Canine Diphyllobothriosis with ascites: A case report

D.Oza[1], M. Rajvi[1], N.N. Brahmbhatt[1*], V.D. Chauhan[1], A.S. Patel[2]

[1]Department of Veterinary Parasitology, College of Veterinary Science & A.H., Kamdhenu University, Anand, Gujarat, [2]College of Veterinary Science & A.H., Kamdhenu University, Sardarkrushinagar, Gujarat, India.
*Corresponding author: nnbrahmbhatt@kamdhenuuni.edu.in

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Abstract

Diphyllobothrium latum, commonly referred to as the broad fish tapeworm, is a zoonotic cestode of considerable public health significance. Although it predominantly infects fish-eating mammals, dogs may also act as definitive hosts. Infected animals typically exhibit gastrointestinal disturbances, including diarrhoea, weight loss, and reduced appetite. In some cases, prolonged parasitism may lead to anaemia, primarily due to competition for essential nutrients such as vitamin B_{12}. The present report describes a clinical case of diphyllobothriosis in a German shepherd dog, highlighting its clinical presentation, diagnostic approach, associated haematological alterations, and successful therapeutic management. A one-year-old female German shepherd dog was presented with melena, chronic abdominal distension, inappetence, weakness, fever, and no history of deworming. Clinical examination revealed poor body condition and abdominal enlargement. Microscopic examination of faecal sample identified based on characteristic operculated brown coloured eggs of *Diphyllobothrium latum*. Haematological findings indicated anaemia, evidenced by reduced haemoglobin, erythrocyte count, and packed cell volume, along with lymphocytopenia and leukocytosis suggestive of systemic inflammation. The dog was treated with praziquantel (5 mg/kg body weight) and amoxicillin (500 mg), repeated after 14 days, along with supportive therapy. Marked clinical improvement with complete resolution of abdominal distension was observed by day 15 post-treatment. This case highlights the clinical relevance of *D. latum* infection in dogs and emphasizes the importance of timely diagnosis and appropriate anthelmintic therapy for successful management.

Keywords: *Diphyllobothrium latum*, haematology, microscopy, operculum

Introduction

Diphyllobothriosis is a zoonotic infection caused by the cestode *Diphyllobothrium latum*, a broad fish tapeworm that inhabits the small intestines of fish-eating mammals, including humans as definitive hosts and dogs as reservoir hosts (Durrani *et al.*, 2022). After ingestion of fish containing infective larvae of the family Diphyllobothriidae, the parasites develop into adult broad tapeworms within the intestinal tract of mammalian or avian hosts. In humans, infection is generally mild or asymptomatic and may remain undetected until the adult worm is expelled in the faeces (Tobin *et al*., 2026). Although incidences in canines are relatively uncommon, infection typically occurs through the ingestion of raw fish or tadpoles harbouring the plerocercoid larval stage (Payghan *et al.*, 2022; Waeschenbach *et al.*, 2017). Environmental contamination of aquatic sources through untreated sewage and faeces of stray or domestic animals, particularly dogs and cats, also plays an important role in the transmission of the parasite (Amer, 2014). Therefore, the role of dogs and cats in the spread of these parasites should not be neglected (Semenas *et al.*, 2014). After maturation, the adult tapeworm may reach 4–25 meters in length and can cause gastrointestinal disturbances and pernicious anaemia due to competition for nutrients, especially Vitamin B12. In severe infections, metabolic disturbances and hypoproteinaemia may develop, leading to reduced oncotic pressure and ascites. This fluid accumulation is generally attributed to protein-losing enteropathy and impaired protein metabolism secondary to Vitamin B12 deficiency (Kubas *et al.*, 2022; Schmidt *et al.*, 2016). Consequently, recognizing these haematological alterations and systemic involvements is vital for the accurate diagnosis and timely clinical management of the disease.

Materials and Method

History and Diagnosis

A one-year-old female German Shepherd weighing 20 kg was presented with a history of melena (black tarry faeces) for several days and progressive abdominal distension for approximately one month. The dog had never been dewormed since birth and was routinely fed fish once weekly. According to the owner, no previous medical treatment had been administered. On clinical examination, the dog appeared dull, weak, and lethargic. Pale conjunctival mucous membranes were observed, indicating anaemia. The rectal temperature was elevated at 103.9°F, suggestive of pyrexia, while the peripheral lymph nodes were within normal limits. Marked abdominal enlargement was evident on physical examination, and the abdomen appeared tense and pendulous due to fluid accumulation. Auscultation revealed a normal cardiac rhythm with a heart rate of 96 beats/min and a respiratory rate of 38 breaths/min. On abdominal palpation, a distinct fluid thrill was detected, confirming the presence of ascites. Overall clinical findings suggested severe systemic involvement associated with gastrointestinal parasitism and chronic nutritional compromise.







