

A rare case of intestinal obstruction due to ascariasis in Niš, south Serbia

Case Report

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Abstract: Ascariasis is a helminthic infection of global distribution, and intestinal obstruction is its most common gastrointestinal complication. This is a case of a 7-year-old boy admitted to Pediatric Surgery because of intestinal obstruction caused by ascariasis. On admission, the patient presented with colicky abdominal pain, bile-stained vomiting and meteorism. On physical examination, the patient was thin, pale, and dehydrated. An abdominal examination showed distention and diffuse tenderness. After admission, the patient had fecal vomiting and expulsion of worms through the mouth. Laboratory-test results showed leucocytosis, eosinophilia, hypoalbuminaemia, and hypochloremia. Abdominal radiographs and ultrasound studies were indicative of small-bowel obstruction due to roundworms, which led to the performance of an exploratory laparotomy. On bowel exploration, an intraluminal mass, 10 by 6 cm in diameter, consisting of roundworms in the middle third of the ileum was found. A longitudinal enterotomy was performed, and the worms were meticulously extracted manually. Postoperatively, broad-spectrum antibiotics and antihelminthic drugs were administered. Our case of intestinal obstruction caused by ascariasis is the first to be reported in Serbia, according to the Serbian literature.

Keywords: *Ascariasis • Intestinal obstruction • Enterotomy*

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1. Introduction

Ascariasis is a helminthic infection of global distribution; approximately 1.5 billion people are infected, which is about 25% of the world population. The disease is present especially in rural areas of tropical and subtropical countries with poor hygiene and socioeconomic conditions. The global frequency of ascariasis depends on a country's regional, climatic, economic, and cultural conditions [1-3]. Although it occurs in all ages, preschool and school children are predominantly affected [3,4].

Each female *Ascaris lumbricoides* roundworm produces about 200,000 eggs per day, which are excreted in the stool. Transmission is via ingestion of water or food contaminated with ascaris eggs [5]. After ingestion, the eggs excyst in the small bowel. Larvae invade the wall of the intestine, penetrate the intestinal lymphatic vessels, and reach the right side of the heart, pulmonary circulation, and the alveoli through the portal vein. In alveoli, maturation occurs. Then, they migrate to the larynx and are swallowed again [6].

Ascariasis is usually asymptomatic, but it can cause serious intra-abdominal complications such as intestinal obstruction, volvulus, intussusception, biliary obstruction, cholangiohepatitis, liver abscess, pancreatitis, acute appendicitis, intestinal perforation, and granulomatous peritonitis. Intestinal obstruction is the most common complication [7-9].

2. Case Report

A 7-year-old boy was admitted to Pediatric Surgery with severe colicky abdominal pain of 2 days' duration, repeated bile-stained vomiting, and clinically significant meteorism. The patient's mother had noticed the presence of worms in his stool the day before admission. After admission, the patient had fecal vomiting, with the expulsion of roundworms through the mouth.

This patient was of school age, and he lived in a rural area with a lack of sanitary infrastructure and at a low socioeconomic level. His mother told us he played in

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Figure 1. Ultrasonographic appearance of multiple longitudinal curvilinear echogenic strips with a central anechoic linear area, which corresponds to *Ascaris lumbricoides* in dilated intestinal loops.



contaminated soil, using the raw, uncooked vegetables, and drank polluted water.

On physical examination, the patient was thin, pale, and dehydrated, with an axillary temperature of 37.5°C, blood pressure 95/45 mm Hg, pulse 150 beats per minute, and respiratory rate 100 breaths per minute. His weight was 21 kg (17th percentile), height 126 cm (63rd percentile), and body mass index 13.2 kg per square meter (3rd percentile). An abdominal examination showed distention and diffuse tenderness, with absence of bowel sounds. There was no passage of stool or fecal gases.

