

Diagnosis and treatment of Ehrlichiosis in a Pug dog

Desak Gede Bintang Pradnya Dewanti¹, Putu Gede Yudhi Arjentina^{2*}, I Nyoman Suartha²

¹ Student of the Veterinary Profession, Faculty of Veterinary Medicine, Udayana University, Denpasar, Bali

² Laboratory of Veterinary Internal Medicine, Faculty of Veterinary Medicine, Udayana University, Denpasar, Bali

ABSTRACT: In addition to damaging the skin and causing inflammatory reactions and anemia, dog tick infestations are vectors for blood parasites such as *Ehrlichia* spp., known as Ehrlichiosis. This article reports the case of a five-year-old female Pug dog whose body was covered with ticks. The clinical examination found tick infestation on the face, ears, back, abdomen, legs, and interdigital areas. Supporting examinations included a complete blood count (CBC), buffy coat smear, and a test kit. CBC examination showed that the dog had leukocytosis, neutrophilia, hypochromic microcytic anemia, and thrombocytopenia. A buffy coat smear examination showed the presence of *Ehrlichia morulae* in the cytoplasm of the dog's monocytes, and the test kit results were positive for Ehrlichia antibodies; therefore, the dog was diagnosed with Ehrlichiosis. Treatment is done by administering Doxycycline, Intervetta Dr. Choice Ferro-B, and Fu Fang Ejiao Jiang orally for 21 days. After treatment, hematological parameters in leukocytes, neutrophils, erythrocytes, and platelets returned to normal ranges.

Keywords:

Pug dogs, ticks, doxycycline, *Ehrlichia* spp., ehrlichiosis

■ INTRODUCTION

Tick infestations in dogs, in addition to damaging the skin due to dermatitis, causing inflammatory reactions and anemia, ticks are also vectors of blood parasites, such as *Ehrlichia* spp., which are the causative agents of Ehrlichiosis in dogs (De Waal *et al.* 2020). *Ehrlichia* is an obligate intracellular bacterium in the form of a coccus, dark blue or navy when stained with Giemza, and is a leukocytophilic bacteria because it multiplies in the cytoplasm of leukocytes (Procajto *et al.* 2011, Ramakant *et al.* 2020). *Ehrlichia* enter the blood circulation of dogs through tick bites, and then invade leukocyte cells and replicate intracellularly in the cytoplasm of lymphocytes, monocytes, and macrophages by forming mulberry-like structures called morulas (*Ehrlichia* microcolonies) (Sharma *et al.* 2015). The most common clinical symptoms are inappetence, lethargy, fever, epistaxis, and pale mucosa, whereas the blood hematology profile is characterized by anemia, leukocytosis, lymphocytosis, and thrombocytopenia (Suartha *et al.* 2023). This article reports the case of a five-year-old Pug dog whose body was covered in ticks with clinical symptoms suspected of Ehrlichiosis.

■ CASES

Signalement and Anamnesis: Dog named Dogi, Pug breed, five-year-old female with body weight 10 kg. The body of the dog was infested with ticks for two months. The dogs were kept freely in the areas inside and outside the house. In the owner's house, there are stray dogs with tick infestation. **Clinical Examination:** Heart rate 140x/minute, pulsus 140x/minute, respiration 30x/minute, CRT (cardiac resynchronization therapy) <2 seconds, body temperature 38.8 °C, Body Condition Score (BCS) 8/10,

infestation found ticks on the face, ears, back, abdomen, legs, and interdigital. **Supporting examinations:** Complete Blood Count (CBC) (Table 1), buffy coat smear (Figure 1), and blood parasite test kit. **Diagnosis:** Ehrlichiosis. **Prognosis:** Fausta. **Therapy:** Doxycycline (10 mg/kg BW once a day), Intervetta Dr. Choice Ferro-B (1 tablet daily), Fu Fang Ejiao Jiang (2 mL 2 times daily), PO for 21 days.

■ RESULT AND DISCUSSION

CBC examination showed that the dog had leukocytosis, neutrophilia, hypochromic microcytic anaemia, and thrombocytopenia (Table 1). An increase in neutrophils indicates inflammation due to *Escherichia* bacterial infection in dogs. Anaemia in Ehrlichiosis cases occurs due to erythrocyte cells being attacked by bacteria and identified as foreign bodies in the reticuloendothelial system; thus, erythrocytes are destroyed by macrophages (Shrestha & Karmacharya 2016). Thrombocytopenia is the most common haematological abnormality in dogs with Ehrlichiosis, both naturally and experimentally (Chandran *et al.* 2021). Thrombocytopenia occurs because of an increased need for platelets due to inflammation that occurs in the blood vessel endothelium (vasculitis) (Chandran *et al.* 2021).

