



## Case Report

# A Case of Acute Mechanical Bowel Obstruction by Intestinal Ascariasis in a Child in the Era of Routine Deworming Prevention: Can this Infestation be Eradicated?

Landry W Tchuenkam<sup>1\*</sup>, Fetsus T Wirwah<sup>2</sup>, Axel S Nwaha Makon<sup>1,3</sup>, Caleb N Tangong<sup>2</sup>, Joel Tatsa Tameyi<sup>1</sup>, Joel Noutakdie Tochie<sup>1</sup>

<sup>1</sup>Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Cameroon

<sup>2</sup>Wum District Hospital, North-West Region, Cameroon

<sup>3</sup>Urology unit, Department of Surgery, Douala Laquintinie Hospital, Cameroon

\*Corresponding author: Landry W Tchuenkam, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Cameroon.

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## Abstract

**Background:** Intestinal obstruction is one of the common emergencies in pediatric surgery. It should be suspected in any child with persistent vomiting, distention of the abdomen and abdominal pain. It can be due to several causes, among which an intestinal infestation by *Ascaris Lumbricoides* which remains a significant cause, especially in low-resource settings. In its acute form, intestinal obstruction represents a potentially life-threatening condition. Undiagnosed or improperly managed, it can progress to vascular compromise which can lead to bowel necrosis, perforation, septic shock and death. Hence, early recognition and prompt treatment of intestinal obstruction due to *Ascaris Lumbricoides*, often overlooked is imperative.

**Case Presentation:** This is a case of a 5-year-old sub-Saharan African male pupil who presented with a six-month history of progressive abdominal pain, distention and constipation. He had never taken anthelmintic drugs since birth. The child was admitted at the surgical emergency for persistent post prandial vomiting, abdominal pain and distension associated with complete inability to pass out gas or faeces of two days duration. Following the clinical examination, acute bowel obstruction was diagnosed. Initial management consisted of resuscitation measures followed by an emergency exploratory laparotomy. Intra-operatively, 50 long adult worms of *Ascaris Lumbricoides* were removed from the small and large bowels. Immediate post operative management consisted of fluid therapy, antibiotic prophylaxis, analgesics and anthelmintic therapy with mebendazole. The post-operative course was uneventful and he was discharged home in good health.

**Conclusion:** Intestinal ascariasis still remains cause of pediatric intestinal obstruction especially in poor-resource settings where deworming coverage has not reached a 100 percent. This case highlights the urgent need to scale up public health programs against worm infestation especially in children. It also pinpoints the need to consider obstruction by *Ascaris Lumbricoides* as a potential differential diagnosis of pediatric intestinal obstruction especially in children who have never been dewormed before. Hence, the emphasis also on a good history taking.

**Keywords:** *Ascaris Lumbricoides*; Case report; Mechanical Bowel Obstruction

**List of Abbreviations:** °C: Celsius degree; EPI: Expanded Program of Immunization; LMICs: Low- and Middle-Income Countries

## Background

Intestinal obstruction is one of the most common pediatric surgical emergencies [1,2]. It should be suspected in any child with persistent vomiting, abdominal distention and abdominal pain [3]. It is defined as a partial or complete interruption of the

flow of intraluminal content [4]. This blockage leads to liquid sequestration upstream of the obstacle, as well as transudative loss of fluids from the intestinal lumen into the peritoneal cavity [4,5]. The immediate consequences of these phenomena are fluid and electrolyte imbalances, bacterial translocation leading to intra-abdominal sepsis. At the local area, there are disorders in the vascularization of the intestinal wall leading to ischemia, necrosis, perforation of the intestinal wall, ultimately leading to peritonitis, multiple organ failure and death if un-addressed [4,5]. The mortality related to this affection varies from one region to another in the world. In children, it varies from 2-15% between Low- and Middle-Income Countries (LMICs) [6,7].

Intestinal obstruction can be classified according to the site of the obstacle (small or large bowel), acute or chronic obstruction and the etiology (functional or mechanical) [4,5]. In children, it is often a small bowel obstruction [5]. When the occlusion is complete, clinical findings are often acute; they combine abdominal pain, vomiting, inability to pass flatus or stool, abdominal distention, bleeding per rectum and abdominal mass [4,5,8]. These manifestations are more subtle in the very young children where we can observe inconsolable crying, lethargy or altered consciousness [3]. Imaging is an essential component in the diagnostic workup of children presenting with intestinal obstruction [9]. Imaging confirms the diagnosis, directs towards one of the etiologies and possibly intra abdominal complications. Imaging modalities commonly used in the assessment of pediatric intestinal obstruction are abdominal plain radiography or contrast radiographies and abdominal ultrasonography [9,10]. Abdominal computed tomography although essential in adults must be performed with caution in children where there is a significant risk of unnecessary radiation exposure [3,9]. In addition to imaging, biological examinations will aim to explore the impact of the pathology. Once the pathology is suspected, management becomes an urgency in order to improve vital prognosis [3,5]. This management generally begins with a pre-operative optimization of the patient to make him fit for surgery. It can be done either by laparoscopy or by laparotomy depending on the aetiology suspected at the end of the clinical assessment and imaging. With regards to the etiology, mechanical obstruction is more frequent than the functional type. This include intestinal atresia, malrotation of gut, Hirschsprung disease and anorectal malformations in neonates [10,11]. Infants and children present often with intussusceptions, Meckel's diverticulum, adhesive bands, hernias and worm impaction [6,12].