Parasitological examination

Diagnostic investigations across the reviewed studies showed that traditional parasitological techniques remained the predominant approach for both dogs and cats, with only a single canine study employing molecular diagnostics. Routine identification of Diphyllobothrium infections typically relies on direct microscopic observation of eggs or proglottid segments in faecal samples. However, due to substantial morphological overlap among *Diphyllobothrium* spp., achieving accurate species-level identification can be challenging when relying solely on conventional morphological criteria. (Zolfaghari Emameh *et al.*, 2018). Faecal examination performed using a direct smear technique revealed multiple elliptical, brown, operculated eggs of *Diphyllobothrium latum* observed under 10× (Fig.1) and 40× (Fig.2) magnifications. Micrometry was also performed to measure the size of egg, the length was found to be 62 µm and width was 41 µm (Choi *et al.,* 2015).



Fig. 1: *D. latum* eggs under 10x magnification

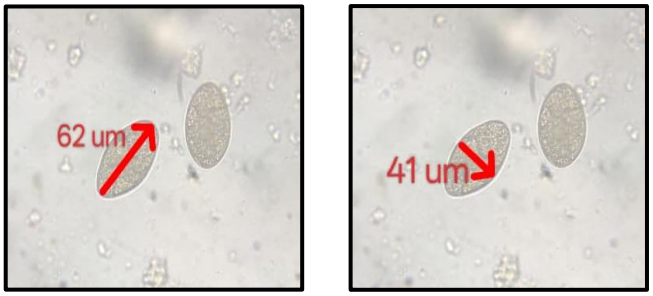


Fig. 2: Micrometry of *D. latum* eggs under 40x magnification measuring length 62 µm and width 41 µm

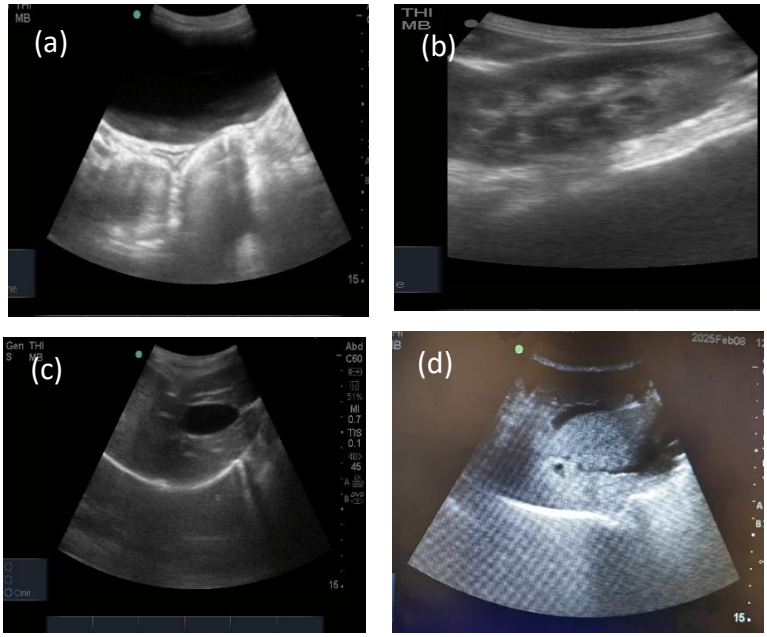


Fig. 3: (a) Urinary bladder was physiologically well-distended and normal.
(b) Kidneys were normal in size, shape and position, with a clearly preserved corticomedullary differentiation.
(c) Gall bladder was physiologically well distended and appeared normal. Wall thickness was normal.
(d) Liver showed hyperechogenic lobes & hyperechoic nodules, with rough and irregular boarders.

Ultrasonographic examination

In addition to microscopy, ultrasonography was done to evaluate the internal organs affected. The ultrasound findings describe a significant contrast between the healthy abdominal organs and a diseased liver, where the normal physiological state of the urinary bladder, kidneys, and gallbladder, noted by clear corticomedullary differentiation and proper distension which suggests that the renal and biliary drainage systems are intact. However, the liver's description is clinically concerning, as the presence of hyperechogenic lobes and hyperechoic nodules indicates an increase in tissue density typically associated with the replacement of healthy cells by fatty deposits or fibrous scar tissue. The rough and irregular borders are a classic diagnostic hallmark of advanced chronic liver disease, suggestive of ascites leading to distorted liver's natural smooth architecture, potentially compromising its metabolic functions.

