

A Far-Out Case of Ascariasis Causing Small Bowel Obstruction in Mauritius

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Abstract

Ascaris lumbricoides (*A. lumbricoides*), the soil-transmitted helminth is the most prevalent parasitic infection of the gastrointestinal tract in developing countries. Heavy worm loads mainly due to untreated worm infestations are often associated with increased risk of severe sequelae. We report the first complicated case of *A. lumbricoides* causing small bowel obstruction in a 9-year-old boy that necessitated surgical intervention on a tropical island in the Indian Ocean, where cases of Ascariasis are rarely encountered.

Keywords

Ascaris lumbricoides, Worm Infestation, Small Bowel Obstruction

1. Introduction

Helminthic infection is a global public health concern, affecting approximately 1.5 billion people, mainly in the tropical and sub-tropical regions. *Ascaris lumbricoides* (*A. lumbricoides*), the largest nematode or roundworm is one of the most prevalent pathogenic parasites affecting the human gastrointestinal tract. Infection with *A. lumbricoides* causes symptoms in around 25% of the world's population. In some cases, untreated or heavy infestation led to increased morbidity and mortality [1]. However, in Mauritius, data on parasitic infections are lacking and cases of worm infestations are underreported.

A. lumbricoides is a common agent of human zoonosis which is of great public health concern. Transmission of the nematode's embryonated eggs occurs via fecal-oral route. The cycle from egg ingestion to egg deposit may take up to two years. Hatched eggs release larvae in the small intestines that migrate to pulmonary vascular beds and the heart for maturation via the portal and systemic circulation. In the lungs, matured larvae penetrate the alveolar walls, ascend the

upper airway, are coughed up and eventually swallowed. Once in the intestines, sexual differentiation occurs whereby female worms grow much longer than their male counterparts. Copulation takes place in the intestinal lumen and female worms release around 200,000 eggs per day, which are then eliminated in faeces. Adult worms are viable in the intestines for up to two years. Fertilized eggs remain infective in the soil for years [2].

The eggs of *A. lumbricoides* favour optimum environmental conditions such as, warm, moist and shaded soil. They are mostly prevalent in impoverished areas where reign poor sanitation [3]. Risk factors favouring their transmission include: crowded housing, shared toilet facilities, unhygienic practices, dwellings with dirt or soil and maternal illiteracy among others [4]. Studies have shown pre-school and primary school children are more prone to worm infestation by playing barefoot, biting nails, drinking raw water or eating raw fruits grown in contaminated soil as they are usually impulsive in that age group [5].

Chronic worm infestation could lead to pneumonitis, pancreatitis, malnutrition, stunted growth and poor cognitive development [6]. Heavier worm loads are associated with serious sequelae. In line with the latter, worm bolus is the leading cause of mechanical small bowel obstruction in children. Obstruction usually occurs at the ileocecal valve. Surgical implications of worm infestation are: small bowel obstruction, intussusception and volvulus [7]. Pressure exerted by worm bolus could potentially cause intestinal necrosis and ileal perforation but these disastrous circumstances seldom happen [8].

Here, we highlight the first complicated case of intestinal obstruction caused by *A. lumbricoides* on a small island in the Indian Ocean.

2. Case Report

A 9-year-old boy has referred to the surgical department for abdominal pain with abdominal distension on the 27th of April 2022 following an emergency appendectomy one week ago. Anamnesis unveiled a 2-day history of passage of worms in vomitus, abdominal pain and obstipation. He had a prior history of worm infestation which was untreated. Immunization history was up-to-date. On a social note, he is from a family of lower socio-economic background. He had five siblings and lived in the suburb of the island. There was no relevant travel history. The child was given a single dose of syrup albendazole 400 mg on admission.

