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A Case of Acute Abdominal Syndrome Caused by *Anisakis* Type-II Larva

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Since the first human cases of Anisakiasis were reported in Japan (Asami *et al.*, 1965; Yokogawa and Yoshimura, 1965), several hundred cases with similar pathologic changes in the digestive tract have been presented by many workers. One of causative agents of the disease has been clarified to be *Anisakis* Type-I larva. Recently, a few cases of acute abdominal syndrome due to *Terranova* Type-A larva were also reported by Suzuki *et al.* (1972) and Kagei *et al.* (1972), and the cases detected are accumulating to this day.

The present paper deals with the clinical feature of the patient infected with the other pathogen than above two types of worms, *Anisakis* Type-II larva and the detailed morphological characteristics of the worm, isolated from the stomach wall of the patient.

Case History

A 14-year-old in near Hamamatsu City, Shizuoka Prefecture, complained of severe epigastric pain and vomitted about 30 hours after having eaten "Sushi" prepared from a raw squid (*Todarodes pacificus* Steinstrup) and about 7 hours after having eaten "Sashimi" prepared from a raw fish (*Katsuwonus pelamis* Linnaeus). She was admitted to the Hamamatsu Red Cross Hospital on 11 April 1978. A total blood count, corpuscular hemoglobin, chemical examination of blood and the urinalysis on the patient were all normal, except for the eosinophilia of 4 per cent. On the rentogenographic examination, the gas was found fulled in her large intestine. In the examination by gastrocamera at 13 April, it was recognized that several small red and erosive protruded lesions were dotted on the posterior wall of the stomach, and a whitish and thin thread-like worm had partly penetrated into the lesions. This worm directly removed from the stomach wall by means of a gastroendoscopic biopsy clipper. The patient's complaint disappeared in 2 days after having removed it and treated with 30 mg Predonin per day.

Morphology and Identification of the Removed Parasite

The worm taken out with a biopsy clipper was still moving in salin solution. This worm was fixed 10% formalin solution, cleared with glycerine alcohol and examined

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with microscope.

The nematode larva (Photograph 1) was stout, 20.26 mm in length and 0.69 mm in maximum width, and whitish color after the fixation with formalin solution. The larva was found partially exsheathed at anterior part (Photograph 2). Accordingly the boring tooth was lacking. The mouth was surrounded by three rudimentary lips with barely apparent dentigerous-ridges on each (Photograph 3). Interlabia absent. An excretory pore opended between two subventral lips. A nerve ring was found at 0.38 mm from the anterior end. A short square ventriculus (V in Photograph 2; 0.36 mm long and 0.21 mm wide) was observed between the developed muscular portion of esophagus (1.57 mm in length) and the intestine. The junction with ventriculus and intestine was horizontal. Both a ventricular appendix and an intestinal caecum were not found. The tail (Photographs 4 and 5; arrow: anus) was conical, tapering evenly to a point and lacking in a mucron. Length of the tail was 0.17 mm. Reproductive organs were not seen to be developed. The cuticle was slightly striated transversely. Indices α, β_1, β_2, β_3 and γ were 29.36, 10.50, 12.99, 56.28 and 119.18 respectively (Table 1).

On the basis of these characteristics (especially, the presence of a wide and short ventriculus and a conical and tapering tail), the larva could be identified as a *Anisakis* Type-II larva described by Berland (1961) and Koyama *et al.* (1969).

Discussion

Since two types of *Anisakis* larvae (I and II) found in the fishes and the squids captured in Japanese waters were described by Kobayashi *et al.* (1966), the surveys for many fishes and squids have been conducted by many research workers in Japan and *Anisakis* Type-II larvae have been found from 32 species of fishes and 2 species of squids captured in the neighbouring waters

Table 1 Measurements and indexes of *Anisakis* Type-II larva reported before and the present larva

