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Case Report

A rare cause of small bowel obstruction internal herniation due to Allen-masters Syndrome: case report and literature review

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ABSTRACT

Background: Internal hernias are rare and constitute only a small fraction of bowel obstruction cases. Herniation through the broad ligament of the uterus, known as Allen-Masters syndrome, is an exceptionally rare cause of small bowel obstruction.

Case Report: We present the case of a 56-years-old woman with clinical signs indicative of mechanical bowel obstruction. During diagnostic laparoscopy, a segment of the small bowel was found entrapped within the broad ligament (ligamentum latum uteri). The entrapped bowel loop was released, and the ligament defect was sutured.

Conclusion: A defect in the ligamentum latum uteri, as seen in Allen-Masters syndrome, is a rare and often incidental finding in female patients presenting with ileus. This syndrome may account for nonspecific symptoms such as dyspareunia, dysmenorrhea, and both acute and chronic pelvic pain. Allen-Masters syndrome can be effectively diagnosed and treated through a laparoscopic approach.

Keywords: Allen-Masters syndrome; Broad ligament; internal hernia; intestinal obstruction; small bowel herniation.

Introduction

Bowel obstruction arises when the normal passage of intraluminal contents is interrupted. Approximately 80% of mechanical intestinal obstructions involve the small bowel (1,2). In developed countries, adhesions are the most frequent cause, followed by hernias, malignancies, and various infectious and inflammatory conditions. Acute mechanical small bowel obstruction is a common clinical scenario that necessitates prompt surgical evaluation (3). It is responsible for 2-4% of emergency department visits, approximately 15% of hospital admissions, and 20% of emergency abdominal surgeries (4,5).

Herniation through a defect in the broad ligament was first reported during an autopsy series (6,7). The clinical syndrome associated with a defect in the broad ligament, typically following trauma during delivery, was first

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described by Allen and Masters (8). This syndrome is characterized by symptoms such as dyspareunia, excessive physical fatigue, and dysmenorrhea. In 1955, Allen and Masters established a connection between traumatic delivery and lacerations in the posterior leaf of the broad ligament, thus defining this condition (8). Patients commonly present with persistent pelvic pain, dyspareunia, and menstrual irregularities. Herniation through the broad ligament of the uterus represents a rare form of internal hernia, accounting for approximately 4–7% of all cases (9).

This study aims to report a case of acute small bowel obstruction resulting from Allen-Masters Syndrome. Diagnostic and therapeutic considerations are discussed, accompanied by a comprehensive literature review.

Case Presentation

Patient Information: A 56-years-old female patient presented to the emergency department on September 20, 2024, with complaints of abdominal pain, nausea, and vomiting that had persisted for three days. Her medical history includes diagnoses of diabetes mellitus, hypertension, and hyperlipidemia, and she underwent cataract surgery approximately one month ago. She has a history of two cesarean sections as intra-abdominal surgeries. Her BMI was calculated as 23,14 kg/m^2 with no history of smoking, alcohol use, or known allergies. Laboratory parameters at admission showed hemoglobin (Hgb) 13.8 g/dL, white blood cell count (WBC) 10.59 x10^3/µL, pH 7.40, lactate 2.2 mmol/L, C-reactive protein (CRP) 18.3 mg/L, creatinine 2.65 mg/dL, urea 157.3 mg/dL, sodium 129 mmol/L, and glucose 109 mg/dL.

Clinical Findings: On clinical examination, dryness of the mucous membranes and darkened urine were observed. Abdominal examination revealed distension and tenderness, particularly in the lower quadrants. Drainage consistent with intestinal content was noted from the nasogastric tube.

Diagnostic Assessment: Abdominal computed tomography (CT) revealed air-fluid levels in the small intestine with dilation, reaching up to 37 mm at its widest point (Figure 1). The transition zone of the dilation was observed in the pelvic region, leading to a preliminary diagnosis of small bowel obstruction, and the patient was taken to surgery.

Therapeutic Interventions: The patient underwent abdominal exploration via diagnostic laparoscopy. During the exploration, a 5 cm segment of ileal loop approximately 40 cm proximal to the ileocecal valve was found to have herniated and become trapped within a defect in the broad ligament adjacent to the uterus on the left side (Figure 2). The trapped ileal segment was released laparoscopically. Examination of the defect revealed a peritoneal opening located between the round ligament and fallopian tube, consistent with Type 1 Allen-Masters syndrome (Figure 3). No signs of ischemia were observed in the small bowel, and no additional surgical intervention was deemed necessary. The peritoneal defect was repaired intracorporeally using 3-0 polyglactin 910 sutures, and the procedure was completed without complications.

