Urinary Gnathostomiasis In A Laotian Refugee

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Gnathostoma spinigerum is an uncommonly encountered parasite, even in a practice such as ours, which hosts a Traveler's Clinic and provides care for a relatively large Southeast Asian population. Gnathostomiasis is most commonly reported in Asia, particularly Thailand and Japan. Nonetheless, gnathostomiasis is a potentially serious, even life-threatening, parasitosis that can be seen in any primary care setting that provides health care for Southeast Asian refugee populations. As of 30 September 1990, the Southeast Asian refugee population of the United States was estimated to total 957,100, with refugees in every state and large populations in California (378,500), Texas (71,800), Washington (44,900), Minnesota (34,900), and New York (34,300). Consequently, although this parasite is reportedly rare in the United States, family physicians could well encounter Southeast Asian refugee patients and should be familiar with the clinical presentations of this parasite.

We present a case of urinary gnathostomiasis in a Laotian refugee. To our knowledge, this case is only the second reported in the United States. The first case of urinary gnathostomiasis in the United States was reported in 1984.

Case Report

A 36-year-old male native of Laos immigrated to the United States via a refugee camp in Thailand during summer 1990. On 7 November 1990 he came to the Family Medical Center of the University of California, San Diego, Medical Center with the chief complaint of passing bright red blood and worms in his urine approximately 20 times during the past summer. He had been asymptomatic for the previous 2 months. During the summer he also noticed occasional lower abdominal pain, which resolved spontaneously. His medical history was pertinent only for a “left inguinal groin abscess” treated by incision and drainage in Laos in 1974. He was afebrile and the bowel sounds were active. The abdomen was soft and nontender without mass or organomegaly. The stool was positive for occult blood. No skin lesions or subcutaneous masses were noted. Both urine and stool were examined for ova and parasites. The California State Medical Laboratory identified Gnathostoma spinigerum in the urine specimen. Further studies failed to provide evidence of other parasitic infections. The patient declined blood studies and was lost to follow-up after the second clinic visit despite numerous efforts to contact him.

Comment

Gnathostomiasis is most commonly reported from Southeast Asia and Japan, but sporadic cases have occurred in many other areas of the world, including Europe, Africa, Mexico, and South America. Humans are infected through the ingestion of raw fish, which contains encysted larvae in its flesh. Feral and domestic cats and dogs are the natural hosts of G. spinigerum, harboring the adult worms in the stomach wall and excreting eggs in the feces. The eggs then hatch in fresh water, and the motile first-stage larvae penetrate cyclops, a copepod, which is eaten by such intermediate hosts as freshwater fish, frogs, snakes, and rats. When these animals are ingested by feral or domestic dogs and cats, the larvae migrate to the stomach wall and mature to the adult stage within approximately 6 months. The cycle is then completed (Figure 1). Humans are incidental hosts, infected by the ingestion of raw or undercooked fish. Man is infected by the third-stage larvae of G. spinigerum, which are then incapable of further maturation. The third-stage larvae, which are very active, are capable of migrating widely throughout the body, producing myriad clinical manifestations. Therefore, there is no single or typical presentation of gnathostomiasis. In fact,
Figure 1. Life cycle of the *Gnathostoma spinigerum*.

Some infections are likely to be subclinical or minimally symptomatic and remain undiagnosed. Urinary tract involvement, as documented in our patient, is apparently an unusual manifestation of this disease. The most dreaded manifestation of *G. spinigerum* infection is involvement of the central nervous system (CNS) as manifested by an eosinophilic myeloencephalitis, cerebral hemorrhage, spinal cord involvement with radiculopathy, cranial nerve palsies, and subarachnoid hemorrhage. There are, however, a wide variety of other manifestations, including creeping eruption (pruritic migratory swellings caused by larval migration), uveitis, skin and subcutaneous nodules, gastrointestinal granulomatous masses, cervical infection, penile infection, and pneumonitis. Eosinophilia is often present in the peripheral blood smear, sometimes as high as 90 percent of leukocytes, but serologic studies and other diagnostic efforts are frequently inconclusive. In clinical syndromes of CNS gnathostomiasis, the cerebrospinal fluid typically shows a mild-to-moderate pleocytosis with high percentages of eosinophils, elevated protein, normal glucose, and a mildly elevated opening pressure. Diagnosis rests upon identification of the parasite in the appropriate tissues or body fluids.

Third-stage larvae are believed to survive for up to 10 years in the human host. Infection with *G. spinigerum* is extremely unlikely in North America; however, it is important for primary care physicians, particularly those caring for Southeast Asian patients, to recognize this entity. Unfortunately, no consistently effective medical therapy is available for this parasitosis. When appropriate and feasible, surgical excision of the parasite is the treatment of choice. The parasite has been successfully excised from the skin, uveal tract, colon, uterine cervix, and penis. Infection can be disseminated, however, and surgical excision impossible, particularly for gnathostomal infections of the central nervous system. Steroids can help cerebral edema, but no anthelmintic agent has proved effective for CNS gnathostomiasis.

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Man, Domestic Cats/Dogs

Fish, Frogs, Birds, Rats

(3rd Stage Larva)

Cyclops (freshwater Copepod)

(2nd stage larva)

Egg

(1st Stage Larva)
one series of patients with CNS gnathostomiasis reported from Thailand, none of whom were treated with anthelmintics, 54 percent recovered fully, 38 percent recovered with neurologic residua, and 8 percent died.5

It is unknown what percentage of patients with undiagnosed infection caused by G. spinigerum remain asymptomatic or minimally symptomatic. As a result and because of the relative ineffectiveness of available pharmacologic therapies, patients in whom the parasite can be excised, but who are otherwise asymptomatic, should not undergo investigation for foci of asymptomatic infection.

The lack of convincing data in support of efficacy notwithstanding, the current recommended pharmacotherapy for gnathostomiasis is mebendazole 200 mg every 3 hours orally for 6 days.13 Using mebendazole as therapy for gnathostomiasis is considered investigational. Other agents that have been used with varying success include diethylcarbamazine citrate, thiabendazole, and albendazole. Bunnag,1 who has had extensive experience with gnathostomiasis, is not convinced that any anthelmintic agent has been proved efficacious. Nevertheless, mebendazole is relatively well tolerated and has an excellent safety profile. Side effects are limited to abdominal pain and diarrhea, which have generally occurred when treating patients infected with large burdens of (nongnathostomal) intestinal parasites.14 Because mebendazole was teratogenic in rats, it is not recommended for pregnant women.15

The disease can be prevented by thoroughly cooking seafood, fowl, and reptiles. Family physicians should counsel travelers that gnathostomiasis can be prevented by avoiding uncooked fish and fowl. Although travelers might be especially vigilant in the third world nations of Southeast Asia, it is important to recall that gnathostomiasis is also endemic in Japan, where sushi is very popular. The ingestion of uncooked seafood carries the risk of infection with cholera, Anisakis marina, fish tapeworm, Paragonimus flukes and liver flukes, in addition to G. spinigerum. Additionally, physicians caring for Southeast Asian refugees or other patients with a history of travel in endemic areas should include gnathostomiasis in the differential diagnosis of patients with fever, eosinophilia, rash suggestive of cutanea larva migrans, and especially symptoms and signs of central nervous system disease, including eosinophilic meningitis, radiculitis, encephalitis, and cerebral hemorrhage. The third-stage larvae of G. spinigerum are “strangers in a strange land” in the human host and could migrate to any tissue in the body.

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