

**CASE REPORT: IMPROVEMENT IN BODY CONDITION SCORE (BCS) IN A CAT WITH DIARRHEA INFECTED WITH *ANCYLOSTOMA* SPP.****Laporan Kasus: Perbaikan *Body Condition Score* (BCS) Pada Kucing Diare Yang Terinfeksi *Ancylostoma* spp.****Stephanie Levina<sup>1</sup>, Ida Ayu Dian Kusuma Dewi<sup>2</sup>, I Nyoman Suartha<sup>3</sup>**<sup>1</sup>Veterinary Medicine Student, Faculty of Veterinary Medicine, Udayana University, PB Sudirman Street, Denpasar-Bali, 80113<sup>2</sup>Veterinary Clinical Diagnosis, Clinical Pathology, and Radiology Laboratory, Faculty of Veterinary Medicine, Udayana University, PB Sudirman Street, Denpasar-Bali, 80113<sup>3</sup>Veterinary Internal Medicine Laboratory, Faculty of Veterinary Medicine, Udayana University, PB Sudirman Street, Denpasar-Bali, 80113\*Corresponding author email: [stephanielevina@student.unud.ac.id](mailto:stephanielevina@student.unud.ac.id)

How to cite: Levina S, Dewi IADK, Suartha IN. 2026. Case report: Improvement in body condition score (BCS) in a cat with diarrhea infected with *Ancylostoma* spp. *Bul. Vet. Udayana* 18(1): 34-41. DOI: <https://doi.org/10.24843/bulvet.2026.v18.i01.p04>

**Abstract**

An 8-month-old domestic male cat presented with chronic bloody diarrhea, accompanied by weight loss and a below-ideal body condition score (BCS) of 3/9. Fecal examination using native, sediment, and flotation methods confirmed infection with *Ancylostoma* spp., whereas hematological examination revealed leukocytosis with neutrophilia and monocytosis. Bacterial culture of the fecal sample yielded negative results. Treatment was administered with the anthelmintic drug Drontal Cat® (pyrantel pamoate and praziquantel), along with symptomatic therapy using kaolin–pectin, supportive therapy with B12, probiotics, and high-protein diet (Purina Pro Plan Kitten). Follow-up evaluation showed that by days 3 and 7, the patient no longer had diarrhea, and microscopic examination revealed no *Ancylostoma* spp. eggs in the stool. By week 4, the cat had gained weight to 3.2 kg and achieved an ideal BCS of 4/9. This case demonstrates that combination therapy can yield favorable outcomes and recovery, thereby improving the nutritional status and enhancing the quality of life of the cat.

Keywords: *Ancylostoma* spp., anthelmintics, body condition score, domestic cats

**Abstrak**

Seekor kucing jantan domestik berusia 8 bulan muncul dengan keluhan diare kronis bercampur darah, disertai penurunan berat badan dan skor kondisi tubuh (*Body Condition Score*/BCS) dibawah ideal yakni 3/9. Pemeriksaan feses dengan metode natif, sedimen, dan apung mengkonfirmasi adanya infeksi *Ancylostoma* spp., dan pemeriksaan hematologi menunjukkan leukositosis dengan neutrofilia dan monositosis. Sementara itu, kultur bakteri pada sampel feses menunjukkan hasil negative. Penanganan dilakukan dengan pemberian obat anthelmintik Drontal Cat® (pyrantel pamoate dan praziquantel), terapi simptomatik berupa kaolin–pectin,

suportif berupa B12, probiotik, dan pakan tinggi protein Purina Pro Plan Kitten. Hasil evaluasi menunjukkan pada hari ke- 3 dan ke-7 pasien sudah tidak mengalami diare dan pemeriksaan mikroskopis tidak ditemukan adanya telur *Ancylostoma* spp., Pada minggu ke-4, kucing mengalami peningkatan berat badan menjadi 3,2 kg dan BCS menjadi ideal yaitu 4/9. Kasus ini menunjukkan bahwa kombinasi terapi memberikan hasil yang baik dan kesembuhan sehingga dapat memperbaiki status nutrisi dan meningkatkan kualitas hidup kucing.

