

Furuncular Myiasis in 2 American Travelers Returning From Senegal

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Practice Points

- Cutaneous myiasis is caused by an infestation of fly larvae and can present as furuncles (furuncular myiasis), migratory inflammatory linear plaques (migratory myiasis), and worsening tissue destruction in existing wounds (wound myiasis).
- Furuncular myiasis should be included in the differential diagnosis in patients with furuncular skin lesions who have recently traveled to Central America, South America, or sub-Saharan Africa.
- Furuncular myiasis may be treated by both occlusive and extraction techniques.

Furuncular myiasis caused by Cordylobia anthropophaga larvae is commonly seen in Africa but rarely is diagnosed in travelers returning from the sub-Saharan region. We report 2 cases of furuncular myiasis due to Cordylobia species in adolescent American travelers returning from Senegal.

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Case Reports

Patient 1—A 16-year-old adolescent boy presented to the emergency department with painful, pruritic, erythematous nodules on the bilateral legs of 1 week's duration. The lesions had developed 1 week after returning from a monthlong trip to Senegal with a volunteer youth group. He did not recall sustaining any painful insect bites or illnesses while traveling in Africa and only noticed the erythematous papules on the legs when he returned home to the United States. After consulting with his primary

care physician and a local dermatologist, the patient began taking oral cephalexin for suspected bacterial furunculosis with no considerable improvement. Over the course of 1 week, the lesions became increasingly painful and pruritic, prompting a visit to the emergency department. Prior to his arrival, the patient reported squeezing a live worm from one of the lesions on the right ankle.

On presentation, the patient was afebrile (temperature, 36.7°C) and his vital signs revealed no abnormalities. Physical examination revealed tender erythematous nodules on the bilateral heels, ankles, and shins with pinpoint puncta noted at the center of many of the lesions (Figure 1). The nodules were warm and indurated and no pulsatile movement was appreciated. The legs appeared to be well perfused with intact sensation and motor function. The patient brought in the live mobile larva that he extruded from the lesion on the right ankle. Both the departments of infectious diseases and dermatology were consulted and a preliminary diagnosis of furuncular myiasis was made.

The lesions were occluded with petroleum jelly and the patient was instructed to follow-up with the dermatology department later that same day. On follow-up in the dermatology clinic, the tips of intact larvae were appreciated at the central puncta of some of the lesions (Figure 2). Lidocaine adrenaline tetracaine gel was applied to lesions on the legs for 40 minutes, then lidocaine gel 1% was injected into each lesion. On injection, immobile

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Figure 1. Tender erythematous nodules on the bilateral heels, ankles, and shins.



Figure 3. Dead larva extracted by lidocaine injection and punch biopsy.



Figure 2. The tips of intact larvae were appreciated at the central puncta of some of the lesions following occlusion with petroleum jelly.

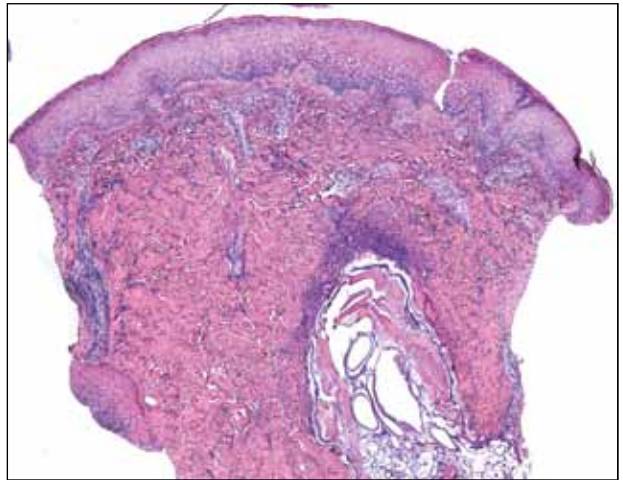


Figure 4. Deep dermal cavity containing larval fragments encased by a thick chitinous cuticle with spines surrounded by mixed dermal inflammation (H&E, original magnification $\times 40$).

larvae were ejected from the central puncta of most of the lesions; the remaining lesions were treated via 3-mm punch biopsy as a means of extraction. Each nodule contained only a single larva, all of which were dead at the time of removal (Figure 3). The wounds were left open and the patient was instructed to continue treatment with cephalexin with leg elevation and rest. Pathologic examination of deep dermal skin sections revealed larval fragments encased by a thick chitinous cuticle with spines that were consistent with furuncular myiasis (Figures 4 and 5). Given the patient's recent history of travel to Africa along with the morphology of the extracted specimens, the larvae were identified as *Cordylobia anthropophaga*, a common cause of furuncular myiasis in that region.

