

## HEPATOZOONOSIS IN DOBERMAN - EMERGENCY WHOLE BLOOD TRANSFUSION AND TREATMENT STRATEGIES

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### ABSTRACT

*A two and half year old intact 19 kg female Doberman was referred to small animal medicine outpatient unit of Madras Veterinary College Teaching Hospital with the history of lateral recumbency, dyspnoea, weight loss, inappetence, brownish diarrhoea for past 2 weeks. Clinical examination revealed fever, blanched mucous membrane, lymphadenopathy, dehydration > 5%. Hematology revealed severe anaemia, moderate thrombocytopenia and severe leukocytosis with neutrophilia. Ultrasonography evidenced chronic kidney disease (CKD) and peripheral blood smear cytology confirmed Hepatozoan canis gamonts in neutrophils. Emergency fresh whole blood transfusion was done and treatment initiated with a combination therapy including single dose of Imidocarb dipropionate @7.5 mg/kg and Doxycycline @ 10 mg PO for 28 days following which the dog showed progressive improvements.*

**Keywords:** *Hepatozooncanis*, CKD, anaemia, Blood transfusion

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### CASE REPORT

A 2.5 year old intact, female doberman weighing around 19 kg was presented to

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Small Animal Medicine Outpatient Unit of Madras Veterinary College Teaching Hospital (MVCTH) with history of lateral recumbency, weight loss, inappetence, acariasis, lethargy, brownish diarrhoea since 2 weeks (Fig 1). On clinical examination pale conjunctival and oral mucous membrane, tachypnoea, poor perfusion and peripheral lymphadenopathy noticed. Hemogram revealed decreased hemoglobin, decreased RBC and PCV, thrombocytopenia and elevated WBC counts with neutrophilia (Table-1). Serum biochemistry revealed

elevated BUN, creatinine, phosphorous and decreased albumin level. The case also revealed slightly elevated activities of ALT with a normal ALP activities (Table-2). On ultrasonography, reduced size and irregular contour of the kidney with hyperechoic cortex at the cortico-medullary junction was noticed suggestive of chronic kidney disease according to IRIS staging 2023 (Fig.2).

Stained peripheral blood smear revealed the presence of *Hepatozoan canis* gamonts in neutrophils (Fig.3). On the basis of history, clinical and laboratory findings it was diagnosed as a case of Hepatozoonosis caused by *H. canis*. An emergency blood transfusion was carried out after compatibility check of donor and recipient (blood typing Dog erythrocyte antigen 1.1 negative) by immunochromatographic assay as described by Baranidharan *et al.*, (2018) following which 350 ml of fresh whole blood was transfused @ 1.5 ml/kg/ hour. Mild increase in haemoglobin (4.5g/dL), RBC (2.40m/cmm), PCV (14%), platelets (190000/cmm) and reduced WBC (9700/cmm with 80% neutrophils) was observed after 24 hours post transfusion. The treatment was started with combination therapy including single dose of Inj. Imidocarb dipropionate @ 5 mg/kg, SC and Tab. Doxycycline @ 10 mg/kg, PO, SID for 28 days. Supportive treatment was done with Inj. RL @ 200 ml very slow IV, Inj. Pantoprazole @1 mg/kg, IV, SID were administered for

management of gastritis and CKD for 7 days. Along with this, hematinics (syrup aRBC® @ 10 ml, PO, BID) and nephroprotectants (capsule CK-Reno® @ 2capsule per day per OS) and phosphate binders (powder Phos-clear® @ 4 scoops per day with food) were also advised for 4 weeks. After 4 weeks of therapy, the dog showed marked improvement in condition. Haemato-biochemical values were found within a normal range and peripheral blood smear was negative for *H. canis* on 28th day of post therapy.

### CASE DISCUSSION

Canine hepatozoonosis is caused by *Hepatozoon canis* and is transmitted through ingestion of an ixodid tick, *Rhipicephalus sanguineus sensu lato* containing mature oocysts. Fever, weight loss, and severe hyperesthesia over the paraspinal regions are common findings of clinically affected dogs. Anorexia, pale mucous membranes from anaemia, depression, oculonasal discharge, meningo-encephalomyelitis, and bloody diarrhoea occur in some dogs.

Otranto *et al.* (2011) suggested that clinical signs of *H. canis* infection are weight loss, pale mucous membranes, and lymphadenomegaly. Gondim, *et al.* (1998) stated that in severe and fatal cases of the illness, symptoms such as fever, paralysis, inappetence, anaemia, ocular discharge, hind limb weakness and emaciation were noted.

