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Case Reports

Scabiosis, Otitis Externa, With Toxocariosis and Ancylostomiasis In Local Cat

Skabiosis, Otitis Eksterna, Dengan Toksokariosis dan Ankilostomiasis Pada Kucing Lokal

Muhammad Hasby Arrizki Akbar*[1], Putu Ayu Sisyawati Putriningsih[2], Sri Kayati Widyastuti[2]

[1]Program Study of Veterinary Medicine, Faculty of Veterinary Medicine, Udayana University, Denpasar- Indonesia
[2]Laboratory of Veterinary Internal Medicine, Faculty of Veterinary Medicine, Udayana University, Indonesia

ABSTRACT

Background: Skin diseases caused by ectoparasites are common health issues found in clinical cases involving domestic animals kept as pets. Scabiosis is a skin disease in livestock and companion animals caused by the *Sarcoptes scabiei* or *Notoedres cati* mites in the stratum corneum of the skin. Otitis externa is an inflammatory condition in the external ear canal. Toxocariosis is a disease brought on by parasites from the genus Toxocara. Hookworm disease is an infection by hookworms, *Ancylostoma sp.* **Purpose:** To report the management of scabiosis, otitis externa, toxocariosis and ancylostomiasis in local cats. **Case:** The case animal was a male cat named Chipmunk, aged 3 years, with orange eyes and hair color, 2.4 kg body weight. The cat was examined due to redness on the back of the neck and scratching behavior while eating. Upon physical examination, the cat appeared active and behaved calmly with a scratching habit. The pruritus score was 8/10. The Body Condition Score (BCS) was 3 out of 9. There was alopecia and hyperkeratosis on the face, ears, and neck; crusts on the neck area and scales on the face and neck. The nasal mucosa was moist and the oral mucosa was pale pink. Abdominal palpation revealed a relatively firm consistency. Laboratory examinations conducted included complete blood count (CBC), superficial skin scraping, ear cerumen swab, direct microscopic examination, sedimentation, floatation, and egg per gram for feces. **Case Management:** The treatment involved the administration of ivermectin and diphenhydramine injections, drontal, and prescribed medications included chlorpheneramine maleate, multivitamin, and fish oil. **Conclusion:** Treatment for scabiosis and otitis externa proved effective, as well as toxocariosis and ancylostomiasis clinically.

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***Correspondence:**
Muhammad Hasby Arrizki Akbar
E-mail: contact.mhaakbar@gmail.com

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ABSTRAK

Latar Belakang: Penyakit kulit yang disebabkan oleh ektoparasit merupakan masalah kesehatan umum yang ditemukan pada kasus klinis yang melibatkan hewan peliharaan. Skabiosis merupakan penyakit kulit pada hewan ternak dan hewan peliharaan yang disebabkan oleh tungau *Sarcoptes scabiei* atau *Notoedres cati* pada stratum korneum kulit. Otitis eksterna merupakan kondisi peradangan pada liang telinga bagian luar. Toksokariosis merupakan penyakit yang disebabkan oleh parasit dari genus Toxocara. Penyakit cacing tambang merupakan infeksi oleh cacing tambang, *Ancylostoma sp.* **Tujuan:** Untuk melaporkan penanganan skabiosis, otitis eksterna, toksokariosis dan ankilostomiasis pada kucing lokal. **Kasus:** Kucing jantan bernama Chipmunk, berusia 3 tahun, dengan mata dan bulu berwarna jingga, berat badan 2,4 kg. Kucing tersebut diperiksa karena adanya kemerahan pada bagian belakang leher dan perilaku menggaruk saat makan. Pada pemeriksaan fisik, kucing tersebut tampak aktif dan berperilaku tenang dengan kebiasaan menggaruk. Skor pruritus adalah 8/10. Skor Kondisi Tubuh (BCS) adalah 3 dari 9. Terdapat alopecia dan hiperkeratosis pada wajah, telinga, dan leher; kerak pada area leher dan sisik pada wajah dan leher. Mukosa hidung lembab dan mukosa mulut berwarna merah muda pucat. Palpasi abdomen menunjukkan konsistensi yang relatif keras. Pemeriksaan laboratorium yang dilakukan meliputi hitung darah lengkap (CBC), kerokan kulit superfisial, usapan serumen telinga, pemeriksaan mikroskopis langsung, sedimentasi, apung, dan telur cacing per gram untuk feses. **Penatalaksanaan Kasus:** Penanganan yang dilakukan meliputi pemberian suntikan ivermectin dan diphenhydramine, drontal, dan obat-obatan yang diresepkan meliputi chlorpheneramine maleate, multivitamin, dan minyak ikan. **Kesimpulan:** Penanganan untuk skabiosis dan otitis eksterna terbukti efektif, begitu pula dengan toksokariosis dan ankilostomiasis secara klinis.

