

**EMACIATION WITH DUAL INFECTION OF MALASSEZIOSIS AND  
EHRlichIOSIS IN DOMESTIC DOG****Emasiasi Dengan Infeksi Ganda Malasseziosis Dan Ehrlichiosis Pada Anjing Domestik  
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**Abstract**

Domestic dogs are frequently encountered in poor physical condition, one of which is emaciation that is often accompanied by fungal and parasitic infections, thus requiring comprehensive clinical management. This case report aims to describe emaciation accompanied by Malasseziosis and Ehrlichiosis in a 4-month-old domestic dog. Physical examination revealed a body condition score of 3/9, dermatological lesions including alopecia, papules, crusts, and scales, accompanied by a strong odor and greasy hair, as well as the presence of the tick *Rhipicephalus sanguineus*. Laboratory examinations included acetate tape preparation, which identified *Malassezia* spp., hematological analysis showing anemia and thrombocytopenia, and blood smear examination revealing *Ehrlichia morulae* within monocytes, which was further confirmed by a positive *Ehrlichia canis* antibody rapid test kit. Therapeutic management consisted of nutritional improvement through dietary modification, medicated bathing using a combination of Sodium Salicylate, Sulphur, Econazole Nitrate, and Chloroxylenol (Virbac Poison Sebazole<sup>®</sup>), administration of the antiparasitic Fluralaner (Bravecto<sup>®</sup> oral chewable tablet), Doxycycline antibiotic therapy, and supportive treatment with Livron B-plex. Evaluation on day 28 demonstrated significant weight gain, marked improvement in skin condition with resolution of alopecia, papules, crusts, and scales, reduction of malodor, normalization of hair texture, and improvement in blood smear and routine hematological findings. Based on clinical findings, laboratory results, and therapeutic response, the patient was diagnosed with emaciation accompanied by Malasseziosis and Ehrlichiosis and showed a favorable response to treatment, resulting in significant clinical improvement and stable condition after 28 days of monitoring. Dog owners are advised to ensure adequate nutrition, proper kennel sanitation, and environmental hygiene to prevent disease recurrence.

Keywords: domestic dog, Ehrlichiosis, emaciation, Malasseziosis

## Abstrak

Anjing domestik kerap ditemukan dalam kondisi fisik yang memprihatinkan, salah satunya berupa emasiiasi yang sering disertai infeksi jamur dan parasit, sehingga memerlukan penanganan klinis yang komprehensif. Laporan kasus ini bertujuan untuk mendeskripsikan kejadian emasiiasi yang disertai Malasseziosis dan Ehrlichiosis pada anjing domestik berusia 4 bulan. Pemeriksaan fisik menunjukkan *body condition score* 3/9, lesi kulit berupa *alopecia*, *papula*, *krusta*, dan *scale*, disertai bau menyengat serta rambut berminyak, dan ditemukannya caplak *Rhipicephalus sanguineus*. Pemeriksaan laboratorium dilakukan melalui metode *acetate tape preparation* yang mengidentifikasi keberadaan *Malassezia* spp., pemeriksaan hematologi yang menunjukkan anemia dan trombositopenia, serta apusan darah yang memperlihatkan morula *Ehrlichia* pada monosit, yang kemudian dikonfirmasi dengan hasil positif *rapid test kit antibody* terhadap *Ehrlichia canis*. Penanganan yang diberikan meliputi perbaikan manajemen nutrisi melalui pergantian pakan, *medicated bath* menggunakan kombinasi *Sodium Salicylate*, *Sulphur*, *Econazole Nitrate*, dan *Chloroxylonol* (Virbac Poison Sebazole®), pemberian antiparasit *Fluralaner* (Bravecto® Oral Chewable Tablet), antibiotik *Doxycycline*, serta terapi suportif menggunakan Livron B-plex. Evaluasi pada hari ke-28 menunjukkan peningkatan berat badan yang signifikan, perbaikan kondisi kulit dengan hilangnya lesi *alopecia*, *papula*, *krusta*, dan *scale*, berkurangnya bau menyengat, rambut tidak lagi berminyak, serta perbaikan hasil apusan darah dan pemeriksaan hematologi rutin. Berdasarkan temuan klinis, laboratoris, dan respons terapi, pasien didiagnosis mengalami emasiiasi yang disertai Malasseziosis dan ehrlichiosis dengan respons terapi yang baik, sehingga kondisi klinis membaik secara signifikan dan pasien dinyatakan stabil setelah pemantauan selama 28 hari. Pemilik disarankan untuk memperhatikan kecukupan nutrisi, sanitasi kandang, dan kebersihan lingkungan guna mencegah kekambuhan penyakit.