Patient 2—The next week, a 17-year-old adolescent girl who had been on the same trip to Senegal as patient 1 presented with 2 similar erythematous

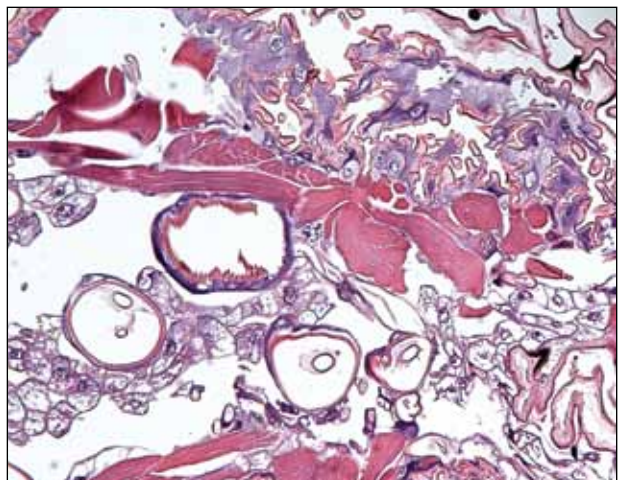


Figure 5. Larval intestinal components were visualized as well as striated muscle (H&E, original magnification $\times 200$).

nodules with central crusts on the left inner thigh and buttock. On noticing the lesions approximately 3 days prior to presentation, the patient applied topical antibiotic ointment to each nodule, which incited the evacuation of white tube-shaped structures that were presented for examination. On presentation, the nodules were healing well. Given the patient's travel history and physical examination, a presumptive diagnosis of furuncular myiasis from *C anthropophaga* also was made.

Comment

The term *myiasis* stems from the Greek term for fly and is used to describe the infestation of fly larvae in living vertebrates.¹ Myiasis has many classifications, the 3 most common being furuncular, migratory, and wound myiasis, which are differentiated by the different fly species found in distinct regions of the world. Furuncular myiasis is the most benign form, usually affecting only a localized region of the skin; migratory myiasis is characterized by larvae traveling substantial distances from one anatomic site to another within the lower layers of the epidermis; and wound myiasis involves rapid reproduction of larvae in necrotic tissue with subsequent tissue destruction.²

The clinical presentation of the lesions noted in our patients suggested a diagnosis of furuncular myiasis, which commonly is caused by *Dermatobia hominis*, *C anthropophaga*, *Cuterebra* species, *Wohlfahrtia vigil*, and *Wohlfahrtia opaca* larvae.³ *Dermatobia hominis* is the most common cause of furuncular myiasis and usually is found in Central and South America. Our patients likely developed an infestation of *C anthropophaga* (also known as the tumbu fly), a yellow-brown, 7- to 12-mm blow-fly commonly found throughout tropical Africa.³ Although *C anthropophaga* is historically limited to sub-Saharan Africa, there has been a report of a case acquired in Portugal.⁴

In a review of the literature, *C anthropophaga* myiasis was documented in Italian travelers returning from Senegal⁵⁻⁷; our cases are unique because they represent North American travelers returning from Senegal with furuncular myiasis. Furuncular myiasis from *C anthropophaga* has been reported in travelers returning to North America from other African countries, including Angola,⁸ Tanzania,⁹⁻¹¹ Kenya,⁹ Sierra Leone,¹² and Ivory Coast.¹³ Several cases of ocular myiasis from *D hominis* and *Oestrus ovis* have been reported in European travelers returning from Tunisia.^{14,15}