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Kata kunci: *Ancylostomiasis;* Otitis Externa; *Scabiosis; Toxocariosis*

INTRODUCTION

Cats are beloved pets by humans because they have high reproductive power and good adaptability. However, there are still many cat owners who do not pay attention to the maintenance of their petsm, which can cause disease. Common diseases in cats include skin diseases (scabiosis and otitis externa) and digestion (toxocariosis and ancylostomiasis) (Chen *et al.,* 2018; Yudhana, 2021). Skin diseases caused by ectoparasites are a common health problem found in clinical cases with domestic animals used as pets. Cats are domestic pets that are susceptible to exposure to parasitic infectious agents, with mite ectoparasite infestations dominating cases. Skin disease due to microscopic mite infestation, known as scabies or scabiosis, is one of the dominant skin diseases in cats, both domesticated and wild (Senthil, *et al.,* 2008). The mites that cause scabies are arthropods belonging to the class Arachnida, subclass Acarina, order Astigmata and family Sarcoptidae (Pudjiatmoko, *et al.,* 2014). Otitis externa is an inflammatory condition of the external ear canal (Rosser, 2004) and is the most common case found in small animal practitioners. Inflammation of the external ear canal occurs due to the colonization of microorganisms (bacteria, fungi, or parasites) that result in damage to the local tissues of the ear, triggering an inflammatory reaction. *Otodectes cynotis* infestation is the most common cause or 50% – 84% of otitis externa in cats (Acar and Yipel, 2016).

Toxocariosis is a disease brought on by worms of the genus Toxocara. *Toxocara cati* worms are one of the Toxocara species that can attack cats. High humidity is an optimum condition for the development and spread of various types of worm diseases (Nealma, *et al.,* 2013). This condition can be a contributing factor to *Toxocara cati* infection. Ancylostomiasis is an infection caused by hookworms, *Ancylostoma sp.* (Raji, *et al.,* 2013). Hookworms such as *Ancylostoma sp.* are blood-feeding parasites that inhabit the intestines of mammalian hosts, such as cats, dogs and humans (Dami, *et al.,* 2023). Common ancylostoma species that affect cats are *Ancylostoma braziliense, Ancylostoma tubaeforme, Ancylostoma caninum* (in some cases), and *Ancylostoma ceylanicum* (Bowman, *et al.,* 2010). This article aims to report the management of scabiosis, otitis externa, toxocariosis and ancylostomiasis in local cats

CASE

Medical Record

The case animal is a male cat named Chipmunk, 3 years old, orange eye and hair color, with a body weight of 2.4 kg. The case cat was examined for redness on the back of the neck and active scratching while eating. The cat was rescued on Wednesday, November 22, 2023, and examined on 25 November 2023. The case cat was fed twice daily with ad libitum drinking and had not been medicated since rescue. As the case cat was a rescue cat, vaccine and deworming history could not be determined.

Physical Examination

The result of status praesens case cat is shown at Table 1. On physical inspection, the case cat still appeared active and behaved calmly with a scratching habitus. The pruritus score was 8/10 (Colombo, *et al.,* 2022). The body condition score (BCS) was 3 out of 9 (Teng, *et al.,* 2018). There was alopecia and hyperkeratosis on the face, ears and neck; crusts on the neck and scale on the face and neck (Figure 1). The eye, genital, and anal mucosa were pink while the nasal mucosa was wet, and the oral mucosa was pale. On palpation, the abdomen has a moderately dense consistency.

Table 1. Result of Status Praesens Examination

Parameter	Result	Normal Range*	Reference
Heart rate (times/minute)	144	110–130	Normal
Pulse rate(times/minute)	132	110–130	Normal
Respiration rate (times/minute)	32	20–30	Normal
Rectal temperature (°C)	38.8	37.8–39.2	Normal
Mucous membrane	pale	pink	Decrease
Capillary Refill Time (second)	<2	<2	Normal

Note: * Source: Abdisa (2017).

Figure 1. Case cat during physical examination. Hyperkeratosis, alopecia, crusts and scale (red circle) are seen.

