Tunga penetrans acquired while travelling in Africa

EILEEN M PROCTOR PhD

EM PROCTOR. *Tunga penetrans* acquired while travelling in Africa. *Can J Infect Dis* 1994;5(2):82-83. Three cases of tungiasis acquired in the course of travel are briefly described, and the biology of the jigger flea, *Tunga penetrans*, is reviewed.

Key Words: Jigger flea, Tungiasis

Tunga penetrans acquis lors d'un voyage en Afrique

RÉSUMÉ : Brève description de cas de sarcosyllose acquise durant un voyage et des paramètres biologiques de la puce-chique *Tunga penetrans*.

BETWEEN SEPTEMBER AND NOVEMBER 1992, THREE CASES of tungiasis or tungosis were identified in British Columbia residents who had travelled to Africa.

CASE ONE

A 35-year-old female nurse who had been on assignment for one month in southern Tanzania, in the district of Ulanga, developed an unusual sensation in the second toe of the right foot. She thought it might be a splinter and continued to experience an uncomfortable feeling. By the time she returned to Canada the toe was inflamed and slightly swollen. A few days after her return she poked at the swelling with a needle and a mass of eggs was extruded. The toe bled considerably after the eggs had been squeezed out. The eggs, which measured 700 µm by 350 µm, were opaque with rounded blunt ends and appeared to be cemented together. The patient did not recall being bitten and most of the time wore closed shoes, the exception being the odd occasion when it was extremely hot and she wore open sandals. She slept under some form of netting each night except on one occasion when she bedded down on the floor of a makeshift dispensary. Material submitted to the Armed Forces Institute for Pathology (AFIP), Washington

DC, was identified as adult flea and eggs of *Tunga penetrans*.

CASE TWO

A 67-year-old female who had visited Kenya for a two-week period presented to her physician with a painless lesion on the sole of the foot. A small quantity of friable white tissue curetted from the lesion, which was thought to be a 'worm-like structure and grubs', was embedded and sectioned (Figure 1). A preliminary diagnosis of tungiasis was made based on the appearance of structures seen in the sections. The patient had only walked barefooted in her bungalow. The material was submitted to AFIP, where it was identified as broken-up sections of an adult female flea. Subsequently, additional keratin-like material suggestive of the leg of a flea was surgically removed from the lesion.

CASE THREE

A 33-year-old male geologist on assignment in Tanzania developed an abscess on the fifth toe of the right foot. He noticed redness around the toe, which became swollen and itchy and for which a topical preparation was prescribed. By the time he returned to Canada,

National Centre for Diagnostic Parasitology (Morphology), BC Centre for Disease Control, Vancouver, British Columbia and University of British Columbia, Division of Medical Microbiology, Vancouver, British Columbia

Correspondence and reprints: Dr EM Proctor, Provincial Laboratory, BC Centre for Disease Control, 828 West 10th Avenue, Vancouver, British Columbia V5Z 1L8. Telephone (604) 660-6005, Fax (604) 660-0403

Received for publication February 12, 1993. Accepted May 31, 1993

Figure 1) Section of embedded friable tissue curetted from the lesion showing developing eggs (e) and tracheae within the body (arrows) of the insect, x30

about three weeks later, the entire foot was swollen, with a red streak ascending the leg. The lesion was debrided in the emergency department of the Vancouver General Hospital and a white sac containing egg-like structures was removed and submitted for identification (Figure 2). The patient indicated that he had had tungiasis on a previous occasion.

T penetrans is commonly known as the jigger flea, chigoe or sand flea. Its name is said to result from the irritation that causes the host to 'jig' about (1). Tungiasis was evidently confined to Central and South America and the Caribbean until 1873, when infected crew members of a British sailing ship transported the flea to the shores of Angola. It is also likely that the flea was carried in the ship's sand ballast, which was dumped on shore and not at sea. Jigger fleas are today found across Africa, on the island of Madagascar and on the Indian subcontinent (2-5). They are common parasites of the feet of pigs and dogs in tropical America and Africa. People who walk barefooted on ground contaminated by infested animals are liable to become parasitized.

The unfed mature female flea is about 1 mm long. After mating, the male dies and the female begins a pattern of jumping, as high as 35 cm from the ground. When she comes into contact with humans and other warm blooded animals she burrows into the skin. The female becomes engorged with blood and developing eggs, and her abdomen swells to about the size of a pea. The eggs, discharged through an opening in the tail of the flea, fall to the ground. They develop in sandy soil and in about three weeks become adult male and female fleas, and the life cycle begins again. If the adult fleas are not removed following the discharge of eggs and excrement, the carcass of the female collapses and a fibrinopurulent exudate forms beneath the carcass at the base of the crater. The base then becomes re-epithelialized, the walls of the crater pinch in and the carcass sloughs off along with the covering keratin.

Figure 2) Portion of the debrided tissue showing the white, oval eggs measuring $130\text{ }\mu\text{m} \times 65\text{ }\mu\text{m}$ and the head of the flea (arrow), x19

Chigoe fleas commonly burrow between the toes, under the toe nails or the sole of the foot, although they may attack any exposed area of the body. The symptoms of tungiasis are mainly pain or intense pruritus of the affected area, resulting in continuous scratching. The flea initially appears as a minute black spot in the skin, but as it enlarges, an erythematous papule develops. This itches and becomes painful; fleas beneath the nails are especially painful.

When recognized, the fleas should be removed intact by carefully peeling back the keratin with a needle or other sharp instrument. The flea should then be gently extracted and the crater cleansed and dressed. Prophylactic measures should include protection of susceptible areas by wearing proper footwear and the maintenance of clean conditions inside human dwellings.

Tungiasis is usually innocuous; however, secondary infections including tetanus and other clostridial organisms that result in gas gangrene kill many patients in tropical Africa (2).

ACKNOWLEDGEMENTS: Dr Ronald J Molony, Pathologist, Saanich Peninsula Hospital, Dr Marion V Rogers, Vancouver and Dr Donald L Londorf, Emergency Department, Vancouver General Hospital.

REFERENCES

1. Schmidt GD, Roberts LS. Foundations of Parasitology, 4th edn. Toronto: Times Mirror/Mosby College Publishing, 1989:612-3.
2. DH Connor. Tungiasis. In: Binford CH, Connor DH, eds. Pathology of Tropical and Extraordinary Diseases, An Atlas. Vol 2. Diseases Caused by Arthropods. Washington: Armed Forces Institute for Pathology, 1976:610-4.
3. Burke WA, Jones BE, Park K, Finley JL. Imported tungiasis. Int J Dermatol 1991;30:881-3.
4. Sanusi ID, Brown EB, Shepard TG, Grafton WD. Tungiasis: Report of one case and review of the 14 reported cases in the United States. J Am Acad Dermatol 1989;20:941-4.
5. Zalar G, Walther RR. Infestation with *Tunga penetrans*. Arch Dermatol 1980;116:80-1.