Kata kunci: anjing domestik, Ehrlichiosis, emasiiasi, Malasseziosis

## INTRODUCTION

Emaciation is a commonly encountered condition in domestic dogs. This disorder is often associated with inadequate intake of protein, lipids, vitamins, and minerals, which subsequently leads to impaired growth, muscle weakness, weight loss, and compromised immune function. Such conditions predispose affected dogs to infectious diseases, either from the environment or from ectoparasites (Fabretti *et al.*, 2015). One dermatological disorder frequently observed in immunocompromised dogs is Malasseziosis. This disease results from the excessive proliferation of *Malassezia* yeast, a normal constituent of canine skin microflora that typically remains non-pathogenic under normal immune conditions. Disruption of the cutaneous microbiota and decreased host immunity allow this yeast to become pathogenic (Dosom *et al.*, 2024). Clinical signs range from moderate to severe pruritus, foul odor, and alopecia. If left untreated, Malasseziosis can markedly reduce the dog's quality of life (Pratama *et al.*, 2025).

In addition to skin disorders, domestic dogs are also susceptible to ectoparasite-borne diseases, one of which is Ehrlichiosis. This disease is caused by infection with the rickettsial organism *Ehrlichia*, transmitted primarily through bites of the brown dog tick, *Rhipicephalus sanguineus* (Utomo *et al.*, 2024). Ehrlichiosis is considered a serious systemic illness in dogs and is characterized by lethargy, anorexia, fever, anemia, hemoglobinuria, lymphadenopathy, thrombocytopenia, and epistaxis. The disease may manifest in acute or chronic forms depending on the immune response and overall health status of the dog (Ene *et al.*, 2024).

The adoption of domestic dogs presenting with concurrent emaciation, Malasseziosis, and Ehrlichiosis highlights the complexity of rehabilitating neglected animals. Management

requires not only targeted therapy for each disease entity, but also nutritional rehabilitation and continuous health monitoring. Reports of co-infection involving *Malassezia* spp. and *Ehrlichia* in emaciated dogs remain limited, resulting in a lack of comprehensive understanding of disease interactions and therapeutic strategies. The present case report documents a dog exhibiting emaciation in conjunction with Malasseziosis and Ehrlichiosis.

## RESEARCH METHODS

### Signalment and Anamnesis

The patient was a domestic dog named Uma, a 4-month-old female weighing 3.7 kg, with brown and white haircoat. The dog had been recently adopted from the streets. The owner reported severe pruritus and the presence of tick infestation around the ears. Additionally, the dog appeared markedly underweight, exhibited alopecia, oily skin and haircoat, and a foul odor, although it remained active and playful. The dog was kept outdoors in the yard with free access to the environment. Its diet consisted of cooked rice mixed with chicken heads. According to the owner, the dog had received its first complete vaccination set and deworming. No treatment had been administered prior to presentation despite the ongoing clinical signs.

After being informed about the dog's overall health condition, the owner acknowledged understanding and provided voluntary and informed consent for clinical examination, complementary diagnostic procedures, and medical treatment deemed necessary to improve the patient's health status. The owner was informed about the purpose, benefits, and potential risks of the procedures performed and agreed to participate in subsequent care and monitoring as recommended.

### Physical Examination

The physical examination began with visual inspection to assess body posture, behavior, gait, and general body condition. Vital parameters were evaluated, including body temperature using a thermometer, heart rate through auscultation, and respiratory rate by observing thoracic movements. The examination continued with inspection and palpation from head to tail, including evaluation of the eyes, ears, nose, oral cavity, and lymph nodes. Cardiac and pulmonary auscultation were performed using a stethoscope to detect abnormalities in heart sounds or respiratory patterns. The abdomen was palpated to assess visceral organs, detect pain responses, or identify organ enlargement. Skin and coat condition, hydration status, mucous membranes, and extremities were also assessed.

