https://doi.org/10.1016/j.jemermed.2019.08.038

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Clinical
Communications: Adult

A CASE REPORT OF ADHESIONAL SMALL BOWEL OBSTRUCTION CAUSED BY EXTRAINTESTINAL ANISAKIASIS

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□ **Abstract—Background: Small bowel obstruction (SBO) is a common diagnosis made in the emergency department (ED). We present a case with an unusual underlying cause of SBO: extraintestinal infection with an *Anisakis* roundworm. Case Report: A healthy young woman with no prior abdominal surgery presented with epigastric abdominal pain, nausea, and anorexia 1 day after eating a raw oyster. Laboratory studies were significant for 14% eosinophilia. Initial abdominal computed tomography (CT) showed small bowel inflammation and small-volume ascites. After discharge home, she returned on day 14 of illness with a closed-loop SBO, to which she was predisposed by an adhesion formed in association with an eosinophilic abscess containing an *Anisakis* roundworm. Why Should an Emergency Physician Be Aware of This?: Anisakiasis is an uncommon cause of common symptoms with which patients may present to EDs. The diagnosis should be considered in patients presenting with abdominal pain and recent ingestion of raw seafood, with suspicion raised further by the presence of focal gastric or small bowel inflammation and ascites on abdominal CT. Extraintestinal anisakiasis can cause inflammation leading to intraabdominal adhesions, a sequela of which is small bowel obstruction. If suspicion for gastric or intestinal anisakiasis is high, treatment with endoscopic removal or albendazole may be initiated. © 2019 Elsevier Inc. All rights reserved.

□ **Keywords**—infectious disease; parasitology; food-borne illness; gastroenterology; helminth; anisakiasis; bowel obstruction

INTRODUCTION

Small bowel obstruction (SBO) is a common diagnosis encountered in the emergency department (ED), but uncommon among patients with no prior abdominal surgery. Among patients with SBO without prior abdominal surgery, adhesions are responsible for about 85% of cases, the etiology of which is usually presumed to be prior episodes of intraabdominal inflammation (1). We present a case of adhesional SBO in which the source of intraabdominal inflammation was a rare helminthic infection: extraintestinal anisakiasis.

CASE REPORT

A healthy 26-year-old woman with no history of abdominal surgery presented to the ED with 2 days of burning periumbilical and epigastric abdominal pain, nausea, and anorexia. She had normal bowel movements and no vomiting. She denied fevers and chills, and review of systems was otherwise negative. She volunteered that she had eaten a raw oyster at a restaurant in New England 1 day prior to symptom onset; she denied other known raw or undercooked seafood intake. She denied recent travel. She had no sick contacts. Vital signs were blood pressure 119/77 mm Hg, heart rate 65 beats/min, temperature 37.2°C, respiratory rate 16 breaths/min, and SpO₂ 100% on room air. On examination, she was generally well appearing, with normal mental status. Her head

