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Case Report

Acute Intestinal Obstruction Due to Ascariasis in a Child: A Case from a Resource Limited Setting

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Abstract:

Background: Ascariasis remains a widespread and frequently undiagnosed condition, with most cases being asymptomatic. However, severe manifestations can result in total or partial intestinal obstruction. In resource-limited settings, diagnosis primarily depends on clinical presentation, stool examination, and basic radiographic imaging.

***Case*:** A three-year-old child from rural Southwest Sumba presented with vomiting, fever, abdominal pain, and constipation. Physical examination, faecal examination, and imaging revealed partial small bowel obstruction due to an *Ascaris* bolus, complicated by mild to moderate dehydration. Following conservative management including fluid resuscitation, NPO status, NGT insertion, and single dose albendazole, the patient passed numerous worms, improved clinically, and was discharged on day five.

***Discussion*:** This case report highlights the diagnostic and management challenges of a severe form of ascariasis that caused partial small bowel obstruction in a resource-limited setting. The patient's differential diagnoses included intussusception, mesenteric cyst, and abdominal tuberculosis. The patient presented with risk factors including young age, frequent barefoot contact with soil, poverty, residence in an area with limited access to water and healthcare, and a lack of participation in deworming programs. Through clinical assessment, the patient was successfully managed with conservative treatment and antihelminthic therapy.

Conclusion: While small bowel obstruction presents a diagnostic challenge with a wide range of differential diagnoses, ascariasis offers distinct risk factors and can be readily confirmed with basic diagnostic tools. Ascariasis remains a significant public health issue, highlighting the urgent need for intensified community education on hygiene and improved public health infrastructure in Southwest Sumba.

Keywords: ascariasis, deworming program, resource-limited setting, small bowel obstruction

Introduction

Ascariasis, classified as a neglected tropical disease, is an infection of the small intestine caused by the roundworm Ascaris lumbricoides.[1] Ascariasis is the most common helminth infection in humans worldwide, with an estimated one billion people infected globally.[2] While specific prevalence data for ascariasis in Indonesia are lacking, the overall prevalence of soil-transmitted helminthiasis, of which ascariasis is the most prevalent, ranges from 2.5% to 62%.[3] Infection occurs via the fecal-oral route, typically through the ingestion of food or water contaminated with Ascaris eggs from feces-contaminated soil.[4]

Ascariasis is prevalent in tropical and subtropical regions within resource-limited settings, including Indonesia.[5] This disparity in prevalence is attributable to factors common in these settings, such as poor sanitation, limited access to clean water, a lack of deworming programs, and poverty.[6]

Ascariasis is often asymptomatic, leading to underdetection, particularly in adults.[7] However, in children, ascariasis has significant impacts on health, including malnutrition and impaired growth, cognitive development issues, and in severe cases, intestinal obstruction, as observed in the present case.[8]

This case is of particular interest as it directly reports a case of ascariasis presenting with a severe manifestation of ascariasis in a 3-year-old child from Southwest Sumba. The Southwest Sumba region is an area with a relatively high poverty rate. In 2024, the percentage of the poor population reached 102.000 people.[9] This condition is worsened by the geographical landscape, which makes the distance between residential areas and healthcare facilities far and difficult to access. In these resource-limited settings, diagnosis relied on clinical presentation, stool examination, and basic radiographic imaging, such as plain radiography. We also describe the diagnostic approach to ascariasis, emphasizing the importance of recognizing clinical presentation and effectively using available resources.

Case

A three-year-old boy from Waimahaka, Kodi Bangedo District, a remote rural area in Southwest Sumba, presented to the emergency department of Karitas Hospital in December 2024 with a three-day history of vomiting. He had four to five vomiting episodes in a day that were nonbilious, containing food contents. He presented with a two-day history of fever, refused to eat, and mild abdominal pain. He also presented with a one-week history of constipation. According to the parents, the patient's abdomen had appeared distended for the past week. The patient had no previous similar complaints and was otherwise healthy.

He frequently had unprotected contact with soil (i.e., without footwear), infrequent handwashing, and consumption of boiled water from a dug well. The patient had no history of prior deworming medication. There was no family history of tuberculosis. Parental report indicated normal growth and developmental milestones according to his age.

Upon physical examination, the patient presented with signs of mild to moderate dehydration, with a heart rate of 102 beats per minute, a respiration rate of 22 breaths per minute, and a temperature of 37.7 °C. Abdominal examination revealed distension and tenderness to palpation in the right hypochondriac and left lumbar regions. Additionally, a mobile, firm, and elastic mass approximately 2 x 2 cm in size was palpable in the same regions. Bowel sounds were increased and shifting dullness was absent. The remaining head-to-toe examination was unremarkable. The child had good nutritional status.

