Sjournals
Scientific Journals
Scientific Journal of Veterinary Advances (2014) 3(9) 96-100
ISSN 2322-1879
doi: 10.14196/sjvs.v3i9.1731

Contents lists available at Sjournals
Scientific Journal of Veterinary advances
Journal homepage: www.Sjournals.com

Case report

Canine hepatozoonosis in a 4 month old intact male German Shepherd dog in Ibadan, South West Nigeria: A case report

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ARTICLE INFO

Article history:
Received 02 September 2014
Accepted 21 September 2014
Available online 29 September 2014

Keywords:
Hepatozoon canis
Rhipicephalus sanguineus
Hematology
Serum biochemistry
Dog
Nigeria

ABSTRACT

Hepatozoonosis is caused by an apicomplexan haemoparasites of the genus Hepatozoon, which are closely related to Plasmodium spp. and piroplasms. A four month old intact male German shepherd dog was presented to the Veterinary Teaching Hospital, Ibadan, South west Nigeria with history of anorexia for a week and lethargy. All the necessary deworming and vaccination were up to date. Blood sample was collected for haematology and serum biochemistry as well as ticks from the body for identification. *Hepatozoon canis* gamonts were detected in peripheral blood smears of the dog stained with Giemsa. The tick was identified as *Rhipicephalus sanguineus*. Hematology revealed moderate anaemia, leucocytosis characterized by moderate neutrophilia without left shift and a moderate lymphocytosis. Serum biochemistry showed hypoalbuminaemia, hyperglobulinaemia and mild hyponatremia. The dog was successfully managed and recovery was completed by 4th week post treatment. The client was educated on the prevention of tick borne infections by periodic fumigation of the environment as well as regular acaricide tick bath and grooming of dog.

1. Introduction

Canine hepatozoonosis is a tick borne infection caused by an apicomplexan protozoan parasite called Hepatozoon canis and H. americanum and transmitted by *Rhipicephalus sanguineus* and Amblyomma maculatum respectively. Hepatozoon canis is the causative agent of canine hepatozoonosis in most parts of the world where its vector is enzootic and has been reported in Mediterranean countries such as Italy, France, Greece, Spain, Portugal and Israel as well as in South American, Asian and African countries (Baneth et al. 1995) while H. americanum is most commonly seen throughout the southern gulf states of the USA (Gavazza et al. 2003).

Hepatozoon canis infection can be asymptomatic, mild or severe and these varying degrees depend on the level of Parasitaemia and immune response of the animal (Gavazza et al. 2003). Sub-clinical infection with H. canis commonly leads to mild disease that affects haemopoiectic organs (bone marrow and spleen) thereby causing anaemia and lethargy. Vincent –johnson et al. (1997) reported that H. americanum is more pathogenic than H .canis and is associated with serious clinical syndromes characterized by fever, lethargy, weight loss, pains, paralysis and ocular discharge. Diagnosis of the American hepotozoonosis in made by identification of the organism in muscle biopsies (Panciera et al., 1999). The clinical picture of canine hepatozoonosis caused by H. canis is different from that caused by H. americanum as H. canis infection occurs as mild or subclinical form (Hervas et al. 1993, Gondim et al. 1998).

Furthermore, Baneth et al. (1997) and Gavazza et al. (2003) reported that canine hepatozoonosis caused by H. canis is easily diagnosed by observation of blood smear. Gametocytes seen in circulating white blood cells are often accidental finding in dogs without clinical signs. Canine hepatozoonosis can occur in association with other haemoparasites in dogs such as Ehrlichia and Babesia (Gondim et al. 1998). Based on efforts of works done on symptomatic canine hepatozoonosis, there are no uniform changes in haematological and biochemical parameters caused by the presence of Hepatozoon canis (Paludo et al. 2003; Assarasakorn et al. 2006 and Eiras et al. 2007).

In the life cycle of Hepatozoon canis, gametogony and sporogony occur in the Rhipicephalus sanguineus while schizogony followed by gametes formation occurs in dogs (Ivanov et al., 2008). Hepatozoon transmission takes place when dogs ingest ticks containing mature oocysts in the hemocoel (Gevrey, 1993). After ingestion, sporozoites are released into the dog's gastrointestinal tract, penetrate the intestinal wall and are transported through the blood to hemolymphatic tissues, including the spleen, bone marrow and lymph nodes, where meronts are formed. Merogony can also take place in other visceral organs, such as the liver, lungs and kidneys. Merozoites released from meronts invade neutrophils or monocytes, in which they develop to form gamonts in the peripheral blood. When ticks take a blood meal from an infected dog, the ingested gamonts are released from the leukocytes in the tick gut, associate in pairs and differentiate to gametes. Fertilization is followed by formation of a zygote, which undergoes a process called sporogony, to form mature oocysts in the tick hemocoel (Baneth et al. 2001).