was normocephalic and atraumatic, with a clear oropharynx and moist mucous membranes. Her heart had a regular rate and rhythm with normal heart sounds, no murmurs. She was in no respiratory distress, and lungs were clear to auscultation bilaterally. There were no rashes or swollen joints. On abdominal examination, bowel sounds were normal. There was no distension. There was moderate mid-abdominal and left lower quadrant tenderness without rebound or guarding. There was no costovertebral angle tenderness. Basic metabolic panel, liver function tests, lipase, and urinalysis were normal. Urine human chorionic gonadotropin was negative. Complete blood count was significant for white blood cell count of 9.6 thou/μL with 14% eosinophils; absolute eosinophil count was 1.29 thou/μL. Computed tomography (CT) of the abdomen and pelvis (Figure 1) showed focal small bowel wall thickening in the left lower quadrant, and a small amount of intraperitoneal free fluid, reported as a nonspecific finding possibly consistent with gastroenteritis by the reading radiologist. Retrospectively reviewed by an independent radiologist, the findings of enteritis and free fluid were more severe than that usually seen in either gastroenteritis or in physiologic pelvic free fluid in a woman of reproductive age. She was given a presumed diagnosis of gastritis and was discharged with a prescription for omeprazole.
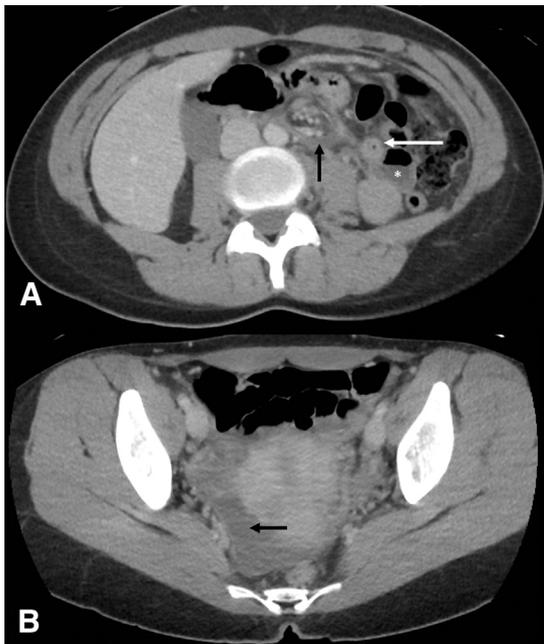
Figure 1. Computed tomography (CT) of the abdomen and pelvis with IV contrast obtained on initial ED visit on day 2 of illness, axial views of the mid-abdomen (Panel A) and pelvis (Panel B). Inflamed small bowel with thickened wall is seen (white arrow) with a nearby loop of non-specifically dilated bowel (asterisk). Ascites (black arrow) is noted in the mesentery and pelvis.

Her pain continued for 1 week without improvement, and then she developed intermittent waves of sharp, severe abdominal pain. She also began to have loose, mucus- and blood-containing bowel movements. She presented to our ED on day 14 of symptoms, having not had a bowel movement or passed flatus in the last 3 days, with severe colicky abdominal pain, vomiting, and intolerance of oral intake. She had received a crystalloid bolus at an urgent care clinic the day prior due to concerns for dehydration. Her vitals were normal except for heart rate of 115 beats/min. Examination showed a distressed woman with distended abdomen with decreased bowel sounds and diffuse tenderness without peritoneal signs. Basic metabolic panel values were as follows: sodium 136 mEq/L, potassium 3.7 mEq/L, chloride 89 mEq/L, carbon dioxide 29 mEq/L, blood urea nitrogen 21 mg/dL, and creatinine 0.93 mg/dL. Liver function tests and complete blood count were within normal limits, with resolution of eosinophilia (absolute eosinophil count 0.19 thou/μL). Serum lactate was 1.8 mmol/L. Urinalysis was significant for 3+ ketones, and otherwise normal.

Repeat CT abdomen/pelvis (Figure 2) showed a markedly dilated stomach and proximal small bowel loops with edema and a small amount of fluid in the mesentery, with a sharp transition at the level of the mid abdomen with angulation and funneling of the mesentery, consistent with SBO and internal hernia. A nasogastric tube was placed, yielding 1.7 L of bilious fluid, which greatly relieved the patient's abdominal pain. In exploratory laparotomy, she was found to have a closed-loop bowel obstruction due to internal hernia and volvulus around an adhesion, with ischemic appearance of involved small bowel. The adhesion was cut, with satisfactory normalization of the appearance of the bowel. A mass was noted at the base of the adhesion in the jejunal mesentery, and this was excised and sent for pathology.

The mesenteric mass was found on pathology to be an eosinophilic abscess containing a roundworm (Figure 3). The worm was degenerated by the host immune response within the abscess, with distortion of anatomic structures required for definite speciation. In the context of this clinical scenario, this worm was most likely an anisakid. On day 35 of illness, the patient was started on a course of oral albendazole 400 mg twice a day for 3 days. Two months postoperatively, her symptoms had resolved except for pain at her surgical site with exercise.

