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Serpiginous Foot Lesions in a Barefoot Child: A Case Report of Pediatric Cutaneous Larva Migrans

Zulfan Zulfan [1,*], Nanda Earlia [1], Vella Vella [1], and Nisa Fitriani Daud [2]

[1] Department of Dermatology and Venereology, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia; zulfan@usk.ac.id (Z.F.); nanda.earlia@usk.ac.id (N.E.); vella_asnawi@yahoo.co.id (V.L.)
[2] Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia; nftrndaud@gmail.com (N.D.)

* Correspondence: zulfan@usk.ac.id

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Abstract

Cutaneous larva migrans (CLM) is a common zoonotic parasitic dermatosis in tropical regions, most commonly caused by *Ancylostoma braziliense* and *Ancylostoma caninum*. The disease is strongly associated with direct skin contact with soil or sand contaminated by dog or cat feces and is particularly prevalent among children. Clinically, CLM is characterized by intensely pruritic, erythematous, linear or serpiginous tracks that may progressively migrate over time and are often misdiagnosed as other inflammatory or infectious dermatoses. We report a case of a 13-year-old boy who presented with a one-week history of pruritic, erythematous, serpiginous lesions on the dorsum and plantar surface of the left foot. The lesions progressively elongated and were accompanied by pain during ambulation (Visual Analogue Scale 8/10), exceeding the intensity of pruritus. The patient had a history of frequent barefoot exposure to moist soil around his home. Dermatological examination revealed well-demarcated, erythematous serpiginous tracks localized to the left foot. Skin scraping with potassium hydroxide (KOH) preparation showed no fungal elements or larvae. Based on the characteristic clinical features and exposure history, CLM was diagnosed. The patient was treated with oral albendazole 400 mg once daily for three days, along with antihistamines and topical corticosteroids. Significant clinical improvement was observed, with complete resolution of pain (VAS 0/10) and pruritus, with residual post-inflammatory hyperpigmentation at one-week follow-up. This case highlights the importance of recognizing atypical clinical features of CLM, particularly when pain predominates over pruritus, and underscores the critical role of environmental exposure history in establishing early diagnosis. Prompt recognition and appropriate treatment are essential to prevent unnecessary investigations and reduce patient morbidity.

1. Introduction

Cutaneous larva migrans (CLM) is a parasitic skin disease caused by the penetration and migration of animal hookworm larvae within the superficial layers of human skin. The condition is most commonly caused by *Ancylostoma braziliense* and *Ancylostoma caninum*, intestinal nematodes of dogs and cats, although other zoonotic nematodes have also been implicated [1]. CLM is endemic in tropical and subtropical regions, particularly in South America, the Caribbean, Africa, and Southeast Asia. Population-based studies from endemic regions have reported prevalence rates up to 8.2%, with children being disproportionately affected. In northeastern Brazil, prevalence has ranged from 0.2% to 4.4% in the general population and up to 14.9% among

children younger than five years, with marked seasonal variation during the rainy season [2, 3]. Although published epidemiological data from Indonesia remain limited, a 10-year clinicodemographic study conducted at Hasan Sadikin Hospital, Bandung, highlighted the continued occurrence of CLM despite likely underreporting in endemic settings [4].

Dogs and cats serve as the principal zoonotic reservoirs of *Ancylostoma* species, shedding hookworm eggs into the environment through their feces [5]. *A. braziliense* and *A. ceylanicum* predominantly parasitize animals of the Canidae and Felidae families in tropical and subtropical regions, while *A. caninum* is the most pathogenic hookworm species in dogs, and is limited especially to regions with warm climates and optimal humidity, conditions ideal for larval development [6]. Under these conditions, the eggs hatch and develop into infective filariform (third-stage) larvae that can survive in contaminated soil or sand for several days and penetrate exposed human skin upon direct contact [5]. The co-occurrence of *A. caninum* and *A. braziliense* in dogs living in low-income residential areas poses a significant risk of CLM acquisition for the local population, especially children [7]. Consequently, CLM is commonly encountered in coastal areas, playgrounds, gardens, and residential environments with poor sanitation and high populations of stray dogs and cats [2]. Stray animals around residential areas may contribute to environmental contamination and increase infection risk, particularly among children who frequently play or walk barefoot outdoors [5, 7].

