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Case study

Complications of intestinal ascariasis requiring surgical intervention

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ABSTRACT

As a global parasitic disease, Ascariasis has the highest prevalence in the tropical areas of developing countries, such as Yemen. This study was conducted to present our experience in three cases of surgical complications of ascariasis, represented by intestinal obstruction, acute acalculous cholecystitis, and acute appendicitis. Occasional severe manifestations and a high morbidity and mortality rate, especially in endemic areas, make ascariasis a heavy health burden in tropical and subtropical countries. We aim to increase physicians' knowledge and alertness toward ascariasis diagnosis and its severe manifestations.

Keywords: appendicitis, acute cholecystitis, ascaris lumbricoides, complications, intestinal obstruction, surgery

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INTRODUCTION

Worldwide, Ascariasis infection is seen in a quarter of the world's population (1.5 billion people), and the overall prevalence in yemen was 8.3%.[1,2] Ascariasis is a prevalent infestation in tropical countries due to low socioeconomic conditions and poor hygiene. Although conservative management is adapted for most intestinal ascariasis patients, some cases require surgical intervention.[3]

The adult roundworm lives typically in the small intestine, but due to the worms' wanderlust nature to explore orifices, ducts, and cavities, the worms often invade the hepatic and the pancreatic ducts. There are three phases of ascariasis: the pulmonary, intestinal and the complications stage.[2] Patients are normally asymptomatic; however, heavy infestations with worms can lead to threatening complications such as cholecystitis, cholangitis, pancreatitis, liver abscess, intestinal obstruction, peritonitis, and acute appendicitis.[2]

Intestinal obstruction is the most threatening complication of ascariasis infection caused by an acute or subacute aggregation of worms.[4] Acute intestinal obstruction and volvulus prompt the need for emergency surgical intervention.[3] Nevertheless, conservative management is normally the treatment of choice for subacute cases.[5] This study was conducted to present our experience in three cases of surgical complications of ascariasis, represented by intestinal obstruction, acute acalculous cholecystitis, and acute appendicitis.

CASE 1

The patient was an 8-year old boy who was admitted with vomiting, constipation, and abdominal pain that started five days ago. On physical examination (P/E) patient had abdominal distension and rigidity and was febrile and tachypneic. Plain abdominal X-ray showed multiple air-fluid levels typical for intestinal obstruction. Although no apparent cause for obstruction was detected in ultrasound (US) imaging, dilated bowel loops with peristaltic movement and echogenic material within the intestine were detected. For decompression, the patient underwent exploratory laparotomy, and enterotomy. Consequently, several worm balls packing the proximal large bowel, terminal ileum, and stomach (nearly 400) were removed (Figure 1). As soon as oral feeding was started, an antihelminthic was given. The dosage was repeated after 6 weeks, and every 3 months later.

CASE 2

The patient was a 48-year old female who came to the emergency ward with a history of pain in the right upper abdomen and epigastric region for six days. Prior history showed that stool worm passage was present. During the P/E, the patient had no abdominal tenderness and was not jaundiced. Liver function test showed raised serum bilirubin (1.2 mg/dl) and alkaline phosphatase of 120 IU/L. Serum amylase level was in the normal range. Blood hemoglobin concentration was12 mg/dl, and mild eosinophilia in leucocyte count of 18 x 109 cells per liter. The US revealed a 4mm x 5 cm non-shadowing ribbon-like structure in the gall bladder with a low echogenic center and high echogenic wall (Figure 2). Diagnosis of gall bladder ascariasis was made. The patient was treatedconservatively