Laboratory Test

As support, superficial skin scraping or surface skin scraping was also performed, and Ear cerumen swab tests were conducted. The feces were taken and tested, Direct microscopic examination, flotation, sedimentation fecal tests and using the Whitlock method, for egg per gram (EPG) counts to the Balai Besar Veteriner in Sesetan, Denpasar, Bali. In addition, hematological examinations were also carried out to support the evaluation of the systemic condition of the animals being examined.

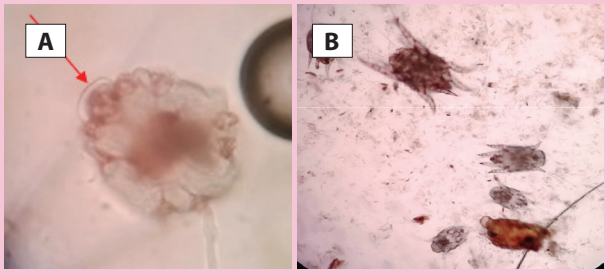


Figure 2. A. *Sarcoptes scabiei.* **B.** *Otodectes cynotis.*

Table 2. Result of Case Cat's Routine Hematology

Parameter	Before Treatment	Reference	Normal Range*)	After Treatment	Reference
WBC ($\times10^3/\mu L$)	14.19	Normal	5.5–19.5	8.29	Normal
LYM ($\times10^3/\mu L$)	12.52	Increase	0.8–7	7.06	Going to normal
MID ($\times10^3/\mu L$)	0.65	Normal	0–1.9	0.39	Normal
GRA ($\times10^3/\mu L$)	1.02	Decrease	2.1–15	0.84	Decrease further
RBC ($\times10^6/\mu L$)	5.45	Normal	4.6–10	4.75	Normal
HGB (g/dL)	10.6	Normal	9.3–15.3	9.4	Normal
MCHC (g/dL)	30.4	Normal	30–38	29.6	Start decreasing
MCH (pg)	19.4	Normal	13–21	19.8	Normal
MCV (fL)	63.7	Increase	39–52	66.7	Increase further
HCT (%)	34.7	Normal	28–49	31.7	Normal
PLT ($\times10^3/\mu L$)	33	Decrease	100–514	51	Increase further
PDW (fL)	9.5	Decrease	10–18	6.3	Decrease further

Note: WBC: White Blood Cell, LYM: Lymphocyte, MID: Leucocyte other than lymphocyte and granulocyte, RBC: Red Blood Cell, HGB: Hemoglobin, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin Concentration, MCV; Mean Corpuscular Volume, PLT: Platelet, PDW: Platelet Distribution Widt. *) Rayto RT-7600

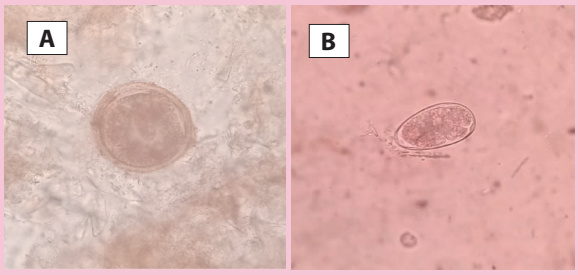


Figure 3. A. Direct microscopic examination of *Toxocara cati* . **B.** *Ancylostoma sp.*

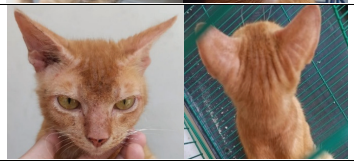
Treatment

Treatment included ivermectin injection (IvermecRhein®, Rheinvet animal health GmbH, Neuweid, Germany) at the recommended dose of 300 µg/kg BW subcutaneously, diphenhydramine (Vetadryl®, PT. Duta Kaisar Pharmacy, Karanganyar, Indonesia) at the recommended dose of 1 mg/kg BW intramuscularly, pyrantel pamoat (Drontal cat®, Bayer AG, Leverkusen, Germany) with the amount of ½ tablet orally, and ear cleaning was conducted. Return medications included Chlorpeneramine maleate (CTM®. PT. PIM Pharmaceuticals, Sidoarjo, Indonesia) orally twice daily at half a tablet for two weeks, Nutriplus gel®(Virbac, Carros, France) at the recommended dose of once daily for two weeks and fish oil (Shanghai Donghai Pharmaceutical Co.Ltd, Shanghai, China) at once daily for two weeks orally. Cats were also bathed once a week using a sulphur-containing shampoo.

