

Successful Treatment of a Doberman Dog Infected with *Dipylidium caninum*

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Dipylidium caninum, also known as “flea tapeworm, cucumber tapeworm, and double-pored tapeworm”, is a common parasite of dogs and cats that can occasionally infect humans (Taylor *et al.*, 2007). It has a worldwide distribution and a complex life cycle involving fleas, viz., *Ctenocephalides canis*, *Ctenocephalides felis* and *Pulex irritans* or lice viz., *Trichodectes canis* as intermediate hosts. Proglottids shed by *Dipylidium caninum* infected dogs in their feces break up and release egg packets in the environment. Larval fleas or lice ingest these egg packets and the oncospheres released their intestines then penetrate the intestinal wall, migrate to the haemocoel, and develop into cysticercoids (Yasuda *et al.*, 1971). The cysticercoid stays in the flea until it becomes an adult. Dogs get infected by swallowing such fleas or lice. The tapeworm larva is freed in the dog’s small intestine and grows into an adult tapeworm in about a month. The tapeworm causes bleeding at the site of attachment in the intestine and diarrhoea. The clinical signs of the infection include poor growth, low work performance, pot-bellied appearance, diarrhoea, anal itching, and overall weakness (Taylor *et al.*, 2007). The faeces of infected dogs contain gravid, double-pored proglottids that detach from the tapeworm. Humans especially young children who play with pets can also get infected by swallowing fleas that have eaten these proglottids (Ramana *et al.*, 2011; Narasimham *et al.*, 2013). Various researchers from different states of India have reported on the prevalence of *Dipylidium caninum* in dogs (Panigrahi *et al.*, 2014; Moudgi *et al.*, 2016; Sivakumar *et al.*, 2018). *Dipylidium* infections can be successfully treated in humans and animals. The present case deals with the diagnosis and successful treatment of dipylidiosis in a Doberman dog.

CASE HISTORY AND OBSERVATIONS

A male Doberman puppy, just four months old, weighing 10.2 kg, was brought to the Veterinary Clinical Complex (VCC) of the College of Veterinary Science and Animal Husbandry, Kamdhenu University, Anand, Gujarat (India). The puppy’s medical history included symptoms of

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lethargy, fleas on hair coat, the presence of white segments in its stool, and a behaviour known as scooting. Despite being provided with a nutritious diet, the puppy exhibited signs of poor health, such as a lack of lustrous coat and unthriftiness. It was also revealed that the puppy was never vaccinated or dewormed, and there were no reports of vomiting or fever.

Clinical examination of dog revealed flea infestation, normal pink conjunctival mucous membranes, and a temperature of 102.2° F. Palpation of the abdomen revealed no pain. Per rectal examination with lubricated gloved finger revealed absence of anal gland impaction, which is a cause of scooting behaviour.

Fecal sample collected per rectum on gross and direct microscopic examination revealed the presence of gravid segments of *Dipylidium caninum* and egg of *Dipylidium caninum*. Under the stereoscope, gravid segments were found to have cucumber seed shape (Fig. 1). A gravid segment when pressed between two slides and stretched showed the presence of egg capsules containing eggs. High power magnification showed the presence of an egg capsule containing 8-16 eggs (Fig. 2 & 3).

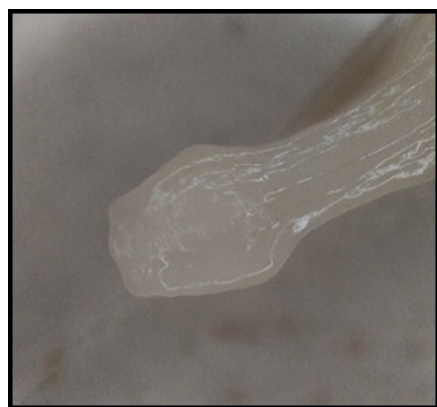
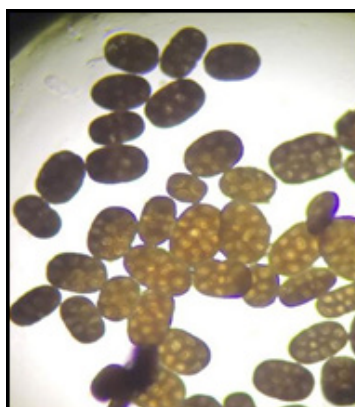

