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Diagnosis and successful management of Spirometrosis in a German Shepherd dog: A case report

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Abstract
Spirometra spp. are globally distributed pseudophyllidean tapeworms that infect various carnivorous mammals as definitive hosts and humans as accidental hosts. This study documents a clinical case of spirometrosis in a 1-year-old male German Shepherd dog presenting with lethargy, reduced appetite, chronic diarrhoea, vomiting, and icterus. Despite prior deworming attempts, symptoms persisted, prompting detailed diagnostic and therapeutic intervention. Faecal examination revealed operculated, yellowish-brown eggs, confirming *Spirometra* sp. infection. Haematological and biochemical analyses showed anaemia, hypoproteinaemia, and elevated markers of liver and kidneys that indicate systemic inflammation. The dog was successfully treated with a revised protocol combining praziquantel, fenbendazole, symptomatic therapy, and nutritional support. Post-treatment faecal examinations were negative for *Spirometra* eggs, and the dog exhibited a full clinical recovery after a month. This case emphasises the zoonotic potential of *Spirometra* infections and underscores the need for vigilance in their diagnosis and management, particularly in endemic regions.

Keywords: Spirometrosis, praziquantel, fenbendazole, zoonosis, dog

Introduction

The pseudophyllidean tapeworms of the genus *Spirometra* are globally distributed parasites that inhabit the intestines of various carnivorous mammals, including canids, felids, and other wild species (Kavana *et al.*, 2014, 2015; Le *et al.*, 2017) [11, 10, 12]. The infection caused by these parasites is termed spirometrosis when involving adult tapeworms and sparganosis when the larval stages invade tissues. While dogs, cats, and wild carnivores are definitive hosts, humans and other animals may act as accidental hosts. *Spirometra* infections in dogs and cats have been documented worldwide (Little and Ambrose, 2000; Sahoo *et al.*, 2018; Nguyen *et al.*, 2024) [14, 7, 15]. *Spirometra* spp. has an indirect lifecycle involving two intermediate hosts. The first intermediate host is a freshwater crustacean, typically of the genus Cyclops, while the second intermediate hosts include amphibians (e.g., frogs and reptiles), birds, and mammals. Definitive hosts, such as dogs and cats, become infected by consuming the tissues of intermediate hosts harbouring the infective larval stage, the plerocercoid (or sparganum). Humans may inadvertently become accidental hosts by ingesting contaminated water or undercooked tissues of infected intermediate hosts (Badri *et al.*, 2022) [9]. The lifecycle begins when infected definitive hosts shed *Spirometra* eggs in their faeces. These eggs embryonate in water, releasing free-swimming coracidia that are ingested by copepods (first intermediate hosts). Inside copepods, coracidia develop into procercoid larvae. When second intermediate hosts such as frogs, snakes, or birds consume the copepods, the procercoids migrate to their tissues and develop into plerocercoid larvae. The cycle completes when a definitive host, such as a dog, cat, or fox, ingests an intermediate host containing plerocercoid larvae, allowing adult tapeworms to mature in the intestines. This study presents a clinical case of spirometrosis in a 1-year-old Male German Shepherd dog, detailing its clinical manifestations, diagnostic procedures, treatment regimen, and successful recovery.

Case History and Clinical Observations

A 1-year-old intact male German Shepherd dog weighing 18 kg was presented to the

Veterinary Clinical Complex, Veterinary College, Kamdhenu University, Anand, with a history of lethargy, reduced appetite, chronic greenish diarrhoea, intense yellow urination, lateral recumbency, vomiting, and occasional passage of white segments in the stool since last twenty days. These symptoms persisted despite multiple deworming attempts using anthelmintics such as praziquantel, albendazole, and pyrantel pamoate, administered either under veterinary supervision or at the owner's discretion. The treatments failed to alleviate the diarrhoea and vomiting. On clinical examination, the dog appeared debilitated with a rough coat and icteric conjunctival mucous membranes (Fig. 1 and Fig. 2). Persistent diarrhoea (Fig. 3) and a rectal temperature of 101.6°F were noted. Auscultation of the heart revealed tachycardia and mild submandibular oedema was observed. These clinical signs suggested a severe underlying systemic condition requiring further diagnostic evaluation.

Fig. 1 Emaciated and Lateral Recumbent Dog

Fig. 2 Icteric Conjunctival Mucus Membrane

Fig. 3 Greenish Diarrhoea

Fig. 4 *Spirometra* eggs (40X)

Laboratory Examination and Diagnosis

A faecal sample was collected and analysed using the faecal flotation technique for parasitological examination. A segment of the worm was sent to the parasitology department for species identification. Microscopic examination of the faecal sample revealed operculated, yellowish-brown eggs with pointed ends, characteristic of *Spirometra* spp. (Fig. 4).

