An autochthonous case of gnathostomiasis in the United States

Joshua Schimmel, BS,[a] Lucy Chao, MD,[b] Alfred Luk, MD,[c] Lee Grafton, MD,[d] Abida Kadi, MD,[b] and Erin Boh, MD, PhD[b]

Camden, New Jersey and New Orleans and Houma, Louisiana

Key words: autochthonous; creeping; cutaneous larva migrans; endemic; gnathostoma, gnathostomiasis; ivermectin; Louisiana, United States; nematode; parasite; travel.

INTRODUCTION

Gnathostomiasis is a rare parasitic infection caused by the consumption of raw meat and seafood infected with the late third-stage nematode larvae of *Gnathostoma* spp. The disease is endemic to Southeast Asia, Japan, and Latin America; however, there are increasing reports of gnathostomiasis in nonendemic areas.[1,2] We present an autochthonous case of gnathostomiasis in the United States in a patient with no travel history.

CASE REPORT

A 52-year old man was referred to our clinic for further management of a cutaneous parasitic infection. He presented with migratory, exquisitely tender, pruritic nodules on his abdomen that appeared 1 week prior. He also reported pruritus of the hands and feet, arthralgias, headaches, dysgeusia, tinnitus, and fatigue. He reported no new exposures or recent travel history, domestic or international. Notably, 6 weeks prior, he ate home-prepared bream ceviche, which he caught from a freshwater lake just outside New Orleans, Louisiana.

Initial physical examination found tender, erythematous, edematous nodules and plaques on the lateral trunk. At the time of our evaluation, biopsy had been performed, and his cutaneous eruption was clearing. A complete blood count was within normal limits. Magnetic resonance imaging of the head and neck was clear. Punch biopsy of a cutaneous nodule found a nematode parasite embedded in the dermis (Figs 1 and 2). Evaluation of these histologic sections by the Centers for Disease Control and Prevention (CDC) found the parasite to be consistent with *Gnathostoma* spp based on morphologic features of the nematode. Further speciation was not possible based on morphology alone. Although we submitted for serologic testing to the CDC, serologic testing was not performed, as it is currently not available at the CDC or in the United States.

Abbreviation used:

CDC: Centers for Disease Control and Prevention

The patient was treated with a single dose of ivermectin followed by a 3-week course of albendazole. After treatment, the patient initially had residual neuropathy, fatigue, and altered sensation. These symptoms resolved by his follow-up visit 2 months later, and he continues to be asymptomatic.

DISCUSSION

Gnathostomiasis presents 3 to 4 weeks after the ingestion of raw fresh water fish or meat containing larvae. Tender or pruritic cutaneous migratory swelling, eosinophilia typically develop, and patients report a history of recent travel to endemic countries. Cutaneous manifestations include variable pain and swelling in the areas of larval migration. More rarely, symptoms can be experienced when solid organs are affected, the visceral form of gnathostomiasis. Rarely, the central nervous system is affected, which typically manifests as meningitis and painful radiculopathy that may lead to paraplegia.

From Cooper Medical School of Rowan University, Camden[a]; the Departments of Dermatology[b] and Infectious Diseases,[c] Tulane University, New Orleans; and Grafton Dermatology and Cosmetic Surgery, Houma.[d]

Funding sources: None.

Conflicts of interest: None disclosed.

Correspondence to: Joshua Schimmel, BS, Cooper Medical School of Rowan University, 401 Broadway, Camden, NJ 08103. E-mail: schimmelj4@rowan.edu.

JAAD Case Reports 2020;6:337-8.

2352-5126

https://doi.org/10.1016/j.jdcr.2020.02.019

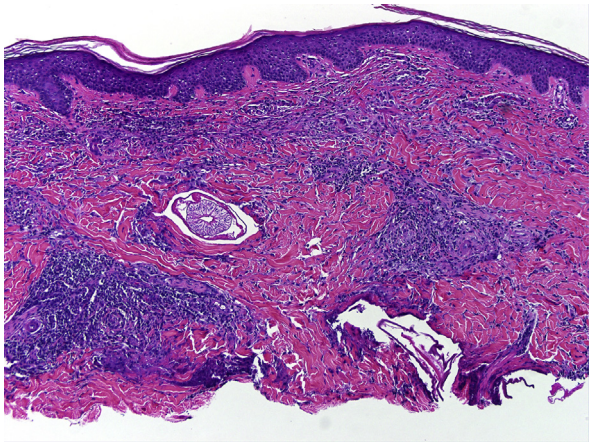

Fig 1. Gnathostoma nematode embedded in the dermis with nearby lymphohistiocytic and eosinophilic perivascular and periadenexal infiltrates. (Hematoxylin-eosin stain; original magnification: ×100.)