Kata kunci: *Ancylostoma* spp., anthelmintic, *Body Condition Score*, kucing domestik

## INTRODUCTION

Underweight or suboptimal body condition is one of the most common health problems in cats and is often closely related to nutritional deficiencies, metabolic disorders, digestive disorders, and systemic diseases. One condition that often triggers weight loss in cats is malabsorption, along with other digestive disorders. Malabsorption occurs when the small intestine cannot effectively absorb nutrients from food, resulting in malnutrition (Riza *et al.*, 2024).

Diarrhea is a clinical effect of malabsorption, which is the passage of stool that is soft to liquid in consistency, with a frequency of three or more times a day, which can result in fluid and electrolyte loss, as well as increased body catabolism (Utomo *et al.*, 2023). Diarrhea in cats can be caused by various factors, including bacterial, viral, gastrointestinal parasitic, and protozoal infections (Cristina *et al.*, 2019). If left untreated, this condition will directly negatively impact the Body Condition Score (BCS) due to weight loss. This assessment uses quantitative and subjective methods to evaluate body fat by palpating the ribs and waist and visual observation to assess fat tissue thickness and muscle mass using a scale of 1-3 for thin, 4-5 for ideal, and 6-9 for fat/obese (Aqila *et al.*, 2020).

Several types of parasites are commonly found in the digestive tract of cats, including *Ancylostoma* spp., *Toxocara* spp., and *Strongyloides* spp. (Nugraha *et al.*, 2022). Ancylostomiasis is a disease caused by infection with *Ancylostoma* spp. (Monti *et al.*, 1998). The most common clinical symptom of hookworm infection is diarrhea. Other clinical signs include weakness, anemia, weight loss, a dull coat, and a distended abdomen (Rao *et al.*, 2021). Adult worms suck 0.1-0.8 ml of blood daily. Cats begin to lose blood 10-25 days after infection, but most cases occur 10-15 days after infection. Therefore, cats suffer from anemia, hypoproteinemia, intestinal malabsorption, and decreased immunity. The danger that will develop in cats is a thin body, sometimes accompanied by vomiting. More severe consequences can occur if secondary infections occur (Nugraha, *et al.*, 2022). The hookworms commonly found in cats are *Ancylostoma tubaeforme* and *Ancylostoma braziliense*. These worms have a hook-like structure with three pairs of teeth, and their eggs are oval or elliptical in shape with a thin shell (Bowman *et al.*, 2010).

This case report discusses the efforts to improve the BCS of a cat infected with *Ancylostoma* spp. Investigating the causes of malnutrition through a series of accurate examinations and appropriate treatments is key to improving the BCS and quality of life of infected cats.

## CASE PRESENTATION

### Animal Case

An 8-month-old black domestic male cat, weighing 2.5 kg, was brought in with complaints of recurrent diarrhea since April 2025. In the past week, diarrhea had become more severe and was mixed with blood. The frequency of diarrhea increased to three to four times a day (Figure 1). The owner also reported that the cat always appeared thin and had difficulty gaining weight. The patient's weight gain history was recorded in the vaccination card, namely at 2 months of age, the weight was 1.1 kg, and at 8 months of age, the weight was 2.5 kg (an increase of 1.4

kg in 6 months). The patient was not kept in a cage and often interacted with other cats. The living environment was humid and close to ditches. The food provided was Cat Choize commercial dry food with drinking water provided ad libitum from the tap. The last deworming was recorded in December of the previous year, and the cat had been vaccinated. The patient had also been neutered.

### **Clinical Examination**

The clinical examination included the pre-examination status, the patient's general condition, and a physical examination, which showed that all parameters listed in the table below (Table 1) were normal. The patient's general condition showed a BCS of 3/9, and he was still active and docile. During the digestive system examination, inflammation was observed around the anus, causing pain during body temperature measurement (Figure 2).

### **Parasitological Examination**

Fecal examination was performed using native, sediment, and flotation methods, which showed positive results for *Ancylostoma* spp. eggs. The eggs were ovoid in shape with a thin and smooth shell and had 2-8 large blastomeres (Figure 3).

