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Concurrent infection of Toxocariasis and Ancylostomiasis in a puppy and its Therapeutic management: A case report

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Abstract
The present case study is about the concurrent infection of *Toxocara canis* and *Ancylostoma caninum* in a dog. A mongrel dog about 5 month of age was presented to Teaching Veterinary Clinical Complex (TVCC), Veterinary College and Research Institute, Orathanadu, Thanjavur on April 2017 with the history of dullness, reduced food intake, vomiting and having bloody diarrhea since 2 days. There is no history of vaccination and deworming. On clinical examination revealed foul smelling bloody diarrhoea on very first day and on second day it voided feces along with the worm and poor hair coat. Faecal examination showed presence of *T. canis* and A. *caninum* eggs. Dog was treated with pyrantel pamoate @5 mg/kg b.wt PO for three consecutive days and animal stabilized with fluid and supportive Vitamin B complex therapy. On re-examination of faecal sample after a week of treatment, were found negative for parasitic eggs. Dogs showed uneventful recovery after treatment.

Keywords: Concurrent infection, Puppy, *Toxocara canis, Ancylostoma caninum*

1. Introduction
In the pet animal practice gastrointestinal signs associated diseases are very frequently encountered problem. Especially endoparasitic infestations like *Toxocars spp*. and *Ancylostoma spp.* are the common gastrointestinal parasites, which affecting the dogs all over the world including India [1]. These both parasites are the most important zoonotic gastrointestinal nematodes transmitted to human from dogs [2, 3]. The main roots of transmissions are oral by contaminated soil, skin penetration, transplacental and transmammary. The common clinical signs were inappetence, anemia, weight loss, diarrhea, poor hair coat, and abdominal distension. Both of the parasites which causes larval migrant in human and as well as animal body, i.e visceral migrants by *Toxocara canis* and cutaneous migrants by *Ancylostoma caninum* [4, 5]. The prevalence of *T.canis* and *A.caninum* were reported by various authors in different states of India [6-10]. Among the GI parasites *T.canis* and *A.caninum* infection were needs more attention than others. The most of the gastrointestinal parasites of dogs and cats are zoonotic nature and may result in serious disease in humans as well as in animals. In the present study was discussed the concurrent infection of *T. canis* and *A.caninum* in a five month old puppy and its therapeutic management.

2. Materials and method
2.1 Clinical history
A 5 month old mongrel dog weighing about 5 kg was presented to Teaching Veterinary Clinical Complex (TVCC), Veterinary College and Research Institute, Orathanadu, Thanjavur on April 2017 with the history of dullness, reduced food intake, vomiting and bloody watery diarrhea (Fig.1) since 2 days. Dog was not deworming and vaccination.

2.2 Clinical examination
On Clinical examination of animal revealed dull, depressed, congested conjunctival mucus membrane, poor hair coat, temperature 41.0 ˚C with heart rate 124/ min, respiratory rate 35/min and mild dehydration were observed. No pain was evinced while palpation abdominal. Animal voided foul smelling bloody diarrhoea on first day and second day foul smelling bloody diarrhoea with the worm. Faecal examination showed confirmed presence of *Toxocara canis* and *Ancylostoma caninum* eggs (Fig.2) as per the guidelines given by Soulsby [8].

2.3. Parasitological examination

Microscopic examination of faecal sample revealed the presence of *Toxocara canis* and *Ancylostoma caninum* eggs (Fig.3&4). Further faecal sample were subjected to floatation and sedimentation techniques for identification of eggs revealed the presence of *Toxocara canis* and *Ancylostoma caninum* eggs only. The worms were separated from faeces and kept in normal saline solution for further characterization. It was confirmed as *Toxocara canis* and *Ancylostoma caninum* worms.

2.4. Hematological and biochemical examination

At the time of case presentation, blood was collected for complete haematological studies and biochemical studies as per the guidelines given by Benjamin [11]. Whole blood was examined for Total erythrocyte count, hemoglobin, volume of packed red cells, total leukocyte count and differential leukocyte count were estimated as per the method described by Schalm *et al*. [12]. Whereas Sera thus separated were stored at -20°C till further analysis.

Blood urea nitrogen, serum total proteins, serum albumin, serum globulin, Alanine aminotransferase and serum electrolytes such as sodium, potassium, chloride, ionized calcium were estimated on first day using semiautomatic analyzer and electrolyte analyzer, respectively as per the manufacturer's instructions and using standard kits.

2.5. Treatment

Dog was treated with pyrantel @ 5 mg/kg body weight orally for three consecutive days along with supportive fluid therapy and vitamin B complex to stabilize pet. Dogs showed marked recovery during post treatment. On re-examination of faecal sample after a week, were found negative for all parasitic eggs.

3. Result and discussion

In our study the presented pet was concurrently infested with *T.canis* and *A.caninum* eggs. According to Torres *et al*., [13] none of dogs in their study were concurrently infected with more than one parasite species. But concurrent infection was observed by Sahu *et al*., [7] who reported mixed infection with eggs of *Ancylostoma caninum* and cestode eggs in addition to *T. canis* eggs. Swai *et al*. [14] observed that the prevalence rate was found to be very high in below 6 months of age dogs in both stray (62.79%) and owned (41.74%). This was in agreement with our study. This might be due to higher prevalence in young dogs might be due to prenatal and transmammary transmission of Toxocara infection as suggested by Hendrix *et al*. [15].

