



Case Report

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Strangulating Closed-Loop Ileal Obstruction Caused by Broad Ligament Hernia with Ileal Perforation: A Case Report

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Abstract

A broad ligament (broad band) hernia is a rare internal hernia caused by small bowel herniation through a defect of the broad ligament, often presenting as intestinal obstruction. Delayed diagnosis may progress to strangulation and generalized peritonitis. We report a case of strangulating closed-loop ileal obstruction caused by broad ligament hernia complicated by ileal perforation. A 51-year-old woman was initially treated conservatively for 10 days at Jepara District Hospital for colicky abdominal pain suspected to be adhesive small bowel obstruction, despite no prior abdominal surgery. Nasogastric decompression, intravenous fluids, and nutritional support resulted in temporary improvement, and she was discharged. Symptoms recurred one day later, and plain abdominal radiography suggested small bowel obstruction; conservative treatment was continued. The next day she developed diffuse abdominal pain worsening with movement. Repeat radiography revealed free air under the diaphragm, and she was referred to St. Elizabeth Hospital, Semarang, with generalized peritonitis due to intestinal perforation. Emergency laparotomy found gas, fibrin, pus, and fecal contamination, with a distended ileal segment trapped in the pelvic cavity on the left side of the uterus. Two constriction rings were identified, with a bowel perforation at one site. A ~2 cm defect in the left broad ligament was confirmed. The constriction ring was opened up, the bowel was freed, the defect was sewn up, and a loop ileostomy was done. The patient recovered well and was discharged on postoperative day seven. Internal hernia should be considered in small bowel obstruction without previous surgery, and early abdominal CT is recommended to improve diagnostic accuracy and prevent life-threatening complications.

Keywords: Abdominal CT scan; Broadband hernia; Internal hernia; Small bowel obstruction.

انسداد الحلقة المغلقة في اللبائي الناتج عن فتق الأربطة العريضة مع ثقب لفانفي: تقرير حالة

الخلاصة

الفتق العريض (واسع النطاق) هو فتق داخلي نادر يسببه انزلاق الأمعاء الدقيقة من خلال عيب في الرباط العريض، وغالبا ما يظهر على شكل انسداد معوي. قد يتطور التشخيص المتأخر إلى الاختناق والتهاب الصفاق العام. نبلغ عن حالة انسداد لمغلق الحلقة الخانقة ناتج عن فتق رباط عريض معقد بسبب ثقب لفانفي. تم علاج امرأة تبلغ من العمر 51 عاما بشكل تحفظي في البداية لمدة 10 أيام في مستشفى منطقة جيبارا بسبب ألم بطني مغمصي يشتبه في أنه انسداد لاصق في الأمعاء الدقيقة، رغم عدم إجراء جراحة بطنية سابقة. أدى تخفيف الضغط الأنفي المعدي، والسوائل الوريدية، والدعم الغذائي إلى تحسن مؤقت، وتم إخراجها. عادت الأعراض بعد يوم واحد، وأشارت الأشعة السينية للبطن إلى انسداد في الأمعاء الدقيقة؛ استمر العلاج المحافظ. في اليوم التالي ظهرت عليها ألم منتشر في البطن وازداد سوءا مع الحركة. كُشف التصوير الشعاعي المتكرر عن وجود هواء حر تحت الحجاب الحاجز، وتم تحويلها إلى مستشفى سانت إليزابيث في سيمارانغ بسبب التهاب الصفاق العام بسبب ثقب الأمعاء. وجد إجراء فتح البطن الطارئ ثلوثا بالغازات والفيبرين والصدئ والبراز، مع وجود جزء ليفي منتفخ محاصر في تجويف الحوض على الجانب الأيسر من الرحم. تم تحديد حلقتين تضيق، مع ثقب في الأمعاء في أحد المواقع. تم تأكيد وجود عيب ~2 سم في الرباط العريض الأيسر. تم فتح حلقة التضيق، وتحرير الأمعاء، وخطابة العيب وإجراء عملية لوب إيليوستومي. تعافت المريضة جيدا وتم إخراجها في اليوم السابع بعد العملية. يجب النظر في الفتق الداخلي في حالات انسداد الأمعاء الدقيقة دون جراحة سابقة، وينصح بالتصوير المقطعي البطني المبكر لتحسين دقة التشخيص ومنع المضاعفات المهددة للحياة.