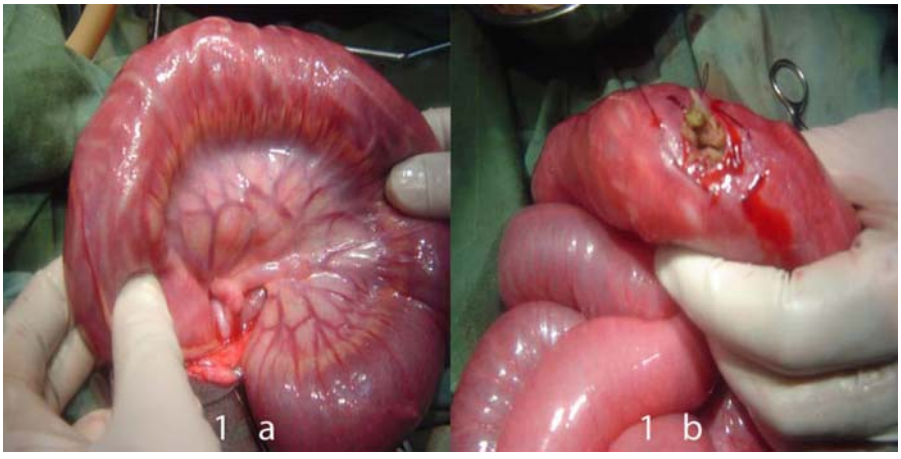

Figure 1. (a) Large number of ascaris seen in lumen of the bowel, and (b) perforations of small intestine.

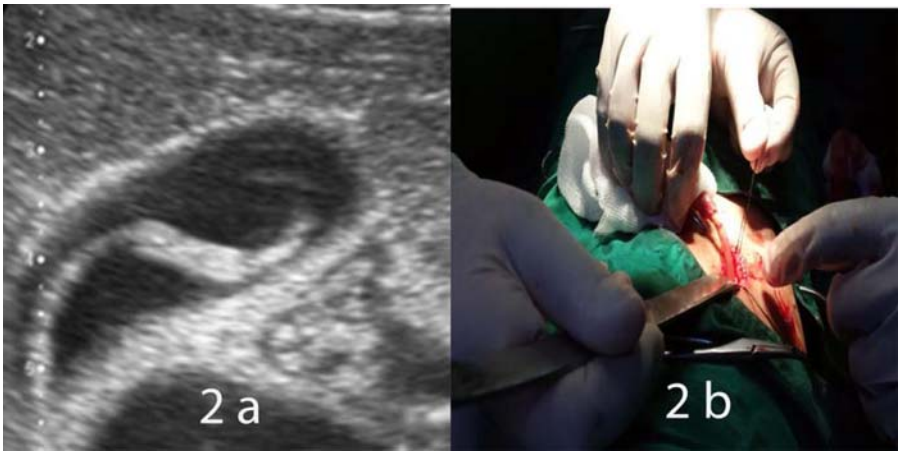

Figure 2. (a) Ultrasound image of ascaris in the gall bladder and (b) gallbladder associated with ascaris.

with albendazole (400 mg) once a week for three consecutive doses. The patient showed no proper response to the treatment, so under general anesthesia, open cholecystectomy revealed a dead tubular structure(a dead ascaris). The patient's postoperative period was uneventful, and US and lab results were normal. The patient was discharged five days after surgery with antihelmenthic drugs.

CASE 3

The patient was an 18-year old boy who visited the emergency department with a history of nausea and vomiting and a deteriorating abdominal pain in the right lower quadrant of the abdomen, which started 24 hours ago. In the P/E, the patient had abdominal tenderness and rigidity in palpation in the right iliac fossa. The US was performed, which revealed a blind-ending distended loop in the right iliac fossa; most likely the appendix. Upon investigation, hemoglobin was 10.2 g/dl, and her whilte blood cell (WBC) was 14.71 /L with a shift to the left. The eosinophil count was normal. The clinical diagnosis was acute appendicitis, and the patient was taken to the operation room. Appendectomy was performed through a Davis incision exhibiting inflammation. While incising its base, the presence of an ascaris Lumbricoides worm occupying the whole appendiceal lumen with extension to the cecum was detected (Figure 3). Appendectomy was completed, and after an uneventful postoperative period, 72 hours later, the patient was discharged after being given a single dose of Albendazole (400 mg).

