

HAEMATO-BIOCHEMICAL ALTERATION IN A CASE OF CANINE HEPATOZOONOSIS

CH. Sudha Rani Chowdary^{1*} and Y. Chaitanya²

¹Assistant Professor, Department of Veterinary Pathology, ²Assistant Professor, Medicine, Department of VCC, NTR College of Veterinary Science, SVVU, Gannavaram-521102, (A.P.).

Received: 17.10.2022; Accepted: 19.11.2022]

{DOI 10.29005/IJCP.2022.14.2.158-160}

Diagnostic and haemato – biochemical study was conducted on a dog infected with *Hepatozoon canis*. Diagnosis was made based on the microscopic examination of blood smear. The study revealed that hepatozoonosis resulted in severe anaemia, leucocytosis, neutrophilia, lymphopaenia, hypoproteinemia, hypoalbuminaemia, elevated liver enzymes, BUN and creatinine levels in blood.

Keywords: Dog, Haematology, *Hepatozoon canis*, Serum biochemistry.

Canine hepatozoonosis is a tick-borne disease caused by protozoan of genus *Hepatozoon canis*. It is an important infectious disease of dogs in tropical and sub-tropical regions throughout the world. The clinical signs in *H. Canis* infected dogs are anorexia, pale mucous membranes, weight loss, diarrhoea, gait abnormalities, fever, polyuria and polydipsia (O'Dwyer *et al.*, 2006). The definitive host of *H. canis* is *Rhipicephalus sanguineus* and the intermediate hosts are dogs and wild canids (Rupali *et al.*, 2017). *Hepatozoon canis* is transmitted by ingestion of tick or parts of tick body containing oocysts. Oocysts rupture and release sporozoites in dog's intestinal lumen. Sporozoites penetrate the gut wall, phagocytosed and carried to the visceral organs and muscles via lymph or blood. In these organs, meronts are formed, rupture to form merozoites which transform into gamonts in neutrophils and monocytes. The life cycle completes when a tick feeds on blood of an infected dog and ingests gametocytes. These undergo gametogony and produce oocysts in the tick's body cavity (Vojta *et al.*, 2012). The disease exists in different clinical forms ranging from asymptomatic to highly fatal hepatozoonosis (Baneth *et al.*, 2007). However, subclinical form of the disease is the most common form in canines (Tsachev *et al.*, 2008).

Materials and Methods

Blood was collected into a sterile vacutainer containing K3 EDTA as an anticoagulant for haematological studies and simultaneously into a serum vacutainer for biochemical studies. Haematology was performed as per the standard methods. Haematological parameters such as haemoglobin (Hb), Packed cell volume (PCV), total erythrocyte count (TEC) and total leukocyte count (TLC) were estimated. Leishman's stained blood smear was screened for the presence of parasites and subjected to differential leukocyte count (DLC). Serum biochemistry included Total Protein, Albumin, Alkaline amino transferases (ALT), Alkaline phosphatase (ALP), Blood urea nitrogen (BUN) and Serum creatinine. All the biochemical parameters were estimated using Erba Mannheim ready to use kits in a semi automatic biochemical analyzer.

Results and Discussion

Hepatozoon canis infection in a Labrador Retriever dog was diagnosed based on the blood smear examination. The neutrophils on the blood smear contained capsule shaped, clear to pale blue gamont in the cytoplasm almost obscuring the cytoplasm and nucleus of the neutrophil (Fig.1). The blood smear also revealed, of anisocytic and poikilocytic RBCs. It means normally anisocyte and pykocytes are more.

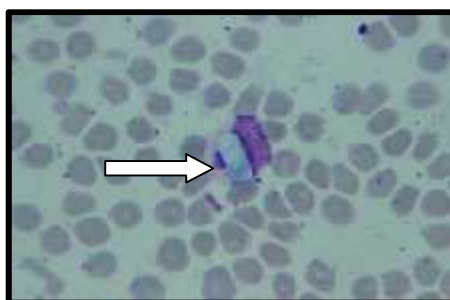


Fig.1. Blood smear showing a capsule shaped, light blue colored gamont in the cytoplasm of a neutrophil (arrow), Leishman's stain x 1000

The haematological and biochemical values were estimated and presented in (Table-1). Haematology revealed decreased haemoglobin, packed cell volume and total erythrocyte count, leukocytosis, neutrophilia and lymphopaenia. Serum biochemistry

revealed hypoproteinemia, hypoalbuminaemia, increased levels of Alkaline amino transferase (ALT), Alkaline phosphatase (ALP), Blood urea nitrogen (BUN) and creatinine.