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INTRODUCTION

A broad band hernia is a type of internal abdominal hernia in which bowel loops protrude through a defect in the broad band. This condition is quite rare, primarily because a defect in the broadband usually does not exist. A study by Mendoza-Moreno *et al.* (2019) [1], reviewing articles indexed in PubMed from 1933 to 2018, identified only 75 cases. The underlying causes of broadband hernias remain unclear, but several hypotheses have been proposed. These include obstetric trauma, inflammatory pelvic disease, gynecological surgery, and, in cases without any preceding history, a congenital defect. Such congenital

defects may arise from the rupture of a cyst in the broad band ligament and can manifest as either a true hole or a sac structure [1]. In 1955, Willard M. Allen and William H. Master published an article titled "Traumatic Laceration of Uterine Support," which introduced a new anatomical and clinical syndrome later termed Allen-Master Syndrome [2,3]. This syndrome is characterized by lacerations of the posterior leaf of the broad ligament, typically resulting from obstetric complications. It is consistent with painful retroversion of the uterus and an unusually mobile cervix. Several risk factors for lacerations of the broad band ligament have been identified, including a history of obstetric distress,

difficult forceps deliveries, complex breech deliveries, the birth of large infants, severe postpartum hemorrhage managed with uterine packing, and criminal abortion procedures [4]. Patients with internal hernias often present with intestinal obstruction, most commonly a small bowel obstruction. Since there are no specific symptoms, diagnosis can be delayed, typically being identified during surgical intervention [5]. This report discusses a case of strangulating closed-loop ileal obstruction by broad band hernia with generalized peritonitis to raise awareness of the possibility of internal hernias in cases of unexplained small bowel obstruction, particularly in women, where broad band hernia should be considered as a potential cause.

Case Presentation

A 51-year-old woman was referred from Jepara District Hospital with generalized peritonitis, suspected to be due to gastric perforation. She arrived at St. Elizabeth Hospital in Semarang, Indonesia, on September 25, 2020. Prior to her arrival, she had been hospitalized in Jepara for 10 days, experiencing colicky abdominal pain and bulging, and had been treated conservatively by an internist with a nasogastric tube and parenteral nutrition. During the first week, her conservative treatment was effective, and she was discharged home. However, just one day later, her symptoms returned, leading to her readmission to Jepara District Hospital. Upon readmission, she was placed on nasogastric suction and received intravenous fluids. A plain abdominal X-ray (Figure 1) suggested a diagnosis of small bowel obstruction, prompting the continuation of conservative treatment.

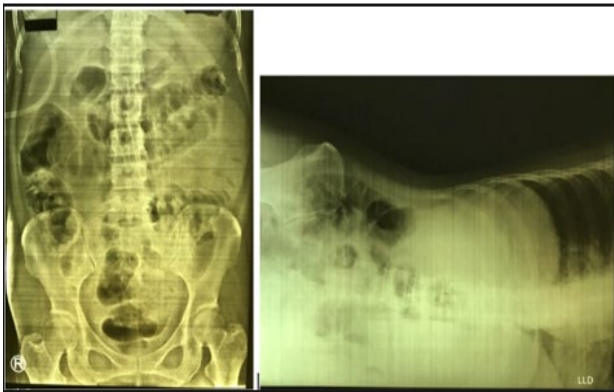


Figure 1: Plain abdominal X-ray showing the supine position (left) and left lateral decubitus position (right). The images reveal a dilated small bowel, including in the pelvic area, minimal air-fluid levels, and a clear pre-peritoneal fat line. (X-ray was performed at Jepara District Hospital during the patient's first admission).

The next day, the patient reported diffuse abdominal pain that intensified with movement. A follow-up plain abdominal X-ray revealed free air beneath the diaphragm (Figure 2). During the first admission at the referring hospital, conservative treatment was continued because the patient initially showed clinical improvement after nasogastric decompression, intravenous fluid therapy, and nutritional support. However, in retrospect, the 10-day duration of conservative management was longer than the generally recommended observation period for suspected small bowel obstruction.

