

Clinical Communications: Adults

FURUNCULAR MYIASIS FROM *DERMATOBIA HOMINUS*: A CASE OF HUMAN BOTFLY INFESTATION

Jacqueline J. Mahal, MD, MBA and Jeremy D. Sperling, MD

Department of Emergency Medicine, New York-Presbyterian: Weill-Cornell Medical Center, New York, New York

Reprint Address: Jacqueline J. Mahal, MD, Department of Emergency Medicine, New York-Presbyterian Hospital, 525 E. 68th Street, Box 573, New York, NY 10065

□ **Abstract—Background:** Travelers to tropical regions are at risk for a myriad of exotic illnesses. Malaria and dengue are diagnoses that are associated with insect bites, in particular, mosquito bites, acquired while traveling in foreign, tropical countries. Infestation with *Dermatobia hominus*, the human botfly, endemic to South and Central America, is usually transferred via a mosquito vector. The human botfly should be considered in patients who have traveled to these endemic regions and present with a mosquito bite history and non-healing skin lesions. **Objectives:** We present this case to increase awareness among emergency physicians regarding furuncular myiasis from the human botfly. **Case Report:** A 39-year-old pregnant woman presented to the Emergency Department (ED) with an intensely pruritic lesion to the right calf and mild systemic symptoms 6 weeks after travel to Belize. The lesion she thought was a mosquito bite had persisted despite escalating treatment modalities and had been incorrectly diagnosed by multiple physicians. **Conclusion:** Parasitic disease is not always a systemic process. Botfly infestation presents as local boil-like lesions that are irritating and uncomfortable. Once correctly identified, it can be easily treated in the ED. © 2012 Elsevier Inc.

□ **Keywords—**furuncular myiasis; myiasis; *Dermatobia hominus*; botfly; boil

INTRODUCTION

With the tremendous ease and availability of air travel today, infectious diseases once isolated to specific, re-

mote regions of the world can present to any United States (US) emergency department (ED). Although clinicians are likely to consider these infectious diseases in patients who are visiting from endemic regions, US citizens who vacation in exotic locations are also at risk. This case of *Dermatobia hominus*, the human botfly, which is endemic to South and Central America, is illustrative of this latter scenario and emphasizes the importance of a carefully taken travel history.

The human botfly causes furuncular myiasis, or larval infestation of the skin. The lesions present as persistent, uncomfortable boils that can be easily mistaken for abscesses. Given that methicillin-resistant *Staphylococcus aureus* (MRSA) is the most commonly identified soft-tissue infection in ED patients, the examining physician might incorrectly attribute the lesion to MRSA and treat accordingly, which will significantly delay the correct definitive care (1). Furuncular myiasis from the human botfly should be considered in the differential diagnosis of skin lesions of patients who have traveled to endemic regions.

CASE REPORT

A 39-year-old pregnant woman presented to the ED with an intensely pruritic lesion to the right calf. While hiking in the rainforest during a vacation in Belize 6 weeks earlier, the patient had felt a sudden, sharp pain. Despite

long pants, the pain was on her leg and quickly developed into a lesion that looked like a typical mosquito bite. The site then developed a central scab that healed and was replaced by a central, small hole. Since the injury, the area had remained red, indurated, and constantly itchy without improvement, despite calamine lotion, Domeboro® (Bayer HealthCare LLC, Morristown, NJ) soaks, and over-the-counter (OTC) hydrocortisone cream.

She reported nocturnal symptoms of pain and pruritis at the site. A watery odorless discharge with black debris intermittently leaked from the hole. Pruritis and tingling would usually precede the fluid leaks. The patient reported 1 week of intermittent sweats and nausea, which she had attributed to her pregnancy. She did not have any fever or chills. Two weeks before the ED visit, the patient sought treatment from a dermatologist, who prescribed a high-dose hydrocortisone cream. The pruritis temporarily improved, but the lesion continued to enlarge. A few days before ED presentation and after 2 weeks of prescription-strength (and 4 weeks of OTC) topical steroid treatment, the area became cellulitic. She started cephalexin, which had improved the erythema around the lesion. The patient was a 20-week pregnant emergency physician who denied any cigarette, alcohol, or drug use, or any significant occupational exposures.

On ED presentation, the patient was afebrile (37.1°C) with normal vital signs. Her physical examination was remarkable for a warm, mildly erythematous lesion that was tender to palpation, with a hole in the center (Figure 1). Some pulsatile movement was observed at the central hole when pressure was applied nearby. The lesion was indurated but not fluctuant. The patient's leg was neurovascularly intact distally.