### Ancillary Examinations

Additional diagnostic examinations were performed to support and establish the diagnosis. The procedures included acetate tape preparation, trichogram, hematology analysis, blood smear evaluation, and rapid test for blood parasite antibodies.

### Acetate Tape Preparation

For the acetate tape preparation, clear adhesive tape and clean slides were prepared. The tape was gently applied to the skin at the axilla, dorsum, neck, and interdigital spaces using light pressure to collect surface debris. The tape was then placed onto a slide pre-stained with Diff-Quick, with the adhesive (sample) side facing downward. The preparation was examined microscopically to identify parasites, bacteria, or fungi based on characteristic morphological features.

### **Trichogram Examination**

The trichogram was performed by plucking a small number of hairs from affected skin areas using forceps, pulling in the direction of hair growth to preserve the hair roots. The hairs were placed on a slide and may be immersed with immersion oil before being covered with a cover slip to stabilize the sample. The preparation was observed microscopically to evaluate hair shaft structure, follicular morphology, growth phase, and to detect abnormalities such as shaft breakage or parasitic organisms.

### **Hematological Examination**

Hematological evaluation was performed by collecting 1 mL of blood from the cephalic vein, which was placed into a tube containing ethylenediaminetetraacetic acid (EDTA) as an anticoagulant. Routine hematology was conducted using an automated hematology analyzer (Licare CC-3200, PT. Aerocom Global Sejahtera, West Jakarta, Indonesia).

### **Blood Smear Examination**

Blood smear evaluation was conducted using freshly drawn blood from the cephalic vein using a syringe. A drop of blood was placed on the edge of a slide and spread using another slide held at a 45° angle to form a uniform thin smear. The smear was air-dried and subsequently stained with Diff-Quick for cytological assessment. The stained preparation was examined microscopically to assess erythrocyte, monocyte, and platelet morphology, size, and abnormalities.

### **Rapid Antibody Test for Blood Parasites**

The rapid test for blood parasite antibodies was performed using blood collected from the cephalic vein. One drop of blood was applied to the specimen well of the test cassette, followed by the addition of buffer solution into the same well. The cassette was placed on a flat surface and incubated for 15 minutes.

## **RESULTS AND DISCUSSIONS**

### **Results**

#### **Physical Examination**

The physical examination revealed that most vital parameters were within normal limits. The patient showed a heart rate of 132 beats/min with a regular rhythm, pulse rate of 128 beats/min, capillary refill time of <2 seconds, respiratory rate of 36 breaths/min, and a rectal temperature of 38.9°C. However, the body condition score (BCS) was markedly low at 3/9.

Overall assessment indicated that the dog remained active, playful, and exhibited severe pruritus with a score of 8/10. The dog appeared markedly thin and frequently scratched itself. Alopecia was observed over most of the body. Dermatological examination revealed alopecia affecting the head, neck, lateral body region, thorax, abdomen, forelimbs and hindlimbs (bilateral), and tail; crusts on the neck, axilla, and tail; papules on the lateral body and abdomen; and scaling on the dorsal and axillary regions. The dog had a foul odor with oily skin and haircoat. Tick infestation by *Rhipicephalus sanguineus* was noted on the ears. No abnormalities were detected in the cardiovascular, respiratory, digestive, urogenital, musculoskeletal, neurologic, lymphatic, or ocular systems.

#### **Acetate Tape Preparation**

Acetate tape cytology revealed the presence of *Malassezia* spp., characterized as oval to elongated yeast cells with a broad-based monopolar budding pattern (Figure 2).

### **Trichogram Examination**

Trichogram analysis revealed no parasitic agents. The hair shafts were intact but showed incomplete medulla, shaft breakage, and anagen-phase follicles (Figure 3).

### **Hematology**

Hematological evaluation demonstrated anemia and thrombocytopenia. The anemia was indicated by reduced red blood cell count and hemoglobin concentration, while thrombocytopenia was indicated by decreased platelet levels (Table 1).

### **Blood Smear Examination**

Cytological evaluation of the blood smear revealed intracellular morulae within monocytes. The morulae were round, small, and located within the cytoplasm but distinct from the monocyte nucleus (Figure 4).