We believe that our patient's original symptoms of abdominal pain were related to inflammation as the worm migrated across the small bowel into the jejunal mesentery, and that the patient's eosinophilia during her initial ED visit reflected this response. The host immune response formed an eosinophilic abscess and intraabdominal adhesion, which was demonstrated during laparotomy to be the cause of a small bowel obstruction.

Figure 2. CT of the abdomen and pelvis with IV contrast obtained on day 14 of illness, coronal (Panel A) and axial (Panel B) views. Markedly dilated stomach and small bowel are noted (asterisk). A transition point is noted (arrow). Imaging is consistent with high grade small bowel obstruction.

Therefore, this is a case of extraintestinal anisakiasis leading to adhesional bowel obstruction. Diagnosis of this condition on the patient's first ED visit would have been difficult, but suspicion could have been raised by the constellation of recent raw seafood ingestion, eosinophilia, and the CT findings of ascites and focal enteritis. Immediate endoscopy may have revealed the worm in transit through the bowel wall and allowed for endoscopic removal; though the translocation may have occurred at a site too distal to be visualized by esophagogastroduodenoscopy. Existing data on antiparasitic medications are too limited to conclude whether initiation of albendazole on the first ED visit would have been likely to prevent the complication of adhesion and small bowel obstruction.

DISCUSSION

This case demonstrates anisakiasis as an uncommon cause of common symptoms with which patients present to the ED: undifferentiated abdominal pain, and later symptoms consistent with small bowel obstruction. Intestinal parasitic infections are relatively rare in the United States, but suspicion is raised when a dietary history includes recent ingestion of raw or undercooked meats. In patients presenting with abdominal pain without prior abdominal surgery, the diagnosis of SBO is often low on the differential diagnosis, as only 3–9% of SBOs occur in patients without prior abdominal surgery [1,2]. Eighty-five percent are caused by adhesions, thought to be caused by prior intraperitoneal inflammation such as from Crohn's disease or diverticulitis [1]. Extraintestinal anisakiasis is a rare cause of such inflammation.

