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CASE REPORT | ESOPHAGUS

# You Are What You Eat: A Case of Nematode-Induced Eosinophilic Esophagitis

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## ABSTRACT

Human anisakiasis is acquired through eating raw or undercooked saltwater fish or squid. Infestation with living larvae caused by eating parasitized fish often times results in gastroenteritis. It mainly involves the stomach and small intestine with no reported cases of eosinophilic esophagitis caused by *Anisakidea*. A 41-year-old man presented for the evaluation of 1 year of dysphagia to solid foods and was found to have endoscopic findings consistent with eosinophilic esophagitis with pathology showing 100 eosinophils per high-power field. During endoscopy, a roundworm, later identified as *Anisakidae* species, was found. Patient was treated with a 6-week course of albendazole with symptomatic, endoscopic, and histologic improvement.

## INTRODUCTION

Human anisakiasis was first reported in 1960 in a patient from Netherlands[1] and is acquired through eating raw or undercooked saltwater fish or squid.[2] Two members of the *Anisakidae* family, *Anisakis simplex* and *Pseudoterranova decipiens*, cause most human infections.[2] Most reported cases worldwide are in coastal areas.[2] Although *Anisakidae*-infected marine life exists in all major oceans, there are regional variations in which type of marine life is more commonly the culprit in causing disease. For example, in the United States, wild salmon carries the highest prevalence of infection.[2] Infestation with living larvae caused by eating parasitized fish often results in gastroenteritis with cases reported in the literature.[3] This is often characterized by peripheral eosinophilia along with an eosinophilic infiltration of the digestive tract and nonspecific gastrointestinal (GI) symptoms of abdominal pain, vomiting, and diarrhea.[4] In contrast, esophageal anisakiasis is a more rare disease, with 28 cases of esophageal anisakiasis compared to 11,989 cases of gastric anisakiasis.[5] Most of the described cases in the literature of esophageal anisakiasis are associated symptomatically with esophageal reflux, with no reported cases of dysphagia and eosinophilic esophagitis caused by the *Anisakidae* species. [6]

## CASE REPORT

A 41-year-old man with a past medical history of allergic rhinitis and asthma presented to gastroenterology clinic for evaluation of dysphagia that had developed over the previous year. He had difficulty swallowing solids, especially thick solids like steak. He did not have any difficulty swallowing liquids or soft foods. His symptoms were intermittent. He otherwise denied chest pain, regurgitation, and nausea. He subsequently underwent upper GI endoscopy, which was significant for ringed esophagus, longitudinal furrows, and white plaques in the entire esophagus concerning for eosinophilic esophagitis (Figure 1). In the stomach, a roundworm was found and removed (Figure 2). Pathology of the esophagus was significant for 100 eosinophils per high-power field (HPF) in all biopsies (Figure 3). In addition, the worm was identified as a nematode, likely an *Anisakidae* species. Of note, the patient did not have peripheral eosinophilia.

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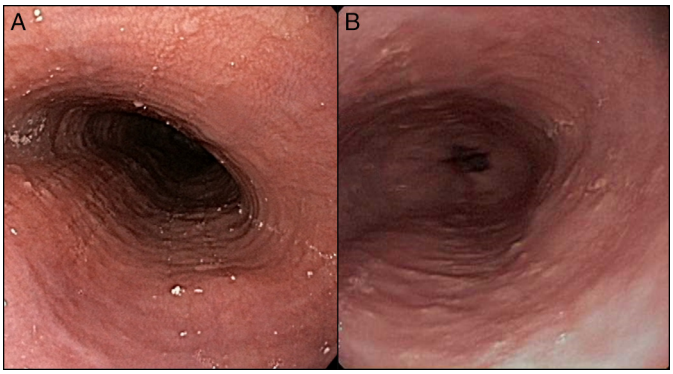


**Figure 1.** (A) Initial endoscopy showing esophagus with longitudinal furrows, microabscesses, and rings. (B) Post-treatment endoscopy showing improvement in longitudinal furrows, microabscesses and rings.

Due to the findings of anisakiasis, the patient was treated with a 6-week course of albendazole. He was not treated with any proton pump inhibitors throughout this period. He subsequently underwent repeat upper GI endoscopy after completion of his antiparasitic treatment. The esophageal mucosal findings were improved from initial endoscopy, with pathology showing marked improvement in mucosal eosinophilia of only 9 eosinophils per HPF. In addition, his symptoms of dysphagia were also improved.

