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Case Report

Cutaneous Larva Migrans on the Dorsum of the Foot in a Rural Primary Care Setting: A Case Report from Sintang, West Borneo

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Abstract

Cutaneous larva migrans (CLM), commonly termed creeping eruption, is a zoonotic dermatosis resulting from the intraepidermal migration of filariform hookworm larvae, predominantly originating from dogs and cats, and is endemic to tropical and subtropical areas characterized by warm, humid, sandy environments. This report delineates the clinical manifestations, predisposing factors, and therapeutic approaches to CLM in a rural primary care context, aiming to enhance prompt identification and appropriate management. A 45-year-old woman presented with intensely pruritic, erythematous, serpiginous papules on the dorsum of her right foot that had progressively extended over a two-week period. She reported frequent barefoot work in agricultural fields and residence in an area with numerous free-roaming dogs and cats. Physical examination revealed multiple linear, winding erythematous tracks on the dorsum pedis dextra, consistent with CLM. The patient was treated with oral albendazole, ethyl chloride spray, and an oral antihistamine, along with counseling on personal and environmental hygiene. Pruritus significantly improved within one week, and the skin lesions resolved completely within two weeks. This case highlights the critical importance of identifying the distinctive clinical features of CLM and implementing prompt treatment, particularly in resource-constrained rural settings, as early diagnosis and appropriate management can result in rapid symptom resolution and avert avoidable complications.

Keywords: Creeping Eruption, Cutaneous Larva Migrans, Hookworm-Related Skin Disease, Serpiginous.

1. Introduction

Cutaneous larva migrans (CLM), also referred to as creeping eruption, is a zoonotic dermatosis marked by linear, serpentine (serpiginous), elevated, and progressively advancing erythematous lesions resulting from the migration of hookworm larvae within the superficial layers of the skin (Aisah, 2015; Heukelbach & Feldmeier, 2008; Leung et al., 2017; Cardoso et al., 2020). Classically, this condition manifests on body regions that come into direct contact with soil or sand, notably the plantar and dorsal surfaces of the feet, the hands, the gluteal region, and the abdomen (Aisah, 2015; PERDOSKI, 2021).

The predominant etiological agents are the filariform larvae of *Ancylostoma braziliense* and *Ancylostoma caninum*, which reside within the intestinal tract of dogs and cats, while humans function as accidental, dead-end hosts (Natadisastra & Agoes, 2009; Suh & Keystone, 2012). The worm eggs excreted in faeces hatch in the environment into rhabditiform larvae and then develop into infectious filariform larvae. When the skin comes into contact with contaminated soil or sand, the larvae penetrate the stratum corneum and migrate along the dermo-epidermal junction, forming the characteristic CLM tunnels (Centers for Disease Control and Prevention, 2016; PERDOSKI, 2021; Coello et al., 2019).

Given its high prevalence in Indonesia (Natadisastra & Agoes, 2009; Novita & Buhari, 2018) and its typical presentation in primary care, prompt recognition and effective management of CLM are essential. This case report presents an adult patient with CLM on the back of the foot who came to a primary care service in a rural area in Indonesia, along with management with albendazole, ethyl chloride spray, antihistamines, and education. This case is expected to increase primary care clinicians' awareness of CLM, particularly in high-risk populations who frequently walk barefoot in environments with many pets.

2. Literature Review

Cutaneous Larva Migrans (CLM) chiefly arises in tropical and subtropical zones typified by warm, humid, sandy milieus, encompassing Central and South America, the Caribbean, Africa, Southeast Asia, and Australia (Heukelbach & Feldmeier, 2008; Cardoso et al., 2020). It is estimated that approximately 576-740 million individuals worldwide are affected by hookworm infection (Centers for Disease Control and Prevention, 2016). In Indonesia, hookworm infection rates are reported to range from 30–50%, with higher prevalence in plantation and rural areas, resulting in a relatively high risk of exposure to filariform larvae (Novita & Buhari, 2018; Natadisastra & Agoes, 2009).

In non-tropical countries, CLM is often reported as an ‘imported’ disease in travelers returning from tropical regions. Studies of travelers show that CLM is one of the most common causes of travel-related skin disorders, with a significant proportion among travelers who holiday at the beach (Blackwell & Vega-Lopez, 2001; Kincaid et al., 2015; Wesołowski et al., 2021). Cases in Europe have been reported to be increasing, partly due to climate change and increased travel to tropical regions (Gutiérrez García-Rodrigo et al., 2017).