2. Materials and methods

A four month old intact male German shepherd dog weighing 7.6kg was presented to the Veterinary Teaching Hospital, University of Ibadan, Ibadan, South west Nigeria with history of anorexia for a week and lethargy. All the necessary deworming and vaccination have been completed.

On physical examination the pup was active and responsive. There was slight increase in temperature 39.7oC, rough hair coat, pale mucous membrane, superficial lymph nodes were normal and ticks were found all over the body of the dog . Heartbeat was 174beats/min.

10mls of blood sample was collected from the cephalic vein of the dog from which 5mls was dispense into labeled sterile bijou bottle containing Disodium ethylene diamine tetra acetic acid(Na2 EDTA) as anticoagulant for hematology and 5mls into plain vacutainer tube for serum biochemistry. Blood smears were made and stained with giemsa for microscopy while buffy coat and wet mount examination were carried out. Haematolgy and serum biochemistry was carried out as described by Schalm (1986).

Several ticks were collected from various parts of the body of the dog by careful detachment with pairs of forceps. The detached ticks were collected into universal bottles containing 10% formalin and conveyed to the parasitological laboratory section of the Department of Veterinary Microbiology and Parasitology, University of Ibadan for identification.

3. Results

The ticks were identified into species as Brown dog tick Rhipicephalus sanguineus using morphological features as described by Soulsby (1982) and Wall and Shearer (1997). Hepatozoon canis gamonts were detected in blood smears of the dog stained with Giemsa (Figure 1a – d).

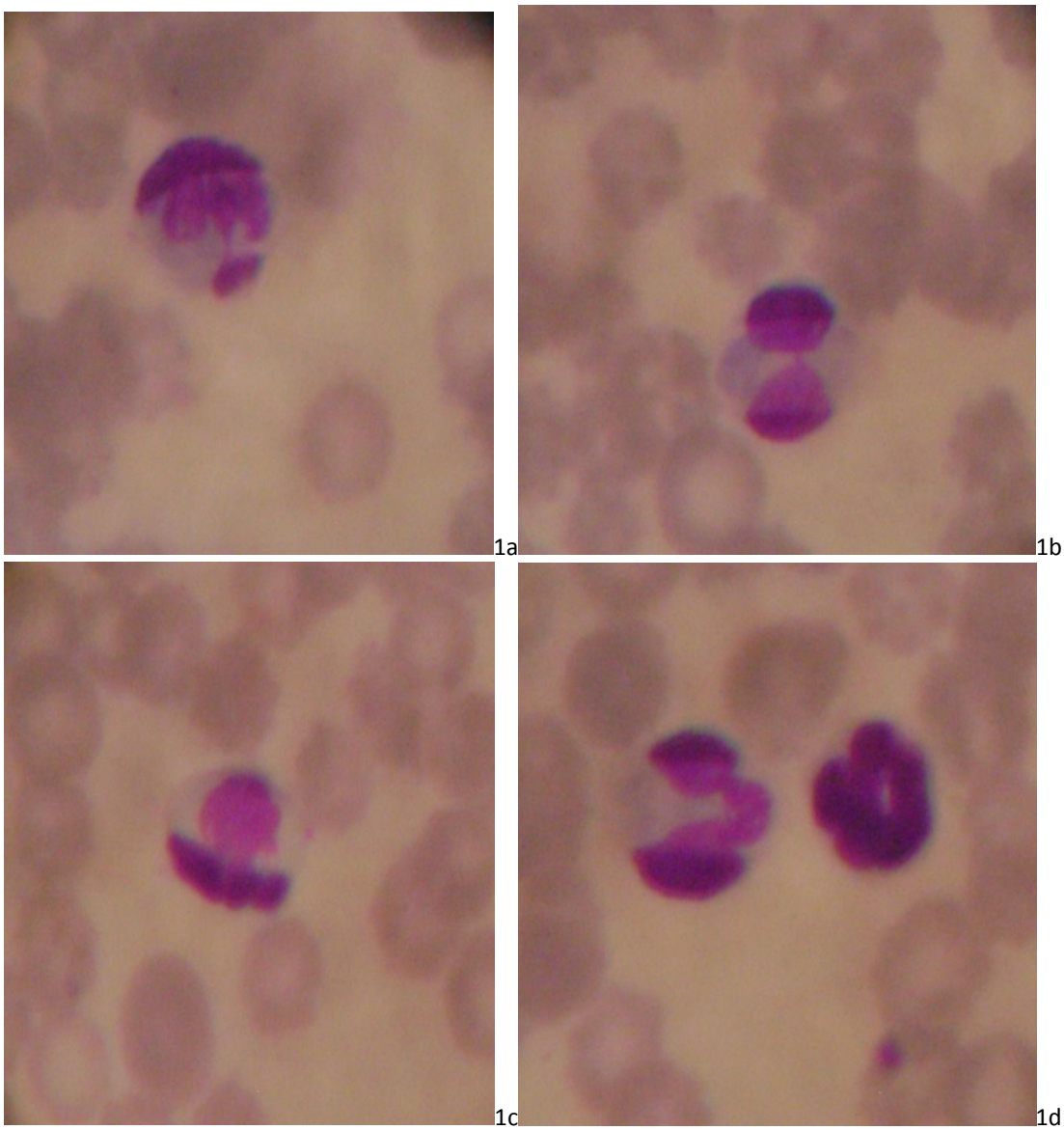

Fig.1. (a-d) shows Hepatozoon canis gamonts in the neutrophils of peripheral blood smear.

