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Haematological alterations during concurrent infection of *Dirofilaria immitis* and *Ancylostoma caninum* infections in dog and its therapeutic management: A case report

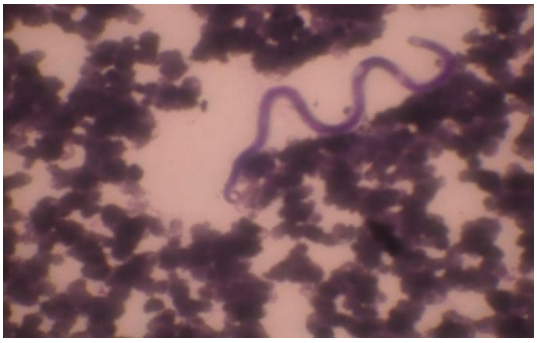
Ajit Kumar, Anjay and Deepak Kumar

Abstract
The single dose of ivermectin 250 µ/kg. b. wt. subcutaneously was observed highly effective against the microfilarae of *Dirofilaria immits* and *Ancylostoma caninum* worms in a dog by early recovery from worms infestation. The deteriorated health condition due to alteration of haematological parameters (Hb, TEC, Lymphocytes, Neutrophils, Monocytes and eosinophils) became normal values following treatment.

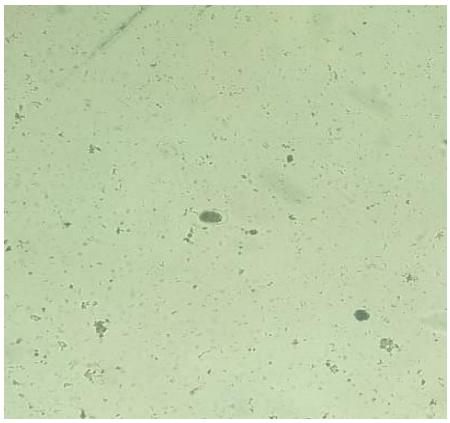
Keywords: haematological profile, *Dirofilaria immitis*, *Ancylostoma caninum*, ivermectin

Introduction
Among various helminthic infection *Dirofilaria immitis* is a dreadful parasitic disease of dogs which causes severe cardiopulmonary problems and even death of the affected animals [1] whereas *Ancylostoma caninum* is a voracious blood sucker helminth leading to microcytic hypochromic anaemia in severely affected dog [2]. There are scanty reports available on haematlogical changes during mixed infections of *Dirofilaria immits* and *Anyclostoma caninum* in a dog. The present report highlights the haematl*ogical* alterations during mixed infections of *Dirofilaria immits* and *Ancylostoma caninum* and its therapeutic management with ivermectin in a female dog.

Case History and Observations
A female Doberman dog about four months old presented with a history of anorexia, emaciation and pyrexia for few days. On wet drop method and Giemsa stain blood smear examination revealed a large number of microfilariae of *Dirofilaria immitis*. Then, their faecal examinations by direct and indirect technique, eggs of *Ancylostoma caninum* were detected. Based on larval culture, *Ancylostoma caninum* and morphologically microfilaria of *Dirofilaria immitis* infections were diagnosed. Eggs per gram (EPG) were counted by the Mc Master technique. After a confirmatory diagnosis of mixed infection of *Dirofilaria immitis* and *Ancylostoma caninum*, the haematological parameters like Haemoglobin (Hb%), Total erythrocyte count (TEC), Total leukocyte count (TLC) and Differential leukocyte count (DLC) were done during pre-treatment and 14th day post - treatment as per the slandered techniques



Microfilaria of *Dirofilaria immitis*



Egg of *Ancylostoma caninum*

Result and Discussion

The mixed *Dirofilaria immitis* and *Ancylostoma caninum* infected dog was treated with ivermectin @ 250 µ/kg. body weight subcutaneously. Then faecal samples and blood samples were collected on before treatment (0-day) and after treatment on 3rd and 7th day for the detection of eggs of *Ancylostoma caninum* and microfilariae of *Dirofilaria immit*s. Electrocardiogram was also studied before and after amelioration of parasites. The microfilariae were absent in the wet drop and Knott's method of blood examination on 3rd day post-treatment. However, the live microfilariae were found about 80 hours in pre-treatment collected blood in which EDTA was added and kept in freeze by wet drop examination. The egg per gram count was recorded 900.00 before treatment which became zero on 7th day post-treatment. Ivermectin is effective against *Ancylostoma caninum* and also against *Dirofilarial immitis* have been reported [3-4]. The observation recorded clearly (table-1) showed that lower pre-treatment value of Haemoglobin, TEC, neutrophils and Monocytes were found to have improved in their normal values on 14th day after giving Ivermectin treatment whereas, the lymphocytes and eosinophils percentage were observed markedly increased during infection this became normal on 14th day post-treatment. *Dirofilaria immitis* caused haemolysis of RBCs which results decrease in Hb and Total erythrocyte count [3]. Adults *Dirofilaria immitis* when enter in the heart or microfilaria first released into the blood circulation by the female worms result eosinophilia [5]. Alteration in haematological profile (decreased Hb & TEC, leucocytosis, neutropenia and eosinophilia) during the *Dirofilaria immitis* infection also observed by authors [6]. The TEC and Hb values were recorded lower during *Ancylostoma caninum* infection because it is a voracious blood sucker parasite which results microcytic hypochromic anaemia [2].

Table 1: Haematological profile during pre- and post-treatment of concurrent infection of *Dirofilaria immitis* and *Ancylostoma caninum.*

Haematological profile	0-day (Pre-treatment)	14th day post-treatment
HB g%	09.30	12.10
Total erythrocyte count ($X10^6$/µl)	04.40	05.50
PCV %	38.00	39.00
Total leucocyte count ($X10^3$/µl)	16.50	09.00
Lymphocyte %	10.00	05.00
Monocyte %	09.00	05.00
Neutrophil %	69.00	84.00
Eosinophil %	12.00	06.00
Basophil %	00.00	00.00

Conclusion

The present study showed that the Ivermectin is safe and provides a high efficacy in controlling concurrent infection of *Dirofilaria immitis* and *Ancylostoma caninum* infection in dog.

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