

Intestinal malrotation in adults, cause of intestinal obstruction. Case report

Malrotación intestinal en el adulto, causa de oclusión intestinal. Reporte de caso

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Abstract

Intestinal malrotation refers to the incomplete rotation of the primitive intestine around the vitelline sac or superior mesenteric artery. It is frequently found on the first days of extrauterine life or in adult life, as an incidental finding or with obstructive symptoms. We present a case of intestinal obstruction due to intestinal malrotation in a male adult, who underwent urgent surgical abdominal exploration.

Keywords: Malrotation. Intestinal obstruction. Acute abdomen. Ladd procedure.

Resumen

La malrotación intestinal es una rotación incompleta del intestino primitivo alrededor del saco vitelino o la arteria mesentérica superior. Comúnmente es evidente en los primeros días de vida extrauterina o como hallazgo incidental en la etapa adulta con eventos recurrentes de oclusión intestinal. Presentamos un caso de malrotación intestinal en un adulto, el cual fue sometido a exploración quirúrgica abdominal urgente.

Palabras clave: Malrotación. Oclusión intestinal. Abdomen agudo. Procedimiento de Ladd.

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Date of reception: 07-13-2022

Date of acceptance: 08-24-2022

DOI: 10.24875/CIRUE.M22000821

Cir Cir (Eng). 2025;93(1):117-120

Contents available at PubMed

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Introduction

Intestinal malrotation is a clinical condition characterized by incomplete or abnormal rotation during the embryological development of the primitive intestine. In pediatric patients, it typically appears within the first days of life in 80% of cases. In adulthood, it may be an incidental finding during a radiological study or cause recurrent obstructive symptoms. Diagnosis is based on clinical suspicion and confirmation through imaging studies, with contrast-enhanced intestinal transit being the gold-standard method. The definitive treatment is surgical, and the Ladd procedure is the technique of choice. If performed in childhood, recurrence in adulthood may require surgical reintervention.

Clinical case

This is the case of a 29-year-old patient who arrived at the emergency department with a 48-hour history of clinical presentation of intense, generalized abdominal pain associated with abdominal distension and > 5 episodes of diarrhea, nausea and 4 instances of gastroalimentary vomiting.

Relevant past medical history includes 2 previous episodes of intestinal obstruction during childhood, both treated surgically. The first occurred at the age of 15, when the patient underwent an exploratory laparotomy, though the exact procedure performed is unknown. The second occurred at age 22, when the patient underwent surgery for adhesion lysis.

On physical examination, the patient presented with evident abdominal distension and tenderness on deep palpation, hypoactive bowel sounds, and generalized tympanic percussion. The patient was afebrile, without tachycardia, and normotensive. Lab test results showed no abnormalities.

Upon admission, IV hydration with Hartmann's solution was initiated, and a nasogastric tube was placed, draining 1,025 cc of gastrointestinal content, which led to partial symptom relief. A contrast-enhanced abdominal computed tomography (CT) scan was performed, revealing ileal loop distension, a transition point in the distal ileum with an increased diameter of approximately 40 mm, and air-fluid levels. The CT scan also identified a "whirlpool sign" at the ileocecal valve, with inversion of the superior mesenteric artery (SMA) and vein (Fig. 1). Based on these findings, the patient was taken to the operating room for an exploratory laparotomy.

A midline incision was performed, revealing dilated intestinal loops without any signs of ischemia, containing fluid and gas, with loop-to-loop and loop-to-wall adhesions at the ileocecal valve. A clockwise mesenteric volvulus was identified (Fig. 2). Loose adhesions were dissected with cold cutting, while fibrous adhesions were released using monopolar energy. The intestinal loops were exteriorized, the volvulus was released, and pexy of the ascending colon to the right paracolic gutter was performed. A previous appendectomy was noted (Fig. 3). The intestinal loops were repositioned into the abdominal cavity using the Noble technique. The abdominal wall was closed, and surgery was concluded uneventfully.