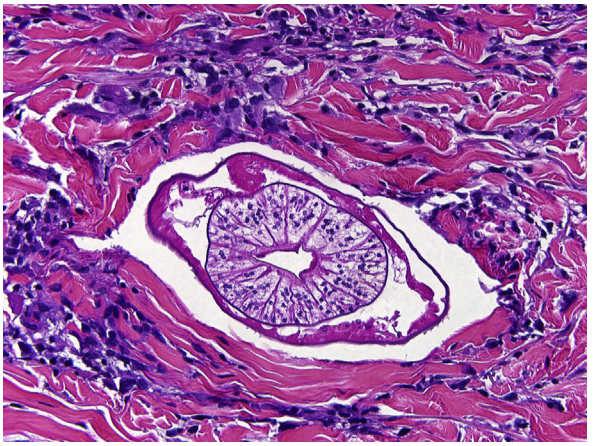

Fig 2. Gnathostoma nematode shows cuticular spines, coelomyarian musculature, and an intestinal tract lined by multinucleated epithelial cells consistent with *Gnathostoma* spp. (Hematoxylin-eosin stain; original magnification ×400.)

The elongated morphology of erythema and swelling, indicating larval migration, and *peau d'orange* skin surface changes are common cutaneous findings useful in differentiating gnathostomiasis from other inflammatory processes.[3] Superficial larval migration may mimic the creeping eruption of cutaneous larvae migrans. The location of the migratory swelling may help differentiate these as gnathostomiasis, typically present on the trunk, whereas cutaneous larvae migrans is more common on the extremities.[3]

The diagnosis is made based on clinical presentation but may be confirmed with histologic evidence of encysted larvae from biopsied skin lesions, as seen in this case. However, visualizing the larvae on biopsy is exceedingly rare because of its ability to migrate throughout the body. A biopsy may be more efficacious after treatment because of the superficial migration of larvae. Current therapy of gnathostomiasis includes oral albendazole, 400 mg for 21 days, or a single dose of ivermectin, 0.2 mg/kg, each with efficacy greater than 90%.[4,5] Patients may exhibit residual symptoms after initial treatment owing to the presence of deceased larvae within the skin. These symptoms are temporary and resolve with immune system clearance of the larvae. Treatment failures can also occur, and patients may need to be retreated. Initial relapses occur up to 7 months after treatment. Patients that are asymptomatic for 12 months and demonstrate resolution of eosinophilia are considered cured.[2]

This case is the second reported case of autochthonous gnathostomiasis in the United States.[6] Increases in international travel and importation of live *Gnathostoma*-infected species have resulted in the potential establishment of regional zoonoses in previously nonendemic regions around the world.[1,2] The infection in this case may indicate the establishment of pathogenic *Gnathostoma* spp. in Louisiana and possibly other areas of the United States. Therefore, it is important to avoid consuming raw or undercooked fish caught domestically in the United States, especially swamp eels, catfish, sleeper perch, bream, Nile tilapia, butterfish, loaches, or snake-headed fish.[2] Dermatologists should be aware of this emergence and consider gnathostomiasis in patients presenting with cutaneous migratory swelling, even in the absence of travel to endemic areas.

REFERENCES

1. Diaz JH. Gnathostomiasis: an emerging infection of raw fish consumers in gnathostoma nematode-endemic and nonendemic countries. *J Travel Med*. 2015;22(5):318-324.
2. Herman JS, Chiodini PL. Gnathostomiasis, another emerging imported disease. *Clin Microbiol Rev*. 2009;22(3):484-492.
3. Bravo F, Gontijo B. Gnathostomiasis: an emerging infectious disease relevant to all dermatologists. *An Bras Dermatol*. 2018;93(2):172-180.
4. Kraivichian P, Kulkumthorn M, Yingyourd P, Akarabovorn P, Paireepai CC. Albendazole for the treatment of human gnathostomiasis. *Trans R Soc Trop Med Hyg*. 1992;86(4):418-421.
5. Nontasut P, Bussaratid V, Chullawichit S, Charoensook N, Visetsuk K. Comparison of ivermectin and albendazole treatment for gnathostomiasis. *Southeast Asian J Trop Med Public Health*. 2000;31(2):374-377.
6. Jarell AD, Dans MJ, Elston DM, Mathison BA, Ruben BS. Gnathostomiasis in a patient who frequently consumes sushi. *Am J Dermatopathol*. 2011;33(8):e91-e93.