

# First Case of *Hepatozoon canis* Infection of a Dog in Japan

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We report a case of *Hepatozoon canis* infection in a 15-month-old male beagle which was bred in Tagawa-gun, Fukuoka Prefecture, Japan and sent to the hospital on June 23, 1990. In 1905, Bentley [1] and James [5] found *Hepatozoon canis* in a dog in India, and after that it has been detected all over the world [2, 4, 7]. In Japan, Maede *et al.* [6] reported *Hepatozoon* infection in a wild fox in 1982, and the present report is the first of the dog in Japan.

The main symptom was paralysis in hind quarters. The dog was diagnosed as intervertebral disk protrusion (I.V.D.P.), and ventral disk fenestration was performed. After that, paralysis was relieved, and the dog could stand 6 days after operation and was discharged from the hospital 3 days later.

Body weight was 9.5 kg at the first examination and

decreased to 8.7 kg postoperation. Body temperature was 40.8°C at the first examination and declined to about 38.5°C during hospitalization.

Hematological study at the first examination revealed that red blood cell count and packed cell volume decreased slightly and white blood cell count increased slightly (Table 1), but these blood cell counts recovered slowly after operation. Biochemical examination of serum revealed that alkaline phosphatase activity increased slightly at the first examination and that lactate dehydrogenase activity decreased slightly on 23 days but increased on 68 and 147 days after operation (Table 2).

Radiographic findings showed smooth and periosteal new bone proliferation at the bilateral radii and ulnae, ilia and right femur on 23 days after operation (Figs. 1 and 2), although these changes could not be noted before operation. The osteal proliferation was reduced on 126 days after operation (Figs. 3 and 4). These pathological

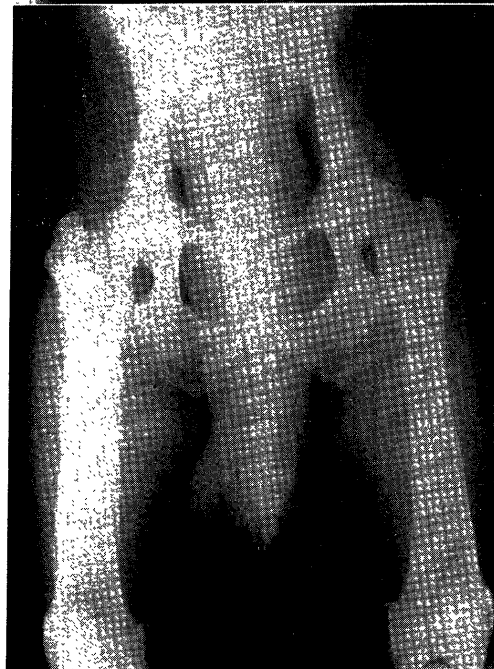
Table 1. Hematological findings

Date	6/23 First examination	6/28 Days after disk fenestration operation	7/5	7/20	9/3	11/21
		1	8	23	68	147
RBC ( $\times 10^4/\mu\text{l}$ )	527	393	350	528	565	620
PCV (%)	35	25	24	38	39	43
Hb (g/dl)	12.5	7.5	5.9	10.4	12.7	15.1
PP (g/dl)	7.0	6.2	7.8	7.2	6.8	6.0
WBC ( $/\mu\text{l}$ )	18,700	32,400	19,500	13,000	10,200	9,900
band (%)	—	9.0	2.0	3.0	0.5	3.5
seg. (%)	—	78.5	71.5	68.5	55.0	57.5
lymph. (%)	—	6.0	18.5	25.0	31.0	26.5
mono. (%)	—	6.5	7.0	1.0	4.0	12.5
eosino. (%)	—	0.0	1.0	2.5	9.5	0.0
Infected leucocytes (%)	—	7.0	47.0	11.5	1.5	0.5

Table 2. Serum biochemical findings

Date	6/23 First examination	7/20 Days after disk fenestration operation	9/3	11/21
		23	68	147
GOT (IU/l)	34	41	40	38
GPT (IU/l)	44	6	52	63
AlkP (IU/l)	479	144	128	58
LDH (IU/l)	245	78	493	515
BUN (mg/dl)	13.6	12.7	16.2	18.3
Creat. <sup>a)</sup> (mg/dl)	0.6	0.4	1.0	1.0

a) Creatinine.



Figs. 1 and 2. Radiographs of forelegs and hip on 23 days after operation, showing smooth, periosteal new bone proliferation at bilateral radii and ulnae, ilia and right femur.

changes seemed to be associated with the infection and to be the acute clinical changes.

On Giemsa's stained blood smears, an oval or elliptical inclusion body-like parasite with the nucleus was detected in the cytoplasm of large, rough neutrophil-like leucocytes (Fig. 5) and some of monocyte-like leucocytes. A faintly stained capsule without the nucleus was observed in the cytoplasm of Hemacolor stained neutrophil-like leucocyte (Fig. 6). This faintly stained capsule appeared to be the site of the gametocyte which had left the host cell, but it might be the gametocyte itself, the nucleus of which was



Figs. 3 and 4. Radiographs of the same sites in Figs. 1 and 2 on 126 days after operation. The pathological changes are reduced slowly.

not stained with Hemacolor's.

The inclusion body-like parasites were  $8.9 \times 5.2 \mu\text{m}$  in mean size. Although non-infected neutrophils were  $10.3 \times 9.1 \mu\text{m}$  in mean size, the infected neutrophil-like leucocytes were  $15.9 \times 14.1 \mu\text{m}$  in mean size. The parasites in the cytoplasm of neutrophil-like leucocytes were identified as *Hepatozoon canis* gametocytes based on their morphological characteristics. Differential cell counts of leucocytes fell into the normal range but the frequency of parasites in leucocytes varied (Table 1). In addition, there is few polychromatic erythrocytes, the occurrence of which shows anisocytosis.

*H. canis* has the specific life cycle [3] as follows; a dog is



Fig. 5. *Hepatozoon canis* gametocyte (arrowhead), an oval or elliptical inclusion body-like parasite associated with the nucleus in the cytoplasm of a large rough neutrophil-like leucocyte. Giemsa's stain  $\times 1,000$ .



Fig. 6. A faintly stained capsule (arrowhead) in the cytoplasm of the host leucocyte. Hemacolor stain  $\times 1,000$ .

infected by ingestion of *Rhipicephalus sanguineus* ticks infected with sporulated *H. canis* oocysts, while the ticks are infected by ingesting gametocytes in circulating leucocytes of infected dogs. In the present case, we could not find *R. sanguineus* ticks but an adult male, a nymph and a larva of *Haemaphysalis campanulata* ticks on the infected dog.

The infected dog has shown no clinical signs caused by *H. canis* infection nor I.V.D.P. after treated by disk fenestration.

Recently we have conducted the epidemiological investigation of *H. canis* infection in dogs in the area where the infected dog lives, and the study on the susceptibility of *H. campanulata* ticks to *H. canis*.

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