



## Case report

## Cutaneous larva migrans in a beach volleyball player

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## ABSTRACT

Athletes playing beach volleyball come into contact with sand and may contract skin parasites. We present a case of *cutaneous larva migrans* in a 20-year-old Polish female beach volleyball player. The athlete participated in The World Tour in Asia (China, Malaysia, Cambodia) a month before. In the beginning, her skin lesions were misdiagnosed as allergic reactions and treated with antihistamines. The disease in the form of a pruritic, migratory serpiginous skin eruption on legs was diagnosed during routine medical examination at the National Centre for Sports Medicine in Warsaw. She was treated successfully with albendazole and cetirizine. The skin lesions resolved entirely within two weeks.

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## Introduction

The globalization of competitive sport is causing more and more athletes to travel around the world, including regions where parasitic diseases are endemic. There is also a growing number of sports where athletes come into contact with sand, soil, or mud, which may contain pathogens including helminths (worms), which they can contract [1,2]. *Cutaneous larva migrans* (CLM) is the distinctive, pruritic migratory serpiginous or urticarial skin eruption caused by infection of the skin with zoonotic hookworm larvae. The canine parasites *Ancylostoma brasiliense* and *Ancylostoma caninum* cause 98% of all cases of CLM. Adult parasites occupy the digestive tract of their hosts. Eggs excreted in the feces contaminate the soil, where larvae which can penetrate the skin of humans develop. Patients typically acquire infection through direct contact with larva-infested sand e.g., through walking barefoot or sunbathing on the beach in the subtropics or tropics where moist, sandy soil promotes larval development [3,4]. Although CLM is the most common travel-related skin disease in travelers, two cases only are described in the athletes, including beach volleyball players [5,6]. Recent years have seen rapid development and growing popularity of beach sports, which was reflected by the beach games organized for the first time in history in 2019. Simultaneously, the number of competitions like World Tour in beach sports held in Asia and Africa is on the rise, which may pose a higher risk of CLM infections for athletes.

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## Case report

At the routine medical examination at the National Centre for Sports Medicine in Warsaw, a 20-year-old Polish female beach volleyball player reported pruritic skin changes in the form of wormlike burrows and bumps on her legs (Figs. 1 and 2). The history revealed her participation in The World Tour in Asia (China, Malaysia and Cambodia) during the previous month. Three days before the examination, she showed up to the emergency department at the local infectious disease hospital, where the allergic reaction to insect bites was diagnosed. The recommended antipruritic and antihistaminic medication reduced the symptoms, but the treatment was not sufficient. We diagnosed *cutaneous larva migrans* syndrome based on the distinctive features of creeping eruption and successfully treated with albendazole (2 × 400 mg for five days) and cetirizine (2 × 10 mg) as well as liquid nitrogen freezing of the epidermal burrow ends. The skin lesions gradually disappeared within two weeks.

## Discussion

The risk of infection of physically active individuals and athletes with pathogens originating from water, sand, and soil is described in the literature, but mainly as transferring pathogenic microbes to and from adjacent water [2,7,8]. *Cryptosporidium* spp. and nematode larvae and eggs in nearshore beach sands have been detected [9]. The sports with the highest risk are mountain biking (MTB), triathlon, and open water competitions [1]. The sand for beach sports is often imported for competitions, and the proximity of water is not necessary, which may suggest a lower risk of pathogenic infections. However, developing countries of Asia and



**Fig. 1.** Typical serpiginous, erythematous rash on the lower leg of beach volley player.



**Fig. 2.** Pruritic skin changes in the form of wormlike burrows her thigh.

Africa face a problem of stray dogs and cats, which are a potential source of CLM infection [10]. The diagnosis of CLS is made clinically based on the presence of the typical creeping rash and compatible exposure history. The hallmark presentation is a serpiginous, pruritic, erythematous eruption, arising about 1–5 days. Rash typically forms a track, about 2–3 mm wide and about 15–20 cm in length. A track may extend by a few centimeters per day as the larva migrates beneath the skin. The majority of patients have a single track; less often, 2–3 lesions are present. Local edema or vesiculobullous lesions may also appear. The lesions are most frequently found on buttocks and feet or thighs, but may also appear on arms, elbows, legs, knees, breasts, or back and rarely on the face, scalp, genitals, or oral mucosa. Differential diagnosis includes *larva currens*, a skin presentation of strongyloidiasis, *gnathostomiasis*, loiasis (*Loa loa*), fascioliasis due to *Fasciola gigantica*, skin infection with *Spirurina* species, *cutaneous pili migrans*, a rare skin condition in which a hair shaft is embedded in the superficial skin, characterized by a creeping eruption with black-line, *dracunculiasis*, *paragonimiasis*, *scabies*, *myiasis* and *herpes zoster*. No serologic testing for zoonotic hookworm infection is available. CLM is a self-limiting condition that resolves within 2–8 weeks without treatment. The treatment with anthelmintic helps to control symptoms, particularly the intense pruritus. Oral

anthelmintic therapy includes ivermectin (200 µg/kg single dose or), albendazole (400 mg/day orally for 3–7 days). Oral or topical antihistamines may be considered in addition to anthelmintic therapy to control itching [3,4].

## Conclusions

- (1) In athletes returning from the tropics with a pruritic, serpiginous rash not responding to antihistamines, parasitic etiology should be considered, including Cutaneous larva migrans.
- (2) Organizers of international sporting events in tropical and subtropical countries should protect designated sand facilities from cats and dogs that may transmit hookworms.
- (3) Guidelines for sand beach protection and hygiene in sports should be developed.

## Author contribution

All authors contributed equally to the manuscript. We all took care for the patient, wrote and approved the manuscript.

## Declaration of Competing Interest

The authors report no declarations of interest.

## Ethical approval

We have informed our local Bioethics Committee. It is a standard procedure in Poland.

## Consent

We obtained the informed consent from the adult patient.

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