Follow-up and Outcome of Interventions: Postoperatively, the patient was monitored with nasogastric drainage tube for one day. Oral intake was initiated on postoperative day

Figure 1. Abdominal CT scan showing dilated small intestine loops in the pelvic region and a transition zone indicating luminal narrowing in the ileal loops

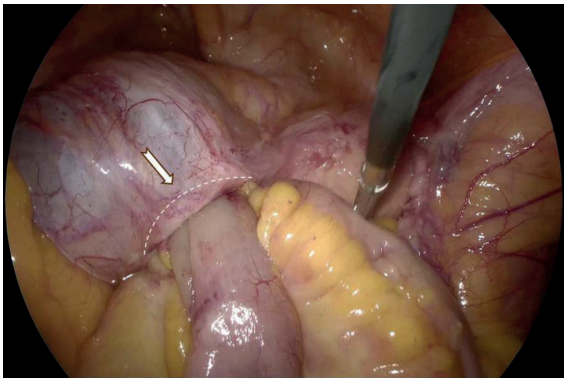

Figure 2. Compressed ileal loop herniating through a defect in the broad ligament

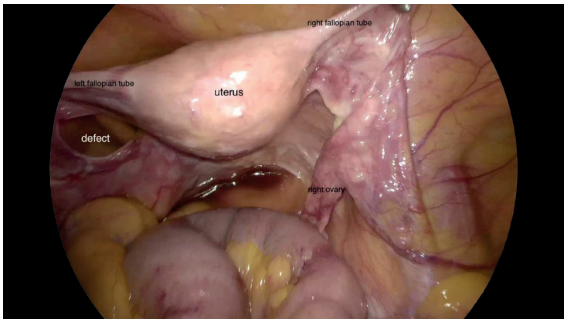

Figure 3. Appearance of the defect and anatomical landmarks after the ileal loops were reduced

two after confirming the absence of nasogastric drainage and disappearance of air-fluid levels on imaging. Oral intake was gradually increased, and the patient was discharged on postoperative day four.

Diagnosis: Type 1 Allen-Masters syndrome causing intestinal obstruction.

Informed Consent: An informed consent form was signed by the patient.

Discussion

Following Quain's initial report of herniation caused by a defect in the broad ligament, this anatomical anomaly has been further studied, with its etiology classified into two categories: congenital and acquired. The primary congenital cause is thought to involve the rupture of cystic remnants of embryological Mullerian ducts (10). Acquired causes, on the other hand, include iatrogenic injuries, pelvic inflammatory disease, or traumatic lesions. A broad ligament defect occurring after tearing during childbirth is referred to as Allen-Masters syndrome, which is commonly associated with chronic pelvic pain.

Defects in the broad ligament are classified based on their anatomical location or whether they involve the full thickness of the peritoneum. Cilley categorized broad ligament defects into three types according to the site of the tear. Type 1, the most common, occurs between the fallopian tube and the round ligament. Type 2 arises between the fallopian tube and the ovary, while Type 3 is located between the round ligament and the uterus (11). Similarly, Hunt proposed a classification with two distinct types (12). In Type 1, only one layer of the double-layered broad ligament is involved, forming a confined space where herniated structures can become trapped. Type 2, the more common form, involves a complete herniation through the entire ligament.

Internal herniation of the small intestine is a rare cause of small bowel obstruction, accounting for only 0.2% to 1% of all cases (6). Among these, only 4% to 5% are attributed to defects in the broad ligament, making it an exceptionally rare condition. While the ileum is most frequently involved, herniation of the colon, ovary, fallopian tube, and ureter has also been reported (6,13). Multiparity is a predisposing factor in approximately 80% of cases (9). The defect is typically isolated, and although the exact cause remains unknown, nearly three-quarters of cases demonstrate a left-sided predominance.

