

Research Note

A human case of hair worm (*Gordius* sp.) infection in Kagoshima, Japan

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Adult hair worms (*Gordioidea*) are free-living fresh-water inhabitants, while the larvae are parasitic in insects (Inoue, 1962). The hair worms parasitizing insects can be accidentally ingested by humans. Kagei (1977) noted that around 35 cases in humans have been reported world-wide. Four human cases have been reported in Japan and all worms were identified as *Gordius* sp. (Kagei *et al.*, 1966; Ichihara *et al.*, 1967; Yoshimura *et al.*, 1977; Kagei, 1977).

The patient with which this report is concerned was a one-year-old infant girl living in Nejime, Kagoshima. In late October 1985, the mother found a long, brown, slender worm in her daughter's feces. The infant showed no special sign of disorder or abnormality before and after discharge of the worm.

The worm, preserved with 10% formalin solution, was light brown in color and 284 mm long by 1.0 mm broad at the thickest portion (Fig. 1A). The anterior end was rounded without mouth opening. There were no neck ring, ventral line nor dorsal line in the cuticle (Fig. 1B). The cuticular surface was smooth and lacked areolae, tubercules and bristles. The

posterior end was bifurcate. The tail lobes were 0.29 mm long and the ratio of the length of lobe to the width was 0.96. The inside of the lobes were not "coloured dark" i.e. the insides were the same colour as the other parts of the lobes. The cloacal opening was oval and surrounded by a dark ring. The postcloacal cuticular ridge was situated just behind the cloacal opening and crescent in shape with relatively sharp ends. The ends of the ridge did not reach to the lobes (Fig. 1C, D). On the cross section at 5 mm from the posterior end, the body surface was covered with a cuticle 0.04–0.05 mm thick, lined with monolayer hypoderm. The muscular layer was 0.09–0.13 mm thick. Parenchymatous cells filled the pseudocoel to near capacity, and a ventral nerve cord, a digestive tract and a pair of genital organs were recognized in the parenchyma (Fig. 1E).

It was clarified that the present specimen was a species belonging to the genus *Gordius* on the basis of the presence of a postcloacal cuticular ridge and the lack of tubercles and bristles on the cuticle. The species of *Gordius* are classified each other by the location of neck ring, ventral lines and lateral lines, and by the shape of areolae if they are present. When these characteristics in the cuticle are lacking, the species can be identified by posterior constructions of male worm, such as tail lobes and postcloacal cuticular ridge. Previously, the following four species have been found in fresh water in several areas of Japan; *G. japonicum* Inoue and Fukui, 1953, *G. cavernarum* Inoue, 1972, *G. luteopunctatus* Inoue, 1979 and *G. ogatai* Inoue, 1979. Among the above four species, the present specimen most resembled morphologically *G. ogatai*; there were only

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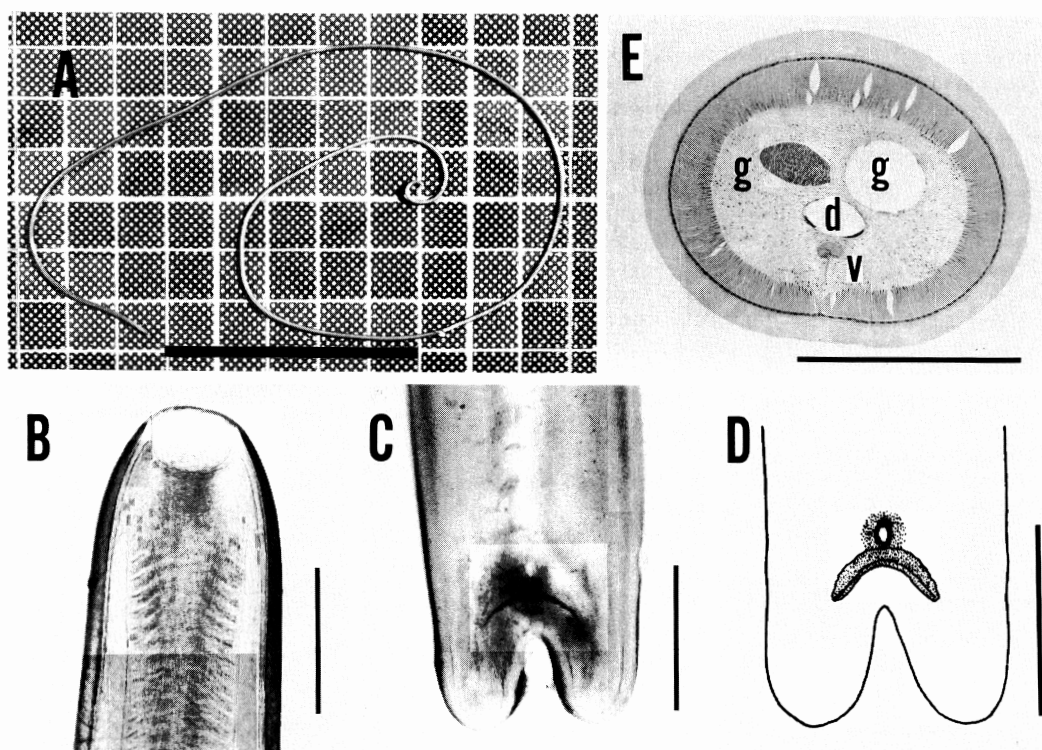


Fig. 1 A male worm of *Gordius* sp. discharged with feces of a one-year-old infant in Kagoshima.  
 A : Whole body of worm (Bar shows 5 cm)  
 B : Anterior part of worm (Bar shows 0.5 mm)  
 C, D : Posterior part of worm (Bar shows 0.5 mm)  
 E : Cross section of worm at 5 mm from the posterior end (Bar shows 0.5 mm)  
 d ; Digestive tract, g ; Genital organ, v ; Ventral nerve cord

slight differences between the two, that is, both ends of the postcolocal cuticular ridge were relatively sharp in the present specimen but rounded in *G. ogatai*. The ratio of lobe length and width was 0.96 in the former and 1.05 in the latter on average. Therefore, the present specimen should be reported as male worm of *Gordius* sp., possibly *G. ogatai* because of the many morphological coincidences between them.

About 20 gordioid hair worm species have been recognized as parasites or pseudoparasites in man, and more than 35 human cases have been reported throughout the world with the exception of Oceanian countries. In most cases of human hair worm infection, the worms were vomitted or discharged through the anus;

nausea, vomiting or abdominal pain was caused by the hair worm in some patients (Ali-Khan and Ali-Khan, 1977; Kagei, 1977). In Japan, four human cases have been reported in Gifu (Kagei *et al.*, 1966), Fukushima (Ichihara *et al.*, 1967), Ishikawa (Yoshimura *et al.*, 1977) and Shizuoka (Kagei, 1977). In the first two cases, worms were vomitted and in the other two, they were discharged per anus. All these specimen were identified as female worms of *Gordius* sp. The present human case is the fifth in Japan, and the first of a male worm.

As for the invasion route, the infant might have accidentally swallowed an insects such as a camel cricket which is an intermediate host. This is the first recorded human hair worm infection in Western Japan.

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