CASE REPORT

Ancylostoma Induced Acute Haemorrhagic Gastroenteritis in a Male Adult Kanni Dog: An Uncommon Incidence

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Ancylostoma caninum is the major cause of canine hookworm disease in most tropical and subtropical regions of the world and anaemia is the main pathological effect caused by blood sucking activity of the worms (Umeakuana *et al.,* 2020). The disease is more often seen in young puppies or dogs under one year of age, by transmammary route of infection and adult dogs are mostly asymptomatic owing to their acquired immunity. Nevertheless, the dog may show iron deficiency and develop a microcytic hypochromic anaemia. Severe anaemia is commonly encountered in puppies and could be successfully treated by appropriate therapy, which includes blood transfusion (Jasmin *et al.* 2020). Hence, severe anaemia requires fecal examination and presence of many eggs in feces is suggestive of acute ancylostomosis, though clinical signs could be observed during the prepatent phase itself (Lefkaditis, 2001). This document reports an unusual case of ancylostoma induced acute haemorrhagic gastroenteritis and its management in an adult male Kanni dog.

Case History and Observations

A male dog of Kanni breed, one year and 5 months old, was presented to the Teaching Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal (Tamil Nadu, India) with the signs of inappetence and haemorrhagic diarrhoea without any offensive odour for 5 days, and vomiting for 2 days. The dog had a history of occasional deworming and irregular vaccination. Clinical examination (Fig. 1, 2) of the case revealed emaciation, pale and congested conjunctival mucosa, pale buccal mucosa, sunken eyeball, enlarged popliteal lymph node, rectal temperature 38.5°C, heart rate 84 beats per min, capillary refill time above 2 seconds. The whole blood and serum samples were collected for haemato-biochemical analysis using auto-analyser (Rayto®, Version 2.4e, RT7600Vet Auto Veterinary hematology Analyzer, Rayto Life and Analytical Sciences Co., Ltd., China), which confirmed anaemic condition (Table 1). Faecal samples collected for detection of canine parvo virus (CPV-2) by lateral flow assay based immunochromatography test (Pet X®, J &B Biotech Ltd, UK) and parasitic eggs by microscopic examination. Microscopic examination of diarrhoeic faeces after centrifugal sedimentation technique on day 1 revealed many embryonated eggs of *Ancylostoma caninum* per field (Fig. 3). Giemsa stained peripheral blood smears by microscopic examination revealed absence of haemoparasites and the faecal sample was negative for CPV-2 virus by immunochromatographic test (Fig. 4). Based on the severe clinical signs and the microscopic examination, the case was diagnosed as acute ancylostomosis.

Treatment and Discussion

On day 1, the case was treated with ivermectin @0.2 mg/kg b.wt. for anthelmintic effect, amoxicillin with sulbactum @ 10 mg/kg b.wt. to combat secondary bacterial complication, pantaprazole @ 2 mg/ kg b.wt. for proton pump inhibition, ondansetron @ 0.2 mg/kg b.wt. to control emesis and Vitamin B_{12} (Tribivet®) @ 1.00 mg to treat anaemia. Fluid therapy with dextrose normal saline and Ringers lactate @ 20 mL/kg b.wt. was given for rehydration. The supportive therapy was continued with parenteral administration of antibiotic, intravenous fluids and Vitamin B_{12} along with oral administration of haematinic (Red plus®) for 7 days. Blood transfusion was not recommended as the animal had a PCV of less than 10 % (Helm and Knottenbelt, 2014). On day 7 post-treatment, diarrhoeic stools with raw undigested blood changed into melena with semisolid consistency. Microscopic examination of faeces revealed a very few eggs (2 to 3) of *A. caninum* per field. The case was treated with oral anthelmintic (Denworm®) containing praziquantel 50 mg, pyrantel embonate 144 mg and febantel 150 mg. On day 14 post-treatment, the colour of the stools returned to normal

and no parasitic eggs could be detected by microscopic examination of the faeces. In this case, a single dose of ivermectin could not completely eliminate the worm load, however, a combination of pyrantel and febantel was found to be very effective (Jasmin *et al.,* 2020)

The haemato-biochemical findings observed before treatment and on day 7 and 14 post-treatment are presented in Table 1. Low red blood cell count, haemoglobinaemia, low packed cell volume, neutrophilia, leucocytosis, hypoalbuminemia, and hyperglobulinemia were the significant haemato-biochemical changes observed before treatment. Continuous loss of serum proteins owing to the blood loss could result in anaemia and hypoalbuminemia (Sivakumar *et al*., 2017; Jasmin *et al.,* 2020), whereas hyperglobulinemia could be due to the systemic infection associated with secondary bacterial complication in the small intestine. The complication could lead to neutrophilia and toxaemic signs such as anorexia, vomiting, lymph node enlargement and tachycardia. However, the neutrophils and leukocyte count returned to normal on day 7 post-treatment and an increase in haemoglobin level, PCV and albumin level was noticed on day 7 and 14, but the case was still anaemic. Aziz *et al.* (2020) also recorded anaemia, neutrophilia and hyperproteinaemia but with elevated alanine amino transferase (ALT) and aspartate transaminase (AST) levels in a seven month old male Labrador dog affected with ancylostomosis, whereas Rao *et al.* (2021) observed anaemia, hypoproteinemia, neutrophilia and vomiting along with ascites and elevated alanine amino transferase (ALT) level.