Parasitaemia was low. Gamonts were oval/ellipsoidal in shape and were detected in the cytoplasm of neutrophils but not in those of monocytes.

Hematology revealed moderate anaemia, leucocytosis characterized by moderate neutrophilia without left shift and a moderate lymphocytosis (Table 1) while serum biochemistry shows hypoalbuminaemia, hyperglobulinaemia and mild hyponatremia (Table 2).

Table 1
Temperature amd Haematological values at Day 0ne of presentation and four weeks after.

Parameters	Day 1	Week four	Reference interval
Temperature(oC)	39.7	38.7	38.9±0.5
Hb(g/dl)	8.2	13.3	12.9-18.4
PCV(%)	24	38	37.1-57
RBC($X10^6$/µl)	3.65	6.1	5.7-8.8
MCV(fl)	65	69	58.8-71.2
MCHC(g/dl)	34	35	31-36.2
Platelets(10/µdl)	240	242	143-400
WBC($X10^3$/µl)	14.5	10.2	5.2-13.9
Seg Neut(%)	72	66	60-70
Band Neut(%)	0	0	0-3
Lymphocytes($x10^3$/µl)	4.2	3.9	1.3-4.1
Monocytes($x10^3$/µl)	0.83	0.71	0.2-1.1
Eosinophils($x10^3$/µl)	0.8	0.6	0-0.6
Basophils ($x10^3$/µl)	0	0	0-0.1
Plasma protein(g/dl)	6.8	6.8	6-7.5

Table 2
Serum biochemistry at Day one of presentation and four weeks post treatment.

Parameters	Day one	Week four	Reference interval
Albumin (g/dl)	2.3	3.3	2.9-4.4
Total protein (g/dL)	7.0	6.9	5.4-7.6
Globulins (g/dl)	4.7	3.6	1.8-3.9
Sodium (mmol/L)	143	147	145-154

Since there is no co-infection in this presented case, a single dose of Diminzene aceturate was administered intramuscularly at a dosage of 3.5mg/kg. 1% Ivermectin was also administered at a dosage of 0.2mg/kg, twice at an interval of two weeks, while oral dose of Doxycycline daily for 21days at 10mg/kg. Vitamin B complex for three days was given intramuscularly.

On the fourth week of treatment, the client reported a very good appetite, physical examination reveal normal vital signs, no ectoparasites were found on the body of the dog, the temperature was 38.7oC, all skin lesions were cleared and the weight was now 12kg. The haemogram revealed no anaemia, normal leukocytes count (Table 1) and all neutrophils as well as monocytes were free of Hepatozoon canis gamonts.

4. Discussion

The common diagnostic technique for Hepatozoon canis infection is the microscopic detection of gamonts within white blood cell (neutrophils) in stained blood smear. The low level of Parasitaemia in this case is in consonance with the usual presentation of asymptomatic to mild disease form of the infection.

Aneamia was normocytic normochromic with minimal responsiveness. This is in agreement with the findings of Baneth et al. (2003) who reported low parasitaemia with normocytic normochromic anaemia as a common haematological abnormality in Hepatozoon canis infection. The leucogram of the dog also showed a moderate leucocytosis characterized by mild neutrophilia without left shift and moderate lymphocytosis.

Thrombocytopenia was not observed in this case as it is a clinical finding in one third of dogs with Hepatozoon canis infection associated with concurrent canine Ehrlichiosis (Baneth et al. 2003). No concurrent infection was established in this case as the blood of the dog was also screened for other haemoparasites.

All the ticks recovered from the dog were Rhipicephalus sanguineus and this dog was brought from a village in Ibadan, Nigeria. This corroborates with the observation of Baneth et al. (1995) who reported that dogs from rural areas or community are commonly infected with H. canis when compared to those that are resident in the cities probably because of their close and frequent contact with ticks. Most cases of H. canis are detected in rainy season when there is higher preponderance of the tick vector R. sanguineus. The client was educated on the proper prevention of Hepatozoon canis infection which includes effective control of ticks on dogs through regular acaricide tick bath and grooming as well as periodic fumigation of the environment.

Conclusively, despite the morphological and genetic similarities between the two species of Hepatozoon infecting dogs, each species causes a distinct disease syndrome. Hepatozoon canis appears to be well adapted to its canine host, producing a subclinical to mild disease in most cases.

Competing interests

The authors also declare that they have no competing interests.

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