DISCUSSION

Although the Republic of Yemen, as a tropical country, is an endemic area for ascariasis, there have been only a few ascariasis intestinal obstruction cases, gall bladder ascariasis, and ascariasis of the

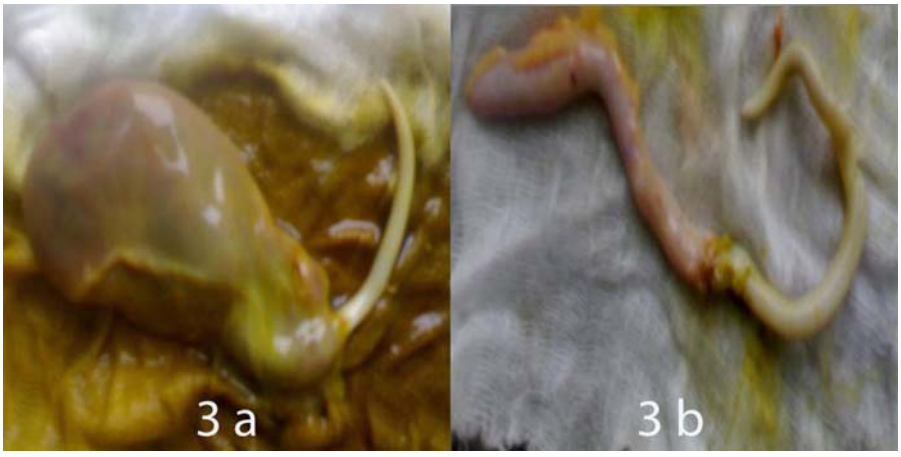

Figure 3. (a) and (b) Presence of an Ascaris Lumbricoides worm occupying the whole appendiceal lumen and extending to the cecum and after removing the appendix.

appendix.[6] The adult worms, via mechanical obstruction, produce symptoms in the small intestine or other migrations sites. Ascaris lumbricoides tends to migrate through natural body orifices; Thus entering the appendix and the common bile duct.[7] Adult worm infestation in the biliary or pancreatic ducts and the small intestine can produce intestinal occlusion, obstructive cholangitis, and cholecystitis, abscesses in the liver, pancreatitis, appendicitis, or peritonitis.[8]

According to Sliva and associations, there are about 1300 million infections with ascariasis worldwide, with 59 million at risk of morbidity. Acute disease is estimated to impact 12 million cases annually, with about 10,000 deaths. With differing degrees of endemic ascariasis, intestinal obstruction was the most prevalent complication, accounting for 38-87.5% of all complications. The majority of morbidity occurs in children.[9]

The highest prevalence of ascariasis is seen in tropical countries, where humid, rainy temperatures offer ideal conditions for infection transmission throughout the year.

This is in contrast to the case in dry regions, where transmission is mostly seasonal and occurs during the rainy season. Additionally, the prevalence is also highest in areas where poor sanitation policies result in increased soil and water pollution. The majority of people infected with ascariasis live in Asia (73 %), Africa (12 %), and South America (8 %), with infection rates as high as 95 % in some populations.[10,11]

The optimal diagnosis of ascariasis in the intestinal system is through the use of ultrasonography (US).[12] In the first case, the symptom was produced by occlusion of the intestinal lumen by worms packed in the distal ileum. Occlusion may be incomplete sub-acute or total acute. Diagnosis of obstruction by plain abdominal X-ray may show air-fluid levels, and the US may show two pairs of echogenic tubular structures. Conservative management leads to a spontaneous resolution in most cases of ascaris partial intestinal obstruction.[13] In patients presenting with acute abdomen, ascaris lumbricoides remains an important differential diagnosis, especially if accompanied by an intestinal obstruction in the ascaris lumbricoides-endemic area.[14] Antiparasitic drugs are considered the primary treatment option for most cases of uncomplicated a scariasis.[2] However, surgical intervention is mandatory in complicated cases. The technique of surgery is determined by the results of the laparotomy. If the bowel is healthy and the obstruction is at the ileum level, the worms may be milked to the caecum without causing damage to the bowel wall. In some case, if the obstruction is in the jejunum and there are several masses, enterotomy can be performed by a horizontal incision with worm removal using sponge-holding forceps. Toxins can be released if the worms are broken during milking. To eliminate worms contaminating the peritoneal cavity, the incision should be closed transversally with extreme caution.[13] In our case, enterotomy was used to remove the worms following cautious milking.