### **Bacterial Culture Examination**

Bacterial culture examination conducted at the Denpasar Veterinary Center yielded negative results.

### **Routine Hematology Examination**

Hematological examination (Table 2) showed leukocytosis with an increase in the number of neutrophils and monocytes and a decrease in the Mean Platelet Volume (MPV).

### **Diagnosis and Prognosis**

Based on the medical history, clinical examination results, and supporting tests, the patient was diagnosed with a hookworm infection with a BCS of 3/9 (thin). The prognosis is favorable because cats generally show good health.

### **Therapy**

Patients are treated with causative, symptomatic, and supportive therapies. Causative therapy uses the anthelmintic Drontal Cat® (PT ELANCO), which contains pyrantel embonate and praziquantel at a dose of 1 tablet/4 kg BW (½ tablet) orally (PO) and is repeated every month. Symptomatic therapy uses kaolin and pectin (Kaotin®, PT Erela) as an antidiarrheal at a dose of 1-2 ml/kg BW (4 ml), q12h for 3 days. Supportive therapy is given with vitamin B12 injection (Jectavit B12® Injection) once a week at a dose of 0.05-0.5 ml/animal IM (0.3 ml), probiotics (Pet Probiotic Tablets®) at a dose of 1-3 tablets/day, and high-protein Purina Proplan Kitten food at a dose of 65-72 g three times daily for cats aged 6 to 12 months.

## **RESULTS AND DISCUSSION**

Clinical and supporting examinations showed that the patient was diagnosed with ancylostomiasis with a BCS of 3/9. The ideal body condition in cats can be assessed using the body fat score, known as the BCS. This BCS assessment was performed by palpating the ribs and waist and visually observing the thickness of the fat tissue and muscle mass. During the inspection of the ribs, the patient's spine and hips were clearly visible, and her abdomen appeared concave with a narrow waist. During palpation, the ribs, spine, and hips were clearly palpable with almost no fat. The BCS is a quantitative and subjective method for evaluating body fat. A BCS score of 1-3 (underweight) indicates that the ribs, spine, and hips are clearly

prominent, the abdomen is concave, and the waist is very narrow, like an hourglass. A BCS score of 4-6 (ideal) indicates that the ribs can be felt and have a little fat covering them, the spine is smooth and easily felt but not sharp or bony, the hips are rounded with a layer of fat, there are slight abdominal folds with small fat pads, and the waistline is clearly visible behind the ribs with a slightly curved hourglass shape. A BCS score of 7-9 (overweight) indicates that the ribs are very difficult to palpate, the spine and hips are difficult to feel, the abdomen is noticeably rounded and enlarged, the waist is not visible, and the upper body is wide and rounded (Permana, 2022).

The preliminary examination showed that all parameters were normal, but a physical examination revealed inflammation around the anus, causing pain when taking their temperature. This condition is consistent with diarrhea, which causes perianal inflammation. Positive results from stool examination using native, sedimentation, and flotation methods revealed *Ancylostoma* spp. eggs.

*Ancylostoma* spp. worms, which are nematodes with a direct life cycle, mainly affect the small intestine. These worms have a hook-like structure with three pairs of teeth, while their eggs are oval/elliptical in shape with a thin shell and contain 2-8 large blastomeres (Bowman *et al.*, 2010). The pathophysiology of infection begins when third-stage infective larvae (L3) penetrate the skin (percutaneously) or are ingested (orally) (Taweethavonsawat *et al.*, 2019), and migrate to the small intestine, where they develop into adult worms within 2–3 weeks (Setasuban, 1980). Adult worms use their hooks to attach to the intestinal mucosa and suck blood, causing repeated microscopic bleeding and significant blood loss (0.1–0.8 mL per worm per day), leading to anemia (Millán & Blasco-Costa, 2012). Additionally, the worms release proteolytic enzymes and anticoagulants, such as AcAP, which stimulate proinflammatory cytokines (IL-1 $\beta$ , TNF- $\alpha$ , IL-6), trigger inflammatory anorexia, and exacerbate emaciation (Shi *et al.*, 2024). Damage to the intestinal mucosa inhibits the absorption of essential nutrients (amino acids, fats, iron, zinc, and vitamin B12) and causes hypoproteinemia due to plasma protein loss (Geurden *et al.*, 2017). The combination of blood loss, malabsorption, and chronic energy deficiency forces the body to catabolize muscle and fat tissue, which progressively leads to a decrease in body mass and a low BCS. Hematological examination shows leukocytosis, neutrophilia, and monocytosis, indicating an inflammatory response (Hermawan, 2023).

