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## Diagnosis and clinical management of ancylostomiasis induced eosinophilic gastroenteritis in a dog

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**Abstract**

A 06 months old German shepherd dog was presented to the Referral Veterinary Polyclinic, IVRI, Izatnagar with the history of anorexia, severe hematemesis and melena sine many days. Haemato biochemical examination showed reduced hemoglobin conc., total erythrocyte counts and hypoproteinemia with the increase in neutrophils count. Fecal smear examination revealed eggs of *Ancylostoma caninum*. The presented case was successfully treated with pyrantel pamoate and ivermectin along with supportive therapy.

**Keywords:** Eosinophilia, *Ancylostoma caninum*, Pyrantelpamoate, ivermectin

**1. Introduction**

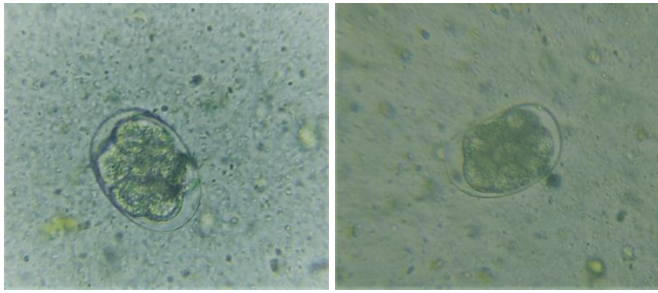
*Ancylostoma caninum* is a species of nematode known as a hookworm, which mainly infects to the small intestine of the dogs [9]. Because of their zoonotic potential, they also infected to humans and leading to cutaneous larvae migrants [3]. Mostly, puppies acquire hookworm infection through their infected Dam's during milk fed [8] and they suck blood in volumes from their host causing severe fatal anemia. Inappetence, anemia, weight loss, diarrhea, poor hair coat, abdominal distension, and rectal bleeding were the common manifestations. Enteric infection with *A. caninum* can lead to eosinophilic enteritis was reported earlier [18]. Diagnosis is mainly done through fecal examination. The characteristic thin-shelled, oval eggs can be easily seen on flotation technique from infected dog's fresh faces. The absence of eggs in feces does not rule out infection; a significant delay of at least 5 weeks may exist sometimes [12]. Fenbendazole, moxidectin, and pyrantel were the choice of drug for *A. caninum* [11]. Prevention can be regular deworming of pregnant bitches and puppies. In the present case, therapeutic management of *A. caninum* infection in the dog was discussed.

**2. Methodology****2.1 Case History**

A six-months-old unvaccinated male German shepherd dog was presented to the Referral Veterinary Polyclinic, IVRI, Izatnagar with the history of anorexia, hematemesis, and melena with no foul smell. There was the history of no deworming. The animal was dull, depressed and shows the sluggish response to normal stimulus.

**2.2 Clinical examinations and laboratory findings**

Physical examination revealed pale conjunctivae mucous membrane, normal rectal temperature (101.2°F), tachycardia (132 beats/minutes), tachypnea (64 breaths/minutes) and lymph node were found palpable. Blood and serum samples were collected for complete blood count and biochemical analysis. Haemato biochemical examination showed a decrease in hemoglobin concentration, total erythrocyte count and increased eosinophil count with reduced total protein (Table.1). The fecal sample was collected for microscopic examination which revealed oval, thin-shelled eggs with 8-16 embryonated cells of *Ancylostoma caninum* (Fig.1 & 2)



**Fig 1:** Egg of *A. caninum*      **Fig 2:** Egg with embryonated cells

**Table 1:** Hemato-biochemical parameters of affected dog

Parameter	Reference range [10].	Pre Treatment	15 <sup>th</sup> day
Hb (g/dl)	11.9-18.9	8.3	12.6
PCV (%)	35-57	32	39
TEC (10 <sup>6</sup> /cmm)	4.95-7.87	3.27	4.86
TLC (10 <sup>3</sup> /cmm)	5.0- 14.1	7.83	6.0
Neutrophils %	58-85	70	74
Lymphocytes %	8-21	16	19
Monocytes%	2-10	2	4
Eosinophils%	0-9	12	3
Basophil%	0-1	0	0
Platelet count (10 <sup>6</sup> /cmm)	211-621	220	290
SGPT(U/L)	10-109	52	27
SGOT (U/L)	13-15	48	24
BUN (mg/dl)	8-28	22	13
Creatinine(mg/dl)	0.5-1.7	0.9	0.7
Total Protein (mg/dl)	5.4-7.5	4.7	6.6
Albumin (mg/dl)	2.3-3.1	2.0	3.0
Globulin (mg/dl)	2.7-4.4	2.7	3.6