A complete blood count was normal except for an elevated platelet count of 430,000/µL. Stool analysis was positive for *Ascaris lumbricoides* ova (1 – 5 ova per high power field). Plain abdominal radiography revealed partial small bowel obstruction with a "cigar bundle" appearance in the ascending and descending colon, suggestive of an *Ascaris* bolus (**Figure 1**).

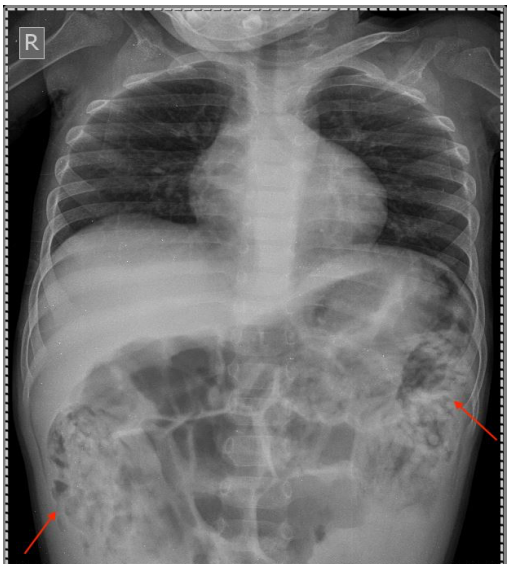

Figure 1. A plain abdominal radiograph of the patient revealed a "cigar bundle" appearance (red arrows).

The patient's signs and symptoms, along with radiographic findings, were consistent with partial bowel obstruction due to an *Ascaris* bolus, complicated by mild to moderate dehydration.

Following diagnosis, the patient was placed on nil per oral (NPO) status, a nasogastric tube (NGT) was inserted, and fluid resuscitation was initiated per guidelines for mild to moderate dehydration. During hospitalization, a shift in the palpable abdominal mass to the umbilical and right iliac regions was noted on day two. Between days two and four, numerous adult *Ascaris lumbricoides* worms were passed in the patient's stool (**Figure 2)**. Oral feeding was subsequently resumed, and a single-dose anthelmintic therapy of albendazole 400 mg was administered for three consecutive days.

Following cessation of worm passage and administration of anthelmintic therapy, the patient exhibited increased activity, resolution of emesis, return of bowel sounds to normal, and passage of stool. Surgical intervention was deemed unnecessary, and the patient was discharged on the fifth day.

Figure 2. *Ascaris lumbricoides* worms passed by the patient.

Discussion

Soil-transmitted Helminth (STH) infections are among the most widespread infections globally, affecting approximately 1.5 billion people, or 24% of the world's population. These infections primarily impact developing countries and underserved communities in tropical and subtropical regions, where access to clean drinking water, adequate sanitation, and proper hygiene is limited. The highest prevalence has been recorded in sub-Saharan Africa, China, South America, and Asia.[10]

This finding aligns with a case observed in our study, involving a preschool-aged boy from a low socioeconomic background residing in a rural community in Indonesia. These established risk factors are particularly pertinent in the context of West Sumba, where access to clean drinking water, adequate sanitation, and proper hygiene remains limited.[11]

The life cycle of *Ascaris lumbricoides* starts when infected eggs are consumed through fecal-oral transmission, a comp (Figure 3). Once inside the body, the eggs hatch into larvae, which penetrate the intestinal mucosa and travel through the portal and systemic circulation to the lungs. Over a period of 10 to 14 days, the larvae continue to mature in the lungs, break through the alveolar walls, move up the bronchial tree to the throat and are then swallowed. Upon returning to the small intestine, they develop into adult worms and are capable of reproducing. Female worms release unfertilized or fertilized eggs, which are then excreted in the feces. In the external environment, under suitable conditions of warmth, moisture, and oxygen, the fertilized eggs embryonate, developing into infective larvae within the eggshell. These embryonated eggs are then capable of infecting a new host, completing the life cycle.[12]