In this study, we reviewed previously reported cases of internal herniation through broad ligament defects, alongside our own case presentation. Using PubMed, we conducted a comprehensive search of all articles published up to November 2024. The search utilized the following terms: "Broad ligament AND internal hernia," "Broad ligament AND intestinal obstruction," "Allen-Masters syndrome AND

internal hernia," and "Allen-Masters syndrome AND intestinal obstruction." This search yielded a total of 115 articles. Among these, 97 articles were written in English, 85 of which were case reports. The remaining 18 articles were published in languages other than English, predominantly French, Spanish, Italian, Danish, Chinese, Japanese, and Russian. It was noted that the herniated intra-abdominal organ was most commonly the small intestine. The details of all identified studies and the cases presented in this article are summarized in Figure 4.

Adhesions are the most common cause of small bowel obstruction, accounting for 55% to 80% of cases in developed countries due to intra-abdominal and pelvic adhesions (14,15). Approximately 80% of patients with adhesive small bowel obstruction have a history of prior abdominal surgery (14). In the case we present, the patient had undergone two previous cesarean sections, and the presence of dilated intestinal loops with a transition zone in the pelvic region initially suggested an adhesive band involving ileal loops in the pelvis. The definitive diagnosis was confirmed through diagnostic laparoscopy, and treatment was successfully performed using a laparoscopic approach during the same session. In our case, the peritoneal defect was closed with absorbable sutures, in accordance with most recommendations in the literature (16,17). However, some studies, particularly those describing Cilley Type 1 defects, have reported alternative approaches, such as cleave the defect to prevent reincarceration (18).

As seen in our case, laparoscopy should be considered the first-line approach in the management of bowel obstructions caused by internal hernias, as it is less invasive and associated with better postoperative outcomes.

Conclusion

In conclusion, although adhesions and abdominal wall hernias are commonly considered in patients with signs of mechanical bowel obstruction and a history of intra-abdominal surgery, it is important to consider rarer etiologies. This case highlights Allen-Masters syndrome as a rare cause and emphasizes the importance of timely diagnosis and management of symptomatic broad ligament defects.

Ethical approval

In this case, we have ensured that the patient's identity is fully anonymized, and no identifiable information has been disclosed. Additionally,

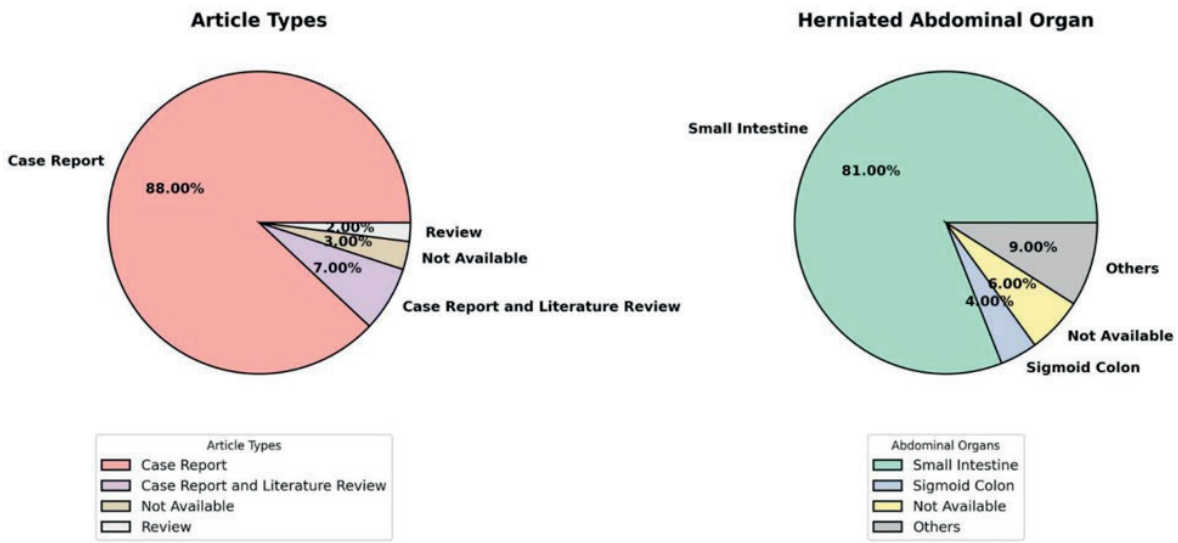

Figure 4. Characteristics of included studies

we have obtained the patient's informed consent to publish this report.

Author contribution

The authors confirm contribution to the paper as follows: Study conception and design: HOS, SY, YD; data collection: HOS, NA, OT; analysis and interpretation of results: HOS, SY, YD; draft manuscript preparation: HOS, NA, OT. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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