Immunochromatographic test is one of the definitive tests in the diagnosis of canine parvo viral enteritis (PVE) **(**Sayed-Ahmed *et al.,* 2021). Presence of this diseases was ruled out due to the reason that the haemoparasites such as *Babesia canis* and *Ehrlichia canis* could be associated with haemorrhagic diarrhoea in acute form (Sainz *et al*., 2015; Bilic

Fig. 1: Adult dog of Kanni breed affected with acute ancylostomosis showing emaciation and sunken eyeball

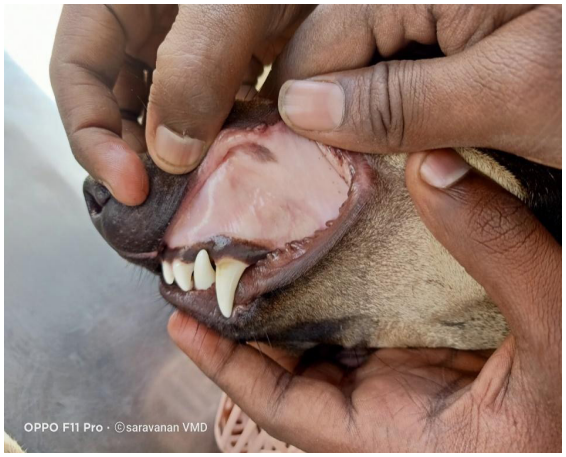

Fig. 2: Pale buccal mucous membrane of the affected breed

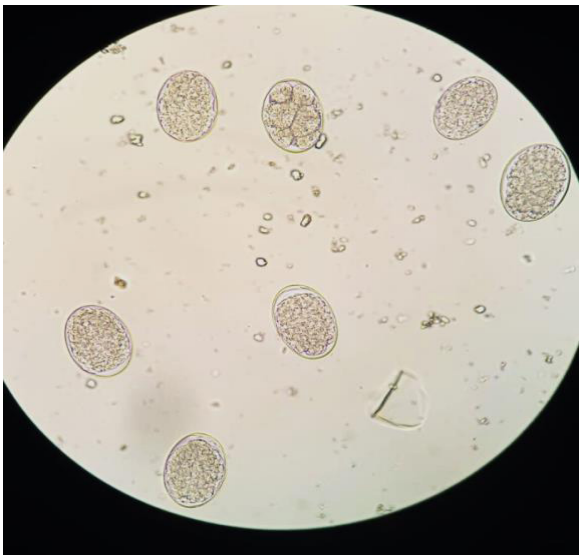

Fig. 3: Eggs of *Ancylostoma caninum* in faecal sample collected before treatment by microscopic examination (x40)

Fig. 4: Lateral flow assay based immuno-chromatographic test showing negativity for CPV-2 (C- control line; T- Test line)

et al., 2018) and canine PVE is one of the diseases causing haemorrhagic diarrhoea in dogs, though it is occasional in older dogs (Mia and Hasan, 2021). Adult dogs are generally reported to have gradual development of age resistance to ancylostomosis and hence the possibility of clinical disease is less likely, especially in dogs reared in endemic areas. Hence, the parasitic burden is generally light in older dogs, resulting in mild anaemia, associated with the long term compensation mechanism of the bone marrow (Lefkaditis, 2001).

Table 1: Haemato-biochemical changes after treatment of the Kanni breed dog affected with *A. caninum*

Parameters	Before treatment	Day 7 post treatment	Day 14 post treatment
Haematological values			
Hb (g/dL)	5.7	6.0	6.8
PCV (%)	19.6	20.9	23.0
RBC ($\times10^6$/µL)	4.39	4.93	5.36
WBC ($\times10^3$/µL)	29.87	14.42	6.8
Platelet ($\times10^3$/µL)	745	534	411
Neutrophils (%)	79	71	68
Lymphocytes (%)	16	23	28
Monocytes (%)	05	06	04
Eosinophils (%)	-	--	
Serum biochemical values			
Total protein (g/dL)	8.22	7.8	7.9
Albumin (g/dL)	1.0	1.7	2.2
Globulin (g/dL)	7.22	6.1	5.7
ALT (u/L)	35	29	41
ALP (u/L)	51	44	95
BUN (mg/dL)	13.1	10	10
Creatinine (mg/dL)	0.98	1.1	0.9
Calcium (mg/dL)	11.2	13.1	9.6
Phosphorous (mg/dL)	5.1	3.6	3.8
Glucose (mg/dL)	55	65	79
Sodium (meq/L)	87	104	135
Potassium (meq/L)	2.5	3.1	3.9
Chloride (meq/L)	84	91	105

In general, though acute ancylostomosis is reported to be common in young puppies, it may occasionally be seen in adults. Hence it needs to be differentiated from other haemorrhagic diseases by early microscopic examination of faeces. Pyrantel and febental were found to be effective anthelmintics in complete elimination of ancylostoma and broad spectrum antibiotic is recommended for combating secondary bacterial infections and preventing associated toxaemic effects.

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