Results

Although Diphyllobothriosis is relatively uncommon in dogs, the infection can lead to significant clinical illness, where the intestinal worms compete directly with the host for essential nutrients, often resulting in marked nutritional deficiencies, particularly of vitamin B12. Haematology showed severe microcytic hypochromic anaemia that is, RBC (2.9×10^6/µL), Hb (5.2 g/dL), PCV (14.7%,) MCV (51 fL), MCH (17.9 pg), MCHC (35.2 g/dL), leucocytosis (23.68×10^3/µL) with neutrophilia (18.78×10^3/µL) indicating an active inflammatory or infectious process and thrombocytopenia (126×10^3/µL) suggested ongoing inflammatory consumption or

Table 1. Laboratory findings

Haematology			Biochemistry		
Parameter	**Reference values**	**Test values**	**Parameter**	**Reference values**	**Test values**
RBC (10^6/µl)	5.5-8.5	2.9	Creatinine	0.5-1.5mg/dl	2.5 mg/dl
HGB (g/dl)	12-18	5.2	BUN	12-25mg/dl	28.6 mg/dl
HCT (%)	37-55	14.7	Total Protein	5.4-7.7 gm/dl	3.2 gm/dl
MCV (fL)	60-77	51	Albumin	2.3-3.8 gm/dl	1.0 gm/dl
MCH (pg)	19.5-24.5	17.9	SGPT	10-88 IU/L	28.7 IU/L
MCHC (g/dl)	31-34	35.2	SGOT	10-88 IU/L	60.2 IU/L
WBC (10^3/µl)	6-17	23.68			
Neutrophils (10^3/µl)	3-12	18.78			
Lymphocytes (10^3/µl)	1-4.8	5.38			
PLT (10^3/µl)	200-500	126			

Table 2. Treatment protocol

Drug	Category	Formulation	Dose Rate	Route & Frequency	Clinical Indication
Praziquantel	Anthelmintic	Tablet (600 mg)	5 mg/kg b.wt.	P/O, Single Dose	Eradication of *D. latum*
Amoxiclav	Antibacterial	Tablet (500 mg)	25 mg/kg b.wt.	P/O, BID	Broad-spectrum antimicrobial coverage
Pantoprazole	Gastroprotective	Tablet (40 mg)	20 mg	P/O, BID	Proton pump inhibitor; gastric acid regulation
Torsemide	Diuretic	Tablet (10 mg)	5 mg	P/O, OD	Loop diuretic for ascitic fluid reduction
Spironolactone	Diuretic	Tablet (50 mg)	Titrated	P/O, OD/BID	Potassium-sparing diuretic; aldosterone antagonist
Liv.52 Pet	Hepatoprotective	Syrup (200 ml)	5 ml	P/O, BID	Metabolic stimulant & liver function support

nutritional deficiency. Biochemistry revealed raised creatinine (2.5 mg/dL) and BUN (28.6 mg/dL) suggestive of compromised renal function or prerenal azotaemia, possibly secondary to dehydration or chronic disease, hypoproteinaemia (3.2 g/dL) and hypoalbuminaemia (1.0 g/dL) reflected poor nutritional status and impaired intestinal absorption, also the mildly increased SGPT (28.7 IU/L) and SGOT (60.2 IU/L) indicating hepatic strain, though not indicative of severe hepatocellular damage. The dog received praziquantel (5 mg/kg, orally) on day 1 and day 14, along with amoxicillin-clavulanic acid (25 mg/kg, BID), pantoprazole (20 mg, BID), torsemide (5 mg, OD), spironolactone and Liv.52 Pet (5 ml, BID), and recovered without complications.

Discussion

This is a rare case occurring in dogs, as Brahmbhatt *et al.* (2025) reported only one positive case among 317 faecal samples examined. Payghan *et al.* (2022) reported anaemia in a canine case without attributing it to vitamin B12 deficiency, so other contributing factors are possible. The neutrophilia suggested secondary bacterial involvement, and the azotaemia was likely prerenal. Assessment of the Serum Ascites Albumin Gradient (SAAG) is a valuable tool for differentiating types of ascites. In the present case, the SAAG value was 0.9 g/dL, which is below the 1.1 g/dL threshold, indicating a low-gradient ascites pattern. Kamenov *et al.* (2024) reported effective treatment of canine Diphyllobothriosis using Prazitel Plus which contains praziquantel. Combining anthelmintic treatment with supportive therapy is therefore important in heavily parasitised, hypoproteinaemic dogs.

Conclusion

This case suggests that diphyllobothriosis should be considered in dogs with severe anaemia, hypoalbuminaemia and ascites, particularly with a history of raw fish consumption. Haematological and biochemical evaluation, along with faecal examination, may aid diagnosis. Treatment with praziquantel and supportive therapy resulted in recovery in this dog. Owner education about avoiding raw fish and routine deworming may help prevent infection.

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Conflict of interest The authors declare no conflict of interest.

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