	Anisakis Type-II larva Koyama *et al.* (1969)	Present larva
Structure measured		
Body length	30.3 (24.5 - 32.9) mm	20.26 mm
Body width	0.57(0.50- 0.69)	0.69
Esophagus		
Muscular	2.31(2.14- 2.67)	1.57
Ventriculus	0.62(0.54- 0.75)	0.36 by 0.21
Total	2.93(2.68- 3.42)	1.93
Tail	0.27(0.18- 0.32)	0.17
Indexes*		
α	53.13(44.8 - 59.7)	29.36
β_1	10.34(8.78- 11.31)	10.50
β_2	13.14(11.3 - 14.4)	12.99
β_3	49.03(39.2 - 54.7)	56.28
γ	114.27(89.6 -168.0)	119.18

* $\alpha = \frac{\text{Body length}}{\text{Body width}}$; $\beta_1 = \frac{\text{Body length}}{\text{Esophagus}}$;
$\beta_2 = \frac{\text{Body length}}{\text{Muscular part of esophagus}}$; $\beta_3 = \frac{\text{Body length}}{\text{Ventriculus}}$;
$\gamma = \frac{\text{Body length}}{\text{Tail}}$

of Japan (Kagei, 1970; Oshima, 1972 and after). *Katsuwonus pelamis* and *Todarodes pacificus* were known as most popular hosts of *Anisakis* Type-II larvae, but not reported on their habitat in the fishes and the squids. According to Berland (1961) and Koyama *et al.* (1969), *Anisakis* Type-II larva is larger in width and shorter in length of ventriculus than in those of Type-I larva. And the junction of the ventriculus and the intestine of Type-II larva is horizontal and the tail is conically tapering without a mucron at the tip. The well developed lips and the partially exsheathed anterior part of the present worm suggest that this larva has been molting in the stomach of the patient and much more developing than the *Anisakis* Type-II larva commonly found in fishes and squids.

The present larva was confiremed to be the forth stage one of *Anisakis* Type-II (Berland, 1961 and Koyama *et al.*, 1969) based on the data indicated in Table 1 and the photographs as well as the above-mentioned morphological features.

In the experimental infection of *Anisakis* Type-II larva to dogs, rabbits and rats, Shiraki (1969), Kikuchi *et al.* (1970) and Yamada (1971) observed that these larvae produced serious damages to the digestive tract of these animals, and suggested that *Anisakis* Type-II larva should be also taken into consideration for studying anisakiasis.

The custom of eating raw fishes or squids is so common among the Japanese, and it has been suggested that *Anisakis* Type-II larvae may be transmitted to man through eating infected marinefishes and squids raw. The present case is a first record of Anisakiasis caused by *Anisakis* Type-II larva. With further surveys and careful examinations on the patients suffered from acute abdominal symptom after eating raw fishes or squids, additional cases similar to the present case may be probably found.

Summary

A case of human anisakiasis was reported in which a nematode larva was found penetrated into the stomach wall. Judging from the morphological features, the worm was identified as *Anisakis* Type-II larva. It was considered that the infection may have been possibly caused by having eaten rawfish, *Katsuwonus pelamis* or raw squid, *Todarodes pacificus* contaminated with this worm. This is the first record of a case of gastric disorder accompanying severe epigastric pain caused by *Anisakis* Type-II larva.

