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# Primary Small Bowel Volvulus Without Intestinal Malrotation In Children: Case Report

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***Summary***
*Volvulus is a condition characterized by the twisting of the intestine upon itself at a fixed point or area. The most common cause is peritoneal adhesions or a meckel's diverticulum. Here, we report the case of a child admitted with signs of intestinal obstruction, in whom surgical exploration revealed primary small bowel volvulus without intestinal malrotation.*

***Keywords:****small bowel volvulus; intestinal obstruction; acute abdomen ; children.*

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## I. Introduction:

Small bowel volvulus is characterized by the twisting of a segment of the small intestine around its mesenteric axis, leading to intestinal obstruction. While it is commonly associated with intestinal malrotation, particularly in infants and young children [1], it can also occur in individuals with normal intestinal rotation and mesenteric fixation. Primary cases, where no underlying cause can be identified, are even rarer and have been scarcely reported in the literature.Prompt surgical intervention is crucial in cases of small bowel volvulus to prevent or manage intestinal ischemia, a complication associated with significant morbidity and mortality.

In this report, we present a rare case of small bowel volvulus in a young child where no underlying cause was identified.

## II. Case Presentation :

This is a case of a 14-year-old patient with no significant medical history, admitted for abdominal pain with bilious vomiting that started 3 days before admission, exacerbated by the onset of an obstructive syndrome characterized by abdominal distension with cessation of bowel movements and gas passage. Clinical examination revealed a patient in fairly good general condition, afebrile, tachycardic, with diffuse abdominal tenderness.

An upright abdominal x-ray showed air-fluid levels, and an abdominal ct scan revealed a closed-loop small bowel obstruction with intraperitoneal fluid collection. Biochemically, the patient had functional acute kidney injury, hypokalemia, hyponatremia, and negative infectious markers.

After rehydration, the patient underwent surgical exploration, which revealed significant small bowel distension with torsion of the third small bowel loop (figure 01), without evidence of ischemia or intestinal perforation, and without abnormalities of intestinal rotation or meckel's diverticulum. After untwisting the loops and performing retrograde decompression, an appendectomy was performed. The bowel loop started to present a normal appearance (figure 02). So, no bowel resection was required.

Postoperative recovery was marked by the return of bowel function and clinical and biochemical improvement. At one-year follow-up, the patient had not experienced any recurrence of obstructive symptoms, with clear clinical improvement.

## III. Discussion :

The twisting of the small bowel around its mesenteric artery axis is referred to as midgut volvulus. This condition often results in luminal obstruction and, more critically, compromises blood flow to and from the bowel wall, posing a significant threat to intestinal viability [2-4].

Midgut volvulus is predominantly observed in the pediatric population, with around 85% of cases of malrotation being diagnosed within the first two weeks of life. Moreover, over 90% of patients are diagnosed by their first birthday [5,6].

The typical embryological rotation of the bowel, which involves the duodenojejunal and ileocolic junctions rotating around the superior mesenteric artery to their normal positions, does not take place [1]. Consequently, the small intestine lacks the usual attachment to the abdominal cavity via the mesentery and is suspended on a narrow mesenteric stalk, making it prone to twisting and midgut volvulus [7].

Cases without any discernible underlying cause can be categorized as primary cases, and they are even less frequently encountered, with their underlying pathophysiology remaining unknown.

In a prior investigation of midgut volvulus, it was observed that individuals at higher risk tended to have a longer mesentery, reduced mesenteric fat, and a narrower insertion of the small bowel [8]. Furthermore, a diet rich in fiber, particularly in large quantities, has been linked to forceful peristalsis of the small bowel, potentially leading to volvulus [3,8].

However, in the case presented here, the patient did not exhibit any of these recognized predisposing factors. Instead, the midgut volvulus was likely secondary to congenital adhesion bands.

Midgut volvulus in children typically manifests with sudden-onset abdominal pain, often located around the peri-umbilical or epigastric regions. Subsequently, patients may progress to develop symptoms of small bowel obstruction, including nausea, vomiting, and abdominal distension. Especially in cases where there is no history of previous abdominal surgery or apparent causes such as hernias, clinicians should maintain a high level of suspicion for midgut volvulus as a potential underlying cause of intestinal obstruction [9].

