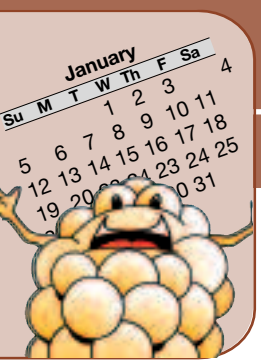

I've Got You Under My Skin: Exposing Creeping Eruption

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While in exotic locations, travellers must always be careful of the obvious and covert health hazards that may be present. The most frequently encountered infections among travellers are gastrointestinal and respiratory, but cutaneous conditions may also occur, posing diagnostic and therapeutic dilemmas. This month's Bug is one of those cutaneous problems, creeping eruption.

What is creeping eruption?

Creeping eruption is a serpiginous skin lesion caused primarily by burrowing larvae of animal hookworms, usually *Ancylostoma canimum* (the dog hookworm) and *Ancylostoma braziliense* (the dog and cat hookworm), although other animal and human hookworms, as well as other non-larval parasites, can be involved. Figure 1 demonstrates the typical lesion of creeping eruption.

Figure 1. The typical serpiginous lesion of creeping eruption on the foot of a Canadian tourist who returned from a Caribbean holiday. The pruritis was sufficiently intense to awake him from his sleep.

Is CLM the same as creeping eruption?

This question often causes confusion since, historically, these terms have been used interchangeably to describe a clinical sign, a syndrome and a disease. A recent classification scheme suggests describing creeping eruption as a clinical sign, cutaneous larva migrans (CLM) as a syndrome and hookworm-related CLM as the disease.

It has also been proposed that non-larval forms of parasites, such as scabies, can cause creeping eruption and that CLM is caused by subcutaneous larval migration of nematodes, such as animal hookworms and, less commonly, *Strongyloides stercoralis*, *Gnathostoma* spp, *Pelodera strongyloides* and various zoonotic species of *strongyloides*.

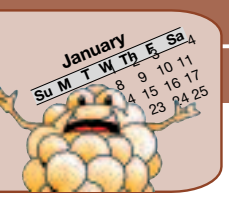
For the purpose of this review, creeping eruption will continue to be used interchangeably with CLM.

Does it differ from ground itch?

Ground itch is also a cutaneous manifestation of hookworm infection, but it is more commonly associated with *Necatur americanus* and *Ancylostoma duodenale*. These hookworms are responsible for what is commonly referred to as hookworm disease, which is primarily an iron-deficiency anemia related to hookworm invasion of the small bowel wall. Ground itch is a local pruritic, erythematous, papular rash resulting from repeated exposure to mature *N. americanus* and *A. duodenale* larvae. It does not have the serpiginous appearance of creeping eruption.

How does hookworm-related CLM develop?

Animal hookworm larvae thrive in moist and warm environments, such as sandy beaches, and as a result, are endemic to warm coastal areas. Infection occurs from exposure of bare skin to soil contaminated with larvae; this typically occurs when walking barefoot on beaches or under porches that are frequented by infected animals, therefore, the feet and legs are



more commonly involved in adults.

It is important to note that any area of the body in contact with the larvae may be affected. Travellers who sat or laid on the moist sand of tropical beaches have reported the lesions of CLM on their buttocks and trunk, respectively.

What is the natural history of hookworm-related CLM?

After penetrating the skin, the larvae become stranded and can not penetrate the blood vessels or lymphatics. They can burrow beneath the skin and travel an inch a day. Papules may indicate the site of entry. The advancing end of the larva, and the unrelenting tunnelling causes linear, slightly elevated, erythematous and serpigenous areas that are intensely pruritic.

Unlike their more sinister cousins, *N. americanus* and *A. duodenale*, *A. canimum* and *A. braziliense* cause self-limiting infections that typically resolve within one to two months, but may persist for six to 12 months. Systemic involvement is uncommon, but rare cases of pharynx, eye and lung involvement have been reported with severe infection.

How is creeping eruption diagnosed?

Creeping eruption or CLM is a clinical diagnosis based primarily on a history of exposure to a high-risk environment and the appearance of the lesion. Eosinophilia can occur, but is not reliable enough as a diagnostic tool. Biopsy of lesions typically shows eosinophilic inflammatory infiltrates, but usually fails to reveal the parasite, which is typically 1 cm to 2 cm beyond the visible lesion that is, essentially, an inflammatory wake of the parasite.

How is it treated?

Although self-limited, CLM, usually resolves within six to 12 months without treatment, however, topical or oral anti-parasitic therapy usually leads to resolution of the infestation and its symptoms within one week. Many patients seek treatment because the pruritis can be intense, disrupting sleep. In addition, for the uninitiated, the serpiginous lesions may appear frightening.

The most common therapy for CLM is 15% thiabendazole cream, applied two to three times a day for five to 10 days. The thiabendazole penetrates the skin and kills the larvae while alleviating symptoms. The pruritis and skin tract advancement usually stops within 48 hours of initiating therapy. If symptoms or discomfort are severe or persistent, thiabendazole may be given orally (25 mg/kg to 50 mg/kg, divided into two doses a day for two to five days).

Within the first 24 hours of oral treatment, 99% of active larval movement stops, and pruritus usually ceases within 24 to 48 hours.The serpiginous tract typically resolves in seven to 10 days. Other treatments include, ivermectin (200 mcg/kg orally, once a day for one to two days). The ivermectin therapy is 77% effective after one dose, and up to 97% with two to three doses. Albendazole (200 mg, orally, twice a day for three days) is an excellent oral alternative.

How is it prevented?

The ideal method to control animal hookworm larva infection of humans is to optimize sanitation and ensure that animals do not defecate on beaches or other places where humans walk. This, of course, is impossible, thus, the simplest approach to prevention is always maintaining a barrier between skin and sand or soil in tropical locations. Wearing footwear whenever possible, such as when walking on the moist, warm sand of beaches, is ideal. It is also ideal to always use a towel when sitting or laying on the sand.

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