A Second Attack of Anisakis: Intestinal Anisakiasis Following Gastric Anisakiasis

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ABSTRACT
A 50-year-old man presented with epigastric pain after eating raw mackerel. Abdominal computed tomography revealed submucosal edema of the gastric antrum and pelvic ileum. Gastroscopy revealed an Anisakis simplex in the gastric antrum. His epigastric pain resolved after endoscopic removal of the Anisakis; however, he developed right lower quadrant pain the following day. Abdominal computed tomography showed submucosal edema of the terminal ileum involving different ileal loops, which was not present on admission. The patient developed delayed intestinal anisakiasis. A serving of raw fish may contain more than one Anisakis. After gastric anisakiasis, a second Anisakis may cause intestinal anisakiasis.

INTRODUCTION
Anisakiasis is a parasitosis caused by the ingestion of raw fish contaminated with Anisakis simplex. More than 90% of cases of anisakiasis are reported in Japan, where raw fish is frequently consumed as sushi and sashimi.1 Gastrointestinal anisakiasis presents with acute abdominal pain, nausea, and vomiting. Contaminated raw fish may contain numerous Anisakis larvae, so they may simultaneously or metachronously attach to multiple sites of the digestive system.

CASE REPORT
A 50-year-old Japanese man presented with a 1-day history of acute epigastric pain with nausea and vomiting. The patient had consumed raw mackerel approximately 3 hours before the epigastric pain developed. His vital signs were normal. Physical examination showed mild tenderness of his epigastrium without guarding or rebound tenderness. Laboratory findings showed a leukocyte count of 15,300 cells/mL (eosinophils 2%) and a C-reactive protein (CRP) level of 12.29 mg/L. Computed tomography (CT) of the abdomen revealed submucosal edema of the gastric antrum and the pelvic ileum, focally dilated small bowel loops in the ileum, and ascites (Figure 1). The diagnosis of gastric and intestinal anisakiasis was suspected based on the patient’s clinical course and medical examination. Gastroscopy revealed a tortuous polypide penetrating the mucosa in the gastric antrum (Figure 2). The mobile polypide was removed with the use of endoscopic forceps. The patient’s symptoms, including epigastric pain, resolved soon after the procedure. He remained in the hospital for observation.

On day 2 of admission, laboratory tests revealed a leukocyte count of 10,200 cells/mL and a CRP level of 10.29 mg/L. He did not have any abdominal pain or discomfort in the morning, but he developed right lower quadrant pain at night. On day 3, his right lower quadrant pain became persistent. His leukocyte count and CRP level were 10,700 cells/mL and 6.62 mg/L, respectively. Abdominal CT showed the absence of submucosal edema in the gastric antrum (Figure 3). Focal submucosal edema was found in different ileal loops (ie, the pelvic ileum on admission...
Submucosal edema was more severe on day 3 than on admission. We suspected that the patient had developed gastric anisakiasis with asymptomatic intestinal anisakiasis on admission, with subsequent symptomatic manifestation of intestinal anisakiasis on day 3 (delayed intestinal anisakiasis). After administration of intravenous 20 mg prednisolone, the patient’s symptoms immediately improved. He was treated with fasting and 20 mg prednisolone twice a day for 3 days. He recovered and was discharged on day 8. After discharge, the anti-Anisakis IgG/A antibody titer drawn on admission was reported as 1.16 (normal range <1.50). Evaluation of parasites showed Anisakis simplex.

DISCUSSION
Anisakiasis is divided into 3 categories: gastric, intestinal, and ectopic anisakiasis. Gastric anisakiasis is most common, representing approximately 95% of cases. Along with appropriate consideration of the patient’s history, the diagnosis of gastric anisakiasis can easily be confirmed on gastroscopy. However, the diagnosis of intestinal anisakiasis is difficult and is commonly made based on the presence of characteristic CT findings: severe submucosal edema of the involved gastrointestinal area, fat infiltration in the mesentery, and ascites. Immunological examinations (eg, Anisakis-specific IgA, IgG, and IgE) are often used. However, anti-Anisakis antibody titer is not elevated in the early phase (70% sensitivity and 87% specificity), and results take time to be reported.

The key difference between gastric and intestinal anisakiasis is the time interval from raw fish ingestion to clinical symptom
onset. Gastric anisakiasis symptoms develop earlier than intestinal anisakiasis (7 hours vs. 36 hours). Our patient did not have any abdominal pain for at least 24 hours after endoscopic removal of the gastric Anisakis, but he developed pain in the right lower quadrant at least 36 hours after raw mackerel ingestion. We believe that the patient developed intestinal anisakiasis following gastric anisakiasis.

Contaminated raw fish may contain several Anisakis larvae. In patients with gastric anisakiasis diagnosed via gastroscopy, 12.9% of patients were infected with multiple larvae; in one case, a total of 56 larvae were reported. In another case, Anisakis was reported to simultaneously invade the stomach and the colon. Although Anisakis larvae die within 14 days in the human body, they may simultaneously or metachronously attach to multiple sites of the digestive system during their lifespan. Careful gastroscopic observation should be performed to determine whether other Anisakis remain. Furthermore, repeat CT is necessary if patients have recurrent symptoms within a few days.

The etiology of anisakiasis is not fully elucidated, but it is considered to involve direct tissue damage and allergic reactions to the Anisakis larvae. Therefore, removal of the larvae is important for treatment. In our case, gastric anisakiasis and intestinal anisakiasis were treated with gastroscopic removal and administration of 40 mg prednisolone for 3 days. In acute allergic reactions, such as asthma, anaphylaxis, or food allergy, prednisolone 30–60 mg/day (0.5–1 mg/kg) is often prescribed for 3–5 days. Although there have been few reports on the efficacy of steroid therapy, this anti-inflammatory treatment could potentially resolve intestinal anisakiasis symptoms and reduce the length of hospital stay.

Anisakiasis should be considered in patients with abdominal pain after raw fish ingestion. However, there are differences in the presentation, diagnostic methods, and management between gastric anisakiasis and intestinal anisakiasis. In addition, a serving of raw fish may contain more than one Anisakis. After gastric anisakiasis, another Anisakis that remains in the gastrointestinal tract may cause intestinal anisakiasis.

**DISCLOSURES**

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