Table 1. Haemato-biochemical observation of a *Hepatozooncanis* infected dog

S. No.	Parameter	Normal reference range	Estimated values
1	Hb (g/dl)	12-16	6
2	PCV (%)	35-55	20
3	TEC ($\times 10^6/\mu\text{l}$)	5.5-8	3
4	TLC ($\times 10^3/\mu\text{l}$)	5-14	16
5	Neutrophils (%)	60-75	90
6	Eosinophils (%)	0-9	0
7	Basophils (%)	0-1	0
8	Lymphocytes (%)	15-30	8
9	Monocytes (%)	3-8	2
10	Total Protein (g/dl)	6-8	4.8
11	Albumin (g/dl)	2.6-4	1.8
12	Globulin (g/dl)	2.1-3.7	3.0
13	ALT (U/l)	12-118	130
14	ALP (U/l)	1-114	180
15	BUN (mg/dl)	8-28	60
16	Creatinine (mg/dl)	0.5-1.7	3.0

The present case, diagnosis and haemato-biochemistry of *Hepatozooncanis* infection in a dog that was brought to the Teaching Veterinary Clinical NTR College of Veterinary Science, Gannavaram, with a history of anorexia and loss of condition. There is no much literature available on reports of hepatozoonosis in dogs of Andhra Pradesh. However, concurrent infection of *Hepatozooncanis* with *Ehrlichia canis* has been reported earlier in the state of Andhra

Pradesh as also has been reported by Rao *et al.*, 2020. In the present case, *Hepatozooncanis* infection was diagnosed based on the presence of gamonts in the neutrophils in blood smear of affected dog. *H. canis* gametocytes can be detected in circulating leukocytes of infected dogs, even in those without clinical signs Roopali *et al.* (2017) also diagnosed the disease in dogs based on blood smear examination. In the present case, haematology revealed severe

anaemia, mild leukocytosis, lymphopaenia and relative neutrophilia. Similar findings were reported in earlier studies by Vojta *et al.*, 2012; Roopali *et al.*, 2017 and Singh *et al.*, 2017. However, Vojta *et al.* (2012) also reported eosinophilia, lymphocytosis and monocytosis in few cases of hepatozoonosis in canines.

Serum biochemistry in the present case revealed hypoproteinemia, hypoalbuminaemia, elevated ALT, ALP, BUN and creatinine levels suggestive of liver and kidney dysfunction. Similar findings were reported by Roopali *et al.*, 2017 and Singh *et al.*, 2017. Changes in liver and kidney function could be connected to the life cycle of *H. canis* whose merogony takes place in the liver and other organs. In contrast, In the present study, there was an increase in the globulin: albumin ratio which could be attributed to immune stimulation by the *H. canis* antigen though contrary to this Vojta *et al.*, 2012 have reported normal protein and albumin values along with hypoglobulinaemia in their studies on *H. canis*.

Conclusions

The present study reported haemato-biochemistry of *H. Canis* infected dog that revealed severe anaemia, mild leukocytosis, severe lymphopaenia, hypoproteinemia, hypoalbuminaemia, increased globulin: albumin ratio, elevated ALT, ALP, BUN and creatinine values.

References

Baneth, G., Samish, M., and Shkap, V. (2007). Life cycle of Hepatozooncanis

(Apicomplexa: Adeleorina: Hepatozoidae) in the tick *Rhipicephalus sanguineus* and domestic dog (*Canis familiaris*). *J. Parasi.*, **93**(2): 283-299.

O'Dwyer, L.H., Saito, M.E., Hasegawa, M.Y. and Kohayagawa, A. (2006). Prevalence, hematology and serum biochemistry in stray dogs naturally infected by *Hepatozoon canis* in São Paulo. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, **58**: 688-690.

Rao, L.N., Rani, N.L and Shaju, L.E. (2020). Diagnosis and Management of Ehrlichiosis and Hepatozoonosis in a Dog. *Intas Polivet*, **21**(1): 231-233.

Roopali, B., Mahadappa, P., Satheesha, S.P., Sandeep, H., Kasaralikal, V. and Patil, N.A. (2017). Acute hepatozoonosis in dogs: a case report. *J. Para. Diseases*, **41**(3): 747-749.

Singh, K., Singh, H., Singh, N.K., Kashyap, N., Sood, N.K. and Rath, S.S. (2017). Molecular prevalence, risk factors assessment and haemato-biochemical alterations in hepatozoonosis in dogs from Punjab, India. *Comp. Imm., Micro. Infect. Disea.*, **55**: 53-58.

Tsachev, I., Ivanov, A., Dinev, I., Simeonova, G. and Kanakov, D. (2008). Clinical Ehrlichia canis and Hepatozoon canis, co-infection in a dog in Bulgaria. *Revue de Médecine Vétérinaire*, **159**(2): 68.

Vojta, L., Mrljak, V. and Beck, R. (2012). Haematological and biochemical parameters of canine hepatozoonosis in Croatia. *Veterinarski arhiv*, **82**(4): 359-370.