RESULT

Sarcoptes scabiei was found (Figure 2) with the characteristics of having four pairs of brown limbs that are hardened and located on the thorax. Thorax and abdomen merge to form idiosoma, abdominal segments are absent or unclear (Walton and Currie, 2007). What distinguishes *Notoedres cati* is the location of the anus in the abdomen (Griana, 2013). *Otodectes*

Table 3. Progress Results of The Cat Cases

No	Day-	Result	Reference
1	Zero		Dirty face, alopecia and hyperkeratosis on face, ears and neck, crusts on neck, and scale on face and neck.
2	Seven		The face looks cleaner, hyperkeratosis, crusts and scale are reduced, the alopecia area starts to grow hair.
3	Fourteen		The face is clean, there is no hyperkeratosis, crusts or scales, the alopecia area is covered with hair.

cynotis was found (Figure 2) with the characteristics of an oval body, males have carunculae on all four pairs of legs, while the third and fourth pairs of legs in females end in long hairs or setae, the fourth pair of legs seems to disappear (rudimeter)(Bowman, *et al.,* 2002). During the direct microscopic examination, *Toxocara cati* and *Ancylostoma sp.* eggs were found. During the flotation test, *Toxocara cati* eggs were found. *Toxocara cati* eggs can be observed with the characteristics of almost round, sometimes oval, thick, there is a distance between the shell and granules, there are granules that are not segmented and usually fill the shell while *Ancylostoma sp.* eggs are characterized by oval, thin, smooth shell, 2-8 blastomeres (Thienpont, *et al.,* 2003). Toxocara and Ancylostoma eggs were found to be 6140 and 840, respectively. Based on anamnesis, physical examination and laboratory examination, this case was diagnosed with scabiosis, otitis externa, accompanied by toxocariosis, and ancylostomiasis with a fausta prognosis because the condition of the case cat was still quite good, as well as normal eating and drinking.

DISCUSSION

Scabiosis is a skin disease of livestock and pets caused by *Sarcoptes scabiei* or *Notoedres cati* mites on the corneum layer of the skin. This disease is highly contagious and zoonotic (Calista, *et al.,* 2019). The disease is transmitted through direct contact with infected animals. Cats with this disease can experience a decrease in body condition, trigger allergic reactions and increase the number of leukocytes in the body, and also have a negative impact on the caretaker because of its zoonotic nature (Susanto, *et al.,* 2020). In addition, secretions and excreta can also cause lysis of the stratum corneum, resulting in irritation and inflammation of the skin, this can cause itching. Itching makes the cat scratch the itchy part, triggering further irritation. *Otodectes cynotis* is the most common etiological agent of otitis externa in dogs and cats (Silva, *et al.,* 2020). The life cycle of *Otodectes cynotis* is imperfect metamorphosis: egg, larva, nymph and adult. They penetrate the host's skin with their mouth parts, feed on the host's lymph, tissue fluid and blood leading to dermatitis or allergic reactions (Montoya, 2018) and cause keratinisation and proliferation of epithelial cells (Powell, *et al.,* 1980).

Cats can be infected by ingesting infective eggs with food and drinking water (Calista, *et al.,* 2019). Infective Toxocara eggs are thick-walled, highly resistant to the environment and remain infective for several years (Overgauuw, 1997). Eggs must embryonate to become infective and this period takes at least four weeks at favorable ambient temperatures or longer at colder ambient temperatures. Stage two larvae (L2) develop in these embryonated eggs, and after cats eat eggs containing stage two larvae (L2), the larvae migrate from the gut to the liver and lungs. In the lungs, the L2 mature into stage three larvae (L3) which then return to the small intestine. There the L3 mature and the female worm will start laying eggs at 6-11 weeks after infection. If the L2-containing (infective) eggs are eaten by a paratenic host (earthworm, beetle, mouse, bird), the L2 migrate into the tissues and remain there until the cat eats the paratenic host. When a cat eats a host containing L2, the worms do not migrate to the liver and lungs; worm maturation occurs directly upon entering the intestine (Calista, *et al.,* 2019). In the cat's stomach, the larvae exit, penetrate the gastric mucosa and travel to the liver and trachea. Final worm development occurs in the lumen of the small intestine (Macpherson, 2013). The life cycle of *Ancylostoma sp.* is direct, with no intermediate hosts. Adult worms live by sucking blood in the small intestine. The worms bite the intestinal mucosa in a mobile location leaving wounds with prolonged bleeding, this is because the worms produce a blood anti-coagulation toxin that prevents blood clotting in the wound one to two days after coming out in the feces, in a moist and wet place the eggs will hatch into stage 1 larvae. After one week the infective larvae, stage 3 larvae, will be formed and ready to infect susceptible animals. Ancylostoma eggs and larvae will develop well at 23-30°C, then develop into infective larvae outside the host's body within 5-8 days (Mogi and Simarta, 2021). Case cats infected with disease are rescue cats whose previous environmental conditions cannot be known. Therapy uses ivermectin because it is known to act on GABA neurotransmission which blocks interneuronal stimulation of excitatory motor neurons, which causes paralysis in parasites (Sivajothi, *et al.,* 2015). Diphenhydramine is an antihistamine drug used to treat skin allergy symptoms such as redness and itching (Ramsey, 2014). As the case cats had increased MCV and decreased PLT; nutriplus gel was administered. The use of nutriplus gel is because it contains B12 and folic acid needed to overcome macrocytic normochromic and thrombocytopenia, in accordance with Khaidir (2007) that macrocytic normochromic can occur due to vitamin B12 deficiency, folic acid and DNA synthesis disorders.

