

## Successful management of Ascaridial small gut volvulus in a child at a resource limited hospital during COVID 19 pandemic: A case report

Ramesh Baharti<sup>1</sup>, Arvind Bhatia<sup>2</sup>, Ankit Shukla<sup>3</sup>, Manjeet Kumar<sup>4</sup>, Rajesh Chaudhary<sup>5</sup>, Tenzin Tsomo<sup>6</sup>

1. MS, Professor, Department Of Surgery, PanditJawaharLal Nehru Government Medical College Chamba, HP, India.
  2. MS, Senior Resident, Department Of Surgery, PanditJawaharLal Nehru Government Medical College Chamba, HP, India.
  3. DNB, Senior Resident, Department Of Surgical Gastroenterology, JawaharLal Nehru Institute of Post Graduate Medical Education & Research, Puducherry, India.
  4. MCh, Assistant Professor, Department Of Urology, Indira Gandhi Medical College Shimla HP, India.
  5. MS, Assistant Professor, Department Of Surgery, PanditJawaharLal Nehru Government Medical College Chamba, HP, India.
  6. MBBS, Junior Resident, PanditJawaharLal Nehru Government Medical College Chamba, HP, India.
- CORRESPONDING AUTHOR : Dr. Rajesh Chaudhary,  
MS, Assistant Professor, Department Of Surgery, Pt.JLNGMCChamba, HP, India

### ABSTRACT

**Introduction:** *AscarisLumbricoides* is the most common nematode infecting the preschool children throughout the world. The patients are usually asymptomatic or present with mild non specific abdominal symptoms and malnutrition with a low *Ascaridial* load. The patients having high worm load can present with intestinal obstruction which could sometimes be managed conservatively. Small gut volvulus is a less frequent but potentially dangerous complication of *Ascaris* infestation having high morbidity and mortality unless quick surgical intervention is done. **Case Presentation:** We present the case of a 4 year old male child who presented to the Emergency Room with the features of pain abdomen with distension, feculent vomitus, fever and a history of passage of worms in stools. X-ray abdomen showed multiple air fluid levels suggestive of Acute Intestinal Obstruction. The patient was subjected to exploratory laparotomy where the small gut was found to be full of *Ascarides*. There was a gangrenous ileal segment due to small gut volvulus. The gangrenous segment was resected and an end to end ileo-ileal anastomosis was performed after evacuating all the worms. In the post operative period patient had an episode of bilious vomiting which contained mature worms. Patient was managed conservatively and was discharged home on 9<sup>th</sup> post operative day, after antihelminthic treatment was given to him and his whole family. **Conclusions:** Intestinal obstruction is the most common complication of *Ascariasis*. Small gut volvulus is a rare presentation of this worm infestation which requires urgent surgery or else there is a risk of poor patient outcome. Post operative antihelminthic therapy of the whole family, repeated at frequent intervals is necessary since there is high incidence of re-infection. Public health measures like practise of proper hand hygiene, proper sanitation and management of the human waste are essential for prevention of worm infestation in the society.

### KEY WORDS

*Ascariasis, AscarisLumbricoides, Antihelminthics, Albendazole, Intestinal Obstruction, Small gut volvulus.*

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### I. INTRODUCTION

Small Bowel Obstruction is one of the most common causes of an Acute Abdomen (AA), accounting for nearly 12%-16% of all the admissions to the Emergency room (ER). The mortality due to Small Bowel Obstruction (SBO) has come down drastically in the past century from over 50% to nearly 3% in the present day.<sup>[1]</sup> Mortality is particularly high in case of closed loop obstruction. Small gut volvulus is a common cause of closed loop obstruction. Primary volvulus of the small gut is more common in the African and Asian continent as compared to the western world where secondary volvulus is more common. The commonest cause of secondary volvulus of the small gut are adhesions.<sup>[2]</sup> *AscarisLumbricoides* is a common helminth, endemic in

under developed & developing countries of south east Asia, Africa and south Americas, having poor hygiene and sanitation. No country and age group are safe from this helminthic infestation. It can cause AA in children due to the worm mass causing mechanical obstruction of the small gut. This is commonly seen after the antielmintic treatment is started leading to paralysis of the worms. The worm mass can lead to ischemia and perforation of the gut, but small gut volvulus due to Ascariasis is a very rare cause of Acute Abdomen.<sup>[3]</sup> We present the case report of a 4 year old male child, prepared in accordance with the Case Report (CARE) guidelines, who presented to the ER with acute abdomen secondary to the Ascariidial volvulus of the small gut.

