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A Human Case Infected by the Larva of *Terranova* type A in Korea

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INTRODUCTION

Human infections by anisakid larvae have been reported in the Netherlands and Japan, where some of marine fishes are consumed raw or under improperly cooked conditions. Most of the cases were found infected with *Anisakis* larvae but *Terranova* type A was also identified (Kagei *et al.*, 1972; Suzuki *et al.*, 1972: Koyama *et al.*, 1972; Fujino *et al.*, 1984).

A total of 8 cases of anisakiasis has been reported in Korea. In the first case, the worm was resided at pharyngeal wall (Kim *et al.*, 1971), the second at ileum (Cho *et al.*, 1980) and the others at gastric wall (Lee *et al.*, 1981; Jeong *et* Suk, 1984). However, the parasitological description on the species of worm is only available in the first case who was diagnosed as *Anisakis* type I larva infection.

The authors experienced a case suffering from acute abdominal syndrome and collected an *Anisakis*-like larva(*Terranova* type A) from abdominal cavity of the patient. This paper deals with the first human case infected by *Terranova* type A larva in Korea.

CASE DESCRIPTION

A 23-year old Korean male was admitted to Department of General Surgery, Seoul District Armed Forces General Hospital, in July 1984. The chief complaint of the patient was acute abdominal pain which firstly appeared at left lower abdomen and extended to right lower quadrant about 10 hours after the abrupt onset. On physical examination, systolic murmur was heard along left sternal border. Rebound tenderness was positive at right lower abdomen. Electrocardiography showed left ventricular hypertrophy. Elongated aortic knob and spina bifida were found at chest roentgenography. His blood pressure was 180/120 at right and 120/70 at left arms. Laboratory examination revealed leukocytosis(total white blood cell count: 12, 400) but otherwise within normal limits. Gastric fiberscopy showed no abnormality.

The patient, in military service, has lived in Incheon, the western port city, before the recruitment. He used to eat raw flesh of marine fishes, and after an episodic eating just 2 days ago the onset of abdominal pain occurred. He has occasionally experienced epigastric discomfort for 2~3 years due to unknown reason.

He was sent to the operation room under the clinical impression of acute appendicitis with underlying aortic stenosis. His peritoneal cavity was opened by Rockey-Davis incision under spinal anesthesia. His appendix was 7cm long. It was slightly edematous and showed serosal congestion, but with neither gangrenous change nor perforation. There was yellowish ascitic fluid, about 30ml in amount, in his pelvic cavity. The surgeons observed a whitish worm, about

2～3cm long, moving on the serosal wall of ileum just proximal to ileocecal junction. The worm was removed. About 80cm segment of terminal ileum was further explored for other worms but none was found. Appendectomy was performed and operation finished. Histopathologically the resected appendix was normal except for serosal congestion. Follow-up examination revealed normal findings except elevated eosinophil count, 11% of all white blood cells, on 7th day after the operation. The patient was discharged without complication on the next day.

DESCRIPTION OF WORM

The worm measured 25.76mm long and 0.66 mm wide. Table 1 summarizes the measurements of various organs and their indices. It has three lips at anterior end where the muscular esophagus originates (Fig. 1). Ventriculus, 0.98mm long, is directly connected with esophagus without any appendage. Intestine begins at distal end of ventriculus, however, its cecum stretches anteriorly to the level of anterior one-third portion of ventriculus (Fig. 2). Tail ends bluntly with a mucron (Fig. 3).

Table 1. Measurements (mm) and indices of the anisakid larva from the present case in comparison with *Terranova* type A larva

Structures	Present worm	*Terranova* type A larva by Koyama *et al.* (1969) mean (range)
Body length (L)	25.76	24.2 (11.0～37.2)
Body width (W)	0.66	0.57 (0.3～0.95)
Esophagus (E)	2.99	2.54 (1.67～3.50)
Muscular esophagus (ME)	2.01	1.68 (1.04～2.4)
Ventriculus (V)	0.98	0.87 (0.6～1.1)
Tail (T)	0.12	0.11 (0.08～0.14)
Cecum (C)	0.73	0.55 (0.27～1.01)
Indices		
α (L/W)	39.03	42.5 (31.1～48.0)
β_1 (L/E)	8.62	9.2 (6.59～11.52)
β_2 (L/ME)	12.82	14.4 (10.6～18.2)
β_3 (L/V)	26.29	27.9 (17.5～33.8)
γ (L/T)	214.69	220.0 (122.2～372.0)
W (V/C)	1.34	1.67 (1.09～2.33)
Y (L/C)	35.29	44.0 (31.8～68.4)

Intestinal lumen was filled with food material which made the intestine turbid for observation. No other special organ was present, therefore, it was regarded as a larval nematode belonging to Ascaroidea because of the morphology of lips. And the body size and morphological feature near esophagus suggested it to be one of the anisakid larvae. It was further identified as *Terranova* type A larva according to the description by Koyama *et al.* (1969).