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Anisakis II 型幼虫による急性腹症の1例

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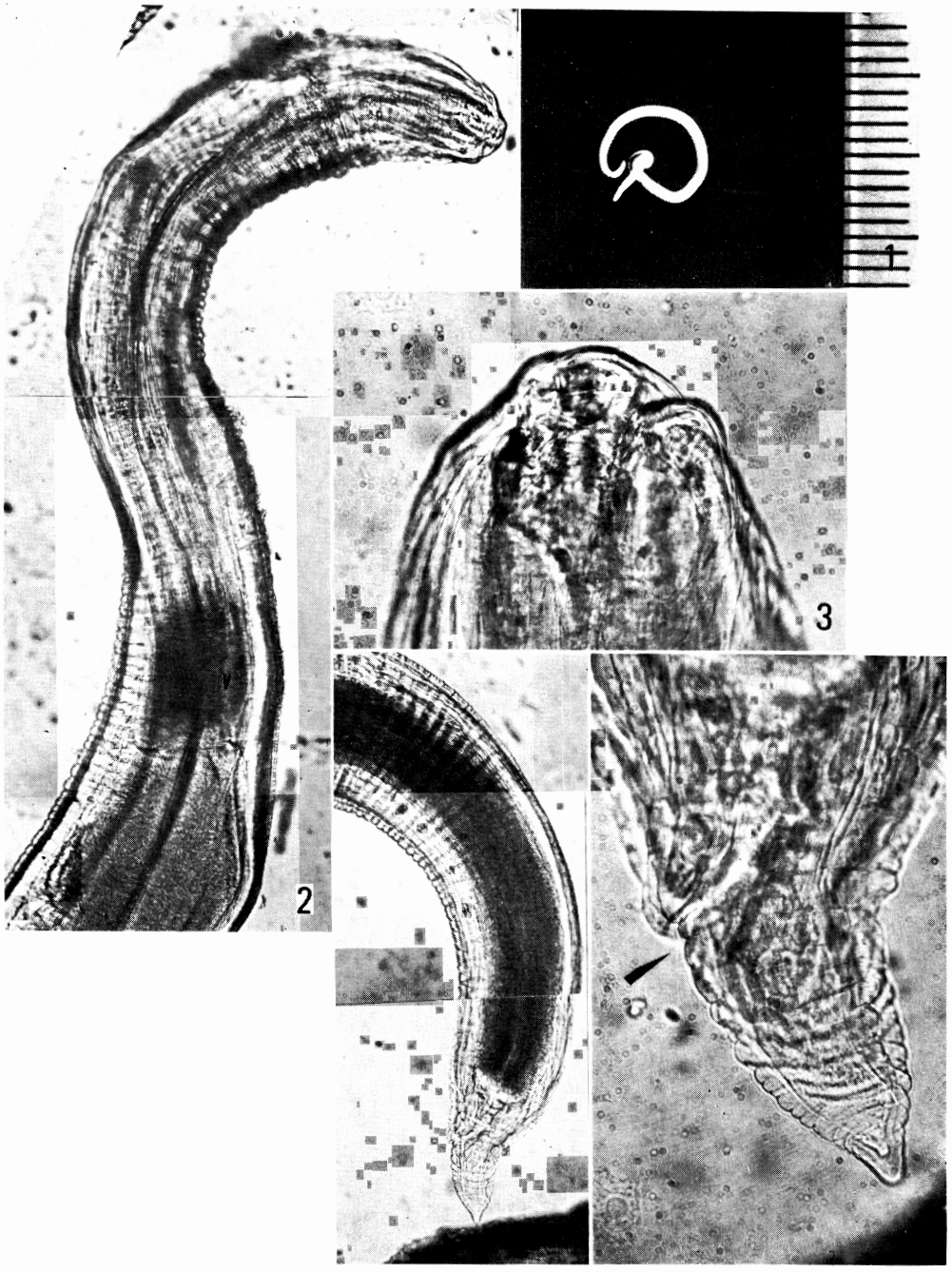
1978年4月，静岡県浜松市在住の14歳の少女が夕食にスルメイカのすし並びにカツオの刺身を食べたところ，その後急激な腹痛が生じた．浜松日赤病院にて胃内視鏡検査を行つたところ，胃壁に侵入せる幼線虫を見出した．胃生検用鉗子で摘出した虫体を顕微鏡で詳細に検討した結果，胃部が短かく，胃部と腸との移行部が斜めでなく，尾部は円錐形にとがり，尾端には mucron がないなどの点から *Anisakis* II 型幼虫と同定された．*Anisakis* II 型幼虫による人アニサキス症は本症例が始めてである．



Explanation of Photos

Photo. 1 A whole specimen of the worm.
Photo. 2 Anterior part of the worm (V : ventriculus).
Photo. 3 Lips.
Photo. 4 Posterior part of the worm.
Photo. 5 Conical tail of the worm (arrow : anus).