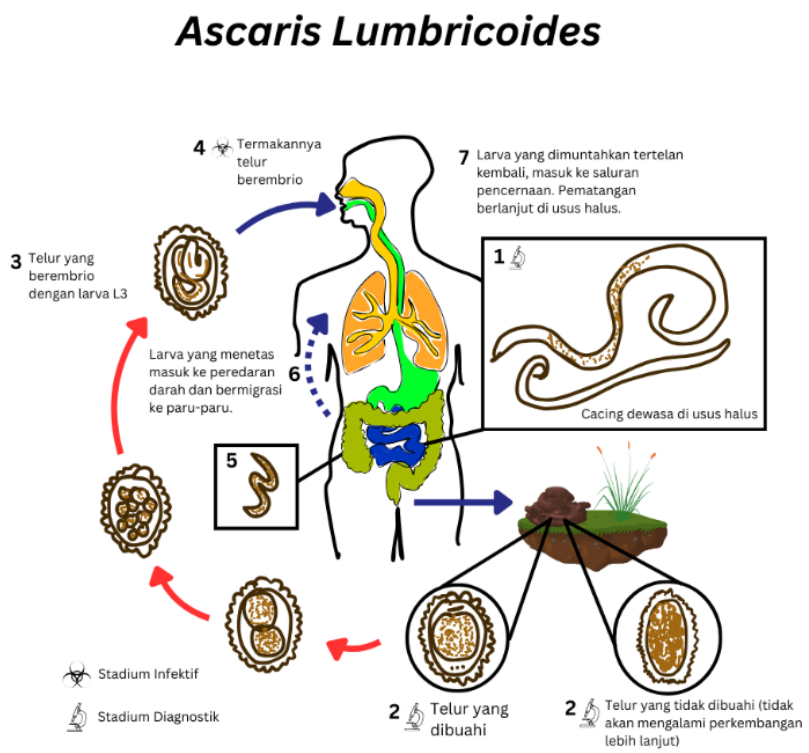

Figure 3. Life cycle of *Ascaris lumbridocides*.[12]

This patient's history included frequent barefoot contact with soil, infrequent handwashing, and consumption of boiled water from a dug well, all of which are recognized risk factors for soil-transmitted helminth infections. Although infection can occur at any age, preschool and early school age children have the highest infection rates, due to low levels of acquired immunity and increased exposure to contaminated soil.[13]

Furthermore, considering the severe clinical presentation of the patient, it is likely that this patient has experienced recurrent infections, likely occurring for more than at least 2 to 4 weeks. This highlights the public health significance of ascariasis, emphasizing the existing barriers between society and healthcare.[12]

Most *Ascaris lumbricoides* infestations are asymptomatic. However, due to the widespread prevalence of the infection, the overall burden of symptomatic cases remains significant. Individuals with a heavy worm burden are more likely to develop symptoms, which may include diarrhea, loss of appetite, weakness, abdominal pain, altered bowel habits, weight loss, and in rare cases, the expulsion of worms through the mouth or rectum. Severe infections can lead to intestinal obstruction, presenting with abdominal distension, the presence of a palpable mass, tenderness, or pain. The likelihood of developing symptoms is related to the worm load. Intestinal blockage caused by roundworms are more commonly observed in children due to their smaller intestinal lumen and higher parasite burden.[8, 14]

This patient presented with a three-day history of vomiting and a week-long absence of bowel movements, accompanied by abdominal distension of one week's duration. Physical examination revealed palpable masses in the right hypochondriac and left lumbar regions. These findings strongly suggested a mechanical bowel obstruction. The initial differential diagnoses encompassed intra-abdominal masses, intussusception, mesenteric cyst, and abdominal tuberculosis.

Intussusception commonly manifests with sudden wax and wane abdominal pain.[15] However, in this case, the patient presented continuous mild intensity of pain. Furthermore, while the classic presentation of intussusception includes the passage of 'red currant jelly' stools, indicative of blood and mucus, this patient did not exhibit hematochezia or pass any stool.[16]

Mesenteric cysts may also manifest with abdominal distension, nonspecific abdominal pain, and obstructive symptoms. However, these cysts typically present as soft, fluid-filled intra-abdominal masses.[17] In contrast, the mass palpated in this patient was a mobile, firm, and elastic mass, suggestive of a solid mass.

While abdominal tuberculosis remains a diagnostic consideration due to its ability to mimic other conditions and the presence of constitutional symptoms, it is deemed less likely in this case. This is based on the absence of typical TB symptoms such as chronic cough, fever for two weeks or more, weight loss, and malaise.[18] Additionally, the patient is not immunocompromised, has no history of contact with TB patients, and physical examination does not reveal ascites or enlarged lymph nodes. Although the patient does present with fever, it is of recent onset. There were no abnormalities detected in the chest x-ray.