Upon examination, he was dehydrated, temperature was 36.7°C, heart rate was 90 beats per min, capillary blood glucose was 5.7 mmol/L and oxygen saturation was 100% on room air. The abdomen revealed a healed gridiron scar, distension with generalised tenderness and involuntary guarding. Bowel sounds were present. Respiratory and cardiovascular examinations revealed no untoward findings. Investigations showed leukocytosis of 16,000/mm³ (reference range, 4000 - 11,000/mm³) and mild hyponatremia of 132 mmol/L (reference range, 135 - 148 mmol/L). Other laboratory parameters were within normal

range. Chest X-ray was negative for free air under diaphragm. An erect abdominal X-ray showed significant air fluid levels (**Figure 1**). An ultrasound of the abdomen was performed on admission, which showed mild to moderate free fluid in the pelvis and tubular structures in the small bowels which were rather unclear.

The child was kept nil per os and fluid resuscitation was initiated. An urgent contrast-enhanced CT-scan abdomen was ordered. The abdominal CT-scan confirmed features of mechanical ileus with worm bolus (**Figure 2**). The child was operated. Intraoperatively, small bowel loops were dilated and crammed with bundles of worms (**Figure 3**). Enterotomy was performed followed by removal of worms (amounting to 375 g) (**Figure 4**). Worm specimen was sent for parasitological identification.

Post-operatively, parenteral broad-spectrum antibiotics were administered for a total of seven days. Albendazole 400 mg (syrup) was given on post-op day 4 and 9 respectively. Eventually, the child was referred to a child psychologist. Repeat blood investigations on day 5 post-op revealed a decrease white cell count to $13,000/\text{mm}^3$ and a corrected hyponatremia of 136 mmol/L. The child's recovery was uneventful after 10 days of post-operative hospital stay. Laboratory analysis was affirmative for the adult *A. lumbricoides* as the ethiological factor. Two weeks later, a follow-up visit in the out-patient clinic showed a healed laparotomy scar with normal bowel habits.

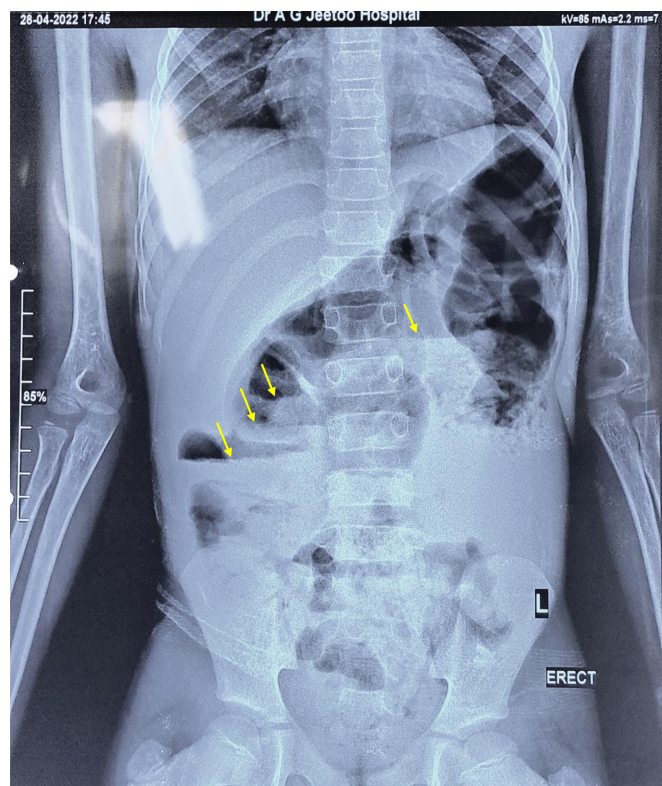


Figure 1. Abdominal X-ray (erect) with multiple air fluid levels (yellow arrows).



Figure 2. CT-Scan of the abdomen (axial view) showed dilated small bowel loops filled with tubular structures (red arrow).



Figure 3. Piles of *Ascaris lumbricoides* causing obstruction in loops of small bowel.

3. Discussion

Intestinal worm infestation is endemic in tropical developing countries mainly due to its environmental circumstances and areas of poor sanitation. Among the soil-transmitted helminths, *A. lumbricoides* is the most prevalent affecting more children than adults [9]. Despite Mauritius being a tropical island in the Indian Ocean, yet, there is a scarcity of reported worm-infested cases. This is the first report highlighting a complicated case of *A. lumbricoides* that necessitated surgical intervention in Mauritius.