### 2.3 Therapeutic Management

Treatment was started with tab Pyrantel pamoate 5 mg/kg, PO, OD and Dexamethasone 1 mg/kg, IM, OD for 3 days and Inj. Ivermectin 0.02 mg/kg SC one times along with Dextrose Normal Saline & Ringer's Lactate 10 ml/kg, IV, BID. Supportive therapy includes Inj. Metronidazole 25 mg/kg, IV, BID, Inj. Omeprazole @ 0.5 mg/kg, IV, OD, Inj. Ondansetron @ 0.2 mg/kg IV BID for 5 days, Multivitamins (Inj. Elder vet C 2ml IV BID for 5 days), Haemocoagulase (Inj. Botropase 1ml IV BID for 2 days) and Hematinic (Syp. Haempup 2 tsf PO BID for 15 days).

### 3. Results and Discussion

The profound improvement was noticed just after five days of treatment and completely recovered after 15 days of treatment. *Ancylostoma caninum* mainly infect the small intestine of dogs as well as wolves, foxes, cats and humans also [16]. The first route of infection is skin penetration due to secretion of a protease by *A. caninum* at hair follicles or sweat glands, especially between the footpads where soil contact is frequent and under the thinner areas of skin. Migration of the larvae from the dermis to the circulatory system, lungs, trachea than it will reach intestine though swallowing of tracheal contents [12]. The second and most common route to the small intestine is by direct ingestion of infected (3rd stage) larvae of *A. caninum* [6, 12]. Mostly puppies of 2 week's age were commonly infected by third stage larvae via oral or trans mammary routes. Direct transmission between hosts and placental transmission to prenatal infection of the fetus also reported [1].

In the present case, clinical-haematobiochemical parameters before initiation of treatment revealed hemorrhagic gastroenteritis and reduced Hb concentration, TEC,

hypoproteinemia on the day of examination. It might be due to infected larvae secrete a molecule (Ac-asp-2) related to venom allergens in response to host-specific signals which is most powerful natural anticoagulants that exist and was the key reason for anemia [7]. After, molting infected larvae converts to the mature form of *A. caninum* which then cause blood feeding up to 0.1 ml in 24hrs produces eggs through the sexual reproduction in intestinal mucosal wall [10, 12]. In puppies it may lead to diarrhea, often bloody, fatal anemia, hypoproteinemia and death whereas non-regenerative anemia may occur due to large amounts of bloodsucking as well as tissue feeding in older dogs. Eosinophilic enteritis characterized by abdominal pain, diarrhea, abdominal distension, weight loss, and rectal bleeding was common in enteric infections [9, 18]. Diarrhea is rare, but stools are typically black due to the presence of blood-derived hemoglobin [4]. Humans infected through direct skin penetration leads to cutaneous larva migrans characterized by progressive, intensely pruritic, and linear eruptive lesions as well as appear as red lines on the skin. Children's had a higher risk of infection than adults due to their playing habits and their attraction toward pets.

In the present case, the clinical manifestations like lethargy, blackish vomition and diarrhea, weight loss, weakness, the roughness of the hair coat, and pale mucous membranes indicative of anemia were similarly reported by earlier authors also [12]. Pyrantel is a nicotine-like depolarizing neuromuscular blocking agent lead to paralysis of worms and cause its slow expulsion from the body and effective against both adult as well as the larval stage of *A. caninum* [15]. Ivermectin, macro cyclic lactone was also used for canine ancylostomiasis has been reported [17]. Broad spectrum antibiotics were also used sometimes to check secondary bacterial infections caused due to damaged intestinal mucosa skin wound creation at the point of entry of *A. caninum*. To reduce the chance of gastrointestinal complications in the present case, omeprazole and ondansetron were administered to diminish gastric acidity resulting vomition [13]. Dexamethasone was also administered to reduce the eosinophilic count and associated gastrointestinal inflammation [5]. Vitamin B-complex as a nervine tonic and vitamin C as an antioxidant was used to minimize the oxidative stress due to parasitic load [2, 14].

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