Clinically, CLM is generally self-limiting and can resolve spontaneously within weeks to months, but intense itching can interfere with quality of life and lead to secondary infections due to scratching (Heukelbach & Feldmeier, 2008; Stebut et al., 2014; Veraldi et al., 2012). Various guidelines and clinical studies indicate that antihelminthic therapies such as albendazole and ivermectin can shorten the course of the disease and accelerate lesion resolution (Stebut et al., 2014; Veraldi et al., 2012; Kincaid et al., 2015; Elmi et al., 2025). Other treatment alternatives, including the use of 5% topical permethrin or topical ivermectin, have also been reported with good results (Gerbig & Kempf, 2020; Tan et al., 2021). Another treatment option is the use of creams or ointments containing thiabendazole or albendazole, applied to the lesions three times a day for 5–10 days. In addition, cryosurgery using liquid nitrogen or ethyl chloride spray can also be performed and combined with albendazole administration (PERDOSKI, 2021).

3. Methods

The method used was a case study of patients who sought treatment at the community health centre. Mrs L, aged 45, female, came to the General Clinic at the Tempunak Community Health Centre, Sintang Regency, complaining of itching and red bumps like twisted threads on the back of her right foot for approximately two weeks. Initially, the patient experienced itching and noticed small red bumps on the sole of her right foot. The itching was persistent, causing the patient to scratch frequently. Over time, the bumps increased in number and formed long, winding lines.

About a week before coming to the clinic, the patient sought treatment from a midwife and was diagnosed with an allergy. She was given anti-allergy medication, but her symptoms did not improve. The lesions then spread to the back of her foot. The patient admitted to frequently working in the fields without footwear. There were many dogs and cats roaming around the patient's house.

The patient denied having a fever, chills, or a history of insect or animal bites. The patient also denied having travelled to the beach or river. The patient had never experienced similar complaints before. There was no history of food or drug allergies. Comorbidities included hypertension and diabetes mellitus, both of which were being treated.

Physical examination revealed that the patient was in a stable general condition and fully conscious (compos mentis), with a blood pressure of 148/97 mmHg, pulse rate of 90 beats per minute, respiratory rate of 20 breaths per minute, body temperature of 36.1 °C, and a body weight of 45.9 kg. Dermatological examination revealed multiple erythematous papules on the dorsum of the right foot, arranged in linear, winding, serpiginous tracks.

The diagnosis of cutaneous larva migrans (creeping eruption) was established based on the characteristic clinical manifestations and a relevant history of exposure. Non-pharmacological management included education about the disease, recommendations to improve personal and environmental hygiene, washing hands after contact with soil, wearing footwear when working in fields, and avoiding contact with dog and cat faeces (Centers for Disease Control and Prevention (Centers For Disease Control and Prevention, 2016; PERDOSKI, 2021).

The medication administered was albendazole 1 × 400 mg per day for 5 days, ethyl chloride spray on skin lesions, and the symptomatic medication cetirizine 1 × 10 mg for itching. The patient's prognosis was assessed as doubtful to favourable. The patient reported that the itching subsided within one week after therapy, and after two weeks, the erythematous plaques had almost completely disappeared, consistent with case reports and other studies on the efficacy of albendazole in CLM (Veraldi et al., 2012; Kincaid et al., 2015; Elmi et al., 2025).

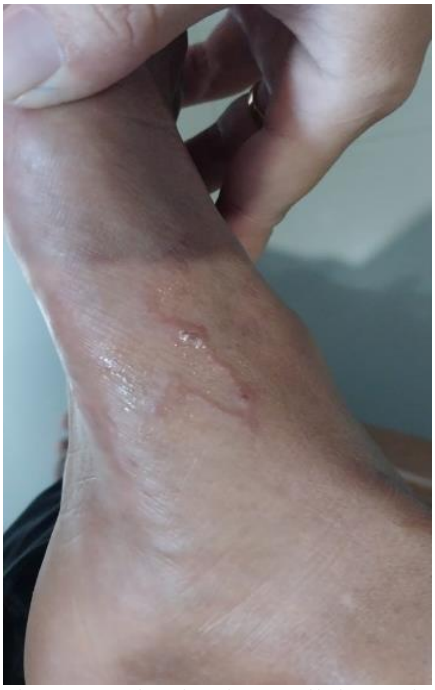

Figure 1. The patient's dermatological condition shows erythematous and serpiginous plaques on the dorsum of the right foot