The administration of nutriplus gel has also been proven to overcome macrocytic normochromic and thrombocytopenia by Purba, *et al.,* (2020). Case animals were also treated by bathing them with soap containing sulphur. Sulphur sublimates easily. When sublimated, sulphur binds with hydrogen ions to form hydrogen sulphide. Treatment with sulphur is most effective if the *S. scabiei* mites have not entered the deep stratum corneum layer. Sulphur helps the shedding process of the skin which is the maturation process of the keratinised cells in the stratum corneum that cause the skin to slough off. This is very helpful in eradicating mites that hide in tunnels in the epidermis (Ilman, *et al.,* 2017). Pyrantel pamoate is an anthelmintic commonly used as a treatment for worm infections caused by nematodes (Papich, 2010). Pirantel pamoate works by inhibiting the neuromuscular depolarization process in worms, causing neuromuscular paralysis and death. Pirantel pamoate also works by inhibiting the enzyme cholinesterase which increases muscle contraction in worms (Wijaya, 2017). The number of 6140 *T. cati* eggs in the case cat was classified as moderate severity, which, according to Overgauuw (1997), is a severe level of 10000. Based on Vatta, *et al.,* (2019), with Ancylostoma egg counts of 3–3940, the 840 Ancylostoma eggs in the case cat were considered mild.

The results of blood tests after treatment for two weeks and before can be seen in Table 2. It was found that lymphocytes were still high but very close to normal, granulocytes were still low, MCHC was close to normal, platelets were still low but had increased, while PDW had decreased. Mean Corpuscular Volume (MCV) is the concentration of hemoglobin per liter of blood (Cascio, 2017). The choice of anticoagulant can affect the platelet count in a blood test. Research from Biljak, *et al.,* (2016) showed that the platelet count and mean platelet volume were affected by the type of anticoagulant used. For example, the use of K3 EDTA as an anticoagulant is associated with a reduction in platelet count, especially in patients with thrombocytopenia (Podda, *et al.,* 2019). Granulocytes are a type of white blood cell that plays a crucial role in the body's defense against infections and inflammation. In cats, neutrophils and eosinophils make up the majority of granulocytes. In cats, low granulocyte counts can indicate a number of underlying illnesses, such as inflammation and infections (Nivy, *et al.,* 2013). Decrease in PDW could be associated with certain health conditions or disease that affect platelet

function such as thrombocytopenia, platelet dysfunction, infection or inflammation, cancer, and nutritional deficiencies (Bommer, *et al.,* 2008). On routine hematological examination lymphocytosis is associated mostly with acute stress response, chronic inflammation, neoplasia and hypoadrenocorticism (Kritsepi and Oikonomidis, 2016). Granulocytes are a collection of neutrophils, basophils and eusinophils. If this value is decreased then, there has been a chronic infection. Normochromic macrocytic was also found and, according to Willard and Tvetden (2012), is caused by vitamin B12 deficiency or folate deficiency as well as thrombocytopenia.

CONCLUSION

Based on history taking, physical examination, and supporting examination, the case cat had scabiosis, otitis externa, with toxocariosis, and ancylostomiasis. Treatment included ivermectin injection, diphenhydramine, drontal cat and home medications such as CTM, Nutriplus gel and fish oil. Treatment for scabiosis and otitis externa proved effective, as well as toxocariosis and ancylostomiasis clinically.

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CONFLICT of INTEREST

The authors declare no conflict of interest

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ETHICAL APPROVAL

In this Case Study, there is no ethical approval needed.

AUTHORS' CONTRIBUTIONS

MHAA recorded data, performed treatment actions, and writes the article. PASP guided in data processing, treatment, and gave suggestion for the article. SKW guided and gave suggestion for the article.

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