Afterwards, the nasogastric tube was removed on postoperative day 3, and the patient was started on oral fluids and crushed ice. A postoperative ileus developed, requiring the placement of an ultrasound-guided right internal jugular central venous catheter for total parenteral nutrition (approximately 1,800 kcal). Oral fluids were reintroduced on hospital day 7 with good tolerance, and the diet was gradually advanced to normal intake. The patient was discharged asymptomatic on postoperative day 10.

Discussion

Intestinal malrotation is a developmental anomaly in which the primitive intestine undergoes incomplete or aberrant rotation around the vitelline artery or SMA¹.

Patients with this condition usually develop symptoms within the first few months of life, presenting with bilious vomiting, abdominal pain, and, in severe cases, hematochezia and peritonitis. Diagnosis occurs within the first year of life in 75–85% of cases¹.

During embryological intestinal rotation, if the cecocolic loop returns to the abdomen before the proximal intestine, the ascending colon lacks proper fixation, and the midgut occupies the left side of the abdomen. Consequently, the duodenum descends directly along the SMA².

For symptomatic patients, the recommended initial diagnostic approach is an abdominal X-ray. In many cases, a normal radiographic pattern is observed, but suggestive findings of malrotation include pneumonized jejunal loops in the right hemiabdomen and the colon in the left hemiabdomen³.

The diagnostic test of choice is a contrast-enhanced upper GI series, with a sensitivity of 96% for malrotation and 54% for volvulus⁴.

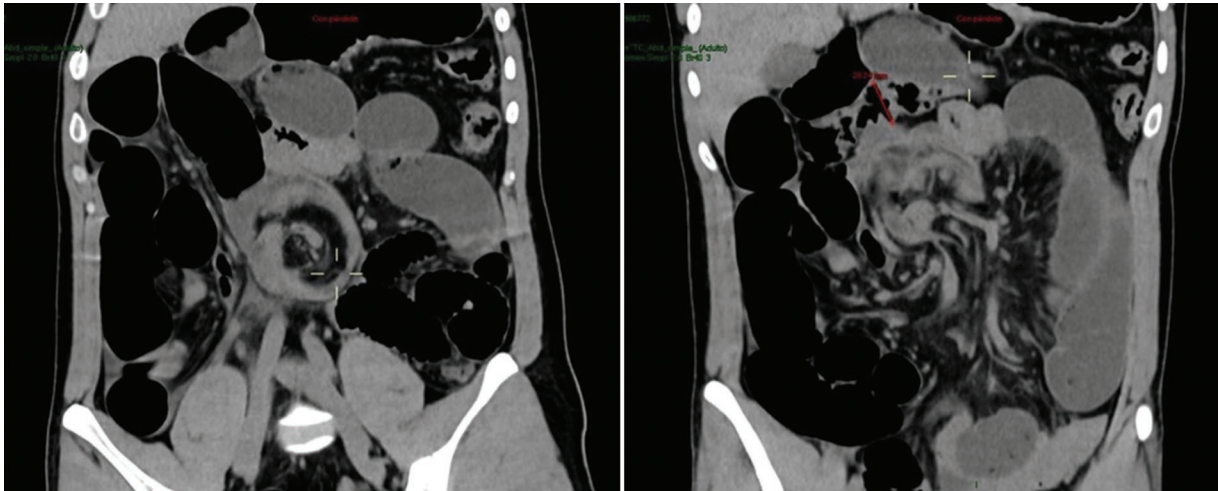


Figure 1. Computed tomography: Dilated ileal loops and ascending colon in the right hemiabdomen with fluid-filled loops in the left hemiabdomen. "Whirlpool sign" with inversion of the superior mesenteric artery and vein (white arrow).



Figure 2. Clockwise mesenteric rotation with abnormal cecal position in the right hypochondrium.