Villamizar et al., investigated ascaris lumbricoides infestation in 87 cases as a source of intestinal obstruction in preschoolers. The majority of cases with a sub - acute condition respond to therapeutic (anthelmintic) were treated with orally administered of Racine oil and piperazine. Of the 23 patients admitted to the operating room, 11 needed external “milking” of the obstructing bolus of worms from the ileum into the colon, 6 required intestinal resection and end-to-end anastomosis, 6 had appendectomy, and 3 required an enterotomy to manually remove the worms. Due to sepsis, one patient needed an ileostomy. After stabilization and anthelmintic therapy, the stoma was closed with an end-to-end ileocolostomy.[15]

An infestation of the gallbladder with ascaris worms, similar to the second case presented in this work, is a rare phenomenon. The narrow, short, and tortuous cystic duct usually limits access to the gallbladder, and the Heister valve prevents an ascaris migration into the gallbladder. In contrast, an acute angulation and a dilation of the cystic duct provide easy access for the nematode. The ascaris size, stage of intestinal development, and patient age and gender are determinant factors affecting migration to the gallbladder.[16] The US is the first and preferred modality of choice for imaging the biliary system.[16] Most of patients were treated by conservative management, while others required surgical intervention.[17] Our case with gallbladder ascariasis was treated conservatively with albendazole (400 mg) once a week for three consecutive doses. However, the patient did not respond to the treatment, and consequently; open cholecystectomy was conducted which revealed a dead tubular structure (dead ascaris).

In another study, Javid et al., reported on detecting anisolated gallbladder ascariasis by US in 47 patients.[8] The cases were medically treated with intravenous fluids, broad-spectrum antibiotics, and antispasmodics. Some patients underwent surgery if they did not remove the worms from the

gallbladder on their own within 7 to 10 days, or if their symptoms worsened (worsening pain, high grad fever, leukocytosis), the gallbladder became larger, or developed with pericholecystic collection. Just 10 of the patients were able to remove the worms on their own, with symptoms and manifestations vanishing. Cholecystectomy was required for the remaining 37 patients, which was consistent with our case.[8]

In our third patient, the clinical picture was straightforward, leading to suspected acute appendicitis, where causative agents of this pathology are numerous and different in their sources, such as bacteria, viruses, and parasites.[5] Therefore, surgical intervention was the choice of treatment. The unusual finding entailed a bizarrely long adult worm occupying the appendix and a part of the cecum which was consistent with what was previously reported by Sforza et al.,.[18] The helminthic infection incidence as a cause of appendicitis is variable but can range from 1.5% to 27.2% in endemic areas, with ascariasis being one of the most significant cases.[5]

The World Health Organization (WHO) reported that up to 10% of the developing world's population are infected with intestinal worms, the majority of these are affected by ascaris. The strategy of WHO for the control of soil-transmitted helminth infections is to control morbidity through the intermittent treatment of the people who live in endemic areas.[19] The management of ascariasis involves primary prevention with proper hygiene and improved sanitation practices to reduce soil contamination with infective eggs, periodic deworming, and specific treatment with antiparasitic medications when cysts are discovered at microscopic stool analysis in effort to effectively reduce the number of cases.[2]

CONCLUSIONS

Occasional severe symptoms requiring urgent surgical intervention and a high morbidity and mortality rate, especially in endemic areas, make ascariasis a heavy health burden in tropical and subtropical countries. Our study discusses surgical complications of ascariasis, which might be fatal. Thus; it is essential to increase physicians' knowledge and alertness toward ascariasis diagnosis and its severe manifestations with focus on physicians operating in endemic areas.

Conflict of interests

The authors declare that they have no competing interests.

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None.

Authors' contributions

All authors contributed to data analysis, drafting or revising the article, gave final approval of the version to be published, and agreed to be accountable for all aspects of the work.

Ethical consideration

Written informed consent was obtained from patients and patients' parents for the participation in our study.

Consent for Publication

Written informed consent for the publication of these cases were obtained from the patients and patients' parents.

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