Treatment for *Ancylostoma* spp. infection includes causative, symptomatic, and supportive therapy. Causative therapy uses anthelmintics, such as Drontal Cat (a combination of pyrantel pamoate and praziquantel), which acts as a neuromuscular depolarization inhibitor, causing spastic paralysis of the worms so that they are released from the intestinal mucosa and expelled (Plumb, 2008), which is very important for stopping the blood loss. Symptomatic therapy uses kaolin–pectin as an antidiarrheal agent that works by adsorbing toxins and protecting the intestinal mucosa (Boothe, 2012). Supportive therapy includes the administration of Vitamin B12 to support red blood cell formation and metabolism, as well as probiotics to restore the balance of intestinal microbiota due to inflammation, strengthen the barrier, and improve stool quality (Simpson, 2012; Lee *et al.*, 2024).

After eliminating parasites and treating clinical symptoms with causative, supportive, and causative therapies, improvement in BCS was achieved through dietary management, namely feeding a high-energy diet with high-quality animal protein (e.g., Purina Pro Plan Kitten). As obligate carnivores, cats require animal protein to survive (Golder *et al.*, 2020). This high-protein diet has been proven effective in supporting anabolism and maintaining muscle mass, which is the main component of healthy weight gain and not excess fat accumulation (Wei *et al.*, 2011; Laflamme & Hannah, 2013). By eliminating parasites that halt catabolic processes, improving nutrient absorption supported by probiotics, and providing energy intake exceeding

daily requirements, the body can rebuild damaged tissues and restore body mass, leading to healthy weight gain and proper recovery of the BCS.

Post-treatment evaluation showed a significant improvement. On the third day after treatment, the patient no longer experienced diarrhea. One week after administering the deworming medication, stool examination revealed no *Ancylostoma* spp. eggs, indicating successful anthelmintic therapy. After cats are given deworming medication, adult worms die and are excreted in the stool within a few days. However, worm eggs can survive in the digestive tract and are excreted in the feces. At 4 weeks post-treatment, the cat gained weight to 3.2 kg, and its BCS improved to an ideal 4/9 from 3/9, indicating recovery of body condition as nutrient absorption and gastrointestinal function improved (Figure 4).

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The patient was diagnosed with Ancylostomiasis. Causative and symptomatic treatments with Drontal and kaolin-pectin, as well as supportive therapy in the form of vitamin B12, probiotics, and high-protein Purina Pro Plan Kitten food, yielded good results. On days 3 and 7 post-treatment, the patient no longer experienced diarrhea, and microscopic examination revealed no *Ancylostoma* spp. eggs. By week 4, the cat had gained weight to 3.25 kg and achieved an ideal BCS of 4/9.

### Recommendations

To prevent the recurrence of Ancylostomiasis infection, routine deworming is recommended, along with maintaining feed and environmental hygiene. Providing hygienic and nutritionally adequate feed positively impacts the health and ideal body weight of cats.

## ACKNOWLEDGEMENTS

The author would like to take this opportunity to express his gratitude to the Laboratory of Veterinary Internal Medicine, Faculty of Veterinary Medicine, Udayana University for its assistance in facilitating and guiding the completion of this case report.