Intussusception remains the commonest cause as reported by many authors. However, intestinal obstruction due to *Ascaris Lumbricoides* constitutes 5% to 35% of all cases of bowel obstruction in endemic tropical regions [5,13]. Therefore, several countries like Cameroon have scaled-up public health preventive interventions such routine deworming of infants when they

present for visits at the Expanded Program of Immunization (EPI) and thereafter every three to six months during mass screening campaigns. Although this control strategy has reduced both the incidence of this parasitic infection and its related-intestinal obstruction in most part of the world [14], cases of massive infestation continue to be reported, especially in LMICs because coverage of parasitic infestation has not reached a 100% [15]. Herein, we present a case of acute intestinal obstruction in a young child living in resource-challenged setting. This research has been reported in line with the care guidelines [16].

### Case Presentation

This is a case of a 5-year-old male Cameroonian child. He was referred from a primary health centre for an insidious onset persistent abdominal pain and distention which aggravated over the last six months. He was brought for consultation to several primary health care centers where a definitive diagnosis was not posed. The child was administered several analgesics and enema with no net remission of his complaints. The father noticed that the child's abdomen was progressively increasing in size and becoming tense. Also, he observed that the child could go for two days without bowing his bowels but could not pass flatus. There was no report of vomiting. About two days prior to our consultation, the child had persistent post prandial vomiting, abdominal pain and distension associated with complete inability to pass out gas or faeces. He was vaccinated correctly up to nine months of age according to the Cameroon EPI. He had never taken anthelmintic drugs distributed during the EPI and deworming campaigns organized by the Ministry of Public Health in Cameroon. He had normal developmental milestones for his age, no relevant family and no psychosocial histories. When admitted to our service the child ill-looking, conscious, and cooperating with signs of moderate dehydration. The Weight-for-length Z-score was calculated at -2.4. The abdomen was uniformly distended, not tender on palpation with no hepatomegaly nor splenomegaly. There was no rebound tenderness, abdominal rigidity and mass. Bowels sounds were reduced. The rest of the physical examination was unremarkable. As work-ups, a plain abdominal radiography was requested showed several central air-fluid levels in a step-ladder fashion. An abdominal ultrasound scan revealed lack of peristaltic movement with hyper echogenicity of the bowels. A laboratory panel revealed leukocytosis at 12000/mm<sup>3</sup>(with eosinophils at 03%, basophils 00%, monocytes 10%, neutrophils 57%, lymphocytes 30%) and normal serum electrolytes. The diagnosis of small bowel obstruction was made and a multidisciplinary team of pediatricians, pediatric surgeons and anesthesiologists concerted to perform an emergency laparotomy after initial resuscitation.

The initial management consisted of resuscitation measures, including nil per os, nasogastric tube decompression, the placement of a large bore intravenous line, fluid replacement therapy with

crystalloids. He also received analgesics and broad-spectrum antibiotic therapy covering aerobes and anaerobes. An emergency exploratory laparotomy was performed after obtaining a signed consent from the father. The laparotomy was done through a mid-line vertical incision under general anesthesia. Intraoperatively, it was found that both the small and large bowel were completely obliterated, obstructed and stocked with adult worms of *Ascaris Lumbricoides* of various sizes. An enterotomy was done and the worms above and below the enterotomy site were pushed with fingers and removed. About fifty long matured worms were removed with the longest measuring about 34cm (Figure 1 and Figure 2). The intestines were thoroughly washed with lukewarm normal saline 0.9% and the incision site repaired. The peritoneal cavity, subcutaneous tissues and the skin were closed. The post-operative management consisted of: antibiotic prophylaxis with ceftriaxone, analgesics with paracetamol, early oral feeding at day 2 and anthelmintic therapy with oral mebendazole 100mg twice daily for 3 days. His postoperative course was uneventful and he was discharged home on day 6 post surgery. He was re-seen after two weeks for follow-up with none of the previous complaints, a normal physical examination and a control stool examination showed no ova or parasites. The parents were counselled on deworming of the child every three months and on preventive hygienic measures.