The buffy coat smear showed the presence of round purplish-blue structures in the cytoplasm of monocyte cells, which were thought to be *Ehrlichia morulae* (Figure 1). *Ehrlichia morulae* are round basophilic intracytoplasmic

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structures that are detected 20 days post-infection and are a characteristic feature that can be used to diagnose Ehrlichiosis (Kaewmongkol *et al.* 2020; Saito & Walker 2016; Aziz *et al.* 2022). Serological tests were performed using a rapid blood parasite test kit to confirm the results of the buffy coat smear examination (Shrestha & Karmacharya 2016). The test kit results showed that the dog's blood was positive for Ehrlichia antibodies, so it was diagnosed with Ehrlichiosis.

Table 1. Complete Blood Count examination results of a Pug dog suffering from Ehrlichiosis

Parameter	Day 0	Day 14	Day 21	Normal Value
WBC (10⁹/l)	17.39	14.84	13.96	6-17
Limfosit (10 ⁹ /l)	2.96	1.85	1.62	1-4,8
Monosit (10 ⁹ /l)	0.68	1.01	0.57	0.2-1.5
Neutrofil (10⁹/l)	13.70	11.96	11.76	3-12
Eosinofil (10 ⁹ /l)	0.04	0.02	0.01	0.0-0.8
Basofil (10 ⁹ /l)	0.01	0.01	0.00	0.0-0.4
RBC (10¹²/l)	5.14	5.76	6.08	5.5-8.5
HGB (g/dl)	9.0	10.7	11.7	12-18
HCT (%)	30.50	35.73	39.36	37-55
MCV (fl)	59	62	65	60-77
MCH (Pg)	17.5	18.6	19.2	19.5-24.5
MCHC (g/dl)	29.5	30.0	29.6	31-39
RDWc (%)	19.6	20.8	20.3	14-20
RDWs (fl)	43.0	48.4	48.4	
Platelet (10⁹/l)	136	233	333	165-500
MPV (fl)	9.4	9.0	9.8	3.9-11.1
PCT (%)	0.13	0.21	0.33	
PDWc (%)	40.9	37.8	39.1	
PDWs (fl)	18.01	14.8	16.7	

Note: bold=lower or higher than normal value, WBC=white blood cell, RBC=red blood cell, HGB=hemoglobin, HCT=hematocrit, MCV=mean corpuscular volume, MCH=mean corpuscular haemoglobin, MCHC=mean corpuscular haemoglobin concentration, RDW=red cell distribution width, MPV=mean platelet volume, PCT=procalcitonin test, PDW=platelet distribution width.

The Ehrlichia infection in the dog was treated with doxycycline (10 mg/kg BW). In the Ehrlichia cell body, this antibiotic binds to the 30S ribosomal subunit and prevents binding between aminoacyl-tRNA and bacterial ribosomes, thereby hampering protein synthesis and Ehrlichia replication (Monsalve *et al.* 2017). Providing Intervetta Dr. supplements Choice Ferro-B and Fu Fang Ejiao Jiang are for treating anemia and thrombocytopenia in case dogs because they are reported to increase hematopoiesis in animals (Rabiulfa *et al.* 2023). CBC examination results on days 14 and 21 after treatment showed that the blood parameters of leukocytes, neutrophils, erythrocytes, and platelets returned to normal ranges (Table 1).

CONCLUSION

Based on the history, clinical examination, and supporting examinations, the dog was diagnosed with ehrlichiosis. Administration of Doxycycline, Dr. Intervetta supplement. Choice Ferro-B and Fu Fang Ejiao Jiang orally for 21 days succeeded in returning the blood parameters of leukocytes, neutrophils, erythrocytes and platelets to normal ranges.

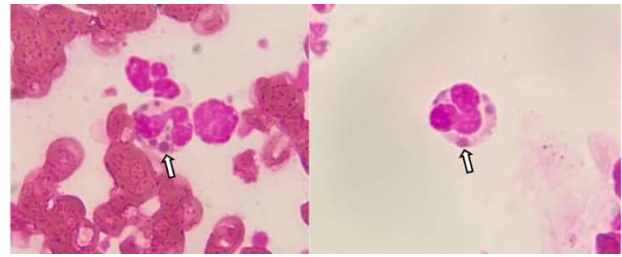


Figure 1. Ehrlichia morula in the cytoplasm of a Pug dog monocyte cells

AUTHOR INFORMATION

Corresponding Author

* PGYJ: yudhijartentia@unud.ac.id

Faculty of Veterinary Medicine, Udayana University.
Jl. Jend. Sudirman, Daging Puri Klod, Kec. Denpasar Bar.,
Kota Denpasar, Bali 80234 INDONESIA.

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