoma (Blume *et al.*, 2014). Very few clinical reports related to oesophageal tumors due to spirocercosis in dogs are available from India (Kumar *et al.*, 1981; Ramachandran *et al.* 1984; Roshini *et al.*, 2013). There are no reports of the disease from western part of Maharashtra State, India, therefore, present communication reports a fatal case of oesophageal spirocercosis in a Doberman dog.

CASE HISTORY

A carcass of ten year old intact Doberman female dog (*Canis familiaris*) was received for the necropsy at Department of Veterinary Pathology of the college. Dog had been anorexic for past five days with signs of vomition and regurgitation according to the history provided by the owner. The dog was treated symptomatically for gastritis with antibiotics, antiemetic and intravenous fluid therapy by a local veterinarian. However, the dog did not respond to the aforesaid treatment and succumbed. A detailed necropsy was performed and multiple lesions were observed and recorded. Representative areas from the sites of different lesions were collected in the 10% neutral buffered formalin for histopathology. Nematodes were extracted from cavity of the nodule and were collected in 70% alcohol for identification and confirmation. Formalin fixed tissue samples were subjected for standardized procedure and cut into thin sections (4-5 micron) and taken over glass slide, subsequently stained with hematoxylin and eosin stains. The stained slides were observed under microscope and lesions were noted. Temporary mounts of the nematodes were prepared in lactophenol for morphometric identification of the nematode under a stereozoom microscope.

RESULTS AND DISCUSSION

External examination of dog carcass revealed pallor of all visible mucous membranes and tick infestation. Systemic necropsy revealed, mild to moderate congestion of splanchnic organs. Lungs were severely congested and edematous. There were large quantities of frothy exudates in the tracheal and bronchial lumens. The most characteristic lesion

observed was a large esophageal tumor like nodule, located at distal oesophagus just proximal to gastric cardia. The nodular structure had thick fibrous wall with a central cavity containing reddish spiral nematodes embedded in muco-purulent exudate (Fig. 1). There were five worms in the oesophageal nodule with lengths varying from 2 cm to 6 cm. Histopathology of the same showed presence of inflammatory reaction centered around numerous transverse and longitudinal sections of adult nematodes. Cellular infiltration consisting of plasma cells and macrophages (which were often hemosiderin-laden), along with few lymphocytes, neutrophils and eosinophils (Fig. 2). This cellular infiltration extended from submucosa to tunica muscularis and the serosal layers of the oesophagus in the nodular region. Nematodes and inflammatory cells were surrounded with numerous small blood vessels and reactive fibroblasts progressing to more dense fibrous connective tissue (fibrosis). Histological section revealed nematode which has a thick smooth pigmented cuticle, lateral cords, coelomyarian-polymyarian musculature, and a pseudocoelom containing eosinophilic material (Figure 2). The present case confirms the incidence of fatal oesophageal spirocercosis in the area. Temporary mounts of the nematodes extracted from the nodule revealed morphological characteristics akin to *S. lupi*. Nematodes had short pharynx and trilobed lips in their anterior part.



Fig. 1. Esophageal nodule having embedded nematodes (*Spirocerca lupi*)

S. lupi, a nematode parasite of dogs, is transmitted through various species of coprophagous beetles acting as intermediate host. The species is

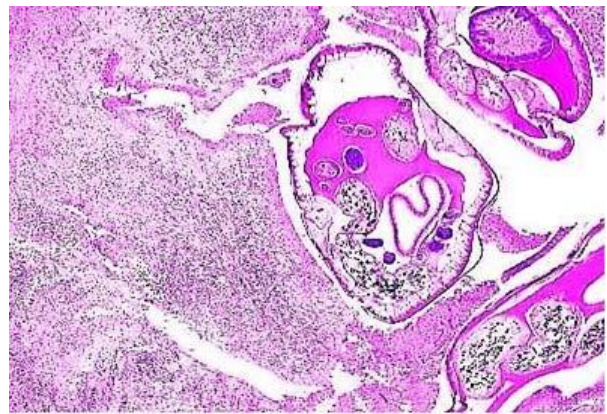


Fig. 2. Oesophagus: Expanding and disrupting the tunica muscularis, there are sections of adult nematode parasites with thick smooth pigmented cuticle, lateral cords and a pseudocoelom containing eosinophilic material. H&E x 40

