

Hematologic profile of tick paralysis in a domestic cat

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ABSTRACT: Tick paralysis is a toxicosis in animals caused by the infestation of ectoparasites, such as lice or ticks, which secrete neurotoxins that lead to muscle paralysis. This article reports the haematology findings of a 2-year-old male domestic cat diagnosed with tick paralysis at the West Java Provincial Veterinary Hospital. The cat, recently adopted as a stray, presented with hind limb incoordination, *Ctenocephalides felis* infestation, decreased appetite, constipation, and dehydration. Physical examination revealed the cat was severely underweight (BCS 1/5) with abnormal vital signs, including a rectal temperature of 37°C, respiration rate of 10 bpm, and pulse rate of 260 bpm. Haematological analysis showed granulocytosis, macrocytic anaemia, and thrombocytopenia. The cat was treated with doxycycline, cyproheptadine, vitamin and mineral supplements, iron dextran, NaCl 0.9%, and tick removal. This case underscores the importance of haematological monitoring in managing tick paralysis and ensuring an adequate treatment response.

Keywords:

tick paralysis, granulocytosis, thrombocytopenia, macrocytic anemia

INTRODUCTION

Tick paralysis is a severe toxicosis in animals caused by the infestation of ectoparasites, particularly female lice or ticks (Honnas *et al.*, 2020). These parasites attach to the host's skin, feed on the blood, and secrete neurotoxin-laden saliva, especially during the blood-feeding of gravid females. The neurotoxin enters the circulatory system, targeting the neuromuscular junction where it inhibits calcium influx and subsequently blocks acetylcholine release, leading to muscle paralysis (Cadet & Bolla, 2007). Tick paralysis is commonly observed in dogs and cats (Tilley & Smith, 2015). Monitoring the hematologic profile of feline tick paralysis is critical for detecting respiratory failure, identifying potential complications, assessing nutritional status, and evaluating treatment efficacy (Wang *et al.*, 2022; O'Keeffe *et al.*, 2023). This study reports the hematologic findings (complete blood count) in a cat diagnosed with tick paralysis at the West Java Provincial Animal Hospital, highlighting the clinical implications of such assessments.

CASE

Signalement and Anamnesis: A 2-year-old male domestic cat, recently adopted as a stray, weighing 1.70 kg with a white and black coat, presented with severe emaciation, lethargy, incoordination of the hind limbs, and refusal to eat or drink. The cat had lice infestation, dehydration, and constipation and had not received deworming or flea treatment. **Physical Examination:** The cat was skinny (BCS 1/5), with a rectal temperature of 37°C, low respiration rate

(10 bpm), high pulse rate (260 bpm), pale mucosa, and hindlimb incoordination. **Laboratory Examination:** A haematology test revealed granulocytosis, macrocytic anaemia, and thrombocytopenia, with normal erythrocyte morphology and no blood parasites. **Differential Diagnosis:** myasthenia gravis, botulism, and hypokalemia. **Diagnosis:** Tick paralysis. **Therapy:** The cat received doxycycline, cyproheptadine, vitamin and mineral supplements, iron dextran, tick removal, and NaCl 0.9%.

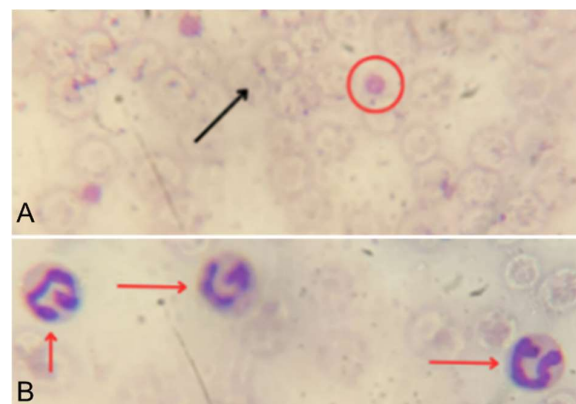


Figure 1. Blood test results demonstrate normal erythrocyte morphology (A, black arrow), typical lymphocytes (A, red circle), and hypersegmented neutrophils (B, red arrow).