### **Rapid Antibody Test for Blood Parasites**

A rapid antibody test for blood parasites was performed to confirm hematological findings and the presence of *Ehrlichia* morulae observed on blood smear. The rapid test result was positive for *Ehrlichia canis*, indicated by formation of a red line on the test line (T) (Figure 5).

### **Diagnosis and Prognosis**

Based on the owner's anamnesis, the dog presented with a BCS of 3/9, widespread alopecia, crusts, papules, scales, foul odor, oily coat, and tick infestation. Ancillary diagnostic examinations demonstrated *Malassezia* spp. on acetate tape preparation, anemia and thrombocytopenia on hematology, *Ehrlichia* morulae on blood smear, and a positive *Ehrlichia canis* rapid antibody test. The patient was diagnosed with emaciation accompanied by Malasseziosis and Ehrlichiosis. The prognosis was deemed favorable.

### **Treatment**

Management included nutritional rehabilitation consisting of high-protein feeds using beef and eggs, carbohydrates from rice, and fiber from carrots. Dermatological therapy included bathing with a medicated shampoo containing Sodium Salicylate, Sulfur, Econazole Nitrate, and Chloroxylenol (Virbac Poison Sebazole<sup>®</sup>) applied twice weekly, administration of Fluralaner 250 mg (Bravecto Oral Chewable Tablet<sup>®</sup>), and Doxycycline at 10 mg/kg orally once daily for 28 days. Supportive therapy included vitamin B-complex and minerals (Livron B Plex<sup>®</sup>) at one tablet once daily for 7 days. Ticks were manually removed using tweezers and placed in a container containing soapy water.

### **Evaluation**

The treatment resulted in marked clinical improvement. By day 7, no tick infestation was observed. After 28 days, body weight increased significantly from 3.7 kg to 6.2 kg following enhanced nutritional intake. Dermatological lesions, including crusts, papules, and scales, had resolved. The dog no longer emitted foul odor, the coat was no longer oily, and hair regrowth was observed in previously alopecic areas. Acetate tape examination showed a reduction in *Malassezia* spp., with only a single yeast cell observed per field. Hematological parameters improved significantly, and blood smear analysis no longer detected *Ehrlichia* organisms.

### **Discussion**

Emaciation is a nutritional deficiency condition that can have serious systemic consequences (Gerstner & Liesegang, 2017). In this case, the patient presented with a body condition score (BCS) of 3/9. Dogs with a BCS of 3/9 are classified as thin, characterized by marked loss of subcutaneous

fat and muscle mass, with ribs, vertebrae, and hip bones prominently visible due to minimal soft tissue coverage. The skeletal structure becomes more apparent than the ideal body contour (Wootton *et al.*, 2023).

Nutritional management of the emaciation was addressed by feeding a high-nutrient diet consisting of beef, eggs, rice, and carrots. Beef served as a source of animal protein, essential amino acids, iron, and B-complex vitamins necessary for tissue repair, muscle growth, and hematopoiesis (Salman *et al.*, 2018). Eggs provided high biologic-value protein, healthy fats, and vitamins A, D, E, and K, supporting skin, haircoat, and neurologic function (Van den Berghe *et al.*, 2018). Rice acted as an easily digestible carbohydrate source for energy (Inal *et al.*, 2017), while carrots supplied fiber, beta-carotene, and micronutrients with antioxidant activity, supporting vision and immune function (Eisenhauer *et al.*, 2019).

The patient additionally suffered from Malasseziosis, a condition commonly associated with superficial dermatitis in dogs (Dosom *et al.*, 2024). Malasseziosis is caused by the overgrowth of *Malassezia* spp., a lipophilic yeast that normally exists as a cutaneous commensal organism (Heparandita *et al.*, 2023). In this case, more than eight organisms were detected within a single microscopic field, confirming Malasseziosis. Pratama *et al.* (2025) noted that cases can be considered positive when more than five organisms are identified cytologically. Microscopically, *Malassezia* spp. appear as oval to elongated yeast cells with thick cell walls and monopolar budding (Heparandita *et al.*, 2023).