very common in tropical countries where prevalence may vary from 10% to 80% (Soulsby 2012). Clinical spirocercosis in dogs has been characterized by lesions of granulomatous or fibro-granulomatous nodules at the caudal esophagus, aortic scarring with or without osseous metaplasia and/or dystrophic calcification, as well as aneurysm formation and caudal thoracic vertebral spondylitis (Yogeshpriya 2016). However, aberrant migration of larvae may produce lesions at other locations like those in the urinary bladder, kidneys, subcutaneous tissues and thoracic vertebrae. Most dogs get *S. lupi* infection by ingestion of paratenic hosts like chicken, rodent or reptiles. Presence of characteristic tumour like nodule at the esophageal mucosa with fistula at the center through which worms protrude and to discharge their eggs is common (Uzal *et al.* 2016). In this post mortem study, six *S. lupi* nematodes were observed in the central cavity of the nodule which is in accordance with earlier reports (Dvir *et al.* 2001; Moulton 2002; Roshini *et al.* 2013). Clinical signs of anorexia, vomiting, regurgitation and anemia as observed during post mortem examination and anamnesis of in the present case corroborates to the findings of Roshini *et al.* (2013). Occlusion of the esophageal lumen by protruding nodule may have been the cause of reduced appetite, anorexia and the vomitions. The condition of anaemia might have been due to the slow progressive reduction in appetite accentuated by tick infestation. Representative histological lesions observed in the present study were similar those described by Uzal *et al.* (2016). Presence of granulomatous inflammation and highly reactive fibroblast proliferation are attributable to chronic irritation caused by maturing parasitic stages and increased expression of vascular endothelial growth factor

(VEGF), fibroblast growth factor (FGF) and IL-8, furthermore which may helps in the transformation of cells and development of neoplasms (Dvir and Clift 2010). Lesions of mild to moderate congestion in the other visceral organs may be due to non specific bacterial infections and septicemias.

In conclusion, the present findings confirm the presence of *S. lupi* in dogs from western part of Maharashtra, India and add substantiate information to the literature. Moreover, it warrants the need for further study of its prevalence and paratenic host species for formulating control policies so as to advise and create awareness among pet and kennel owners to prevent the disease.

Conflict of interest

Authors have declared no conflict of interest.

REFERENCES

- Blume, G.R., Reis Junior, J.L., Gardiner, C.H., Hoberg, E.P., Pilitt, P.A., Monteiro, R.V., de Sant'Ana FJ (2014) *Spirocercia lupi* granulomatous pneumonia in two free-ranging maned wolves (*Chrysocyon brachyurus*) from central Brazil. *J Vet Diagn Invest.*, 26(6): 815-817.
- Da Fonseca, E.J., Do Amarante, E.E., Abboud, L.C., Hees, S.J., Franco, R.J. and Bruno, J.D. (2012). Fatal esophageal fibrosarcoma associated to parasitism by rurid nematode *Spirocercia lupi* in a dog: a case report. *J. Parasit. Dis.* 36(2): 273-276.
- Dvir, E., Kirberger, R.M. and Malleczek, D. (2001). Radiographic and computed tomographic changes and clinical presentation of spirocercosis in the dog. *Vet. Radiol. Ultrasound.* 42: 119-129.
- Kumar, N., Vegad, J.L. and Kolte, G.N. (1981) Note on an unusual case of spirocercal granuloma in the stomach of a dog. *Indian J. Anim. Sci.* 51: 805-806.
- McGavin, D.M. and Zachary, J.F. (2007) *Pathologic basis of veterinary disease.* 4th ed., St. Louis: Mosby Elsevier, pp. 322-323.
- Ramachandran, P.V., Shakir, S.A. and Ramakrishnan, R. (1984). Spirocercosis in canines: a necropsy survey. Cheiron Tamil Nadu. *J. Vet. Sci. Anim. Husb.* 13: 132-135.
- Rinas, M.A., Nesnek, R., Kinsella, J.M. and DeMatteo, K.E. (2009). Fatal aortic aneurysm and rupture in a neotropical bush dog (*Speothos venaticus*) caused by *Spirocercia lupi*. *Vet. Parasitol.* 164: 347-349.
- Roshini, S., Sawale, G.K., Patil, G.N., Mustare, A.K., Mhase, A.K., Moregaonkar, S.D., Kadam, D.P., Rohi, R.R. and Bharkad, G.P. (2013). *Spirocercia lupi* associated granuloma in a stray dog: a case report. *Indian J. Can. Pract.* 5(1): 81-84.
- Sasani, F.J., Javanbakht, A., Javaheri, M., Hassan, M. and Bashiri, S. (2014). The evaluation of retrospective pathological lesions on spirocercosis (*Spirocercia lupi*) in dogs. *J. Parasit. Dis.* 38(2): 170-173.
- Soulsby, E.J.L. (2012). *Helminths, Arthropods and Protozoa of Domesticated Animals*, 7th edition, East-West Press Pvt. Ltd., New Delhi, pp: 729-737.
- Uzal, F.A., Plattner, B.A. and Hotetter, J.M. (2016). Alimentary system. In: Maxie MG, ed. *Jubb, Kennedy and Palmer's Pathology of Domestic Animals*. Vol 2. 6th ed. Philadelphia, PA: Elsevier Saunders: pp. 34-35.
- Yogeshpriya, S. (2016). A complete overview on Spirocercosis in dogs. *JAFV* 6(3): 16-20.