Figure 3. Dilated intestinal loops. During exploration, the duodenum was found in an abnormal position, extending toward the right iliac fossa.

Intestinal malrotation can present with symptoms in adulthood, with an estimated incidence of 0.2–0.5%. Due to its rarity in adults, diagnosis is often incidental during the evaluation of intestinal obstruction^{1,3,5}.

In adults, diagnosis is commonly made incidentally via CT or magnetic resonance imaging (MRI)^{1,3}.

The management of symptomatic patients with incidental findings of malrotation remains a topic of discussion, with both conservative and surgical approaches available. The Ladd procedure is considered the treatment of choice and consists of 5 sequential steps: dissection of Ladd's bands (abnormal peritoneal fixations of the cecum to different intestinal segments), detorsion of the malrotated intestinal segment, mesenteric separation, repositioning of the small

intestine and cecum in their correct anatomical location, and appendectomy⁶.

Patients who undergo the Ladd procedure in childhood are prone to recurrent episodes of intestinal obstruction due to volvulus, making it crucial to recognize this history and prevent life-threatening consequences^{2,4}.

Conclusions

In adulthood, intestinal malrotation poses a diagnostic challenge. Most cases of adult intestinal obstruction are due to adhesions, internal hernias, or neoplasms. Because this condition is almost exclusively seen in childhood, diagnosis in adults is often incidental. Diagnostic suspicion arises in patients with a past medical

history of abdominal surgery in childhood, particularly in the neonatal period, who later experience recurrent episodes of intestinal obstruction.

Diagnostic approach is well-defined, with radiological studies being the cornerstone for detecting this disease. During surgical management, intraoperative findings play a crucial role in decision-making. The Ladd procedure is considered the definitive treatment but may be modified based on intraoperative findings. In cases of reoperated abdomens or, as in our case, patients with 2 previous abdominal surgical procedures, a modification was made by performing cecal pexy to the right paracolic gutter while preserving the key steps of the original technique.

Postoperative follow-up is fundamental due to the potential for postoperative ileus, which may require parenteral nutrition to ensure adequate metabolic status. Despite being a diagnostic and therapeutic challenge, patients can achieve a good quality of life when managed by experienced professionals.

Acknowledgments

The authors thank the cooperation and support of the general surgery residency program director, Dr. Javier Kuri-Osorio, and the adjunct professors.

Funding

The authors declared they did not receive any funding to conduct this study.

Conflicts of interest

The authors declared no conflicts of interest whatsoever.

Ethical considerations

Protection of human and animal subjects. The authors declare that no experiments were conducted on humans or animals for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and have the approval of the Ethics Committee. The recommendations of the SAGER guidelines were followed, according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

References

1. Soffers JH, Hikspoors JP, Mekonen HK, Koehler SE, Lamers WH. The growth pattern of the human intestine and its mesentery. *BMC Dev Biol.* 2015;15:31.
2. Langer JC. Intestinal rotation abnormalities and midgut volvulus. *Surg Clin North Am.* 2017;97(1):147-59.
3. Ballesteros Gómiz E, Torremadé Ayats A, Durán Feliubadaló C, Martín Martínez C, Caro Tarragó A. Intestinal malrotation-volvulus: imaging findings. *Radiologia.* 2015;57(1):9-21.
4. El-Gohary Y, Alagtal M, Gillick J. Long-term complications following operative intervention for intestinal malrotation: a 10-year review. *Pediatr Surg Int.* 2010;26(2):203-6.
5. Low SF, Ngiu CS, Sridharan R, Lee YL. Midgut malrotation with congenital peritoneal band: a rare cause of small bowel obstruction in adulthood. *BMJ Case Rep.* 2014 Mar 7;2014:bcr2013202690.
6. Neville JJ, Gallagher J, Mitra A, Sheth H. Adult presentations of congenital midgut malrotation: a systematic review. *World J Surg.* 2020; 44(6):1771-8.