Clinically, CLM typically presents as erythematous, slightly elevated, linear or serpiginous tracks that advance progressively over time, typically accompanied by intense pruritus resulting from the local inflammatory and immunologic response to larval antigens and enzymatic activity. The diagnosis is predominantly clinical and relies on recognition of this characteristic morphology in conjunction with a relevant history of barefoot soil or sand exposure in an endemic region. Laboratory investigations and parasitological confirmation are rarely achievable, as larvae are generally not detectable on routine skin scraping preparations. Importantly, CLM is frequently misdiagnosed as tinea corporis, scabies, contact dermatitis, or insect bite reactions, especially during the early stages when the serpiginous pattern is not yet fully developed. This diagnostic challenge may delay treatment and prolong patient discomfort [3]. Although pruritus is considered the hallmark symptom of CLM, pain may occasionally predominate, particularly when lesions involve weight-bearing areas such as the plantar surface of the foot.

Treatment of CLM is straightforward and highly effective, with oral anthelminthic agents such as albendazole or ivermectin considered first-line therapy [5]. These medications rapidly halt larval migration, leading to symptom resolution within days. Adjunctive therapies, including antihistamines and topical corticosteroids, may be used to alleviate pruritus and inflammation [8, 9]. Preventive strategies, particularly consistent footwear use and avoidance of direct contact with potentially contaminated soil, are essential to reduce disease burden in endemic settings.

This report describes a pediatric case of plantar CLM presenting predominantly with pain rather than pruritus following barefoot exposure to contaminated soil. This case highlights the importance of recognizing atypical clinical manifestations and obtaining a thorough environmental exposure history to facilitate early diagnosis and appropriate management.

2. Case Presentation

A 13-year-old boy presented to the Dermatology and Venereology Outpatient Clinic of dr. Zainoel Abidin General Hospital, Banda Aceh, with a one-week history of erythematous, serpiginous skin lesions on the left foot. The lesions initially appeared as small, erythematous papules on the dorsum of the foot, accompanied by pruritus. Over the following days, the lesions progressively elongated and migrated, forming characteristic serpiginous tracks extending toward the plantar surface. The patient reported worsening pain during ambulation, which caused him to walk on tiptoe to reduce discomfort. At presentation, pain was more prominent than pruritus. Pain severity at presentation was assessed using the Visual Analogue Scale (VAS) and scored 8/10, indicating severe pain. The patient denied fever, malaise, trauma to the affected foot, recent travel, or systemic symptoms. The patient had no prior history of similar skin lesions and denied any history of chronic illness or previous use of topical or systemic medications. Although the patient denied direct contact with household pets, stray dogs and cats were frequently observed around his home. No family members reported similar complaints. A detailed exposure history revealed that the patient frequently walked barefoot on moist soil around his home, particularly during the rainy season.

On physical examination, the patient was in good general condition with stable vital signs. As shown in Figure 1, dermatological examination revealed well-demarcated, erythematous, slightly elevated serpiginous tracks on the dorsum and plantar surface of the left foot, with irregular

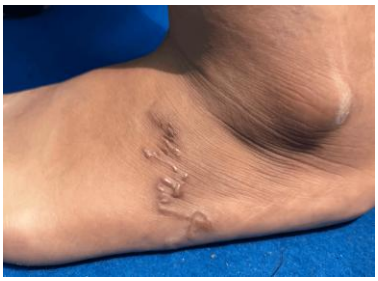

Figure 1. Clinical photographs of the patient taken on December 18, 2025. Clinical photograph demonstrating erythematous serpiginous papules involving the dorsum and plantar aspect of the left foot with regional distribution.

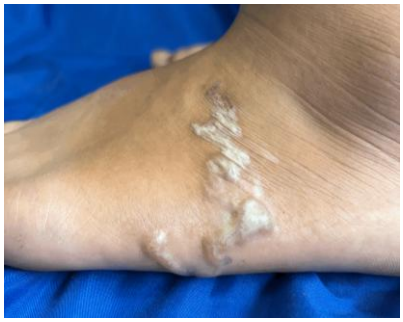

Figure 2. Clinical photographs of the patient taken on December 22, 2025. On the dorsum and plantar region of the left foot shows plaque lesions, erythematous papules in a serpiginous pattern, with clear boundaries, irregular edges, scaly surface, and regional distribution.