The preferred imaging modality for diagnosing midgut volvulus is abdominal ct scan with intravenous contrast. This imaging technique allows visualization of several key signs, including indications of small bowel obstruction such as dilated or air-filled bowel loops, characteristic signs of volvulus such as the "whirl sign" showing the rotated mesentery and superior mesenteric vessels, as well as signs of potential intestinal ischemia such as thickening of the intestinal wall or presence of air within the wall, and portal vein gas [10]. While abdominal radiographs may show nonspecific findings and have limited diagnostic value for midgut volvulus, abdominal ultrasound can potentially identify the "whirl sign" but its utility is often hindered by operator dependence and limitations due to gas interposition from distended bowel loops.

The diagnosis of primary midgut volvulus can be delayed due to limited awareness of the condition and the nonspecific nature of its clinical presentation. This delay in diagnosis poses an increased risk of intestinal ischemia and infarction.

Midgut volvulus necessitates immediate surgical intervention due to the potential for severe intestinal ischemia. The ladd's procedure, whether performed laparoscopically or via open surgery, remains the established approach for midgut volvulus associated with intestinal malrotation. [11,12].

In cases of primary midgut volvulus, devolvulation is typically the primary maneuver required, although intestinal fixation may also be carried out to prevent recurrence [10]. Intestinal resection becomes necessary in the presence of intestinal infarction, and the extent of resection may be considerable, as the entire small bowel can be affected.

## IV. Conclusion

Midgut volvulus represents a rare yet critical etiology of small bowel obstruction in children, carrying significant morbidity and mortality risks if not promptly diagnosed and managed to prevent intestinal ischemia and its complications.

This condition should be considered in the differential diagnosis of children presenting with intestinal obstruction, particularly in the absence of prior abdominal surgery or other apparent causes. Early diagnosis facilitated by abdominal ct imaging, followed by prompt surgical intervention, are paramount for achieving a favorable outcome and preventing serious complications.

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## Figures :

**Figure 01:**
Exploratory laparotomy: significant small bowel distension with torsion of the third small bowel loop, with congenital adhesion bands.

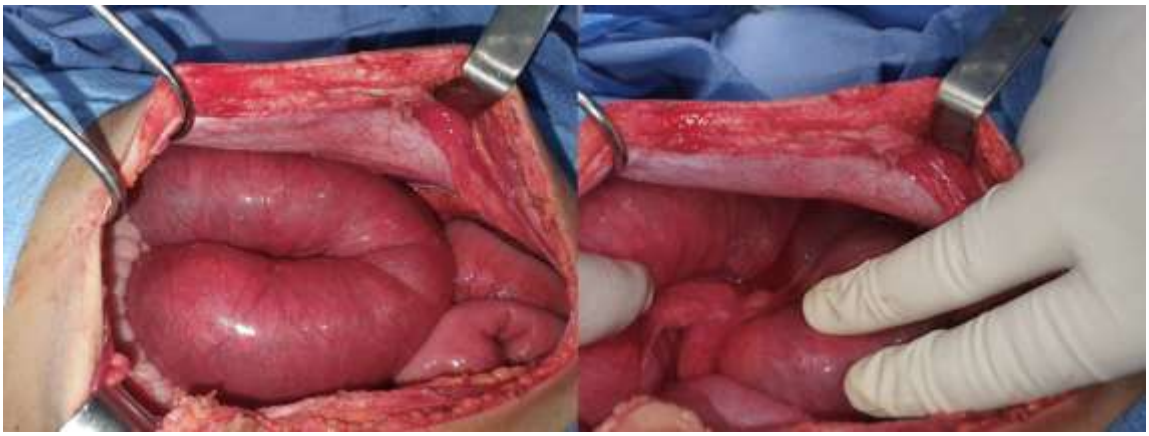

**Figure 02:**
Exploratory laparotomy: after mechanical reduction of the torsion, cyanosis decreased and the bowel loop started to present a normal appearance. No bowel resection was required