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(REVIEW ARTICLE)

Cutaneous Larva Migrans: A comprehensive review of pathogenesis, diagnosis, and treatment

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Abstract

Cutaneous Larva Migrans (CLM) is a skin disorder that develops due to infection by hookworms, causing linear or serpentine skin inflammation. Cutaneous larva migrans is often found in tropical and subtropical environments such as Southeast America, Latin America, the Caribbean, Southeast Asia, and Africa. The types of hookworms that can cause CLM are Ancylostoma braziliense, Ancylostoma caninum, and Ancylostoma ceylanicum. CLM can be caused by a variety of factors, one of which is the presence of dogs and cats. These hookworms can infect humans by entering dogs or cats first. The disease is most commonly spread through animal feces, then spreads to soil and enters the human body through direct skin contact. Infective larvae that enter the skin will cause itching and heat in the area they enter. The itching usually appears at night. CLM is usually found on parts of the body that are in direct contact with soil or sand.

Keywords: Skin infection; Cutaneous larva migrans; Hookworm; Ancylostoma braziliense; Ancylostoma caninum; Ancylostoma ceylanicum

1. Introduction

Cutaneous larva migrans (CLM) is one of the most common skin illnesses in the tropical region. A common clinical skin infection known as cutaneous larval migrans (CLM) is brought on by the active penetration and epidermal migration of nematode larvae, most often Ancylostoma braziliense. The lower extremities, particularly the legs, are the most common site. Even though this illness has the ability to heal itself, additional care is frequently required [1]. Creeping eruptions often emerge 1-5 days after skin penetration, however incubation can last up to a month. Usually accompanied by severe itching and some swelling, the skin develops a serpiginous, erythematous track. The feet, lower legs, and buttocks are the usual sites, although any skin area that comes into touch with contaminated soil—such as the trunk or upper extremities—can be impacted. The lesions are often linear, erythematous, sepiginous, and raised. Vesicles and blisters could also appear. The most often impacted areas are the feet, legs, and buttocks; the face, armpits, and penis are less typically impacted [2,3].

A case with lesions on the oral mucosa was reported. The displacement of larvae causes severe itching. Diagnosing eczema with a secondary infection can be quite challenging. In these situations, it is advised to start with allergy ointments and, if required, antibiotics. This will highlight the clinical feature of larval migrans. Maceration may occur when interdigital spaces are impacted. It's possible to mistake this clinical presentation for foot dermatophytosis. In cases of extreme infestation, the larvae may enter the bloodstream and cause Loeffler's syndrome, which is typified by blood eosinophilia and eosinophilic pneumonia. [2].

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Adult hookworms reside in cats' and dogs' intestines. Feces contain eggs, which hatch within a day after being deposited in the soil. These grow into infectious larvae within the next week. Worms move like snakes in response to physical vibration and elevated temperatures. release a hyaluronidase to break through the corneal layer after coming into contact with a host organism. They burrow through the superficial cutaneous layers, but they cannot reach lymphatics because they cannot get through the basal membrane. As a result, they cannot finish their life cycle. After that, hookworms die without procreating, and the illness is self-limiting [4].

2. Material and methods

This research method uses a literature review study method. The literature study used is the last 10 years of literature from 2024. Literature searches used the Science Direct database, NCBI, and other electronic databases. The literature search used the keywords keywords “skin infection”, “cutenous larva migrans”, and “hookworm”.

3. Results and discussion

Cutaneous Larva Migrans (Creeping Eruption) is a linear or serpentine, progressive inflammatory skin disorder caused by the invasion of hookworm larvae living in the intestines of cats or dogs [5]. Cutaenous larva migrans is caused by infection with hookworms, namely Ancylostoma braziliense, Ancylostoma caninum, Uncinaria stenophala, and Bunostomum phlebotomum. Apart from the skin, helminth infections tend to most commonly involve the respiratory system gastrointestinal tract, nerves, and eyes. The disease can also occur in many other tissues [6].

Cutaneous larva migrans has occurred in approximately 576 - 740 million people worldwide [7]. Cutaneous larval migrans is often found in tropical and subtropical environments such as Southeast America, Latin America, the Caribbean, Southeast Asia, and Africa. CLM often appears during the rainy season and easily affects young visitors [4]. The prevalence of CLM in Indonesia from 2002 to 2006 was 2.4%; 0.6%; 5.1%; 1.6%; and 1.0%, respectively. In January 2014 in Kemiri sub-district, the prevalence of hookworm infection was 41.2% of 51 farmer respondents [7]. In Brazil, CLM is a health problem affecting 8% of the population. Infection is highest in boys aged 10-14 years who often play on the ground barefoot. CLM is also more common among the underprivileged. In Brazil, the total incidence of CLM is 0.52 per person-year, with a monthly rate of 0.21-1.05 cases per person [8].