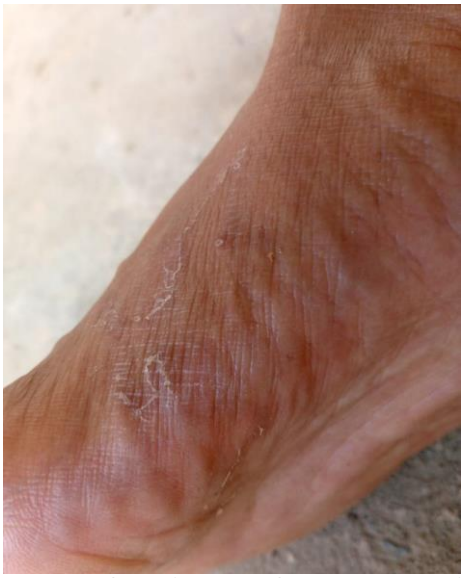

Figure 2. Follow-up of patients after two weeks of treatment

Although CLM is generally self-limiting and can heal spontaneously, the itching and discomfort it causes can be so severe that it still requires rapid diagnosis and appropriate management. This case report underscores the importance of increasing healthcare workers' awareness of zoonotic parasitic infections such as CLM. Additionally, this case highlights the urgency of prevention efforts, including raising awareness about good hygiene practices, administering deworming medication routinely to pets, and educating at-risk groups to reduce the impact of this disease on public health (Elmi et al., 2025).

4. Results and Discussion

From the medical history, the patient complained of red spots that then formed winding ‘paths’ under the skin, accompanied by severe itching, especially at night. A history of walking and working in fields barefoot, as well as the presence of dogs and cats in the home environment, reinforced the suspicion of exposure to soil contaminated with animal faeces containing hookworm larvae. These findings are concordant with multiple reports indicating that CLM commonly occurs in individuals who have frequent direct exposure to soil contaminated with animal feces in tropical and subtropical regions (Heukelbach and Feldmeier, 2008; Novita & Buhari, 2018; Blackwell and Vega-Lopez, 2001; Wesołowski et al., 2021).

CLM is a skin infection caused by animal hookworm larvae that normally live in the intestines of dogs and cats, with humans acting as intermediate hosts that do not allow the worm's life cycle to continue (Natadisastra and Agoes, 2009; Suh and Keystone, 2012). Infection ensues when the skin is directly exposed to soil or sand contaminated with filariform larvae, such as during barefoot walking on beaches, in gardens, or across agricultural fields (Centers For Disease Control and Prevention, 2016; Coello et al., 2019). The incubation period varies from a few days to about a month, with an average of 5–16 days before symptoms appear (PERDOSKI, 2021; Leung et al., 2017).

Early manifestations are usually small, intensely itchy erythematous papules or plaques at the site of larval entry. In the following days, a characteristic pattern of linear or serpentine (serpiginous) lesions appears, raised, with a diameter of approximately 2-3 mm, which can extend several centimetres as the larvae migrate (PERDOSKI, 2021; Heukelbach & Feldmeier, 2008; Cardoso et al., 2020). In the advanced stage, the lesions may appear

more subtle and leave only itchy nodules, making clinical diagnosis more challenging (Natadisastra and Agoes, 2009; Veraldi et al., 2012).

The predilection sites predominantly involve body regions that are frequently exposed to soil, including the legs, plantar surfaces, dorsum of the feet, hands, buttocks, and thighs (PERDOSKI, 2021; Leung et al., 2017). The course of the disease in this patient is consistent with the literature, which reports an incubation period for CLM ranging from several days to one month. The change in lesions from papules to winding erythematous lines on the dorsum of the right foot reflects the migration of larvae in the superficial epidermal layer, which is a characteristic and almost pathognomonic feature of CLM (Natadisastra & Agoes, 2009; Stebut et al., 2014). The absence of systemic symptoms and laboratory abnormalities in this patient is also consistent with most CLM cases, as peripheral eosinophilia and systemic manifestations are generally rare and more common in severe infestations (Heukelbach and Feldmeier, 2008; Cardoso et al., 2020).

The diagnosis of CLM is typically made on clinical grounds, based on a compatible exposure history and the distinctive morphology of the skin lesions, characterized by intensely pruritic, serpiginous, erythematous tracks (Stebut et al., 2014; PERDOSKI, 2021). Dermoscopy can help identify characteristic structures, although larvae are not always visible (Cardoso et al., 2020). Additional laboratory tests, such as peripheral blood eosinophils, are often normal or only slightly elevated and non-specific (Novita & Buhari, 2018).

Differential diagnoses to consider include other parasitic infections (e.g., Strongyloides stercoralis, scabies, loiasis, myiasis, schistosomiasis), granuloma annulare, early-stage herpes zoster, tinea corporis, and contact dermatitis (PERDOSKI, 2021; Aisah, 2016; Cardoso et al., 2020). In the early phase when the lesions are still papules, CLM is often misinterpreted as insect bites or allergic reactions, as was the case with this patient who was initially diagnosed with allergies at the first health facility (Aisah, 2016; Kincaid et al., 2015). The diagnosis in this case was made clinically without invasive supporting tests, reflecting everyday practice in primary health care. In line with previous reports, the patient was initially diagnosed with allergic dermatitis, indicating that CLM in its early stages is often misinterpreted as insect bites or allergic reactions (Aisah, 2016; Kincaid et al., 2015). Delayed diagnosis can prolong itching complaints and increase the risk of complications such as secondary bacterial infections due to scratching (Heukelbach & Feldmeier, 2008; Leung et al., 2017).