Figure 1. Upon presentation, the lesion is firm, tender and erythematous with a central punctum. Healed excoriations are noted distally.



Figure 2. After occlusion of the central air vent, the larva exits in an attempt to seek an air source. In this case, the larva partially exited its subcutaneous home.

The lesion was diagnosed in the ED as furuncular myiasis caused by *Dermatobia hominus*, the human botfly. The patient occluded the air vent with a thick layer of petroleum jelly and a Tegaderm™ (3M, St. Paul, MN) for 24 h. The larva started to exit on its own (Figure 2). Then, the portion of the larva that was still in the skin was surgically removed (Figure 3).

DISCUSSION

Dermatobia hominus, the human botfly, causes furuncular myiasis. Species that cause furuncular myiasis are obligate parasites for which a living host is needed for the larval phase (2,3). *Dermatobia hominus* is found in warm, humid tropical rainforests in areas of Central and South America from Northern Argentina to Southern



Figure 3. Removal of an intact larva is critical to avoid residual foreign body reaction. The larva measures 1.7 cm.

Mexico. Travellers, who imported the human botfly in the series of case reports reviewed, had ventured to Guatemala, Belize, Costa Rica, Mexico and Brazil (2–10). Despite its name, *D. hominus* also infects domestic and wild animals.

Dermatobia hominus has an atypical life cycle. The adult female botfly typically captures a daytime-active mosquito as the vector for transmission, but it can also capture other blood-feeding vectors like ticks and flies. In a process called phoresis, eggs are laid and transferred to the host by direct contact with the vector. Usually, the botfly plants 10–50 eggs on the vector's skin. When the eggs come into contact with the host's skin, the heat of the host's skin stimulates the egg to hatch. The first-stage larva burrows subcutaneously through either a puncture mark made by the vector or a hair follicle. The larva takes 6–12 weeks to mature; during this time, it burrows deeper in the subcutaneous tissue and forms a dome-shaped cavity. The mature larva emerges painlessly from the skin with a diameter of 18–24 mm. After emerging from the skin, it falls off, pupates in warm, humid soil, and matures into an adult botfly, a process that takes 20–30 days (2,11). The adult fly lives only about a week, during which time it mates and lays eggs on the blood-sucking vector to complete the life cycle (<http://chppm-www.apgea.army.mil/documents/FACT/HumanBotFlyMyiasisJTFAug2007.pdf>).

In human hosts, single lesions are the most common presentation; however, multiple lesions (usually 1 to 4) can occur at the same time. In other mammals, such as livestock, the average number of lesions can be up to 40–60 (2). Lesions are initially pruritic papules similar to many other insect bites. Over time, they become larger, with a diameter of 1–3.5 cm, firmer and boil-like, with a central punctum. This central punctum serves as an “air vent” or respiratory sinus for the larva to breathe. This central hole releases a discharge that can be serosanguinous, purulent, or bloody, and occasionally, the larva actually can be seen at this opening. The host may have the sensation of movement or pain as the parasite destroys surrounding tissue and burrows deeper. The lesion is often quite pruritic, and the pain is typically worse at night.

The lesions most commonly appear in exposed skin areas. In a series of 25 cases from Southern Mexico, lesions appeared (in order from most to least common) on the scalp, trunk, upper extremities and lower extremities, and face (7). However, lesions in unusual locations like the labia, peri-auricular region, and scrotum have been reported (8–10).

The other major cause of furuncular myiasis is the African tumbu fly (*Cordylobia arthropophaga*) that is found in sub-Saharan Africa. The tumbu fly causes multiple furuncular lesions (30–40) and is transferred via blankets or articles of clothing that have been infested

with eggs (2). Upon contact, the eggs are transferred subcutaneously in a similar manner to *D. hominus*.

A number of modalities have been described for removing the botfly. Surgical removal is a definite option but not always necessary. Most techniques that are described involve covering the central punctum in an effort to asphyxiate the larva, and then expressing or pulling the larva out the next day. In response to the asphyxiation, the larva tries to leave the punctum to find air, making the larva visible and more easily removable. One method is to place raw bacon or raw meat on top of the central hole. In response, the larva may wander out of the skin and into the fat of the meat; it can then be easily removed with forceps. Other substances described for blocking the “air hole” include surgical glue, tape, wax, bubble gum, petroleum jelly, mineral oil, and paraffin oil. Other options are to try to compress the lesion and let the larva be expressed out; to attempt to remove it with a hemostat or forceps; or to paralyze the larva with lidocaine and then use forceps for removal. Care must be taken with a number of these methods so that a piece of the larva is not left inside. A piece left inside can lead to infection or create a hypersensitivity reaction.