Cutaneous larva migrans (CLM) is caused by Ancylostoma caninum, Ancylostoma braziliense, and Uncinaria stenocephala, which are all hookworms in dogs and cats. Bunostomum phlebotomum, a bovine hookworm, can also cause short-term CLM in humans [9]. Ancylostoma caninum is a member of the genus Ancylostoma, family Ancylostomatidae, and class Nematoda. A small, large-mouth worm that affects dogs, it is found in the intestine tenue. The life cycle of this worm does not require an intermediate host. In the environment, larva 3 will develop from dog feces. When the dog swallows larva 3, it can spread and mature in the body for two to three weeks [10]. Ancylostoma caninum eggs are oval, thin-walled and consist of 2 layers, measuring 56-75 x 34-47 μm, when released the eggs have segments consisting of 8-16 cells. [11].

Cutaneous larva migrans occurs in hookworm species that do not use humans as definitive hosts such as Ancylostoma braziliense and Ancylostoma caninum. The definitive host cycle involves tracheal migration to the small intestine, which is very similar to the cycle of human species. Some larvae remain in the tissues and infect the worm pups via the transmammary route and possibly also through the placenta. Adult hookworms reproduce in the small intestine, and eggs are released through the feces of the definitive host animal. Under favorable conditions (moist, warm, and shady), the released rhabditiform larvae grow in the image soil and feces of the host, and after five to ten days (and two molts), they become infective filariform (third stage) larvae. These infective larvae can survive in a good environment for three to four weeks. After penetrating the skin, they enter the heart and then into the lungs through the blood vessels. They ascend the bronchial tree towards the pharynx, pass through the pulmonary alveoli, and are then swallowed. The larvae enter the small intestine, where they live and mature. Adult worms attach to the intestinal wall within the lumen of the small intestine. Some larvae remain in the tissues, causing infection in puppies via the transmammary route and possibly also through the placenta. When filariform larvae penetrate the skin of the image, people are infected. In most species, the larvae cannot grow further within the human host and move freely within the epidermis, sometimes only a few centimeters each day [9].

Clinical diagnosis is typically made in conjunction with a classic serpiginous rash and the history of recent travel to endemic locations. The rash is elevated, extremely itchy, and grows between millimeters and two centimeters per day. This sets it apart from other diseases that migrate. For diagnosis, blood tests are not required. Eosinophilia is not specific, and it is present in fewer than 40% of CLM patients. Although it is not frequently utilized, non-invasive optical

coherence tomography has been used to confirm the diagnosis. Sometimes a skin biopsy is done, and it can show the nematode larvae inside a circular canal. Although secondary alterations and infiltration aid in the diagnosis, a biopsy is not sensitive, and this clinical diagnosis does not require confirmation [4].

CLM is a self-limited disease. Lesions usually disappear within 2-8 weeks, but active lesions have been reported to persist for up to 2 years. However, anthelmintic therapy is required to reduce symptoms, risk of recurrence and complications of secondary bacterial infection. First-line therapy is anti-helmintic ivermectin (150-200 μg/kg body weight) single dose or albendazole (400-800 mg/day) single dose orally for three days. Other options are topical tiabendazole and topical albendazole applied twice daily for 10 days. However, these drugs are not available in all countries. Other treatments such as cryotherapy/freezing using liquid nitrogen and ethyl chloride are no longer recommended. This method is considered ineffective and difficult because the location of the larvae is unknown, the larvae are several centimeters beyond the visible lesion and prolonged use can damage the surrounding tissue. The cure rate for this disease is 100 percent [12].

4. Conclusion

Cutaneous Larva Migrans (Creeping Eruption) is a linear or meandering, progressive inflammatory skin disorder caused by the invasion of hookworm larvae living in the intestines of cats or dogs. The hookworms that cause cutaneous larval migrans are Ancylostoma braziliense, Ancylostoma caninum, Uncinaria stenophala, and Bunostomum phlebotomum [5,6]. Clinical diagnosis is typically made in conjunction with a classic serpiginous rash and the history of recent travel to endemic locations. The rash is elevated, extremely itchy, and grows between millimeters and two centimeters per day. This sets it apart from other diseases that migrate [4]. CLM is a self-limited disease, but anthelmintic therapy is required to reduce symptoms, first-line therapy is anti-helmintic ivermectin (150-200 μg/kg body weight) single dose or albendazole (400-800 mg/day) single dose orally for three days [12].

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

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