Whole blood was drawn from the cephalic vein and collected into K_3EDTA and clot activator vials for haematological and biochemical analysis, respectively. Complete blood count (CBC) was performed using an automated haematology analyser (Abacus Junior Vet-5), and serum biochemical parameters, including Total Protein, Alanine Aminotransferase (ALT), Total Bilirubin, Blood Urea Nitrogen (BUN), and Creatinine, were analysed using automatic serum biochemistry analyser (CKK 300) before treatment and after 1 month of treatment (Table 1).

Haematological analysis revealed decreased haemoglobin (g/dL), packed cell volume (PCV, %), total erythrocyte count ($\times10^6/\mu$L), & platelet count ($\times10^3/\mu$L), and increased leukocyte count ($\times10^3/\mu$L) and neutrophil percentage (%). Biochemical analysis showed decreased levels of total protein (g/dL) and elevated levels of total bilirubin, & SGPT, indicative of systemic involvement of liver. Based on the clinical history, clinical signs, and laboratory findings, the case was diagnosed as spirometrosis.

Table 1: Haemato-biochemical analysis before and after treatment

Parameter	Reference Range (Fielder, 2023)	Before Treatment	After Treatment
Hb (gm/dl)	11.9-18.9	7.50	11.00
PCV (%)	35–57	23.43	33.00
TEC ($X10^6/\mu l$)	4.95-7.87	3.39	4.70
MCV (fL)	66–77	69.00	70.20
MCH (pg)	21.0–26.2	22.10	23.40
MCHC (g/dL)	32.0–36.3	32.00	33.33
TLC ($X10^3/\mu l$)	5.0–14.1	27.00	12.50
NEU (%)	58–85	87.00	70.00
LYM (%)	8–21	9.40	19.30
MON (%)	2–10	2.60	8.10
EOS (%)	0–9	1.00	2.60
BASO (%)	0–1	0	0
PLT ($X10^3/\mu l$)	211–621	179	231
T. Protein (gm/dL)	5.4-7.5	3.54	5.6
ALT (IU/L)	10-109	180.90	30.10
Total Bilirubin (mg/dl)	0.10-1.00	2.75	0.82
BUN (mg/dL)	8-28	15.50	21.80
S. Creatinine (mg/dL)	0.5-1.7	0.61	0.57

Treatment

The standard recommended dose of praziquantel for treating cestode infections in dogs is 5 mg/kg body weight as a single dose. However, in this case, the single-dose protocol was ineffective in resolving the *Spirometra* infection. Consequently, a revised treatment regimen was implemented. The dog was treated with Tab. Fentas Plus (containing fenbendazole 150 mg and praziquantel 50 mg) at a dose of praziquantel 25 mg/kg body weight, administered orally (three tablets, TID) for three consecutive days. Symptomatic therapy included Inj. Dextrose Normal Saline (DNS) at 20 mL/kg body weight to address dehydration, Inj. Hermin (a multiple amino acid solution) at 5 mL/kg body weight to manage hypoproteinemia, Inj. Dexamethasone at 0.2 mg/kg body weight to control enteritis and associated inflammation, Inj. Metronidazole at 10 mg/kg body weight for its antimicrobial and antiprotozoal properties.

Additionally, orally a liver tonic was prescribed for hepatic support, and orally hematinic syrup was administered to correct anaemia. This injectable treatment protocol was followed for five consecutive days, after which faecal samples tested which negative for *Spirometra* eggs. The dog exhibited an uneventful recovery over one month. After one-month, haematological analyses demonstrated significant improvement, with significant improvement in haemoglobin, PCV, and TEC values reflects effective treatment for anaemia and TLC, neutrophils, and other leukocyte parameters improved, indicating reduced inflammation and infection. Serum biochemical analyses demonstrated ALT and bilirubin normalized suggesting improvement of liver Health.

Results and Discussion

Spirometrosis in dogs and cats is typically subclinical. However, when clinical signs manifest, they may include diarrhoea, enteritis, weight loss, and vomiting (Bowman, 2014), consistent with the clinical presentation of the current case. Microscopic examination of the faecal sample revealed operculated, yellowish-brown eggs with pointed ends, characteristic of *Spirometra* spp. Eggs confirmed a natural infection with *Spirometra* sp. in the German Shepherd dog. Although sporadic cases of *Spirometra* infections in dogs have been reported in India (Kumar *et al.*, 2015) [4], these infections remain relatively uncommon. The exact route of infection in this dog is unclear. Treatment with a high dose of praziquantel (~22.5 mg/kg PO), as recommended by Stephen (2022) [16], was employed in this case, yielding favourable results. The dog showed significant improvement in both haematological and biochemical parameters following treatment. To prevent reinfection, the pet owner was advised to restrict the dog's access to potential intermediate hosts, particularly frogs, which are known to play a key role in the parasite's life cycle.