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### Tables

Table 1. Results of the Cat's Physical Examination

Type of Examination	Result	Reference Range	Interpretation
Heart Rate (beats/min)	148	110–210	Normal
Pulse Rate (beats/min)	143	110–210	Normal
Capillary Refill Time (CRT) (seconds)	< 2	< 2	Normal
Respiratory Rate (breaths/min)	28	20–30	Normal
Body Temperature (°C)	38.2	37.7–39.4	Normal
Skin Turgor (seconds)	< 2	< 2	Normal

Table 2. Results of the Cat's Hematological Blood Examination

Parameter	Result	Reference Range	Interpretation
White Blood Cells (WBC)	$22.21 \times 10^9/L$	2.87–17.02	High
Lymphocytes #	$2.84 \times 10^9/L$	0.92–6.88	Normal
Monocytes #	$1.62 \times 10^9/L$	0.05–0.67	High
Lymphocytes (%)	12.8%	12–30	Normal
Monocytes (%)	7.3%	2–9	Normal
Red Blood Cells (RBC)	$8.35 \times 10^{12}/L$	5.5–8.5	Normal
Hemoglobin	12.4 g/dL	9.8–16.2	Normal
Mean Corpuscular Volume (MCV)	48.7 fL	35.9–53.1	Normal
Mean Corpuscular Hemoglobin (MCH)	14.8 pg	11.8–17.3	Normal
Mean Corpuscular Hemoglobin Concentration (MCHC)	30.5 g/dL	28.1–35.8	Normal
Red Cell Distribution Width (RDW)	21.1%	15.0–27.0	Normal
Reticulocytes (%)	0.3%	–	Normal
Neutrophils (NEU)	$16.68 \times 10^9/L$	2.30–10.29	High
Eosinophils (EOS)	$1.02 \times 10^9/L$	0.17–15.7	Normal
Basophils (BASO)	$0.05 \times 10^9/L$	0.01–0.26	Normal
Platelets (PLT)	494 K/ $\mu$ L	151–600	Normal
Mean Platelet Volume (MPV)	9.8 fL	11.4–21.6	Low
Plateletcrit (PCT)	0.48%	0.17–0.86	Normal

## Figures



Figure 1. Bloody diarrhea in cat feces (A) and vaccination card (B).



Figure 2. Weighing process of cat (A) and BCS examination (B).

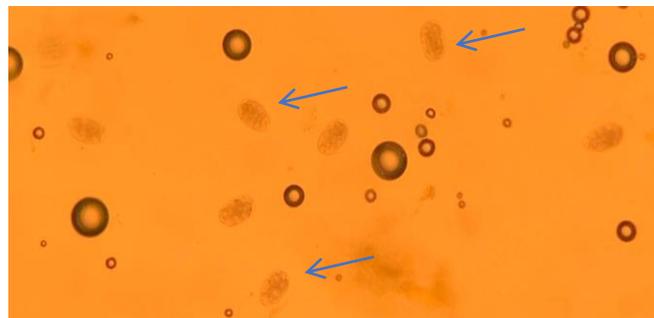


Figure 3. Patient's stool examination results (Positive for *Ancylostoma* spp. worm eggs at the arrow)

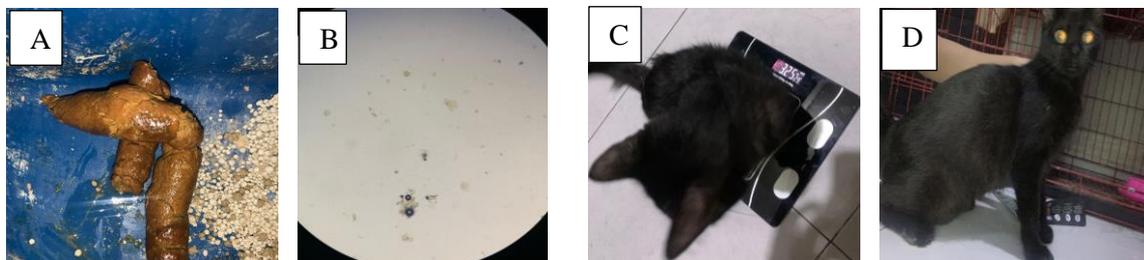


Figure 4. Examination of the cat after treatment. The patient's stool began to solidify (A), and the stool examination results showed no *Ancylostoma* spp. eggs (B). One week after treatment, the patient's weight increased to 3.25 kg (C). After four weeks, the patient's current condition was BCS 4/9 (D).