**Gnathostoma binucleatum**: Pathological and parasitological aspects in experimentally infected dogs

C. Álvarez-Guerrero, M.A. Muñoz-Guzmán, J.A. Buendía-Jiménez, F. Alba-Hurtado

1. Laboratory of Parasitology, Secretary of Investigation and PGR, Universidad Autónoma de Nayarit, México
2. Department of Biological Sciences, Faculty of Sciences, Autonomous University of Mexico, México

**ABSTRACT**

Lesions and antibody kinetics produced by inoculation of Gnathostoma binucleatum larvae into dogs are described, as well as the morphology of the recovered parasites. In four out of five infected bitches, parasite phases were found in the stomach. Only one bitch eliminated eggs and adult parasite phases in feces. In this bitch, the prepatent period lasted 22 weeks and the patent period 14 weeks. Necropsy results showed a copiously vascularized, 8-cm diameter fibrous nodular lodge in the greater curvature of the stomach. Two bitches that eliminated no eggs showed 1- to 2-cm diameter nodules on the gastric wall, with five juvenile phases in each. One bitch that eliminated no eggs and exhibited no gastric nodules showed juvenile parasites on the gastric wall. Results confirm dogs as definitive hosts of this parasite. New data on the pathological and parasitological aspects of canine gnathostomiasis are presented.

© 2010 Elsevier Inc. All rights reserved.

1. Introduction

The nematode *Gnathostoma binucleatum* is the only species confirmed to produce human gnathostomiasis in the American Continent. This disease constitutes a major health problem in the State of Nayarit, Mexico, where a total of 6328 cases were reported between 1995 and 2005 (SUAVE: Unique Automatized System for Epidemiological Vigilance, Secretaría de Salud de Nayarit 1995-2005). The first intermediate hosts of all Gnathostoma species are considered to be copepods, Estuarine fish (Callirhops furtvthii, Pomadasyx macrancithus, Magil currea and Dormitator latifrons) and some turtles (*Kinosternum integrum* and *Trachemys scripta*), act as second intermediate and paratenic hosts, respectively (Álvarez-Guerrero and Alba-Hurtado, 2007). The role of carnivorous (ichthyophagous) mammals as definitive hosts in the biological cycle of the different *Gnathostoma* species has been amply documented. Adult *G. binucleatum* worms have been detected in gastric nodules of naturally infected cats and ocelots (*Almeida-Arignas, 1991*). Koga et al. (1999) isolated adult *Gnathostoma* worms from the gastric nodules of experimentally infected dogs; however, the effects of the parasite on these hosts have not been described. The present study describes pathological and parasitological aspects of experimentally infected dogs.

2. Materials and methods

2.1. Experimental animals

Five clinically healthy bitches of non-defined breed, aged 2-4 months, were used. Before the experiment, preventive anti-parasite treatment consisting of praziquantel, pyrantel pamoate, and febantel (Frontal plus; Bayer) was orally administered. Externally, animals were powdered with 2-methyltetrahydrofuran carbamate (Bollo; Bayer) and immunized against distemper and parvovirus. The bitches were kept in individual cages at the laboratory animal facilities of the Research and Postgraduate Department, Autonomous University of Nayarit, Mexico. Prior to the experiment, none of the bitches showed belminth egg deposition in feces or external parasites. The animals were cleaned daily and fed balanced commercial products and water ad libitum. The study was approved by the Internal Committee for the Care of Experimental Animals of the Postgraduate Program of Animal Production and Health (UNAM, México).

2.2. Collection of advanced third stage larvae (AdvL3) for inoculum

*G. binucleatum* larvae were isolated from *K. integrum* turtles in fishing areas near Agua Brava lagoon, in a northern region of the State of Nayarit, Mexico. The muscle tissue was dissected, ground with a kitchen grinder, compressed between two glass panes (15 cm in width by 18 cm in length) and observed against the light of a 100 W lamp. The AdvL3 were separated with entomological...