Anisakiasis refers to human disease from a group of parasitic seafood-borne nematodes (roundworms) from the family *Anisakidae*, most commonly the species *Anisakis simplex* or *Pseudoterranova decipiens*. Anisakiasis is most common in Japan and Spain, where ingestion of raw seafood is common [3]. Anisakiasis is believed to be underdiagnosed in the United States [4,5]. Rates of per capita fish and shellfish consumption are rising in the United States, and with this comes the potential for increased incidence of anisakiasis [6].
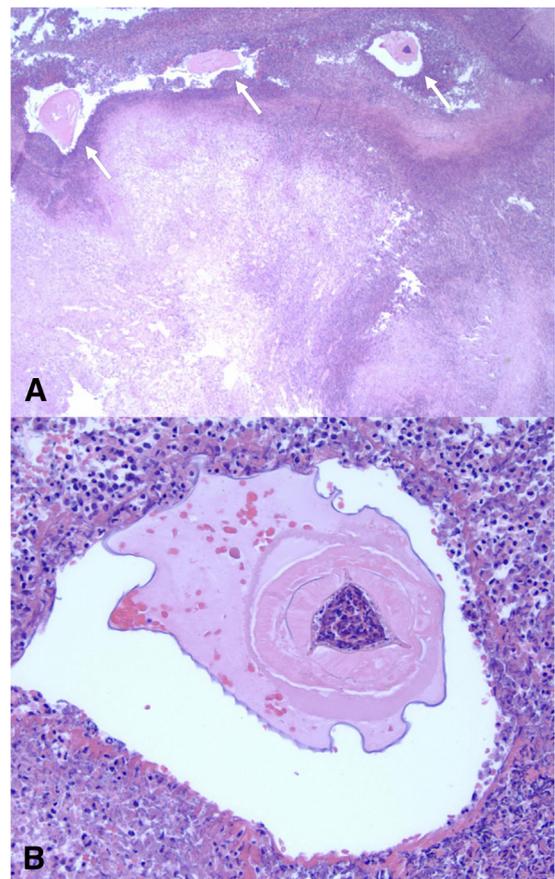
Figure 3. Histopathology of mesenteric mass, hematoxylin and eosin stain. 2x (Panel A) and 30x (Panel B) magnification. Within this eosinophilic abscess, a degenerated worm (arrows) is seen. Degeneration limited precise speciation.
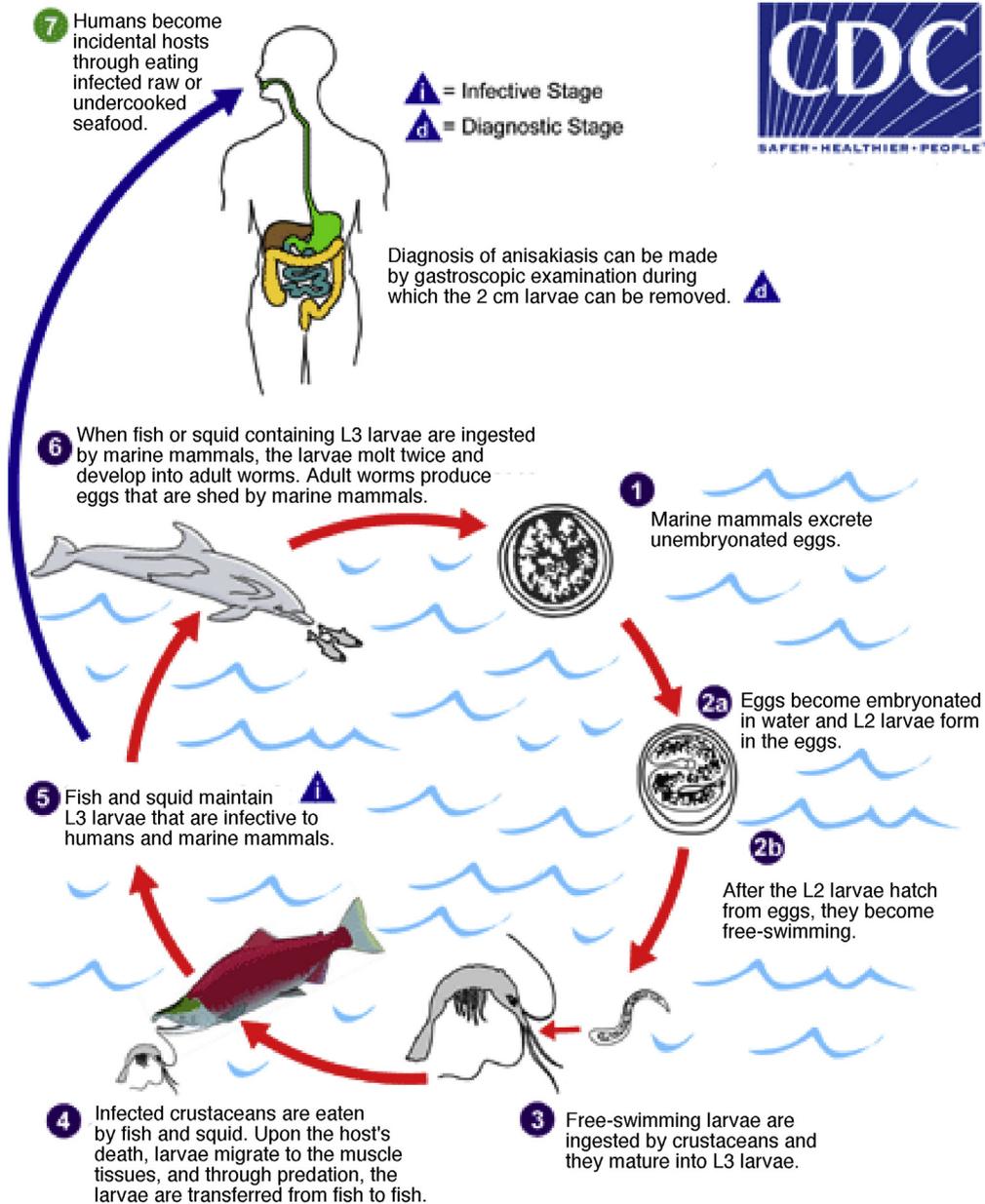
Figure 4. Anisakiasis life cycle.
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Anisakids have a complex lifestyle (Figure 4) (3). Humans are an "accidental host" after ingestion of the third-stage encysted larvae in infected fish or squid. The worms cannot reproduce within a human host, but can cause symptoms through mucosal irritation, and invasion through the bowel wall, resulting in intramural or extraintestinal eosinophilic abscess. Whereas fish and squid are more commonly the source of anisakids affecting humans, oysters and scallops are known to harbor anisakids with the potential to cause human disease (7,8).