## DISCUSSION

The major clinical syndromes of symptomatic anisakiasis include gastric, intestinal, ectopic, and allergic syndromes.[2] Aside from endoscopic visualization of the worm embedded in the mucosa, diagnosis can be established by radiographic findings of filling defects and mucosal edema seen with barium studies and computed tomography and with serologic findings using specific antibodies of immunoglobulin A (IgA), IgG, and IgE *Anisakis simplex*.[2,8] Serologic testing has a sensitivity of 70–80%[8]. Although peripheral and tissue eosinophilia are features of infection with GI helminths, its role in the diagnosis of GI helminths is unknown.[10,11] In mouse models, eosinophilia has a possible role in protecting against repeated exposure to GI helminths.[10,11]The pathogenicity of *Anisakis* is in part due to 2 mechanisms, allergic reactions and direct tissue damage.[8] The natural history of infection includes an acute form and a chronic form.[9] The infection usually begins within 1 hour of ingestion, and the larvae usually die within 14 days. The acute form of the disease occurs due to tissue damage from attachment of the ingested larvae onto the GI mucosa. The chronic form of the disease occurs with penetration and migration of the larvae into the wall of the GI tract.[9]

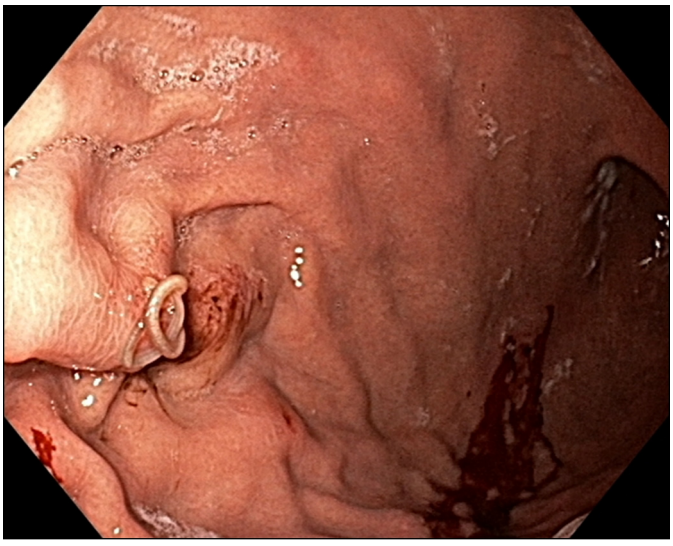

**Figure 2.** Nematode found in the gastric body with pathology consistent with *Anisakidae* species.

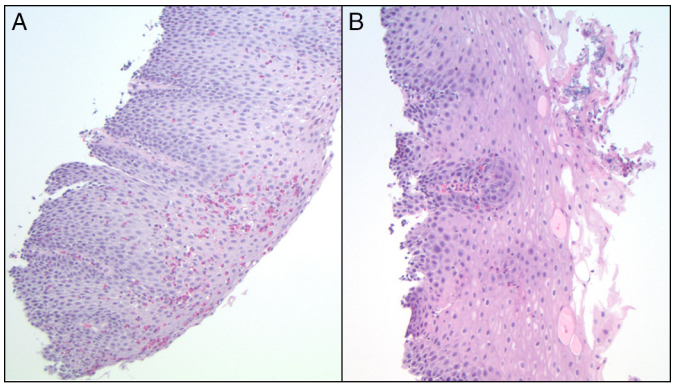


**Figure 3.** Pathology showing (A) 100 eosinophils per high-power field on initial endoscopy, and (B) improvement with only 9 eosinophils per high-power field on post-treatment endoscopy.

Gastric anisakiasis usually manifests with epigastric pain, nausea, and vomiting. In rare cases, hematemesis has also been described.[7] In addition, the time from ingestion to symptom onset is about 12 hours.[7] Esophageal involvement has been reported, with the primary symptoms being esophageal reflux and cough.[2,6] The symptoms of *Anisakidae*-induced eosinophilic esophagitis overlap with typical eosinophilic esophagitis and include dysphagia to solids and transient food impaction. In patients with peripheral eosinophilia, a pertinent history, or high degree of suspicion, nematode-induced eosinophilic esophagitis should be considered. This is especially important as early endoscopic removal of the larvae is the first step in treatment of *Anisakidae*-induced eosinophilic esophagitis, in addition to anti-parasitic medications as shown in our case.[2] Preventative measures against infection include education on the dangers of consumption of raw marine fish or squid and visual examination of fish with extraction of larvae. Heating to temperatures >60°C or freezing to –20°C for 7 days is also effective in eliminating larvae.[2] Our patient's symptoms improved significantly after 6 weeks of treatment with albendazole. Even more significant is the improvement in endoscopic and histologic findings, with the eosinophil count

dropping from 100 per HPF to only 9 per HPF (Figure 3). Nematode-induced eosinophilic esophagitis is a rare but important diagnosis to consider as early diagnosis and treatment can be potentially curative.

## DISCLOSURES

Author contributions: M. Rezapour wrote the manuscript. N. Agarwal reviewed and edited the manuscript, and is the article guarantor.

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Informed consent was obtained for this case report.

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