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■ RESULT AND DISCUSSION

Based on physical examination, clinical findings, and haematology results, the cat was diagnosed with tick paralysis. Haematology is essential for assessing overall health and the body's ability to combat infections. A complete blood count (CBC) was conducted using whole blood samples collected from the cephalic vein, stored in EDTA tubes, and analyzed with a haematology analyzer. The CBC revealed granulocytosis, indicated by elevated granulocyte levels; macrocytic anaemia, shown by reduced red blood cell count, haemoglobin, and hematocrit levels, with increased mean corpuscular volume (MCV); and thrombocytopenia, reflected by decreased platelet count (Table 1). Granulocytes, including neutrophils, eosinophils, and basophils, are leukocytes containing cytoplasmic granules (Siemińska *et al.*, 2021). Granulocytosis, an increase in granulocytes beyond normal limits, often occurs as an immune and allergic response in cats heavily infested with *Ctenocephalides felis*. Neutrophils are the first to respond to pathogens, while eosinophils and basophils trigger inflammatory responses during parasitic infestations and allergies (Stone *et al.*, 2011).

Mean corpuscular volume (MCV) is an erythrocyte index used to assess the type and cause of anaemia by measuring the average size of red blood cells expressed in femtoliters (fL). An elevated MCV indicates macrocytosis, where erythrocytes are larger than normal (Voigt & Swist, 2011). Macrocytosis can be megaloblastic (due to hereditary diseases, bone marrow disorders, or viral immunodeficiency) or non-megaloblastic (caused by hemolysis, haemorrhage, or medication side effects) (Kaferle & Strzoda, 2009). This condition often suggests regenerative anaemia. Cats infested with ectoparasites, such as fleas, frequently exhibit macrocytic anaemia linked to folic acid and vitamin B12 deficiencies, possibly due to malnutrition and flea saliva neurotoxins affecting nutrient absorption (Do *et al.*, 2021; Moore & Adil, 2022). Thrombocytopenia, a low platelet count, may result from *Ctenocephalides felis* bites, where platelets gather at wound sites and reduce their circulation (Jinna & Khandhar, 2019).

Table 1. Hematology examination results (complete blood count) of tick paralysis in a domestic cat.

Item	Results	Ref. Value
Total WBCs (x10 ³ /μL)	19.1	5.5-19.5
Lymphocytes (x10 ³ /μL)	2.3	0.8-7
Mid (x10 ³ /μL)	1.5	0-1.9
Granulocytes (x10 ³ /μL)	15.3	2.1-15
RBC (x10 ⁶ /μL)	2.96	4.6-10
HGB (g/dL)	5.1	9.3-15.3
HCT (%)	16.1	28-49
MCV (fL)	54.6	39-52
MCH (pg)	17.2	13-21
MCHC (g/dL)	31.6	30-38
PLT (x10 ³ /μL)	55	100-514

Note: WBC=white blood cells, Mid=agranulocyte, RBC=red blood cells, HGB=hemoglobin, HCT=hematocrit, MCV=mean corpuscular volume, MCH=mean corpuscular hemoglobin, MCHC=mean corpuscular hemoglobin concentration, PLT=platelet, red colour>normal value, blue colour<normal value.

The relationship between physical examination, clinical findings, and haematological analysis is crucial for diagnosing and managing tick paralysis in cats. While symptoms such as anorexia, dyspnea, tachycardia, and hind limb incoordination offer initial clues, haematological tests are needed to confirm the diagnosis and guide treatment. Haematology complements diagnosis by identifying potential complications and tick-borne diseases but cannot stand alone. A detailed clinical history, including symptom onset, previous tick treatments, and the cat's environment, further improved the diagnostic accuracy and ensured more effective treatment strategies.

■ CONCLUSION

The hematology examination (complete blood count) of a cat with tick paralysis revealed granulocytosis, macrocytic anaemia, and thrombocytopenia.

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