A review of 83 cases of anisakiasis in an ED population had 39 gastric and 44 small intestinal cases (5). Pain, nausea, and blood in stools are the most common symptoms. Extraintestinal or ectopic anisakiasis is rare (9). Allergic reactions including angioedema and anaphylaxis can occur (9,10). Bowel wall edema leading to obstruction, perforation, gastrointestinal bleeding, and intussusception are uncommon complications (9). Extraintestinal anisakiasis leading to adhesional small bowel obstruction, as was seen in this case, is extremely rare, with only one prior case reported in the literature (11).

CT findings of anisakiasis in an ED population included gastrointestinal wall thickening in all patients (5). In small intestinal cases, ascites and mesenteric phlegmon were frequently present (5). Our patient's initial CT (Figure 1) showed focal small bowel thickening and ascites characteristic of small intestinal anisakiasis. Gastric anisakiasis is diagnosed definitively by endoscopy with direct visualization, and simultaneously treated by endoscopic removal of the worm (3,5). Diagnosis of intestinal anisakiasis is more difficult, given that an intact organism often cannot be directly visualized sufficiently for speciation. The sensitivity of eosinophilia for the intestinal anisakiasis is not known; and though eosinophilia raises suspicion for parasitic infection, it is not specific. Elevated anti-*Anasakis* immunoglobulin (Ig)G/IgA titers assessed by enzyme-linked immunosorbent assay have reported sensitivity of 70.4% and specificity of 87.1% (12–14). Elevated *Anisakis*-specific IgE may also be useful for this diagnosis, though specificity is limited by elevated titers being common in persons who regularly consume raw fish (15).

No definitive treatment guidelines exist for intestinal anisakiasis, and it tends to be a self-limited disease. Treatment to reduce the host inflammatory response with antihistamines and corticosteroids is sometimes given. Albendazole has been reported to improve symptoms in one patient with prolonged abdominal pain attributed to anisakiasis, and in 3 patients with ileus attributed to anisakiasis (16,17). Evidence for anthelmintic medications remains limited to case reports. Typical albendazole dosing is 400 to 800 mg orally for 6 to 21 days (18).

Prevention consists of avoidance of undercooked fish and squid. If raw fish is consumed, the risk is mitigated by freezing at −20°C (−4°F) for 7 days or −35°C (−31°F) for at least 15 h prior to consumption (4).

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Anisakiasis is an uncommon cause of common symptoms with which patients present to EDs. We recommend obtaining a brief dietary history in patients presenting with abdominal pain, specifically regarding raw and undercooked foods. Anisakiasis should be considered in patients presenting with abdominal pain and recent ingestion of raw seafood. Suspicion is raised further by eosinophilia and by the presence of focal gastric or small bowel inflammation and ascites on abdominal CT. If suspicion for anisakiasis is high, we recommended pursuing diagnostic and therapeutic endoscopy and consideration of treatment with albendazole. Extraintestinal anisakiasis is one of many conditions that can cause inflammation leading to intraabdominal adhesions in patients with no history of abdominal surgery, a rare sequela of which is small bowel obstruction.

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