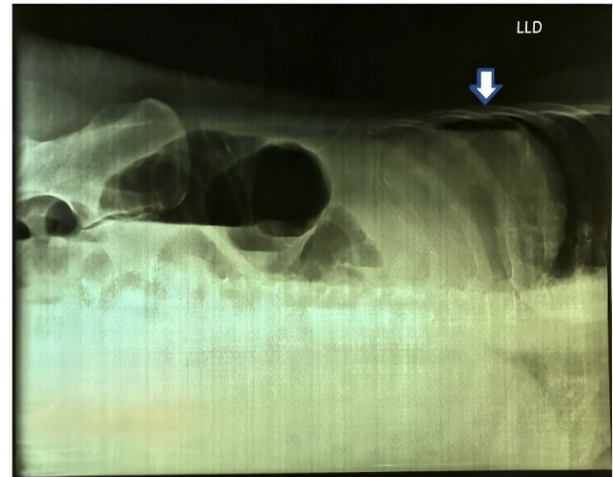


Figure 2: Left lateral decubitus plain abdominal X-ray displays free air (indicated by the white arrow) and blurring of the preperitoneal fat line. (X-ray conducted at Jepara District Hospital during the patient's second admission), consistent with pneumoperitoneum due to hollow viscus perforation.

Contrast-enhanced abdominal CT scan and diagnostic laparoscopy were not performed during the first admission because the initial working diagnosis was uncomplicated small bowel obstruction and the patient temporarily improved with conservative treatment. The absence of early cross-sectional imaging was an important limitation in the initial evaluation and may have contributed to delayed recognition of an internal hernia.

Patients' Assessment

The patient presented at St. Elizabeth Hospital with the following vital signs: blood pressure of 110/70 mmHg, pulse rate of 108 beats per minute, respiratory rate of 28 breaths per minute, and an axillary temperature of 38.6 °C.

Medical History

The patient has been pregnant three times: her first pregnancy ended in miscarriage, her second resulted in a healthy female baby born via normal delivery 30 years ago, and her third also resulted in a female baby born through normal delivery 23 years ago. She reported no history of abdominal surgery or trauma, and her last menstrual period occurred at age 48. The patient frequently receives abdominal massages but has no history of pelvic inflammatory disease.

Physical Examination

Upon examination, the abdomen was distended and tender, exhibited muscular rigidity, and was tympanic on percussion over the liver area, with no peristaltic sounds noted during auscultation. A rectal examination showed a collapsed rectum, without tumors, but there was pain on the ventral side.

Imaging Results

The first plain abdominal X-ray (Figure 1), taken in both supine and left-lateral decubitus positions, showed dilated small bowel segments, including in the pelvic area,

minimal air-fluid levels, and a clear pre-peritoneal fat line. A second abdominal x-ray, also in the left lateral decubitus position (Figure 2), revealed free air under the right diaphragm and blurring of the pre-peritoneal fat line. Based on the diagnosis of generalized peritonitis due to intestinal perforation, a midline laparotomy was performed. The available radiographs were obtained in supine and left lateral decubitus positions. The left lateral decubitus view was used particularly because the patient had worsening abdominal pain and limited tolerance for positional change. Nevertheless, the absence of an erect abdominal radiograph was a limitation because this view is useful for detecting multiple air-fluid levels and subdiaphragmatic free air.

Surgical Findings

During the procedure, the abdominal cavity was found to contain gas, fibrin, pus, and fecal material. The stomach and duodenum appeared normal, as did the jejunum; however, the ileum was fixed at the base of the pelvic wall with associated pus and fibrin in the pelvic region. The abdominal incision was extended downward, allowing identification of a loop of ileum entrapped on the left side of the uterus. The ring was dilated, and the entrapped ileum was released, with the uterus noted to be retroflexed. There were two constriction rings on the ileal loop, one of which had a bowel perforation, alongside a defect in the left broad band ligament measuring approximately 2 cm in diameter (Figure 3). Warm normal saline irrigation was used for abdominal lavage, and an ileostomy was performed from the perforated ileum. The defect in the broad band ligament was sutured with interrupted stitches using 3-0 polydioxanone (PDS) absorbable monofilament suture, and the abdomen was closed without drainage.

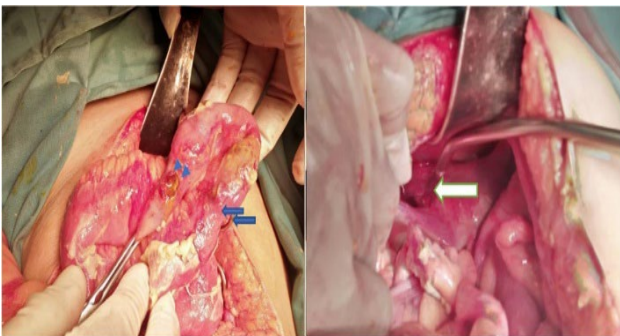


Figure 3: On the left, a loop of ileum with a constriction ring (arrow) and a constriction ring with perforation (arrowhead) are shown. On the right, a defect in the left broad band ligament is visible, measuring approximately 2 cm in diameter (white arrow).