Fig. 1: Gravid proglottid of *Dipylidium caninum*

Fig. 2: Eggs of *Dipylidium caninum* (×45)

Fig. 3: Eggs of *Dipylidium caninum* (×100)

The blood sample collected in EDTA vial for complete blood count (CBC) using an automatic whole blood analyzer (Abacus Junior Vet-5), and in clot activator for serum biochemical parameters by using clinical serum biochemistry auto-analyser (CKK 300) revealed normal haematology and hypoproteinaemia with increased AST levels as shown in Table 1 and 2, respectively.

Table 1: Haematological analysis in a *Dipylidium caninum* infested dog

Parameter	Value	Reference Range (Fielder, 2023)
Hb (g/dL)	11.60	11.9-18.9
TEC (×10 ⁶ /μL)	5.74	4.95-7.87
PCV (%)	34.72	35-57
TLC (×10 ³ /μL)	11.31	5.0-14.1
Lymphocytes (%)	21.90	8-21
Neutrophils (%)	73.30	58-85
Monocytes (%)	4.80	2-10
Eosinophils (%)	0	0-9
MCV (fl)	60.00	66-77
MCH (pg)	20.10	21.0-26.2
MCHC (g/dL)	33.00	32.0-36.3
Platelets (×10 ⁶ /μL)	217.00	211-621

Table 2: Serum biochemical analysis in a *Dipylidium caninum* infested dog

Parameter	Value	Reference Range (Fielder, 2023)
Total protein (g/dL)	3.70	5.4-7.5
Albumin (g/dL)	2.00	2.3-3.1
ALT (U/L)	12.03	10-109
AST (U/L)	38.70	13-15
Creatinine (mg/dL)	0.48	0.5-1.7
BUN (mg/dL)	11.47	8-28
Calcium (mg/dL)	10.04	9.1-11.7
Glucose (g/dL)	77.00	76-119

TREATMENT AND DISCUSSION

The dog was confirmed as a case of *Dipylidium caninum* infection and was treated with a tablet containing praziquantel 50 mg, pyrantel embonate 143 mg, and oxantel embonate 543 mg, orally @ 1 tablet per 10 kg of body weight once. The shampoo containing 1 % propoxur was applied externally once in a week for two time. The syrup containing multiple vitamins and amino acids was given twice a day @ 5 mL per dose. After a week, the dog improved significantly. A fecal test showed no *Dipylidium caninum* eggs, confirming the success of treatment.

Dipylidium caninum eggs were detected in the fecal sample by microscopic examination. A characteristic feature of *Dipylidium caninum* is the egg capsule that contains up to 30 eggs (Fig. 2 & 3). The mature segments of the parasite were processed according to standard methods. The dog was confirmed to be infected with *Dipylidium caninum* (Soulsby, 1982). The presence of fleas in the environment is linked to tapeworm infections in dogs, as these fleas function as intermediate hosts for *Dipylidium caninum*. Several studies have reported cases of this infection in dogs from different regions of India (Qadir *et al.*, 2012; Panigrahi *et al.*, 2014; Sudan *et al.*, 2015; Moudgi *et al.*, 2016; Sivakumar *et al.*, 2018). The lack of awareness about proper deworming schedules and anthelmintic drugs may contribute to the increased occurrence of *Dipylidium caninum* infestation in dogs. Dogs infected with *Dipylidium caninum* experience anal itching due to the movement of gravid segments that exit through their anus. This causes them to scoot, or drag their rear ends, on the ground. This behaviour was observed by Saini *et al.* (2016) in their study. The results of complete blood count were within the normal range. This was consistent with the findings of Sivakumar *et al.* (2018) in dogs infected with *Dipylidium caninum*. Most of the serum biochemical parameters were within the normal range, except for total protein and AST (aspartate aminotransferase). The serum sample showed reduced levels of total protein due to diarrhoea and elevated levels of AST.

The dog infected with *Dipylidium caninum* was treated effectively with oral praziquantel at a dose of 5 mg/kg body weight. After a week, the dog showed significant improvement and no eggs were detected in its faeces. This finding was consistent with the previous study by Sivakumar *et al.* (2018).

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