Tumbu fly infestations typically affect dogs and rodents but can arise in human hosts.³ Children may be affected by *C anthropophaga* furuncular myiasis

more often than adults because they have thinner skin and less immunity to the larvae.²

There are 2 mechanisms by which infestation of human hosts by *C anthropophaga* can occur. Most commonly, female flies lay eggs in shady areas in soil that is contaminated by feces or urine. The hatched larvae can survive in the ground for up to 2 weeks and later attach to a host when prompted by heat or movement.³ Therefore, clothing set out to dry may be contaminated by this soil. Alternatively, female flies can lay eggs directly onto clothing that is contaminated by feces or urine and the larvae subsequently hatch outside the soil with easy access to human skin once the clothing is worn.²

Common penetration sites are the head, neck, and back, as well as areas covered by contaminated or infested clothing.^{2,3} Penetration of the human skin occurs instantly and is a painless process that is rarely noticed by the human host.³ The larvae burrow into the skin for 8 to 12 days, resulting in a furuncle that occasionally secretes a serous fluid.² Within the first 2 days of infestation, the host may experience symptoms ranging from local pruritus to severe pain. Six days following initial onset, an intense inflammatory response may result in local lymphadenopathy along with fever and fatigue.² The larvae use their posterior spiracles to create openings in the skin to create air holes that allow them to breathe.³ On physical examination, the spiracles generally appear as 1- to 3-mm dark linear streaks within furuncles, which is important in the diagnosis of *C anthropophaga* furuncular myiasis.^{1,3} If spiracles are not appreciated on initial examination, diagnosis can be made by submerging the affected areas in water or saliva to look for air bubbles arising from the central puncta of the lesions.¹

All causes of furuncular myiasis are characterized by a ratio of 1 larva to 1 furuncle.¹⁶ Although most of these types of larvae that can cause furuncular myiasis result in single lesions, *C anthropophaga* infestation often produces several furuncles that may coalesce into plaques.^{1,2} The differential diagnosis for *C anthropophaga* furuncular myiasis includes pyoderma, impetigo, staphylococcal furunculosis, cutaneous leishmaniasis, infected cyst, retained foreign body, and factitial disease.^{2,3} Dracunculiasis also may be considered, which occurs after ingestion of contaminated water.² Ultrasonography may be helpful for the diagnosis of furuncular myiasis, as it can facilitate identification of foreign bodies, abscesses, and even larvae in some cases.¹⁷ Definitive diagnosis of any type of myiasis involves extraction of the larva and identification of the family, genus, and species by a parasitologist.¹ Some experts suggest rearing preserved live

larvae with raw meat after extraction because adult specimens are more reliable than larvae for species diagnosis.¹

Treatment of furuncular myiasis involves occlusion and extraction of the larvae from the skin. Suffocation of the larvae by occlusion of air holes with petroleum jelly, paraffin oil, bacon fat, glue, and other obstructing substances forces the larvae to emerge in search of oxygen, though immature larvae may be more reluctant than mature ones.^{2,3} Definitive treatment involves the direct removal of the larvae by surgery or expulsion by pressure, though it is recommended that lesions are pretreated with occlusive techniques.^{1,3} Other reported methods of extraction include injection of lidocaine and the use of a commercial venom extractor.¹ It should be noted that rupture and incomplete extraction of larvae can lead to secondary infections and allergic reactions. Lesions can be pretreated with lidocaine gel prior to extraction, and antibiotics should be used in cases of secondary bacterial infection. Ivermectin also has been reported as a treatment of furuncular myiasis and other types of myiasis.¹ Prevention of infestation by *C anthropophaga* includes avoidance of endemic areas, maintaining good hygiene, and ironing clothing or drying it in sunny locations.^{1,2} Overall, furuncular myiasis has a good prognosis with rapid recovery and a low incidence of complications.¹

Conclusion

We present 2 cases of travelers returning to North America from Senegal with *C anthropophaga* furuncular myiasis. Careful review of travel history, physical examination, and identification of fly larvae are important for diagnosis. Individuals traveling to sub-Saharan Africa should avoid drying clothes in shady places and lying on the ground. They also are urged to iron their clothing before wearing it.

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