## II. CASE REPORT

We present the case of a 4 year old male child who presented to Emergency Room (ER) with feculent vomiting, abdominal distension, peri-umbilical pain, and fever, during the peak of second wave of COVID-19 in India. There was a history of passage of worms in the stools. There was no recent history of antihelminthic intake. He belonged to a nomadic tribe with poor socioeconomic status. His parents were illiterate and he had three other siblings. On examination, patient was having fever (100°F), respiratory rate of 26/ min, pulse rate of 118/ min and blood pressure of 88/60 mm of Hg. He weighed 12 kg. There were visible gut loops over the distended abdomen. (Fig.1) There was generalised tenderness and rigidity over whole of the abdomen. A nasogastric (NG) tube was inserted and patient had an episode of vomiting which contained a 10 cm long worm along with foul smelling bilious material. Active NG tube aspiration was done to empty the stomach as much as possible. The child was started on injection Ceftriaxone 500 mg intravenously (IV) 12 hourly, injection Metronidazole 100 mg IV 8 hourly, alongwith injection Paracetamol 100 mg, IV 8 hourly. His blood investigations revealed Haemoglobin (Hb) of 9 g/dl, Total Leucocyte Count (TLC) of 18000/ mm<sup>3</sup>, Differential Leucocyte Count (DLC) revealed 82% Neutrophils 10 % Lymphocytes and 6% Eosinophils. His biochemical investigations were within normal limit except serum Creatinine of 1.2 mg/dl and a Blood Urea Nitrogen (BUN) of 22 mg/dl. The child was adequately resuscitated with IV fluids. His erect X-ray abdomen showed multiple air fluid levels in the small gut suggestive of Acute Intestinal Obstruction.(Fig.2) Since we didn't have any Intensive Care Unit (ICU) for post operative management, an option for referral to a higher centre was given to the parents, but his parents refused to take the child any further. After a written informed consent by the parents, the patient was subjected to exploratory laparotomy. On opening the abdomen there was about 250 ml of dark fluid in the peritoneal cavity. About 40 cm loop of ileum had rotated 360 degrees around the mesentery, about 10 cm proximal to the Ileocecal Junction (ICJ). The rotated segment of the ileum was gangrenous. The proximal gut was grossly dilated upto the Duodeno-Jejunal flexure (DJF) and the distal ileal segment was collapsed. The ischemic gut segment was resected out.(Fig.3) It was full of Ascariae. The proximal small gut was also full of worms. The small gut was evacuated off the Ascarides, both proximally and distally. An end to end ileoileal anastomosis was done after thorough peritoneal toiletting with normal saline. On second post operative day, the patient had an episode of bilious vomiting, and the vomitus contained two worms of 6cm and 8 cm length, approximately. The patient was managed conservatively with IV fluids, antibiotics and active NG aspiration. He passed stools on 4<sup>th</sup> post operative day, containing more worms. After that the patient had a smooth recovery and was discharged home on 9<sup>th</sup> post operative day. He was given oral Albendazole 400 mg, alongwith other members of the family. The dose of Albendazole was again repeated after three months for whole of the family including the patient. The patient is still in follow-up after six months of surgery and is doing well.

## III. DISCUSSION

Acute intestinal obstruction is one of the commonest causes of Acute Abdomen (AA). Small gut volvulus is a less frequent but an important cause of small gut obstruction.<sup>[1]</sup> It can be classified into Primary and Secondary types. Primary small gut volvulus is more common in the Asian and African countries where the diet mostly comprises of vegetarian and fibrous content. In the Western world secondary small gut volvulus is more common due to adhesions, mainly secondary to surgery. Small gut volvulus is common among children due to malrotation of the gut.<sup>[2]</sup> The incidence of small gut volvulus in children secondary to *Ascaris lumbricoides*, has been reported to be 24% to 36%.<sup>[4]</sup> Ascariasis is common in developing and under developed countries due to poor hygiene, sanitation and improper management of human waste. The transmission of infection is food borne, soil borne or water borne. The children are more commonly infected as they play outdoors and play mostly barefoot in the infected soil or water. About 70% of the children in the African and South East Asian region are infected with *Ascaris lumbricoides*.<sup>[5]</sup> The incidence is high in children between 2-10 years age group but the peak incidence is seen in 4-6 years age group.<sup>[6]</sup> The infection is caused by the embryonated eggs which hatch in the intestine where the larvae penetrate the gut wall and through blood supplies can reach lungs and alveoli. They are coughed up by the patients and reingested, after which they reach the intestine and mature into adult worms. These patients are usually asymptomatic and present with malnutrition and failure to thrive unless the worm load increases significantly to cause a wide range of abdominal symptoms ranging from colicky