**Figure 1:** Small and large bowel stocked with adult worms of *Ascaris*.



**Figure 2:** View of extracted intestinal worms.

## Discussion

### Definition, Epidemiology, Life Cycle and Transmission

Intestinal parasitic worms or “Soil-transmitted helminthes” refer to a group of human gastrointestinal nematodes transmitted through direct contact with eggs or larvae from contaminated soil [17]. More than a billion of the world’s population is infested by these parasites, among which: *Ascaris Lumbricoides* (roundworm), *Trichuris trichiura* (whipworm), and *Anclostoma duodenale* and *Necator americanus* (hookworm). Ascariasis is the term related to human infection by *Ascaris Lumbricoides* or *Ascaris suum*, a species that commonly infests pigs and may also infest and cause pathology in humans [13]. The extent of the disease is estimated to be approximately 25% of the world’s population [18]. This prevalence can reach 95% of people infected in areas with warm and moist climates or areas with poor sanitation practices or hygiene [13]. This infestation mainly affects children between the age of 2 and 10 years [13], as seen in our 5-year old child. Transmission of ascariasis occurs through the fecal-oral rout; when eggs are swallowed through contaminated food or water [19]. After being swallowed, an *Ascaris Lumbricoides* larvae hatches from their eggs, migrate into the vascular system and are transported through the portal veins and right side of the heart to the pulmonary circulation. Unable to cross the capillary network, the parasite penetrates the walls of the alveoli. From here, they migrate to the larynx and is swallowed into the oesophagus ending up as an adult worm in the small intestines [13,19]. The female parasite lays tens of thousands of eggs daily with the intestines that are excreted in faeces, enter the environment and may infect other human hosts. Direct person-to-person contact or from fresh faeces is not contaminating. The time from egg ingestion to larval intestinal migration takes 10 to 14 days and egg production within the guts takes 2 to 3 months. Adult worms can live in humans for 1-2 years. Only fertilised eggs may become infective [13,19].

### Clinical Manifestations

*Ascaris Lumbricoides* cause two main forms of pathology: immune-mediated reaction to migrating larvae and nutrient depletion and/or obstruction due to mechanical obstruction of the bowel by the adult worms in the gastrointestinal tract [13,20]. Most patients with *Ascaris* infections are asymptomatic. Clinical disease is mostly restricted to subjects with high worm loads [13,19,20] as in the indexed patient. Pulmonary manifestations are uncommon; they are observed in new subjects, without prior exposure to the worms. They are related to larval migration to the alveoli and larynx. Signs and symptoms are those of eosinophilic pneumonia or Loeffler syndrome [13]: dry cough, dyspnea, blood-tinged sputum, fever, wheezing, or urticaria. In intestinal

ascariasis, the adult worm in the upper small bowel usually causes no symptoms and may be an incidental finding of ascaris eggs on stool examination or when someone presents after passing worm in stools or more dramatically through the mouth or nose or any of the body orifices [13,19]. Vague abdominal symptoms in the form of abdominal pain, distention, nausea, and occasional diarrhoea are frequent in children with ascariasis in endemic regions [13]. Ascaris-induced intestinal obstruction is a frequent complication in children with heavy worm infection in endemic areas like Cameroon [13,20]. It is caused by an aggregated mass of worms blocking the bowel lumen whether in the small or large intestines, but especially in the terminal ileum at the ileocecal valve [13]. This blockage can be partial most often, or complete, resulting in an acute intestinal obstruction, a serious surgical emergency which our patient presented with. Intestinal obstruction accounted for 38 to 87 % of all complications of intestinal ascariasis [13]. Other complications include malnutrition, hepatobiliary and pancreatic injuries [13,20].

### Management

There are three major strategies for the control of soil-transmitted helminthiasis: health education, improvements in sanitary standards and anthelmintic treatment [18,21]. In Cameroon, the fight against soil-transmitted helminthiasis is an integral part of the national health policy. This national control program mainly involves raising community awareness and systematic deworming of preschool and school-aged children throughout the country. All this was done through yearly health program such as “Action Week for Infant and Maternal Health and Nutrition”; as well as during the activities of the EPI [22]. Regarding anthelmintic drugs, deworming drug regimens in non-pregnant adults and children consist of administering them albendazole, mebendazole or pyrantel pamoate. Alternative agents for treatment include Ivermectin which must be used with caution in areas with an endemic *Loa Loa* infestation [23,24]. As summarized by Albonico, et al. [21], the World Health Organization (WHO) advise targeted preventive chemotherapy (deworming) two to three times a year and once per year for school-age children with a prevalence exceeding 70% and between 50 and 70% respectively.

Concerning *Ascaris* induced-intestinal obstruction; conservative management can be employed in the case of partial obstruction. These are resuscitation measures combining: nasogastric suction, fluid therapy, correction of electrolytic imbalance, analgesics and anthelmintic therapy orally as soon as intestinal transit is restored [13]. Surgical intervention is indispensable in cases of complete intestinal obliteration presented in the case above [13,20]. The other indications for surgery as first-line therapy in cases of intestinal ascariasis are the failure of conservative treatment after 24 to 48 hours, appendicitis, volvulus, intestinal intussusception or associated intestinal perforation [13].

Once anthelmintic therapy has been administered, follow-up should be done. It consists of a stool test ideally carried out on the 14th day with the aim of looking for eggs; their presence suggests incomplete treatment or re-infestation [25].

### Conclusion

Intestinal obstruction is a potentially life-threatening condition, undiagnosed or improperly managed can progress to death. Chronic intestinal worm infestation remains a common cause in tropical regions. Surgical intervention associated with medical care should be employed where necessary to improve quality of life and decrease morbidity and mortality. Prevention is an important part of management. It includes improvements in sanitation and frequent deworming of children as mentioned in our country's health policy.

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