Dermatological manifestations observed in this patient included alopecia, papules, crusts, and scaling. Alopecia occurs as fungal lipases and metabolic by-products disrupt epidermal lipid layers, leading to pruritus and self-induced hair loss (Hobi *et al.*, 2024). Papules form due to lipase and phospholipase activity, which induces pro-inflammatory cytokine release and leukocyte recruitment (Mudiana *et al.*, 2024). Crusts develop following epidermal damage and rupture of papules that exude fluid and subsequently desiccate (Ningrum *et al.*, 2023). Scaling occurs due to altered keratinization associated with excessive colonization (Sudipa *et al.*, 2021).

Malasseziosis was managed with medicated bathing using a shampoo formulation (Virbac Poison Sebazole<sup>®</sup>) containing Sodium Salicylate, Sulfur, Econazole Nitrate, and Chloroxylonol. The shampoo was applied through gentle massage, left in contact for 10 minutes, rinsed, and dried thoroughly. Topical and systemic therapy was continued for 28 days, consistent with the typical antifungal clinical response time of 2–4 weeks. Following remission, *Malassezia* spp. return to commensal populations, and complete eradication is not achievable (Hald *et al.*, 2015).

Inspection further revealed tick infestation. Tick burden significantly contributes to the transmission of *Ehrlichia*, especially as *Rhipicephalus sanguineus* is the primary vector (Ma'arif *et al.*, 2024). Higher tick loads increase the likelihood of pathogen transmission through saliva during blood feeding. Severe infestations increase the volume of blood exposed to pathogens and induce physiologic stress, impairing host immunity and facilitating infection (Rojero-Vázquez *et al.*, 2017). Starkey *et al.* (2015) reported that a single bite from an infected tick is sufficient to transmit *Ehrlichia*, particularly in endemic regions.

Hematologic results demonstrated anemia and thrombocytopenia. Suartha *et al.* (2023) reported similar hematologic abnormalities in canine Ehrlichiosis. Anemia results from erythrocyte destruction once bacteria mark them as foreign, leading to macrophage-mediated phagocytosis in the reticuloendothelial system (Gianopoulos *et al.*, 2016). Thrombocytopenia is the most common hematologic alteration in Ehrlichiosis (Ene *et al.*, 2024). Chandran *et al.* (2021) indicated that thrombocytopenia arises from increased platelet consumption during endothelial inflammation.

Blood smear examination revealed *Ehrlichia* morulae as round bluish structures within monocyte

cytoplasm (Aziz *et al.*, 2023), confirming infection by the tick-borne parasite. After entry into the bloodstream, *Ehrlichia* infect mononuclear cells via phagocytosis and undergo binary fission to form morulae (Nurullah *et al.*, 2023). Blood smear examination is a simple technique for parasite detection; however, accuracy decreases during low parasitemia. Therefore, a rapid antibody test was used for diagnostic confirmation, yielding a positive result for *Ehrlichia* (Ene *et al.*, 2024).

Tick treatment was performed using oral administration of Fluralaner 250 mg (Bravecto Oral Chewable Tablet<sup>®</sup>). Fluralaner inhibits neurotransmission at the  $\gamma$ -aminobutyric acid (GABA) and glutamate-gated chloride channels. Under normal physiology, presynaptic GABA release results in chloride influx into postsynaptic neurons. Fluralaner binds to chloride channel receptor proteins, blocking chloride ion entry and inducing neuronal hyperexcitation, leading to parasite death. The compound achieves 97.3% efficacy within 24 hours post-administration and becomes active when ticks feed on blood (Hadi *et al.*, 2021).

Systemic therapy included Doxycycline, a bacteriostatic antibiotic that inhibits protein synthesis and replication of both Gram-positive and Gram-negative bacteria (Fourie *et al.*, 2015). The drug enters bacterial cells via passive diffusion or active transport and, due to its lipophilic nature, crosses lipid bilayers efficiently (Petrov *et al.*, 2018). Doxycycline binds to the 30S ribosomal subunit, preventing aminoacyl-tRNA attachment and inhibiting *Ehrlichia* protein synthesis (Monsalve *et al.*, 2017). Beyond its antimicrobial effects, Doxycycline has been associated with improvements in erythrocyte and platelet counts and hemoglobin levels, with minimal hepatotoxicity risk (Fourie *et al.*, 2015). It remains the first-line treatment for Canine Monocytic Ehrlichiosis (CME), with the recommended regimen of 10 mg/kg once daily for 28 days, as reduced dosing or shorter duration diminishes therapeutic efficacy (Aziz *et al.*, 2023).