Postoperative Follow-up

The patient recovered without complications and was discharged home on the seventh postoperative day. Three months after the initial surgery, the ileostomy was reversed, and the patient was discharged home uneventfully on the fourth postoperative day. Follow-up at three months post-reversal indicated no complaints, and the patient was reported to be in excellent health.

DISCUSSION

Broadband hernia is an exceptionally rare condition, with fewer than 100 cases reported up to 2019. Autopsy studies have shown that defects in the broad ligament are found in only 0.5% of cases, while broad ligament hernias account for approximately 4% to 5% of all internal herniations clinically observed [6]. Studies show that internal hernias cause up to 5.8% of all small bowel obstructions (SBO), and the overall death rate is very high, sometimes over 50% [7]. A review by Mendoza-Moreno covering the period from 1933 to 2018 identified 75 cases of broadband hernias. The mean age of patients was 44.6 years (+/-15 years), with a median age of 72 years and an age range from 1 to 94 years. The most common symptoms reported were a combination of abdominal pain, nausea, and vomiting, observed in 67.1% of patients (49 individuals), while 23.3% (17 patients) experienced abdominal pain alone. Other reported symptoms included urinary infections and enterovaginal fistulas, each affecting 1.4% of patients (3 individuals). The majority of organs incarcerated within the defect were small intestines, accounting for 82.2% of cases (60 patients), followed by the colon at 8.2%, with the sigmoid colon being the most frequently involved at 6.84%. Other organs included the ovaries in 6.8%, while the cecal appendix and urinary bladder were each reported in only one case [1]. Internal hernia refers to the protrusion of abdominal organs, typically loops of the small intestine, through a defect in the peritoneum or mesentery into a compartment within the abdominal or pelvic cavity. Internal hernias are classified based on the location of the hernia orifice into three main categories: a) Normal Foramen: The only type of internal hernia classified here is the hernia through the Foramen of Winslow, which is a type of lesser sac hernia. b) Unusual Peritoneal Fossa or Recess: This category includes hernias that occur in atypical peritoneal spaces or recesses leading to the retroperitoneum, such as paraduodenal hernia, pericecal hernia, intersigmoid hernia (a subtype of sigmoid mesocolon-related hernia), and most types of pelvic internal hernias (excluding broad band hernia, which is due to a true defect in the broad band); and 3) Abnormal Opening in a Mesentery or Peritoneal Ligament: This classification encompasses hernias that occur through abnormal openings, including: Small bowel mesentery-related hernias, Greater omentum-related hernias, Most types of lesser sac hernias (excluding the Foramen of Winslow hernia), trans-mesosigmoid and intra-mesosigmoid hernias (both subtypes of sigmoid mesocolon-related hernias), falciform ligament hernias, broad band ligament hernias (considered a type of pelvic internal hernia), and Roux-en-Y anastomosis-related hernias [5]. Based on the location of the defect, Cilley (1986) classified broadband hernias into three types: Type I defects occur in the broad ligament below the round ligament of the uterus. Type 2 are located in the broad ligament above the round ligament and may involve the suspensory ligament of the ovary, the mesosalpinx, and the utero-ovarian ligament; and Type 3 defects arise in the "mesoligamentum teres" of the uterus (Figure 4) [8].

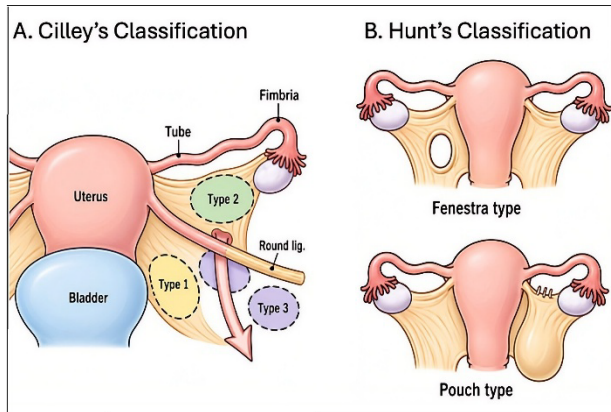


Figure 4: Schematic illustration of Cilley's and Hunt's classifications of broad ligament defects [8]. Cilley's classification is based on anatomical location: Type I, below to the round ligament; Type II, above to the round ligament, involving the mesosalpinx or mesovarium; and Type III, through the mesoligamentum teres. Hunt's classification includes the fenestra type and pouch type.