abdominal pain, diarrhoea, nausea, vomiting to passage of worms in stools and vomitus. The patients can present with features of intestinal obstruction and gut perforation as reported by Darlington CD et al.<sup>[3]</sup> The intestinal obstruction is usually caused by the mass formed due to high worm load which usually gets stuck near the ileo-cecal junction. The toxins released by the adult worms can lead to stiffening of the intestine. Sometimes the patients can present with volvulus of the small gut which can lead to strangulation and perforation of the small gut causing fecal peritonitis and worsening the patient outcome causing high morbidity and mortality, as high as 5.7%.<sup>[7]</sup> The incidence of acute intestinal obstruction due to Ascariasis has been reported to be 9.2 per 100000 population in India.<sup>[8]</sup> Other manifestations of Ascariasis could be Acute Appendicitis, Meckel's Diverticulum perforation, Intussusception of the intestine, acute pancreatitis, cholangitis, liver abscess or acute cholecystitis.<sup>[3,4,6]</sup> The diagnosis of acute intestinal obstruction secondary to Ascariasis should be suspected in all the patients of acute abdomen with history of passage of worms in vomitus or stools. A plain X-ray of the abdomen will show multiple air fluid levels suggesting obstruction. In heavy infestation multiple radiolucent shadows like "Cigar Bundle" Appearance can be seen. A mass of worms can produce a "Whirlpool Effect" on plain X-ray of abdomen, due to contrast against the gas inside the gut lumen.<sup>[4,7,9]</sup> The sensitivity of Ultrasound abdomen in diagnosing the Ascariasis ranges from 88% to 95%.<sup>[4]</sup> The worms within the intestinal lumen are visualised as hypoechoic tubular structures with well defined echogenic walls. They could be seen as multiple long, linear, parallel echogenic strips without acoustic shadowing in longitudinal (Railway track) and transverse (Bull's eye) views or overlapping longitudinal interfaces in the main bile duct due to coiling of a single worm or several worms in the Common Bile Duct (CBD). They produce sinuous movement inside the gallbladder and the bile ducts, which is the pathognomonic of Ascariasis. Computerised Tomographic scan of the abdomen can also visualise the worms within the lumen of the gut but it is seldom required.<sup>[9,10]</sup> Efem EE, has postulated that the gut perforation is rare in the small gut as it can distend and accommodate a large number of worms, except in confined spaces like Appendix and Meckel's Diverticulum. Thus there has been a trend towards the conservative management of the children with Ascaris induced Acute intestinal Obstruction. Mishra PK et al subjected 103 children with Ascaris induced intestinal obstruction, to conservative management with hypertonic saline enemas, Intravenous (IV) Fluid and Nil per Oral (NPO) regimen.<sup>[6]</sup> Nearly 85% children responded to conservative treatment but 15% developed signs of peritonitis and had to be operated. Out of 16 patients who underwent surgery, 6 patients had volvulus of small gut with gangrene. One patient who had ileostomy and resection of the gangrenous gut later died. In an another retrospective study, Ramareddy RS et al reported 3 mortalities among 16 children of Ascaris induced intestinal obstruction.<sup>[4]</sup> All the three patients had small gut volvulus with gangrene. Our patient was a child who presented with Ascaris induced small gut volvulus and gangrene. We didn't have the ICU facility for managing such kids post operatively, thus we gave an option to the parents for referral to a higher centre. The parents refused to take the child any further, so we performed resection of the gangrenous gut and an end to end anastomosis of the ileum. Although conservative management of the Ascaris induced small gut obstruction has been tried, where the patients are kept NPO on IV fluids; the patients need to be kept in continuous monitoring to see for the development of acute generalised peritonitis.<sup>[4,6]</sup> This management needs to be abandoned in such situation and an early surgery should be done. During surgery if the gutwall is not compromised, a mass of worms could be pushed into the caecum. When there is a huge worm load and it can not be pushed forward it is safe to make an enterotomy and extract all the worms. The gangrenous segments should be removed with an end to end anastomosis of the gut performed. Where it is not safe to restore the gut continuity, an ileostomy could be performed with gut restoration left to be done at a later stage.<sup>[4]</sup> In post operative period, patient as well as the other family members should be prescribed antihelminthic drugs. Conterno LO et al found a single dose of Albendazole, Mebendazole and Ivermectin to be effective against the *Ascaris Lumbricoides* infection yielding high parasitological cure and a large reduction in eggs excreted.<sup>[11]</sup> The re-infection rates are very high thus, practise of hand hygiene, proper sanitation and proper management of human waste is important.

#### IV. CONCLUSIONS

Intestinal obstruction is the most common complication of Ascariasis. Small gut volvulus is an uncommon presentation of this worm infestation which requires urgent surgery or else risk of a poor patient outcome is high. Post operative antihelminthic therapy of the whole family, repeated at frequent intervals is necessary since there is high incidence of re-infection. Public health measures like practise of proper hand hygiene, proper sanitation and management of the human waste are essential for prevention of *Ascaris Lumbricoides* infestation in the society.

#### DECLARATIONS

**Reporting Checklist:** The authors have completed the CARE reporting checklist and is being submitted as an additional file.

**Ethical Approval:** This was a case report and the patient identity was totally concealed; hence, the ethical approval was not taken.

**Consent:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal.

**Availability of data and material:** not applicable

**Competing Interest:** The authors declare that they have no competing interest.

**Financial disclosures:** None

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**Rajesh Chaudhary:** Contributed substantially to the Conception, design, Acquisition of data, Analysis and interpretation of data, drafting the article, Critical revision of the article and final approval of the version to be published.

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**FIGURES**



Figure 1: Showing the distended abdomen with visible gut loops.



Figure 2: Showing multiple air & fluid levels in the small gut



Figure 3: Showing the resected gangrenous ileal segment.



Figure 4: Showing the adult *Ascaris lumbricoides*.

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