Supportive therapy included administration of vitamin B-complex (Livron B Plex<sup>®</sup>) to enhance energy metabolism and appetite. Vitamin B12 contributes to platelet formation and aids in managing thrombocytopenia. In cases of blood-borne parasitism, Livron B Plex<sup>®</sup> supports appetite and hematopoiesis, assisting recovery from hemolysis and thrombocytopenia (Ma'arif *et al.*, 2024).

Clinical evaluation showed progressive improvement. By day 7, no ticks were visible on the ears. After 28 days, the dog demonstrated substantial weight gain, resolution of dermatological lesions, absence of foul odor, normalization of coat oiliness, and regrowth of hair. Acetate tape preparation showed a marked reduction of *Malassezia* spp., hematological parameters improved significantly, and blood smear examination no longer detected *Ehrlichia*.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

Based on the history, physical examination, and ancillary diagnostic tests, the patient was diagnosed with emaciation accompanied by Malasseziosis and Ehrlichiosis. Management was conducted comprehensively through nutritional support, antifungal therapy, antiparasitic treatment, Doxycycline administration, and B-complex vitamin supplementation. After 28 days of treatment and clinical monitoring, the patient demonstrated a positive therapeutic response with marked clinical improvement and was considered clinically stable.

### Recommendations

The owner is advised to pay close attention to the animal's nutritional status by providing adequately balanced and high-quality feed. To prevent disease recurrence, proper sanitation of the kennel and surrounding environment should be maintained, ensuring that the housing conditions remain dry and clean. Additionally, regular administration of ectoparasiticides is recommended to prevent tick infestation, which plays an important role as a vector of blood-borne pathogens.

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### Tables

Table 1. Hematology Results at Initial Evaluation

Parameter	Result	Unit	Reference Range	Interpretation
WBC	15.79	10 <sup>3</sup> /μL	6–17	Normal
LYM#	4.26	10 <sup>3</sup> /μL	0.8–5.1	Normal
MID#	1.18	10 <sup>3</sup> /μL	0–1.8	Normal
GRA#	10.35	10 <sup>3</sup> /μL	4–12.6	Normal
LYM%	27	%	12–30	Normal
MID%	7.5	%	2–9	Normal
GRA%	65.5	%	60–83	Normal
RBC	3.73	10 <sup>6</sup> /μL	5.5–8.5	Decreased
HGB	8.6	g/dL	11–19	Decreased
MCHC	34.5	g/dL	30–38	Normal
MCH	23.1	pg	20–25	Normal
MCV	67	fL	62–72	Normal
RDW-CV	13	%	11–15.5	Normal
RDW-SD	40.3	fL	35–56	Normal
HCT	25	%	39–56	Decreased
PLT	27	10 <sup>3</sup> /μL	117–460	Decreased
MPV	6.6	fL	7–12.9	Decreased
PDW	20.9	fL	10–18	Increased
PCT	0.018	%	0.1–0.5	Decreased
P-LCR	10.6	%	13–43	Decreased

Notes: WBC: White Blood Cells; LYM#: Lymphocytes; MID#: Intermediate-sized cells; GRA#: Granulocytes; RBC: Red Blood Cells; HGB: Hemoglobin; MCHC: Mean Corpuscular Hemoglobin Concentration; MCH: Mean Corpuscular Hemoglobin; MCV: Mean Corpuscular Volume; RDW-CV: Red Cell Distribution Width (Coefficient of Variation); RDW-SD: Red Cell Distribution Width (Standard Deviation); HCT: Hematocrit; PLT: Platelets; MPV: Mean Platelet Volume; PDW: Platelet Distribution Width; PCT: Plateletcrit; P-LCR: Platelet Large Cell Ratio.