The leucocyte count was 16.7×10^9 per liter, with an eosinophilia of 13%; the hematocrit was 63%, total protein 39 g per liter, and serum albumin 19 g per liter; the chloride concentration was 80 mmol per liter, and hemoglobin concentration 10.5 g per deciliter. Other results were within normal limits. Abdominal radiographs

Figure 2. Intraoperative photograph of multiple *Ascaris lumbricoides* worms seen through the bowel wall.



showed distention of the small bowel, with air-fluid levels indicative of small-bowel obstruction and shadows of roundworms. Abdominal ultrasound examination showed atonic and distended fluid-filled bowel segments and an echoic oval mass, 8 by 6 cm in diameter, in the right paraumbilical area. Multiple, longitudinal, curvilinear echogenic strips that were rounded in shape, with a central anechoic linear area and no acoustic shadowing, corresponded to solitary worms that were seen proximal to a worm bolus (Figure 1).

According to the anamnesis, clinical course of disease, and abdominal radiographs and ultrasound studies, the diagnosis of intestinal obstruction due to infection with *A. lumbricoides* was established.

After intravenous hydration, nasogastric suctioning, electrolyte monitoring, and antibiotic cover, the patient underwent an exploratory laparotomy. The antihelminthic therapy was not given preoperatively. On bowel exploration, an oval, solid, immobile intraluminal mass, 10 by 6 cm in diameter, consisting of roundworms was present in the middle third of the ileum (Figure 2). The bowel loops were markedly distended proximal to the worm bolus. There was no vascular compromise of the intestine, and the bowel serosa was hyperemic. The mesentery was callous, and multiple, enlarged mesenteric lymph nodes, 1 by 2 cm in diameter, were present. Attempts to milk the worms to the cecum were unsuccessful because of the location and compact mass of the worms and the length of the worm bolus. A longitudinal enterotomy distal to the bolus was performed, and more than 100 worms were meticulously extracted manually (Figure 3). It was nearly impossible to completely clear the worms from the intestine even after surgery, because they remained in the jejunum.

Postoperatively, intestinal peristalsis was established on the second day after surgery. Broad-spectrum

Figure 3. Manual removal of live *Ascaris lumbricoides* worms from the longitudinal incision of the ileum.



antibiotic therapy was given parenterally for another 5 days. Therapy with mebendazole in a dose of 100 mg twice daily on 3 consecutive days, was started on the 6th postoperative day as recommended by the pediatric infectious disease consultant. On the seventh day patient was discharged.

At the time of discharge and in follow-up, the patient and his parents were advised to improve personal hygiene and sanitation. The antihelminthic therapy was repeated after 6 weeks to eradicate any worms that were in the larva phase at the time of admission. During the next 3 months of follow-up, the ascaris ova were not detectable in stool.

3. Discussion

Ascariasis remains a prevalent parasitic infection in the developing countries of Asia, Africa, and Latin America, where levels of sanitation, personal hygiene, and education are low [1-3]. It is most common in children between 2 and 10 years of age, and the prevalence decreases beyond the age of 15 years [3,4]. Intestinal obstruction is the most common surgical complication of ascariasis, especially in children between 3 and 5 years of age, which could be due to the smaller bowel lumen in these children [2,8]. In India, 70% of children are infected with *A. lumbricoides*, but in the Kashmir valley, where it is endemic, the number of infected children is above 78%. In Indian schoolchildren ascariasis causes about 15% of cases of intestinal obstruction, but in the Kashmir valley 63.3% of all cases of intestinal obstruction were reported to be caused by ascariasis [2,10,11].

Ascariasis has been detected in several countries of Eastern and Southeastern Europe. In the study from Slovakia, the occurrence of *A. lumbricoides* and *Trichuris*

trichiura was confirmed in 2.55% of the hospitalized children aged 6 to 10 years, and there was no evidence of *A. lumbricoides* intestinal obstruction among these patients [12]. The prevalence of *A. lumbricoides* in various regions of Turkey is between 0.01% and 16%, and the most common complication caused by ascariasis in childhood is intestinal obstruction [13]. It is difficult to compare these data with those reported in European industrialized countries, where human infection with ascaris occurs sporadically. There are a few reports from the Western European literature in which *A. lumbricoides* has been implicated as a cause of biliary pain and pancreatitis. However, an increasing number of immigrants and refugees from countries where the disease is endemic to the industrialized countries in Europe makes this disease of special concern to public health services [14].