**Table 1. Hematology parameters**

Parameter	Before transfusion (day0)	After transfusion (day2)	Post treatment (day 28)	Reference range*
RBC count (millions/mm <sup>3</sup> )	1.41	2.4	4.8	5.0-7.9
PCV (%)	7.5	13.5	33	35-57
Hemoglobin (g/dl)	2.9	4.3	10.2	12-19
WBC count (/cmm )	37,100	19700	13300	5000-14000
Neutrophils (%)	90	81	76	58-85
Lymphocyte (%)	6	14	19	8-21
Monocytes (%)	4	4	4	2-10
Eosinophils (%)		1	1	0-9
Basophils (%)				0-1
Platelets (/cmm)	52000	122000	275000	250000-600000/cmm

\*: Haematology reference ranges, (Merck Veterinary Manual, 2011)

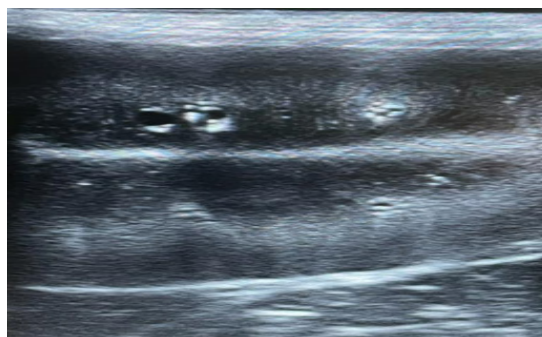
**Table 2. Serum biochemical parameters**

PARAMETER	BEFORE TRANSFUSION (DAY0)	AFTER TRANSFUSION (DAY2)	POST TREATMENT (DAY 28)	REFERENCE RANGE
ALP (IU/L)	103	104	85	20-156
ALT (IU/L)	44	46	42	8.3-53
Total protein (g/dl)	6.3	6.4	6.8	5.4-7.5
Albumin (g/dl)	1.7	1.8	2.1	2.3-3.1
Total bilirubin (mg/dl)	1.2	1.1	0.8	0-0.5
Direct bilirubin (mg/dl)	0.5	0.43	0.4	0.06-0.12
BUN (mg/dl)	99.5	103.6	66	10-28
Creatinine (mg/dl)	4.16	4.28	2.8	0.5-1.5
Phosphorous (mg/dl)	13.98	15.7	8.2	2.6-6.2

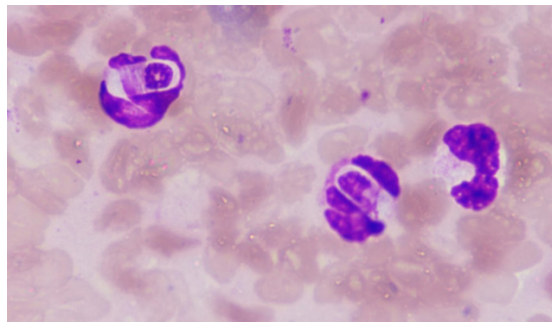
\* Serum biochemical reference ranges, edn. (Merck Veterinary Manual, 2011)



**Fig. 1. Doberman infected with *H. canis* showing dullness, lethargy**



**Fig. 2. Abdominal ultrasound revealed Hyperechoic cortex and lack of corticomedullary junction**



**Fig. 3. Gamonts of *H. canis* in neutrophils**



**Fig. 4. Mucous membrane turned from pale to pink after 24 hours post transfusion**

Baneth *et al.* (2006) stated that thrombocytopenia and anaemia in hepatozoonosis may be caused by bone marrow suppression. Persistent, generally mature neutrophilia is a consistent feature of naturally occurring ACH (Macintire *et al.*, 2001).

Hypoalbuminemia, hypoglycemia, and rarely, polyclonal gammopathy occur

in some dogs. *Hepatozoon canis* can cause glomerulonephritis, schizogony can also progress in kidney this lead to elevated BUN and creatinine values. Periosteal reactions from the inflammatory response directed at tissue phases in muscle can occur in any bone except the skull, are most common in young dogs, do not occur in every case, and are not pathognomonic for hepatozoonosis. Craig *et al.* (1998) reported that dogs with

hepatozoonosis may eat readily when food is placed immediately in front of them, but they often refuse to move to food and water, presumably owing to intense pain, which derives in part from periosteal bone proliferation and inflamed muscles.

Macintire *et al.* (2001) stated that Imidocarb dipropionate (5-6 mg/kg intramuscularly or subcutaneously) administered once or twice 14 days apart is the drug of choice for treatment of *H. canis*. In our case study, the dog with hepatozoonosis had mild hepatitis whereas bilateral chronic kidney changes and related anaemia were documented.

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