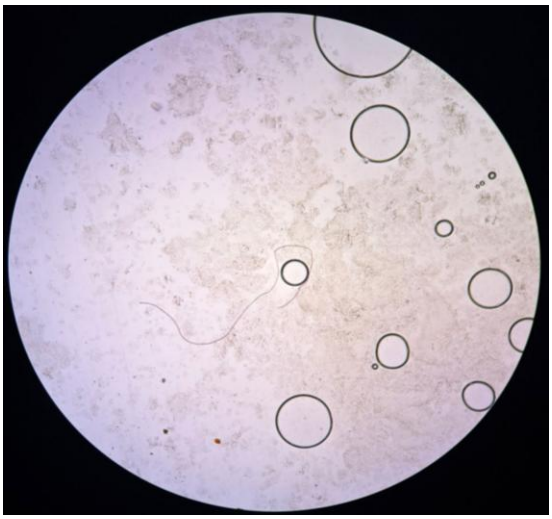

Figure 3. The results of skin scraping examination with KOH staining showed no eggs or larvae.

borders and regional distribution. No vesicles, bullae, or signs of secondary bacterial infection were observed. Examination of other body areas was unremarkable. At follow-up on day 4, the lesions continued to migrate and enlarge, forming more prominent serpiginous erythematous papules and plaques with surface scaling on the dorsum and plantar region of the left foot (Figure 2). This progression was accompanied by increasing pain while walking, eventually causing the patient to ambulate on tiptoe to minimize discomfort.

A potassium hydroxide (KOH) preparation from skin scrapings was performed to exclude superficial fungal infection and revealed no fungal elements or larvae (Figure 3). Based on the characteristic clinical appearance and relevant environmental exposure, a clinical diagnosis of CLM was established. Differential diagnoses considered included scabies, tinea corporis, and irritant contact dermatitis.

The patient was treated with oral albendazole 400 mg once daily for three days, along with oral cetirizine for symptomatic relief of pruritus and topical corticosteroids to reduce local inflammation. Ethyl chloride spray was used as adjunctive therapy for symptomatic relief. The patient was reviewed at day 7 following the initial therapy. At this follow-up visit, the patient showed marked clinical improvement, with cessation of larval migration, complete resolution of pain (VAS 0/10) and pruritus, and gradual fading of the lesions, leaving residual post-inflammatory hyperpigmentation. The patient was able to walk normally without discomfort. No adverse effects attributable to albendazole were reported during treatment, and no recurrence or complications were observed. The patient was advised to wear footwear when outdoors, avoid walking barefoot on moist soil, maintain environmental sanitation (particularly in areas frequented by stray dogs and cats), and ensure regular deworming of household pets. Community-based control of stray animals was also recommended where feasible.

3. Discussions

Based on the patient's clinical presentation, demographic characteristics, and exposure history, this case represents an atypical manifestation of CLM in an endemic tropical setting. The patient was a 13-year-old boy, an age group that has been consistently reported to be at higher risk for CLM due to increased outdoor activities and frequent barefoot contact with soil. In this case, the patient's habit of walking barefoot on moist soil during the rainy season was a significant predisposing factor, as warm, humid conditions promote the survival of infective hookworm larvae in the soil. Similar pediatric cases have been reported in Sri Lanka, Southeast Asia, and other tropical regions, where barefoot exposure remains the most important risk factor. Most reported patients present with intense pruritus and characteristic creeping eruptions on the feet [10, 11].

The progressive migration of erythematous, serpiginous lesions observed in this patient is consistent with the pathophysiology of CLM [10]. After penetrating the

stratum corneum, the larvae migrate horizontally within the epidermis because they lack sufficient collagenase activity to cross the dermal basement membrane, thereby remaining confined to the epidermis [12]. This constrained migration produces the characteristic serpiginous tracks that lengthen daily, as reported by the patient. During their migration, the larvae release hyaluronidase and proteolytic enzymes that facilitate penetration through the superficial epidermis [5, 13]. This enzymatic activity, combined with larval antigens, triggers a progressive local inflammatory response characterized by mast cell degranulation and eosinophilic infiltration at the site of larval migration [3, 12]. The resulting release of pro-inflammatory mediators, including histamine and prostaglandins, sensitizes peripheral cutaneous nociceptors, producing the intense pruritus characteristic of CLM [14, 15]. In contrast to the classic presentation, our patient reported severe pain at presentation (VAS 8/10), which interfered with ambulation and exceeded the perceived intensity of pruritus. Pain completely resolved after treatment (VAS 0/10), further supporting pain as the predominant clinical manifestation in this case.

