CASE REPORT: OCULAR GNATHOSTOMIASIS IN NORTHWESTERN MEXICO

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Abstract. A 42-year-old woman from Culiacán in the Sinaloa State of Mexico presented with a four-year history of migratory, pruritic, painful swellings of the face. Palpebral edema with conjunctival erythema developed when lesions developed near the eye. Routine eye examination showed a mobile worm in the anterior chamber. Following surgical removal, the parasite was identified by light and electron microscopy as an advanced third-stage larva of Gnathostoma sp. This prevalence of this helminthiasis may be increasing in areas where eating freshwater raw fish (“cebiche”) is customary.

INTRODUCTION

Cutaneous larva migrans syndrome due to advanced third-stage larva (AL3) of Gnathostoma spp. is an emerging public health problem in Mexico, particularly in the states of Sinaloa, Oaxaca, Veracruz, Tamaulipas, Guerrero, and Nayarit.1–3 The custom of eating raw freshwater fish in the form of “cebiche” (traditional dish), “callos” (tiny pieces of raw fillet), and sushi is common in these areas. The first two cases in Mexico were reported in 1970,2 and many have subsequently reported.4,5 Aside from the annoying symptoms of pruritus and pain, gnathostomiasis may be cause serious morbidity and even mortality if the parasite invades the central nervous system, where it leads to eosinophilic myelencephalitis and subarachnoid hemorrhage. Another serious complication is ocular involvement, which can cause blindness.6 We report here a case of ocular gnathostomiasis successfully treated by surgical excision of the larva.

CASE REPORT

A 42-year-old woman presented to an ophthalmologist with a four-year history of migratory, pruritic painful swellings that occasionally involved her face. Palpebral edema and pain in the conjunctiva developed when the lesions were near her eye. Such episodes usually lasted for 7–10 days and recurred once a year. A recent episode persisted for 15 days and was associated with palpebral hemorrhage, conjunctival erythema, and pain upon movement of the eye. The initial diagnosis was uveitis, which was treated with pyridoxine. Slit lamp examination disclosed a worm at the inferonasal quadrant of the margin of the iris. A bulbous dilatation was noted at the free end of the parasite. Although the patient was to be treated with laser photocoagulation, this was not done and surgical excision was performed. The parasite had migrated to the posterior chamber of the eye. The surgeon injected sodium hyaluronate through a small keratotomy and the parasite spontaneously returned to the anterior chamber, where it freely floated. The diaphragm of the iris was closed with pilocarpine to prevent further migration. The larva was easily removed with a small forceps and placed immediately in normal saline solution. The results of laboratory examination of the patient were unremarkable, except for low-grade blood eosinophilia (6%). The patient was discharged and not given anti-parasitic drugs. Results of follow-up slit lamp examination and visual function tests were normal. She has remained without symptoms for three years.

THE PARASITE

Examination of a wet mount of the freshly removed parasite showed an AL3 of a Gnathostoma sp.7,8 (Figure 1).
Light microscopy showed that the larva was divided longitudinally into three regions: lips, head bulb, and body. It had a length of 2.06 mm, a maximum width of 0.292 mm, and the head bulb had a width of 0.243 mm. There were four transverse rows of spines with ovoid bases whose number increased posteriorly (measurements were done while the worm was alive; row 1 = 24, row 2 = 32, rows 3 and 4 = 36). The average length of the spines was 0.005 mm. The body was encircled by more than 250 transverse rows of minute, cuticular, single-pointed spines. A cervical papilla was located at the 11th cuticular striation. Inside and posteriorly to the head bulb, two of the four cervical sacs protruded into the pseudocoelomic cavity. Light microscopy showed the pharyngo-intestinal valve, which represents the junction of the esophagus and intestine (Figure 2). The number of nuclei per intestinal cells varied from one to three, and microvilli were observed. Electron microscopy showed that four rows of single-pointed spines were evident (Figure 3). The mouth had a pair of lateral lips, with each having labial papillae. The excretory pore was not observed.

**Figure 2.** Longitudinal section of a *Gnathostoma* sp. advanced third-stage larva. The parasite was fixed in 10% buffered formalin for 48 hours, washed five times in distilled water to remove the fixative, rinsed in Millonig's phosphate buffer, dehydrated, and embedded in paraffin. Half of the worm was cut longitudinally into 5-μm sections and stained with hematoxylin and eosin and Masson's trichrome. a, whole body of the parasite showing the cephalic bulb (CB) and pharyngo-intestinal valve (EI) (magnification × 2.5). b, details of the pharyngo-intestinal junction (EI) showing the microvilli-lined brush border of intestinal cells. Note that most intestinal cells have two nuclei (magnification × 10).

**Figure 3.** Scanning electron photomicrographs of a *Gnathostoma* sp. advanced third-stage larva. Following removal from the paraffin block, the specimen was post-fixed in 0.5% OsO4 for 12 hours. The larva was rinsed, dehydrated in a graded series of ethanol solutions, and placed in a critical-point dryer. The specimen was coated with gold and examined using a Zeiss (Wetzlar, Germany) DSM 950 electron microscope at 25 kv. a, anterior view showing the cephalic bulb (CB) and cervical papilla (CP) (scale = 50 μm × 200). b, higher magnification of the anterior end, and four transverse rows of spines at the cephalic bulb (CB) (scale = 1 μm × 500).
DISCUSSION

An increase in information regarding the risks of developing cutaneous and, more rarely, ocular manifestations of infection by *Gnathostoma* spp. may be the result of a shift from the dietary custom in Mexico of eating traditional food containing raw freshwater fish to eating saltwater fish.\(^{12,13}\) Previous reports of this condition have not included details of the technique used to remove the parasite.\(^{14}\) We describe here the use of sodium hyaluronate, which is currently used in intraocular lens surgery, to preserve the delicate structure of the larva itself.

*Gnathostoma binucleatum* has recently been confirmed to be one of the species of the genus *Gnathostoma* that causes intermittent migratory cutaneous swellings.\(^{8}\) In agreement with other reports,\(^{18,19}\) intraocular gnathostomiasis appears to be rare. As in most cases, the larva was localized to the left eye. Although AL\(_3\) are most commonly found in the skin, they can migrate into a wide range of tissues and organs and cause signs and symptoms of larva migrans.\(^{19}\) The most typical clinical picture is characterized by a creeping and mobile erythematous eruption of the skin.\(^{1,3}\) Some cases has been successfully treated with albendazole.\(^{20}\)

The environmental risk factors associated with this infection are typified in the state of Sinaloa in Mexico. There are 11 large dams serving irrigation and power electricity projects in this area. They are also used as sources of aquaculture and for tourism involving hunting and fishing. It is possible that ecologic changes create a focus of gnathostomiasis.\(^{21}\) Given that live fish are distributed widely among the states of Mexico, it is possible that there may be many more cases of gnathostomiasis that are not recognized.\(^{22,23}\)

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22. Kennedy CR, Hartvigsen R, Halvorsen O, 1991. The importance for tourism involving hunting and fishing. It is possible that ecologic changes create a focus of gnathostomiasis. Given that live fish are distributed widely among the states of Mexico, it is possible that there may be many more cases of gnathostomiasis that are not recognized.\(^{22,23}\)

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