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Effective management of Diphyllobothriosis with ascites in dog: A rare case

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Abstract
A 2-year old female dog was presented at veterinary clinical complex, Junagadh with history of anorexia, emaciation and abdominal distention. Diagnosis was done on the basis of history, clinical signs and laboratory findings the case was confirmed as Diphyllobothriosis along with ascites. Treatment involved oral praziquantel, supportive care and high-protein diet, resulting in recovery.

Keywords: Diphyllobothriosis, ascites, hypoprotinemia, praziquantel, SAAG

1. Introduction
Ascites refers to the accumulation of fluid in the abdominal cavity, leading to the swelling or distension of the abdomen. Ascites is a sign of an underlying systemic disease condition rather than being a disease in and of itself. Ascites is most frequently triggered by a range of underlying factors, including hypoproteinaemia, left-sided heart failure, congestive heart failure, cirrhosis, hepatic diseases, renal diseases, bacterial infections like tuberculosis, malnutrition and parasitic diseases like ancylostomiosis (Randhawa *et al.*, 1988) [4]. Diphyllobothriosis is a disease caused *Diphyllobothrium latum*, a parasitic flatworm that infests the small intestine of mammals that consume fish, with human beings being the definitive host.
In dogs, such occurrences are relatively rare and typically happen when dogs ingest raw, uncooked fish or tadpoles that carry the larval plerocercoid stages of the worm. While not all infections of *Diphylobothrium* species in dogs and cats lead to obvious clinical disease, but symptoms such as vomiting, diarrhea, and weight loss can be evident. The worm in the intestine competes directly with the host for nutrients leading to deficiencies, particularly in vitamin B12. This deficiency is linked to the onset of Pernicious anemia. The occurrence of ascites in Diphyllobothriosis can be linked to low levels of proteins in the blood for two main reasons: (i) Vitamin B12 deficiency, which plays a role in protein absorption and metabolism, and (ii) Protein losing enteropathy due to the worms (Schmidt *et al.*, 2016 [5], Kubas *et al.* 2022 [2]).

2. Case History and Clinical Examination
A 2- year old female Non-descript dog was reported to VCC, College of Veterinary Science and A.H., Junagadh, with complaints of inappetence, abdominal distension and emaciation (Figure-1) for the last 4 days. The dog did not have a record of prior vaccinations or deworming. Upon physical examination, normal rectal temperature (101.4°F), tachycardia, tachypnoea, pale mucous membranes and distended abdomen with fluid thrill on tactile percussion were observed. A blood sample was taken in the vials containing EDTA for hematological analysis and Clot Activator for serum biochemistry. The hematological analysis revealed anemia and mild leucocytosis (Table-1). Serum biochemistry revealed hypoproteinemia and hypoalbuminemia (Table-1). Abdominocentesis was performed for the collection of ascitic fluid for analysis which revealed clear transudate fluid. Analysis of the faecal sample showed the presence of *Diphyllobothrium* spp. eggs (Fig. 2).

3. Treatment and Discussion
The case was diagnosed as ascites related to Diphyllobothriosis based on history, clinical signs, and laboratory findings. Similar case study was done by Payghan *et al.* 2022 [3]. The dog was treated orally with Praziquantel at a dose rate of 7.5 mg/kg body weight and was repeated

after 15 days. Supportive treatment like fluid therapy containing dextrose 25%, Inj. Amoxicillin @ 20 mg/kg intravenously, Amino acid intravenous infusion, Vitamin B-complex injection intravenously, Inj. Pantoprazole @ 1mg/kg intravenously, Inj. Furosemide @ 2mg/kg intramuscularly were given for 5 days. A high-protein diet is also advised as a means to correct hypoproteinemia and hypoalbuminemia. Low levels of albumin in the blood reduced oncotic pressure while increasing hydrostatic pressure, leading to the movement of fluid from the blood vessels into the body cavity.

Fig 1: 2- year old female Non-descript dog

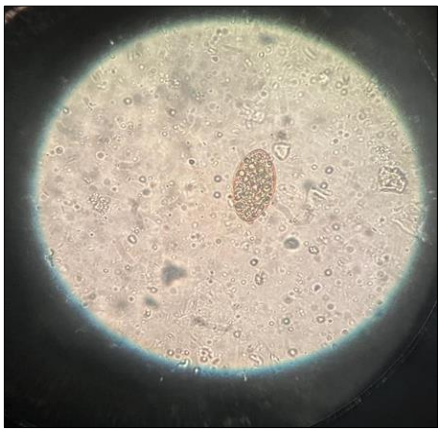

Fig 2: Analysis of the faecal sample showed the presence of *Diphyllobothrium* spp. eggs

Table 1: Hematobiochemical analysis

Parameters	Value	Normal range
Hemoglobin (g/dl)	8.83	10-16
Packed Cell Volume (%)	29.77	30-50
Total Erythrocyte Counts (x 10^6/µl)	5.58	5-8
Total Leucocyte Counts	16470	6000-16000
Neutrophils (%)	71	60-70
Lymphocyte (%)	21	15-30
Monocytes (%)	5	3-8
Eosionophils (%)	3	2-10
Basophils (%)	0	0-2
Platelets (x 10^5/µl)	4.76	2-8.5
ALT (U/L)	56.35	25-92
ALP (U/L)	70.85	10-92
Total Protein (g/dl)	3.82	5-7
Albumin (g/dl)	1.88	2.5-4
Creatinine (mg/dl)	0.82	0.5-1.6
BUN (mg/dl)	40.11	8-25
Total Bilirubin (mg/dl)	0.23	0-0.6
Direct Bilirubin (mg/dl)	0.02	0-0.3

In the present case, the dog had not received deworming and was hosting Diphyllobothrium spp. worms. The intestinal worms directly compete with the host for nutrition, resulting in a deficiency of essential nutrients, especially vitamin B12. The Serum Ascites Albumin Gradient (SAAG) concentration serves as a useful tool for categorizing ascites types. In this case, the SAAG was 0.8 (<1.1 g/dl) (Table- 2), indicating the presence of low-gradient ascites (Burgess, 2004) [1].

Praziquantel is an anthelminthic which is choice of drug for the treatment of various tapeworm infections, including Diphyllobothrium species. Praziquantel works by disturbing the balance of calcium ions within the worm, leading to spastic paralysis in the worm's muscles. In this case, praziquantel proved effective in managing Diphyllobothriosis in dogs. Alongside symptomatic treatment for ascites, the dog recovered successfully.

Table 2: Ascitic fluid analysis

Parameters	Value
Ascitic Fluid Total Protein (g/dl)	3.10
Ascitic Fluid Albumin (g/dl)	1.08
SAAG (g/dl)	0.8

Conclusion

In conclusion, this case report highlights the successful therapeutic management of ascites associated with Diphyllobothriosis in a dog. The effective treatment involved addressing the underlying parasitic infection with Praziquantel, as well as providing supportive care and nutritional interventions. The diagnosis and management of this case emphasize the importance of a comprehensive approach in veterinary medicine, involving a combination of clinical assessment, laboratory diagnostics, and appropriate treatment strategies.

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