Naturally, CLM can resolve on its own within 2–8 weeks, but in some cases the disease course can last longer, up to several months or even more than a year (Suh and Keystone, 2012; Veraldi et al., 2013). Although self-limiting, most guidelines recommend active therapy to reduce the duration of the disease, alleviate pruritus, and prevent complications (Stebut et al., 2014; Leung et al., 2017).

The most frequently recommended first-line treatment consists of oral ivermectin at a dose of 150–200 µg/kg body weight or oral albendazole at 400–800 mg per day for three days, with reported cure rates ranging from 94% to 100% (Stebut et al., 2014; Veraldi et al., 2012; Kincaid et al., 2015). Albendazole 400 mg for 3-7 days is also effective in children >2 years old or weighing >10 kg (PERDOSKI, 2021; Suh & Keystone, 2012). However, ivermectin is not recommended for children under 5 years of age or weighing less than 15 kg, and both ivermectin and albendazole are contraindicated in pregnant and breastfeeding women (Stebut et al., 2014; Suh and Keystone, 2012).

In addition to systemic therapy, several case reports have documented the effective use of topical treatments. Topical thiabendazole or albendazole may be applied three times daily

for 5-10 days with favorable outcomes. Moreover, cryotherapy using liquid nitrogen or ethyl chloride spray can be employed and may be combined with albendazole therapy (PERDOSKI, 2021). Tan et al. (2021) reported that the use of 5% permethrin cream for 10 days provided clinical improvement without significant side effects. Gerbig and Kempf (2020) also reported the success of 1% topical ivermectin in resistant CLM cases, thus opening up additional treatment options, especially for patients who have contraindications to systemic therapy.

In this case, the patient received 400 mg of oral albendazole for 5 days combined with ethyl chloride spray and antihistamines. Improvement in itching within one week and resolution of lesions within two weeks is consistent with the literature showing a rapid response to albendazole (Veraldi et al., 2012; Kincaid et al., 2015; Elmi et al., 2025). The choice of albendazole in this patient was considered appropriate given the availability of the drug, its good safety profile, and the presence of comorbid hypertension and diabetes mellitus. The combination with cryotherapy served as adjuvant therapy to accelerate the improvement of local symptoms, as recommended in national guidelines (PERDOSKI, 2021).

From a public health perspective, this case emphasises the importance of preventive interventions in rural areas with high worm infection rates. Education on the use of footwear, personal hygiene, environmental hygiene, and routine deworming programmes for dogs and cats can help reduce the risk of CLM (Centers for Disease Control and Prevention, 2016; Heukelbach and Feldmeier, 2008; Cardoso et al., 2020). Increased awareness of CLM among primary healthcare workers in endemic areas can prevent recurrent misdiagnosis and enable prompt and appropriate management.

The limitations of this report are the lack of parasitological confirmation and its nature as a single case report. Nevertheless, this report provides practical contributions for clinicians in primary care regarding the recognition and management of CLM. Further research with observational or community-based intervention designs is needed to describe the burden of CLM and evaluate the effectiveness of prevention strategies in endemic areas.

5. Conclusion

Cutaneous larva migrans (CLM) is a dermatological condition caused by the larval stages of the hookworms *Ancylostoma braziliense* and *Ancylostoma caninum*, parasites residing in the intestinal tracts of dogs and cats. Infective filariform larvae gain entry into human skin through direct exposure to soil or sand contaminated with the fecal matter of these animals. CLM treatment can be administered in the form of systemic *antihelminthics* such as ivermectin, albendazole, and thiabendazole, and can be combined with topical therapy and symptomatic therapy to reduce itching. Ivermectin is not recommended for children younger than five years or with a body weight below 15 kg, and both ivermectin and albendazole are contraindicated during pregnancy and breastfeeding.

In this case, the patient was diagnosed with CLM and received albendazole therapy, ethyl chloride spray, antihistamines, and education on personal and environmental hygiene. The response to therapy was good, with improvement in pruritus within one week and disappearance of erythematous plaques within two weeks. In general, the prognosis for CLM is good; the disease can resolve spontaneously within a few weeks to several months, but appropriate management can accelerate lesion resolution and reduce the risk of complications.

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