Another classification, developed by Hunt, distinguishes between the presence of a hernial sac, categorizing broadband hernias as fenestra type and pouch type, with the pouch type containing a hernial sac [8]. Preoperative diagnoses usually involve small bowel obstruction, which is commonly assessed through plain abdominal X-rays; however, identifying the specific type of internal hernia can be challenging (Figure 5).

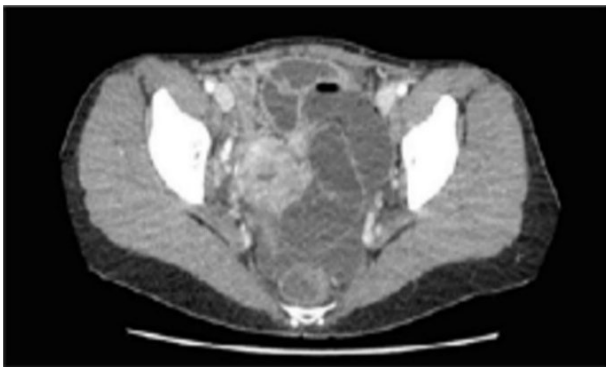


Figure 5: CT scan axial section in the early arterial phase demonstrates the majority of the occlusion located in the left hemipelvis, displacing the uterus to the right and ventrally, consistent with a left broadband hernia. [3].

The Bologna Guidelines for adhesive small bowel obstruction recommend that the primary objectives during the initial evaluation of suspected adhesive bowel obstruction include differentiating it from other causes of bowel obstruction. This case highlights a diagnostic delay during the first admission. Although conservative treatment may be appropriate for selected small bowel obstruction cases, prolonged non-operative management should be avoided when the cause is uncertain, particularly in patients without prior abdominal surgery. Early contrast-enhanced abdominal CT and diagnostic laparoscopy in selected stable patients should be considered to detect internal hernia, closed-loop obstruction, ischemia, or free fluid. A CT scan may help in determining whether there is a complete bowel obstruction that can also help locate the obstruction (for example, whether it is high in the jejunum or deeper in the pelvis), as well as identify signs of closed-loop obstruction, bowel ischemia, and the presence of free

fluid [9]. According to Lanzetta (2019), multidetector computed tomography (MDCT), with its thin-section and high-resolution multiplanar reformatted (MPR) images, is the preferred imaging technique for assessing small bowel obstruction of unknown origin [7]. Surgical management of broad ligament hernias should be individualized according to bowel viability, the presence of perforation, the degree of peritoneal contamination, and the patient's physiological condition. The main operative principles include reduction of the herniated bowel loop, assessment of bowel viability, closure or widening of the broad ligament defect to prevent recurrence, and appropriate management of bowel injury. In a viable bowel without perforation, reduction of the incarcerated bowel and closure of the defect may be sufficient, whereas ischemic or gangrenous bowel usually requires segmental resection with primary anastomosis or stoma formation. In cases of small bowel perforation, primary suturing after trimming the perforation edges may be considered in stable patients with limited contamination; however, ileostomy may be safer in delayed presentation, generalized peritonitis, fecal contamination, or doubtful tissue viability. Laparoscopy has also been increasingly reported as a useful diagnostic and therapeutic approach in stable patients, allowing direct visualization, reduction of the incarcerated bowel, viability assessment, and repair of the broad ligament defect, although open laparotomy remains more appropriate in patients with diffuse peritonitis, suspected perforation, marked bowel distension, or gross contamination, as occurred in the present case [9]. In conclusion, when a small bowel obstruction occurs without a history of prior surgery, an internal hernia should be considered as a potential cause. While plain abdominal X-rays can be advantageous they often do not provide sufficient detail to detect internal hernias. Therefore, multidetector computed tomography (MDCT) should be the imaging method of choice.

Conclusion

This case emphasizes the rarity and diagnostic difficulties of broadband hernia, particularly in patients with no prior history of abdominal surgery. A delayed diagnosis can result in serious complications, such as strangulation and peritonitis. Early detection, utilizing advanced imaging methods like MDCT, is essential for accurate diagnosis. Timely surgical intervention is critical for improving patient outcomes in cases of unexplained small bowel obstruction and peritonitis.

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Conflict of interests

The authors declared no conflict of interest.

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Data sharing statement

The data that supports the findings of this study are available from the corresponding author upon a reasonable request.

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