Conclusion

The presented case highlights the diagnosis and successful management of spirometrosis in a young German Shepherd dog. Despite initial challenges with standard treatment protocols, the implementation of a high-dose praziquantel regimen combined with supportive care, including hydration therapy, anti-inflammatory agents, and liver and hematinic supplements, resulted in significant clinical improvement. Haematological and biochemical evaluations corroborated the recovery, demonstrating normalized parameters and resolution of anaemia and liver dysfunction. This case underscores the importance of a thorough diagnostic approach, tailored treatment strategies, and preventive measures, such as controlling access to intermediate hosts, to manage and mitigate the impact of *Spirometra* infections in dogs.

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References

1. Badri M, Eslahi AV, Majidiani H, Pirestani M. *Spirometra erinaceieuropaei* in a wildcat (*Felis silvestris*) in Iran. Veterinary Parasitology: Regional Studies and Reports. 2017;10:58-61.
2. Cogswell F, Baker DG. Parasites of non-human primates. Flynn's Parasites of Laboratory Animals. 2007;2:693-743.
3. Duggal S, Mahajan R, Duggal N, Hans C. Case of sparganosis: a diagnostic dilemma. Indian Journal of Medical Microbiology. 2011;29(2):183.
4. Kumar B, Maharana BR, Prashad A, Hirani ND, Joseph JP. Epidemiological survey of gastrointestinal parasites of dogs in southwestern Gujarat (Junagadh). Indian Journal of Veterinary Parasitology. 2015;29(1):56-60.
5. Narahari SR, Daulatabad D, Prasanna KS. Human Helminthic Infections (Nematodes, Cestodes, and Trematodes). Comprehensive Approach to Infections in Dermatology. 2016;355.
6. Nobrega-Lee M, Hubbard G, LoVerde P, Carvalho-Queiroz C, Conn DB, Rohde K, Schlabritz-Loutsevitch N. Sparganosis in wild-caught baboons (*Papio cynocephalus anubis*). Journal of Medical Primatology. 2007;36(1):47-54.
7. Sahoo N, Sahoo S, Mohanty B, Khuntia HK, Behera BK, Hota SR. Molecular identification of *Spirometra erinaceieuropaei* infection in a dog with its successful treatment. Journal of Entomology and Zoology Studies. 2018;6(4):1487-1489.
8. Shapiro DS. Infections acquired from animals other than pets. Infectious Diseases. 2017;663.
9. Badri M, Olfatifar M, KarimiPourSaryazdi A, Zaki L, Madeira de Carvalho LM, Fasihi Harandi M, Barikbin F, Madani P, Vafae Eslahi A. The global prevalence of *Spirometra* parasites in snakes, frogs, dogs, and cats: A systematic review and meta-analysis. Veterinary Medicine and Science. 2022;8:2785-2805.
10. Kavana NJ, Kassuku AA, Kasanga CJ. Incubation of *Spirometra* eggs at laboratory conditions by Modified Harada-Mori method. Huria: Journal of the Open University of Tanzania. 2015;19(1):29-36.
11. Kavana NJ, Lim LHS, Ambu S. The life-cycle of *Spirometra* species from Peninsular Malaysia. Tropical Biomedicine. 2014;31:487-495.
12. Le AT, Do LQT, Nguyen HBT, Nguyen HNT, Do AN. Case report: The first case of human infection by adult *Spirometra erinaceieuropaei* in Vietnam. BMC Infectious Diseases. 2017;17(1):1-4.

13. Bowman DD. Georgis' Parasitology for Veterinarians (10th ed.). St. Louis, MO: Elsevier Saunders. 2014.
14. Little S, Ambrose D. *Spirometra* infection in cats and dogs. Compendium on Continuing Education for the Practicing Veterinarian. 2000;22:299-305.
15. Nguyen YTH, Nguyen LAT, Van Dong H, Duong HD, Yoshida A. Molecular identification of sparganum of *Spirometra mansoni* isolated from the abdominal cavity of a domestic cat in Vietnam. Journal of Veterinary Medical Science. 2024 Jan 26;86(1):96-100.
16. Stephen L. Canine *Spirometra* infection. Control & Therapy Series. 2022;309:6-8. Available from: https://www.cve.edu.au/common/Uploaded%20files/CT/CANINE-*SPIROMETRA*-article.pdf