Table 2. Hematology Results at Day 28 of Evaluation

Parameter	Result	Unit	Reference Range	Interpretation
WBC	8.09	10 <sup>3</sup> /μL	6–17	Normal
LYM#	6.31	10 <sup>3</sup> /μL	0.8–5.1	Increased
MID#	0.57	10 <sup>3</sup> /μL	0–1.8	Normal
GRA#	1.21	10 <sup>3</sup> /μL	4–12.6	Decreased
LYM%	78.1	%	12–30	Increased
MID%	7.1	%	2–9	Normal
GRA%	14.8	%	60–83	Decreased
RBC	6.68	10 <sup>6</sup> /μL	5.5–8.5	Normal
HGB	18.6	g/dL	11–19	Normal
MCHC	38.6	g/dL	30–38	Increased
MCH	27.8	pg	20–25	Increased
MCV	72	fL	62–72	Normal
RDW-CV	12.1	%	11–15.5	Normal
RDW-SD	40.5	fL	35–56	Normal
HCT	48.1	%	39–56	Normal
PLT	157	10 <sup>3</sup> /μL	117–460	Normal
MPV	8.2	fL	7–12.9	Normal
PDW	16.5	fL	10–18	Normal
PCT	0.129	%	0.1–0.5	Normal
P-LCR	21.5	%	13–43	Normal

Notes: Abbreviations as in Table 1.

## FIGURES

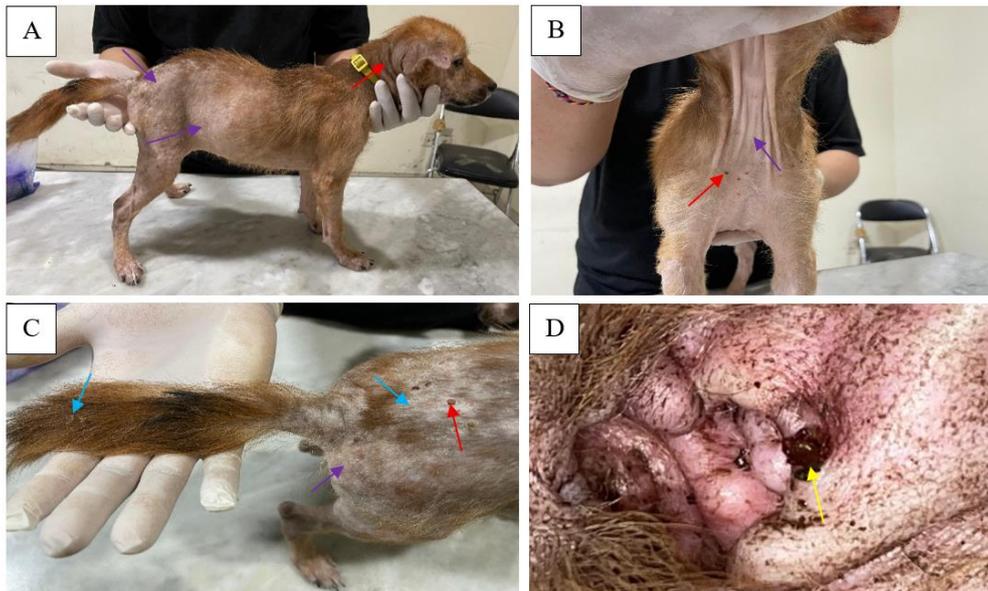


Figure 1. Clinical presentation of the patient. (A) The dog appeared underweight with alopecia (purple arrow) and crusting (red arrow). (B) Presence of crusting (red arrow) and alopecia (purple arrow). (C) Presence of scaling (blue arrow), papules (green arrow), crusting (red arrow), and alopecia (purple arrow). (D) Presence of scaling, crusting, and alopecia. (E) Tick infestation (yellow arrow).

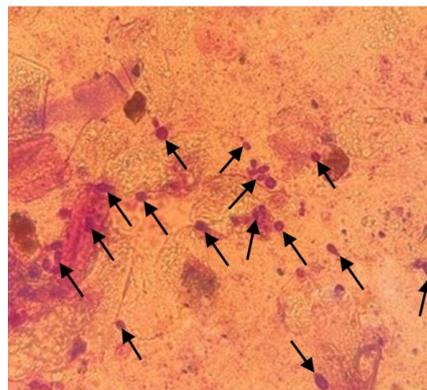


Figure 2. Microscopic findings from acetate tape preparation showing *Malassezia* spp. (1000×) (black arrow). Source: Personal documentation.