Heavy worm loads usually result from untreated ascariasis infection. The child



Figure 4. Removal of worm bundles via enterotomy.

in our case has never been dewormed before. Worms stay in the small intestines for years but they do not normally cause symptoms. Intestinal obstruction arises when large number of worms form bolus and release neurotoxins which cause contraction at the ileocecal junction. In addition, worms secrete exoenzymes: haemolysins, endocrinolysins and anaphylatoxins that add to the host inflammatory reaction and lead to luminal obstruction. In other cases, worm bolus acts as a pivot in bowel volvulus and a lead point in triggering intussusception [7].

A sudden onset intestinal obstruction in the paediatric population should prompt the clinician to think of a potential ascariasis obstruction. Clinical presentation defers among patients. In the majority of patients, abdominal pain, vomiting, constipation and abdominal distension are the primary symptoms. Besides, in a single center study of 189 patients with complete or partial roundworm obstruction, a history of vomiting worms was found in 49.2% and a history of passing worms through rectum in 59.3% of patients respectively [10]. Regarding our case, postoperative paralytic ileus or intra-abdominal adhesions could have well been the cause of small bowel obstruction following appendectomy one week ago. However, a history of vomiting worms on a background of untreated worm infestations were the only clues for suspecting otherwise. Moreover, the wandering nature of the adult *Ascaris* worm could have easily obstructed the vermiform appendiceal lumen and led to the appendicitis or resulted from secondary infection of *Ascaris* eggs [11].

A diagnosis of ascariasis obstruction is often achieved with ultrasound alone. Mishra *et al.* (2008) summarised the ultrasonographic findings of *Ascaris* obstruction depicted in various studies as multiple elongated, parallel echogenic strips with the absence of acoustic shadow [7]. CT-scan of the abdomen may be ordered at times to exclude perforation, or when there is ambiguity of ultrasound imaging [8]. As in this particular study, reaching the correct diagnosis via radiological exams was not straightforward and proved relatively challenging as presence of worm bolus causing intestinal obstruction is rarely encountered on

the island.

Most patients with *Ascaris* obstruction can be managed conservatively: fluids replenishment, nasogastric aspiration for bowel decompression, correction of electrolyte imbalance, broad spectrum antibiotics to prevent translocation of bacteria and adequate analgesics. Anti-helminthic agent is unwise in the acute setting as it causes spastic paralysis of worms and possible enlargement of the worm bolus [12]. At times, anti-helminthic agent is given by unwary clinicians in the emergency department. As in this case, albendazole has contributed to a complete intestinal obstruction and an emergency surgical intervention to relieve the obstruction was a necessity.

To avoid unexpected sequelae with ascariasis, sensitization should promote good hygienic etiquettes together with maternal education on early and regular deworming. They should aim to hit high risk zones that could potentially aid in *A. lumbricoides* transmission such as; overcrowding homes with shared toilet facilities and unhygienic environments. Periodic deworming is recommended by the World Health Organization with albendazole or mebendazole twice or thrice per year [13]. In Mauritius, a single dose of albendazole (oral suspension) 150 mg is given to children every 6 months on demand of the parents. It would be a good initiative to implement deworming therapy in the school health programme at pre-primary and primary levels to ensure a proper coverage.

4. Conclusion

Ascariasis infestation remains a challenge in developing countries. Untreated worm infestation can have dire consequences. A diagnosis of *Ascaris* obstruction should not be overlooked in the setting of acute intestinal obstruction in children. Surgical management of worm bolus obstruction is inevitable for a resumption of normal bowel activity.

Authors' Contributions

Author *J. M. M.* managed the patient, chose the research topic and edited the report. Author *S. H. B.* conducted the literature review and wrote the manuscript. Both authors approved the final manuscript.

Consent for Publication

Written informed consent was obtained from the patient's legal guardian for publication of clinical information and related images.

Competing Interests

Authors have declared that no competing interests exist.

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