A study of intestinal parasitism carried out in central Serbia involved schoolchildren aged 7 to 11 years, and *A. lumbricoides* was present in 3.3% of cases [15]. As of 2010, our case of intestinal obstruction from ascariasis is the first to be reported in Serbia, according to the Serbian literature.

Most patients with ascariasis are asymptomatic or have a chronic clinical course, although massive infection can cause severe life-threatening complications [6,10]. When the burden is high, worms can form an obstructing bolus in the intestinal tract. Worms usually conglomerate in the terminal ileum, although large numbers are also found in jejunum [2,7,8]. The major factors that lead to ascaris-related intestinal obstruction are: worms can form a large bolus that results in mechanical obstruction of the bowel lumen; the worm bolus may act as a lead point in intussusception or a pivot in small-bowel volvulus; ascaris worms may be localized on the ileocaecal valve, where their secretion of neurotoxins provokes small-bowel contraction and can obstruct the intestine; and the inflammatory reaction from hemolysins, endocrinolysins, and anaphylatoxins from the worms can cause obstruction of the intestinal lumen [2,8,16].

The average worm load is 12 per person, but the load may be 500, or even 2000 [4]. It is reported that more than 5000 worms still may not cause symptoms [6]. De Silva et al. reported that a worm burden of more than 60 has been present in cases of ascaris-related intestinal obstruction, and in our case the worm burden was higher than 100 [17].

Ascaris-related intestinal obstruction can cause a variety of symptoms such as colicky abdominal pain, vomiting, constipation, and ascaris in vomit [7,18]. Gangopadhyay et al. reported that 45.5% patients had a history of passing worms through the mouth, and

63.6% through the rectum. On abdominal examination, distention, localized or diffuse tenderness, or a palpable conglomeration of worm bolus is present [10]. The bolus was not palpable in our case.

Ascariasis should be considered in all cases of intestinal obstruction in the pediatric population with a history of passage of worms in vomitus or stool, and it can be confirmed by abdominal radiography and ultrasonography. Abdominal radiographs reveal multiple air-fluid levels, distended small-bowel loops, and shadows of round worms. Abdominal ultrasonography confirms the diagnosis by the presence of the typical sonographic features of roundworms [10,19].

Many reports suggest that children with uncomplicated ascari intestinal obstruction can be successfully treated conservatively, with spontaneous resolution in 83.5% of patients within 3 days via conservative management [4,20].

The conservative management of intestinal obstruction by ascariasis includes fluid and electrolyte replacement to overcome the dehydration, nasogastric aspiration for decompression, and antibiotic coverage. The antihelminthic therapy should not be given at this stage because it can cause spastic paralysis of worms, with a possible increase in the size of the worm bolus [8]. We were forced to perform an urgent surgical intervention.

The type of surgical intervention depends on the findings at laparotomy. The operative procedure involves milking of the worms distally down in the intestine, followed by enterotomy and removal of the worm bolus or resection of gangrenous bowel and anastomosis. If the obstruction is at the level of the ileum, milking of the

worms to the cecum can be carried out carefully without causing trauma to the bowel wall. If the obstruction is at the level of the jejunum, enterotomy must be performed, because milking the bolus down to the ileocecal valve may cause trauma to the bowel wall [8,18].

After surgical treatment, the antihelminthic therapy should be given from 3 to 5 days postoperatively, after the initiation of bowel movements because of possible spastic paralysis of residual worms and formation of a worm bolus. The therapy should be repeated after 6 weeks [8].

Delay in treatment can lead to bowel gangrene, perforation, and spillage of the worms into the peritoneal cavity [2,8]. Massive gastrointestinal bleeding is a rare complication of ascari intestinal obstruction reported in two infants who presented with massive hematemesis [21]. The rate of mortality in ascari intestinal obstruction in children more than 10 years of age is 5.7% [20].

4. Conclusion

Ascariasis is a helminthic infection of global distribution, and intestinal obstruction is the most common surgical complication. If it is left untreated, life-threatening conditions may develop, which require immediate medical and surgical intervention. Early detection of disease, use of diagnostic radiographs and ultrasound study, avoidance of delay of surgical intervention, appropriate antibiotic cover and antihelminthic therapy, and attention to personal hygiene are helpful in reducing morbidity and mortality of intestinal obstruction due to ascariasis [8].

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