Fig 1: On the day of Presentation With bloody diarrhoea

Fig 2: *T. canis* and *A. caninum* worms

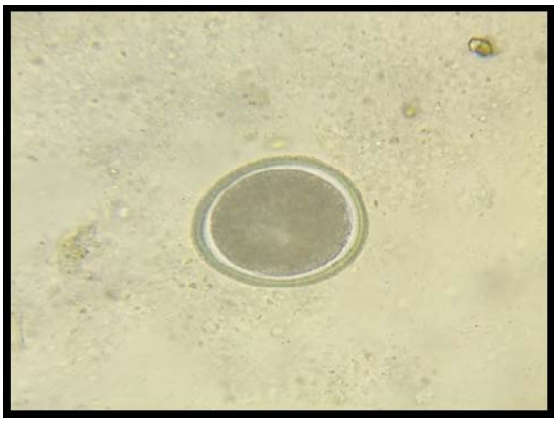

Fig 3: *Toxocara canis* egg

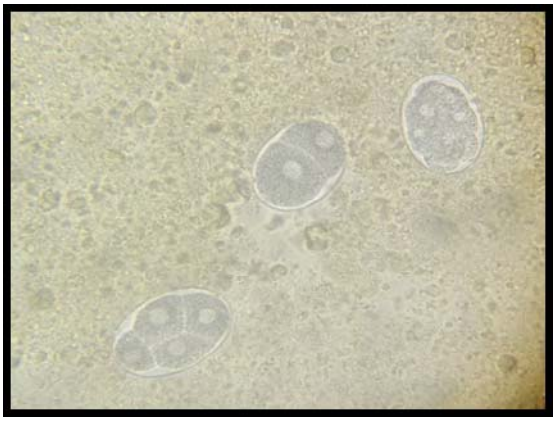

Fig 4: *Ancylostoma caninum* eggs

Toxocara is the ubiquitous parasite and infected animals may have mild symptoms included nausea and intermittent abdominal discomfort [16]. Some animals remain asymptomatic or develop organ specific signs. This was correlated with our studies where we found vomiting and nausea. In dogs *Ancylostoma* spp. infection typically results in diarrhea, blood loss and anemia, poor weight gain, dehydration and can affect dogs at any age [17].

An analysis of the blood count data revealed that the blood profiles of dog showed low level of red blood cells that might be due to intense parasite-induced blood spoliation, which triggers an increased production and release of blood cells by the host bone marrow [18]. Lower levels of white blood cells, albumin and glucose were observed in the present study

(Table.1). Schmidt *et al* [17] observed low levels of albumin and iron in the dogs infected with *Ancylostoma* eggs. It may also be due to its active blood feeding from lacerated capillaries with subsequently lysis of erythrocytes by pore formation and hemoglobin release into the lumen of the parasites intestine, resulting in loss of serum proteins, intestinal inflammation and hemorrhage [19, 20]. Serum electrolytes infected dog revealed normal values other than chloride (Table.2).

Table 1: Haematological parameters of dog with *T. canis* and *A. caninum*

Parameters	Results
Hemoglobin (g/dl)	9.4
Packed cell Volume (%)	41
Total Erythrocyte Count (10^{6}/µl)	3.8
White Blood Cell (x10^{3}/µl	3.4
Neutrophils (%)	74
Lymphocytes (%)	22
Monocytes (%)	3
Eosinophils (%)	1
Basophils (%)	0

Table 2: Biochemical and electrolyte parameters of dog with *T. canis* and *A. caninum*

Parameters	Results
Glucose (mg/dl)	45
Total protein (g/dl)	6.09
Albumin (g/dl)	2.15
Globulin (g/dl)	3.94
ALT (U/L)	29.21
Potassium mmol/l	3.74
Sodium mmol/l	138.8
Chloride mmol/l	264.3
Ionized calcium (iCa) mmol/l	1.60

4. Treatment

Dogs were confirmed to be suffering from concurrent infection of Toxocariasis and Ancylostomiasis. Pyrantel pamoate is widely used as a dewormer against round worms in dogs, cats and many other species. Hence, the present case was successfully treated with pyrentel pamoate @5 mg/kg body wt. orally for three consecutive days and animal stabilized with fluid and supportive vitamin B complex therapy. Dogs showed uneventful recovery after treatment.

According to Goodman and Gilman [21], parental pamoate open nonselective cation channels and induce persistent activation of nicotinic acetylcholine receptors and spastic paralysis of the worm. Similar finding was stated by Mora *et al*. [22] who revealed the host intestine poorly absorbs the pyrantel and causes paralysis of the worm and expulsion with void. So, it can be used effectively with purgative for rapid expulsion of worm in non severe cases prior to surgical approach along with other supportive therapy such as vitamin B–complex as agreed with Katona and Katona–Apte [23].

5. Conclusion

The present study concluded as presence of these parasite in dogs may be the source of soil contamination for transmission of Toxocariasis and Ancylostomiasis which having the public health importance in this region. These parasites can spread to owners, their family members, Veterinarians and Veterinary Health workers through direct contact or by vehicles. Educating the dog owners about zoonotic parasites which can spread from companion animals and effective control method is required for spreading of parasitic infection.

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