Pain is an acknowledged but rarely dominant symptom in CLM, with skin manifestations reported to be "pruritic, painless or painful" depending on the anatomical site and degree of inflammatory response [16]. The pain-predominant presentation observed in this case can be attributed to the interplay between larval migration-induced local inflammation and the unique biomechanical demands of the plantar surface. Larval enzymatic activity and antigenic stimulation trigger the release of pro-inflammatory mediators, including prostaglandins, bradykinin, and histamine, which collectively sensitize peripheral cutaneous nociceptors and reduce their mechanical activation threshold [14, 15]. Under normal circumstances, the plantar surface of the foot endures substantial repetitive compressive forces during walking; when the underlying tissue is inflamed and nociceptors are peripherally sensitized, these forces can elicit pain. These mechanical stimuli are sufficient to elicit pain responses that would otherwise remain below the nociceptive threshold [17]. This proposed mechanism, while inferred from general principles of inflammatory pain rather than CLM-specific experimental data, offers a coherent explanation for the gait alteration observed in this patient.

In this patient, the localization of lesions on the dorsum and plantar surface of the foot further supports the diagnosis of CLM, as these areas are the most common sites of larval penetration due to frequent contact with contaminated ground [10]. The absence of systemic symptoms and the negative potassium hydroxide examination helped exclude other conditions such as superficial fungal infection. Although scabies, tinea corporis, and contact dermatitis were considered in the differential diagnosis, the presence of migrating serpiginous lesions combined with a relevant exposure history strongly favored CLM.

The favorable response to oral albendazole aligns with current guideline recommendations identifying both albendazole and ivermectin as equally acceptable first-line systemic therapies for CLM. The recommended albendazole regimen is 400 mg orally once daily for 3 to 5 days, while ivermectin is administered as a single oral dose of 150-200 mcg/kg in children, with the option to repeat the following day if needed [11, 12]. Albendazole exerts its anthelminthic effect by binding to the β-tubulin subunit of nematode microtubules, thereby inhibiting microtubule polymerization and disrupting essential cellular functions, ultimately leading to larval death [18]. This mechanism applies to the causative agents of CLM, as β-tubulin is the primary molecular target of benzimidazole anthelmintics across parasitic nematode species, including *Ancylostoma caninum* [19]. In previously reported cases, complete resolution of CLM has been documented within one week of treatment initiation [9]. Cessation of lesion migration and full resolution of pain and pruritus at day 7 follow-up in this patient are consistent with this expected treatment timeline and further support the clinical diagnosis. Adjunctive therapy with antihistamines and topical corticosteroids effectively reduced pruritus and inflammation, improving patient comfort and reducing the risk of secondary complications such as excoriation-induced skin breakdown and superimposed bacterial infection.

This case underscores the importance of careful history-taking and recognition of characteristic clinical features in patients presenting with pruritic, serpiginous skin lesions, particularly in children from tropical regions [3]. Early diagnosis and appropriate antiparasitic therapy not only lead to rapid clinical improvement but also reduce unnecessary investigations and prolonged morbidity [20]. Preventive measures, including consistent use of footwear and avoidance of direct contact with potentially contaminated soil, should be emphasized to patients and caregivers to reduce the risk of recurrence and community transmission. Several limitations of this report should be acknowledged. First, as a single case report, findings may not be generalizable to all pediatric CLM presentations. Second, parasitological confirmation was not achieved because no skin biopsy was performed, and direct visualization of the larva is rarely feasible because it migrates continuously beyond the visible

track. Potassium hydroxide examination was performed solely to exclude superficial fungal infection. Third, follow-up duration was limited, precluding long-term assessment of recurrence. Finally, no formal environmental assessment was performed to identify specific contamination sources around the patient's home.

4. Conclusions

This pediatric case highlights that CLM can present with pain as the dominant symptom rather than pruritus, particularly when lesions involve the plantar surface of the foot. Clinicians in tropical endemic regions should maintain a high index of suspicion for CLM in children with progressive serpiginous foot lesions and a history of barefoot soil exposure, even without classic pruritus. In this case, prompt anthelminthic therapy with oral albendazole resulted in rapid clinical resolution and avoided unnecessary additional diagnostic investigations. Prevention measures include consistent footwear use, regular deworming of household pets, and improved sanitation in residential environments with potential soil contamination.

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