DISCUSSION

The species of anisakid larvae are distinguished one another by their esophagointestinal morphology and measurements (Koyama *et al.*, 1969). The present worm has no ventricular appendage, so that *Raphidascaris* and *Contracaecum* spp. are ruled out. *Anisakis* spp. are also excluded because of the presence of intestinal cecum. Therefore, it is regarded as *Terranova* sp., in which two types of larvae, type A and B, are known. The present worm has a mucron at posterior end and cecum reaching to anterior one-third level of ventriculus, which features are compatible with *Terranova* type A larva. The two types of larvae are also different in body length; type A ranges 11.0～37.2mm (mean 24.2) and type B about 6.6～6.7mm (Koyama *et al.*, 1969). The present worm is 25.76mm long and agrees to type A.

Human infection with *Terranova* larva was firstly described by Suzuki *et al.* (1972) in 5 cases. A considerably many of succeeding cases have been reported in Japan (Kagei *et al.*, 1972; Nagano *et al.*, 1979; Fujino *et al.*, 1984). The lesion was almost always at gastric wall and the most frequent symptom was epigastric pain (Suzuki *et al.*, 1972). In the present case, however, the parasitic location was in abdominal cavity and the symptom was lower abdominal pain mimicking acute appendicitis. In this respect this case is one of the rare occasions in manifesting disease due to *Terranova* infection. Surgical intervention was inevitable for

correct diagnosis and treatment. The circulatory disorder coexistent in this case is considered not necessarily due to *Terranova* infection.

It remains to be a question that, in spite of popular habit of eating raw marine fishes in Korea, only a few cases of human anisakiasis have been reported. Some cases may have been unnoticed and regarded simply as gastritis, gastric ulcer or other acute abdominal conditions. Keen observations by physicians, pathologists and parasitologists are needed to diagnose further cases.

SUMMARY

A human case infected with *Terranova* type A larva was found in Korea. The patient was a 23-year old soldier of the Korean Army and the chief complaint was acute abdominal pain. The pain was chiefly at right lower quadrant. Appendectomy was performed under the clinical impression of acute appendicitis. However, during the surgery, a nematode larva was found moving on the serosal surface of terminal ileum.

The worm was 25.76mm long and 0.66mm wide, and had the intestinal cecum reaching to anterior one-third level of ventriculus and a mucron at posterior end. Therefore, it was diagnosed as *Terranova* type A larva. This is the first human case of *Terranova* type A larva infection in Korea.

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=國文抄錄=

Terranova type A 幼蟲에 의한 人體感染 1例

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아니사키스樣 幼蟲(*Anisakis*-like larva)에 의한 人體感染은 日本과 네델란드 등지에서 많은 症例가 알려져 있다. 이들 人體寄生例의 대부분은 *Anisakis*屬 幼蟲에 의한 感染이며 일부만이 *Terranova* A型 幼蟲에 의한 것이다.

우리나라에는 지금까지 8例의 아니사키스症이 報告되어 있으나 咽頭에서 완전한 蟲體를 꺼내어 *Anisakis* type I 幼蟲으로 기록한 첫 例를 제외하고는 種을 同定한 경우는 없다. 著者들은 1984年 7月 급성충수돌기염의 진단하에 수술을 시행한 23세 남자의 腹腔에서 움직이는 백색 蟲體를 적출하고 *Terranova* type A幼蟲으로 同定하였다.

患者는 右下腹部에 심한 痛症이 있었고 左下腹部에도 壓痛이 있어 급성충수돌기염의 症狀을 보였고 대동맥판막 협착증의 소견을 나타내었다. 患者는 어릴때부터 생선회를 즐겨 먹었고 발병 2일전에도 먹은 기억이 있다고 하였다. 충수돌기절제술 시행도중 廻盲部근처의 廻腸壁을 기어다니는 蟲體를 발견하게되어 이 蟲體가 急性腹症(acute abdomen)의 原因이었음을 확인하였다.

蟲體는 길이 25.76mm, 폭 0.66mm이었고 盲腸이 胃樣食道(ventriculus)쪽으로 올라와 있었으며 蟲體後端에 mucron이 뚜렷하여 *Terranova* type A 幼蟲으로 同定되었다. 따라서 이 症例는 우리나라에서 *Terranova* 幼蟲 人體感染에 대한 최초 報告例이다.

EXPLANATIONS FOR FIGURES

Fig. 1. Head part of *Terranova* type A larva showing 3 lips (arrows) and excretory canal (EC), ×200.

Fig. 2. Muscular esophagus (E), ventriculus (V), intestine and intestinal cecum(IC) reaching over mid-level of ventriculus as demarcated by arrows. The characteristic arrangement of *Terranova* type A larva, ×40.

Fig. 3. Tail of *Terranova* type A larva with anus (A) and mucron (M), ×100.


EC
1
V
2
A
3
M