In children with severe worm infestations, large clusters of worms may appear as "cigar bundles" – radiolucent areas visible on plain abdominal radiography. In some cases, the contrast between the worm mass and intestinal gas creates a "whirlpool" effect. Abdominal ultrasonography is also a useful tool for detecting suspected intestinal worm infestations. Roundworms can appear in various sonographic patterns, such as a thick echogenic strip with a central anechoic tube or multiple long, linear, parallel echogenic strips without acoustic shadowing.[14] To confirm the diagnosis, abdominal ultrasound was initially planned. However, due to limited hospital resources, the procedure was only available twice weekly, and the patient had already passed the worms the following day of hospitalization. Given these constraints, the available tests included routine stool examination and plain radiography was performed in this case.

Ascaris-induced intestinal obstruction is a common complication of ascariasis, with a reported prevalence ranging from 38% to 87.5% of all complications.[19] Intestinal obstruction in ascariasis can arise through several mechanisms: Due to the accumulation of large worm clusters that physically block the intestine, the worms acting as lead points for intussusception, or the release of neurotoxins that induce intestinal contractions and inflammation, ultimately leading to obstruction. Furthermore, adult *Ascaris* worms can contribute to various acute abdominal conditions, including small bowel obstruction, upper gastrointestinal bleeding, intussusception, volvulus, and intestinal perforation with peritonitis. The hepatobiliary system can also be affected, resulting in conditions such as acute cholecystitis, acute cholangitis, biliary colic, liver abscess, and acute pancreatitis.[20]

Other frequent complications include pulmonary eosinophilia, or Loeffler's syndrome, resulting from the migration of adult *A. lumbricoides* to the lungs, causing respiratory symptoms.[21] In this patient, this complication was absent, as there were no respiratory symptoms, and both thoracic radiology and laboratory findings were normal, with no evidence of eosinophilia.

Ascariasis can negatively impact growth and development, strongly correlating with undernutrition. In young children, ascariasis can obstruct the small intestine and occasionally migrate into and obstruct the pancreatic and bile ducts, leading to malabsorption of vitamin A and reduced lactose digestion. These consequences can result in growth retardation, undernutrition, impaired cognitive function, low educational achievements, and ultimately, loss of productive years.[22]

The treatment of uncomplicated ascariasis generally conservative and involves the use of antiparasitic medication such as albendazole, mebendazole, or pyrantel pamoate. Partial intestinal obstruction caused by ascariasis can sometimes resolve on its own with measures such as bowel rest, nasogastric decompression, anthelmintic therapy, and fluid-electrolyte replacement. However, in patient with complete obstruction, perforation or peritonitis, surgical intervention may be necessary.[23]

The patient was managed with conservative treatment, including management for dehydration, nil per oral status, and nasogastric tube insertion. During this period, the patient reported the spontaneous passage of multiple worms and as a result the patient's symptoms and clinical condition improved. The patient also received a single dose of 400 mg of albendazole for three consecutive days, considering its potential to improve the cure rate in this case. A randomized controlled trial (RCT) conducted in an endemic area demonstrated that a three-dose regimen of albendazole significantly enhanced cure rates compared to one- or two-dose regimens.[24] Adult *Ascaris lumbricoides* worms do not multiply within the host; therefore, the infection in this patient should resolve following treatment if reinfection by ingestion of fecally contaminated food does not occur. Consequently, the first line of management emphasizes education regarding good hygiene and public health measures.[2]

One program aimed at addressing ascariasis is the deworming program. The deworming program in Southwest Sumba aligns with Indonesian Ministry of Health regulations, encompassing health promotion, helminthiasis surveillance, risk factor control, patient management, and mass drug administration for helminthiasis, specifically albendazole 200 mg for children aged 1 – 2 years and 400 mg for children older than 2 years.[3] In this case, the patient missed the routine deworming program provided at the community health center, and it is unknown whether a mass drug administration program was conducted at his school. This emphasizes that ascariasis remains a problem and that the public health sector in Southwest Sumba must intensify efforts to educate the community about hygiene and improve public health.

Conclusion

Ascariasis, a widespread soil-transmitted helminth infection, disproportionately affects children with poor access to sanitation and hygiene, leading to significant long-term health consequences. This case of a preschool-aged boy underscores the challenges of diagnosing and managing partial bowel obstruction due to ascariasis in a resource-limited setting. Intestinal obstruction is a serious complication of ascariasis that can be identified using basic diagnostic tools, and an appropriate approach can help prevent life-threatening outcomes. Furthermore, this case highlights the need to strengthen preventive measures such as deworming programs, while also emphasizing the importance of improving sanitation, hygiene, and access to healthcare, particularly in endemic regions like Southwest Sumba. Enhancing public health initiatives, including consistent deworming campaigns and community education, is crucial for reducing the burden of ascariasis and its associated complications.

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Conflict of Interest

None declared

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