

Research Note

***Gnathostoma nipponicum* Infection in the Past Human Cases in Japan**

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Three native *Gnathostoma* species, *Gnathostoma spinigerum*, *G. doloresi* and *G. nipponicum*, and one imported species, *G. hispidum*, occur in Japan. Until recently, most cases of human infection were caused by *G. spinigerum* but since 1980 human cases involving the other three species have been reported, usually from ingestion of raw fish (Endo *et al.*, 1980; Ando *et al.*, 1988; Nawa *et al.*, 1989).

The advanced third-stage larvae (AdL3) of these four species are distinguishable by a difference in the number of transverse rows and features of hooklets on the head bulb (Miyazaki, 1960). Morphological features of AdL3 of *G. spinigerum* in cross section were described by Morita (1955) and morphological differences in cross section of AdL3 of three species, *G. spinigerum*, *G. doloresi* and *G. hispidum* were compared by Akahane *et al.* (1986). Recently we also reported the morphological features in cross section of *G. nipponicum* AdL3 (Ando *et al.*, 1990). These data showed that there were morphological differences only in the structure of the intestinal regions among the four species of *Gnathostoma*. Therefore, we have reviewed the original sections of AdL3 of *Gnathostoma* and

summarized the morphological differences in the abdominal regions (Table).

Based on these differences we reviewed 75 gnathostomiasis cases in which at least a portion of the worm was detected in human tissue. We found one case, reported by Hatsushika *et al.* (1985), in which the intestinal structure of the larva resembles that of *G. nipponicum*. The brief case report is as follows. A 58-year-old man living in Okayama Prefecture, Japan, ate raw catfish, *Parasilurus asotus*, in 1983. He noticed a creeping eruption of 10 cm long on the skin surface of his right buttock region with mild itchiness 20 days later. He was submitted to resection of the cutaneous lesion. Intestinal transverse sections of *Gnathostoma* larva were found in the upper dermis (Fig. 1). The number of muscle cells in one-fourth of the circumference of the section was 11 to 13. The circumference of the intestine was composed of 10 to 12 cells whose morphology was columnar cellular epithelium. Cells had 0 to 5 large nuclei (av.  $3.8 \times 4.4 \mu\text{m}$  in size). These morphological features are identical with those of *G. nipponicum*.

Rate of infection with adult worms in each definitive host in Okayama Prefecture was 0% (0/189 including Tottori, Shimane, Hiroshima, and Yamaguchi Prefectures) for *G. spinigerum*, 4.8% (1/21) for *G. doloresi* and 40.4% (23/57) for *G. nipponicum*. Adult worms of *G. nipponicum* are densely distributed, particularly, in the south east area where a human became infected (Nishida, 1958). We found naturally infected larva of *G. nipponicum* from catfish in Ueno City, Mie Prefecture (manuscript in submitting).

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Table Morphological differences in cross section of the abdominal region of advanced third-stage larvae of 4 species of *Gnathostoma*.

Species	No. of muscle cells (1/4 circumference)	No. of intestinal cells	Morphology of cells	No. of nuclei in cells	Dimension of nuclei ( $\mu\text{m}$ )
<i>G. spinigerum</i>	10–15	21–29	columnar	0–7 (mainly 3–7)	2.9 × 3.2
<i>G. hispidum</i>	11–15	19–31	spherical	0–2 (mainly 1)	3.0 × 3.8
<i>G. doloresi</i>	11–15	18–28	spherical	0–3 (mainly 2)	3.1 × 3.8
<i>G. nipponicum</i>	10–14	10–14	columnar	0–4 (1 nucleus 50%)	3.8 × 5.0

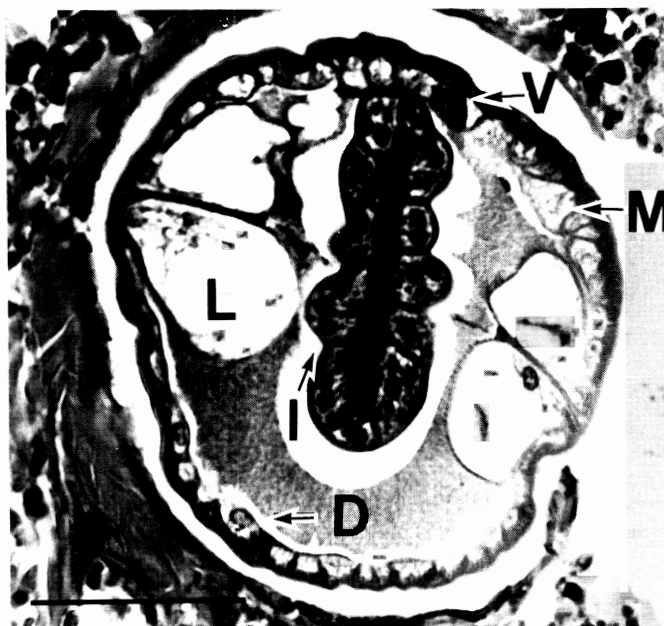


Fig. 1. Transverse section of larval *Gnathostoma* detected from a patient. D: dorsal cord, I: intestine, L: lateral cord, M: muscle layer, V: ventral cord (Scale = 0.05mm).

Therefore catfish can serve as a second intermediate host of *G. nipponicum*. These epidemiological data support the conclusion that the transverse section of *Gnathostoma* shown in the Fig. is that of *G. nipponicum*. As we have previously reported two cases of gnathostomiasis

by *G. nipponicum* (Ando *et al.*, 1988) this is the third case of infection by *G. nipponicum* in Japan.

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