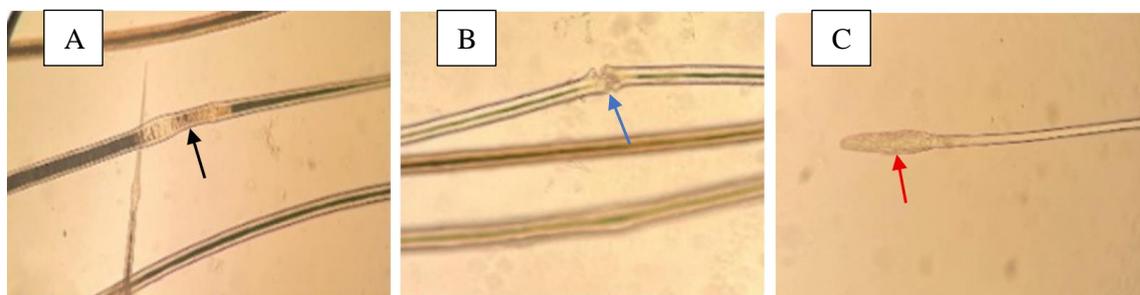


Figure 3. Trichogram examination demonstrating intact hair shafts, with (A) disrupted medulla (black arrow), (B) hair shaft fracture (blue arrow), and (C) anagen phase hair (red arrow) (100×). Source: Personal documentation.



Figure 4. Blood smear examination revealing *Ehrlichia morula* within monocytes (black arrow) (1000 $\times$ ).

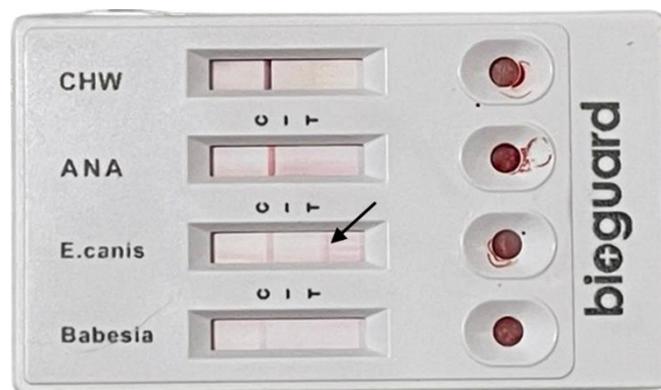


Figure 5. Rapid test kit for blood parasites demonstrating a positive result for *Ehrlichia canis* (black arrow).



Figure 6. Clinical follow-up evaluation demonstrating complete resolution of lesions in the regions of the head, neck, lateral thorax, abdomen, axilla, forelimbs and hindlimbs (left and right), and tail.

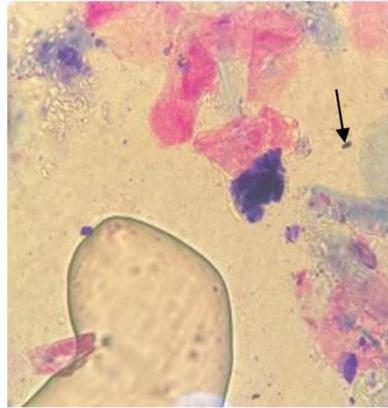


Figure 7. Follow-up acetate tape preparation showing a reduction in the number of *Malassezia* spp. (black arrow) (1000 $\times$ ).

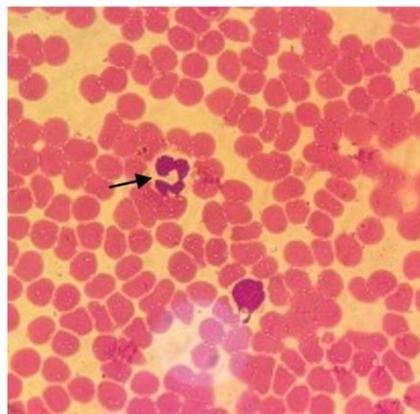


Figure 8. Follow-up blood smear evaluation on day 28 demonstrating absence of *Ehrlichia* morula within monocytes (black arrow) (1000 $\times$ ).