The differential diagnosis for the emergency physician who encounters this type of lesion in the ED might include an abscess, an infected mosquito or other insect bite, infected sebaceous cyst, or retained foreign body. A MRSA abscess might be in the differential diagnosis, as it is often associated with the patient complaining of a “spider” or “insect” bite that the patient never visualized (1). The patient usually thinks a bite occurred due to the painful nature of this soft tissue infection. Ultrasound can be a useful diagnostic adjunct if the diagnosis is unclear. Ultrasound with a 10-MHz probe could help diagnose a foreign body or an abscess, and may help identify the human botfly (7). Another misdiagnosis is attributing the patient's symptoms to having a delusion of parasit infestation when a true parasite infection actually exists.

The most significant complications for human hosts are superinfection and tetanus. However, it should be noted the larva excretes a bacteriostatic substance to prevent local infection (11). A fatal complication of cerebral myiasis has been reported in a pediatric patient (12). While none of the case reports we reviewed reported a MRSA superinfection, furuncular myiasis and a MRSA skin infection may not be mutually exclusive. It is unknown if the bacteriostatic substance excreted would be effective against MRSA.

CONCLUSION

A careful travel history is the key to correctly diagnosing the human botfly and many other infectious diseases. For travelers headed to areas that are endemic for the human

botfly, precautions such as insect repellent, carefully covering the body during outdoor activities, and the use of mosquito nets may help decrease the chance of becoming infected with this disease. On-line resources, such as the Centers for Disease Control and Prevention website (www.cdc.gov), can be especially helpful during real-time practice in the ED when the emergency physician is trying to correctly diagnose someone who has returned ill from foreign travel.

Acknowledgments—We wish to thank Dr. Melba Taylor for her immediate diagnosis affording the patient relief and Dr. Jason Spector for surgical removal of an intact larva. Dr. Melba Taylor and Dr. Jason Spector.

REFERENCES

1. Moran GJ, Krishnadasan A, Gorwitz RJ, et al. Methicillin-resistant *S. aureus* infections among patients in the emergency department. *N Engl J Med* 2006;355:666–74.
2. Maier H, Hönigsmann H. Furuncular myiasis caused by *Dermatobia hominis*, the human botfly. *J Am Acad Dermatol* 2004;50(2 Suppl):S26–30.
3. Johnston M, Dickinson G. An unexpected surprise in a common boil. *J Emerg Med* 1996;14:779–81.
4. Ofordeme KG, Papa L, Brennan DF. Botfly myiasis: a case report. *Can J Emerg Med* 2007;9:380–2.
5. Cottom JM, Hyer CF, Lee TH. *Dermatobia hominis* (botfly) infestation of the lower extremity: a case report. *J Foot Ankle Surg* 2008;47:51–5.
6. Hohenstein EJ, Buechner SA. Cutaneous myiasis due to *Dermatobia hominus*. *Dermatology* 2004;208:268–70.
7. Quintanilla-Cedillo MR, León-Ureña H, Contreras-Ruiz J, Arenas R. The value of Doppler ultrasound in diagnosis in 25 cases of furunculoid myiasis. *Int J Dermatol* 2005;44:34–7.
8. Price N, Boyle F, Currie I. Human botfly infestation presenting as a labial abscess: travel history matters. *J Obstet Gynaecol* 2008;28:109–11.
9. Boruk M, Rosenfeld RM, Alexis R. Human botfly infestation presenting as periauricular mass. *Int J Pediatr Otorhinolaryngol* 2006;70:335–8.
10. Massey RL, Rodriguez G. Human scrotal myiasis: botfly infestation. *Urol Nurs* 2002;22:315–7.
11. McGraw TA, Turiansky GW. Cutaneous myiasis. *J Am Acad Dermatol* 2008;58:907–26.
12. Rossi MA, Zucoloto S. Fatal cerebral myiasis caused by the tropical warble fly, *Dermatobia hominus*. *Am J Trop Med Hyg* 1973;22:267–9.