

Internal Hernia through Congenital Broad Ligament Defect

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Background	In the United States, the most common causes of small bowel obstruction include adhesive bowel disease, tumors, and complicated hernias. Internal hernias are considered complicated hernias and cause between 0.6 to 6 percent of all small bowel obstructions. Most internal hernias are acquired due to adhesions or secondary to artificial mesenteric defects created during procedures like Roux-en-Y gastric bypass or creation of an ileal conduit. Less commonly, internal hernias occur secondary to congenital mesenteric defects. The following patient presented with an exceedingly rare case of internal hernia caused by a congenital defect in the broad ligament.
Summary	A 62-year-old female presented with a six-month history of intermittent abdominal pain, which acutely worsened on the day of presentation. She described progressively smaller caliber stools over the previous three months with minimal passage of flatus in the last day. Her pain was rated at an 8/10 on the pain scale at worst with some association with movement. She had no previous surgical history and was not taking any medications. Computed tomography (CT) scan revealed a small bowel obstruction with a transition point in the right adnexal region. Diagnostic laparoscopy demonstrated herniation of small bowel through a defect in the broad ligament medial to the right ovary. The bowel was reduced after enlarging the internal hernia defect in the broad ligament. Due to concern for future herniation, the fallopian tube, ovary, and suspensory ligament were removed, thus opening the entire right pelvic space and permanently eliminating the risk of recurrence.
Conclusion	This case represents a unique cause of internal hernia through a congenital broad ligament defect. While a rare cause of small bowel obstructions, internal hernias can be difficult to diagnose but should be considered in patients, especially females, who fail conservative treatment. Surgical management of internal hernias through broad ligament defects is mandatory through either suture repair of the defect or salpingo-oophorectomy. Suture repair is preferred in patients who desire future fertility. Salpingo-oophorectomy prevents hernia recurrence, but should be reserved for postmenopausal patients or those who do not desire future fertility.
Keywords	Internal hernia, broad ligament defect

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Case Description

Small bowel obstruction caused by an internal hernia is a rare occurrence. An internal hernia through a congenital defect in the broad ligament is scarcely reported in the literature, with only a handful of case reports published. These hernias are extremely difficult to diagnose, as the presenting symptoms can be nonspecific and abdominal CT findings often identify a small bowel obstruction, but visualizing the actual defect in the broad ligament is more challenging.¹ However, early identification of these rare hernias is crucial because surgical correction is universally required.² The case presented here demonstrates an internal hernia through a congenital broad ligament defect in a patient without a previous surgical, traumatic, or obstetric history.

A 62-year-old nulliparous female with a history of hypothyroidism, diverticulosis, and nephrolithiasis presented with acute worsening of her abdominal pain radiating from the epigastrium to her pelvis. She previously had intermittent abdominal pain that waxed and waned for six months. She described progressively smaller caliber stools over the last three months with minimal passage of flatus on the last day. She denied vomiting but frequently felt the sensation of gagging. Her pain was rated at 8/10 and was associated primarily with movement. She had no previous surgical history and was not taking any medications.

On physical examination she was afebrile, hypertensive, and had a respiratory rate of 20 breaths per minute. Abdominal examination revealed minor diffuse tenderness to palpation without rebound or guarding. Abdominal auscultation revealed high-pitched tinkling bowel sounds. Complete blood count showed a white blood count of 8,200 with 79.3 percent neutrophils. An abdominal radiograph (Figure 1) was consistent with small bowel obstruction.

CT of the abdomen and pelvis demonstrated a small bowel obstruction with transition point in the right adnexal region along with haziness of mesenteric fat in this area (Figure 2 and Figure 3).



Figure 1. Abdominal radiograph demonstrating findings consistent with small bowel obstruction.

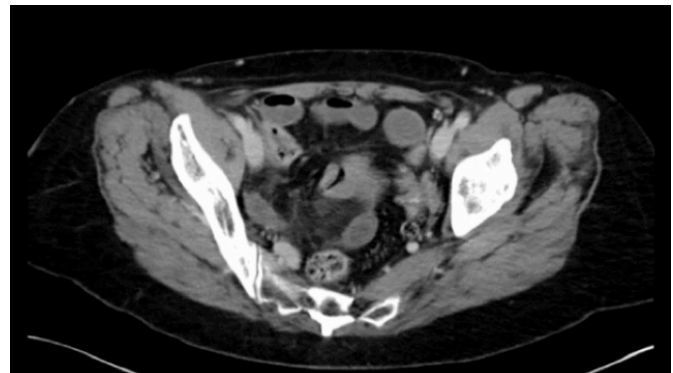


Figure 2. CT of the abdomen and pelvis demonstrating a small bowel obstruction with transition point in the right adnexal region along with stranding of mesenteric fat.

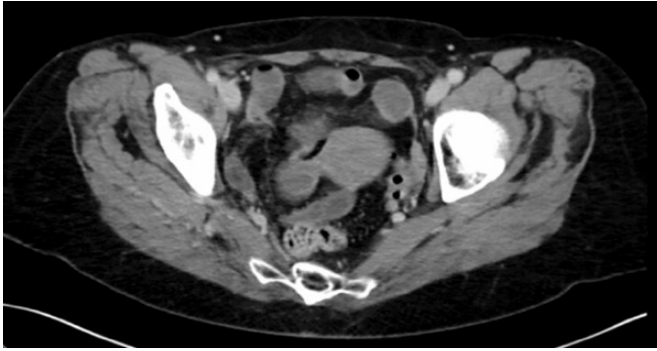


Figure 3. CT of the abdomen and pelvis demonstrating a small bowel obstruction with transition point in the right adnexal region along with stranding of mesenteric fat.

The patient was admitted to the surgical ward and initially managed with bowel rest and intravenous fluids. However, she failed to improve with conservative measures, and therefore was taken to the operating room for diagnostic laparoscopy. After entering the abdomen, the bowel was run retrograde starting at the cecum and progressing toward the ligament of Treitz. This revealed an internal hernia in the right broad ligament that contained incarcerated small bowel. The defect in the broad ligament was medial to the right ovary and inferior to the right fallopian tube. Small bowel was seen entering and exiting this defect with dilated small bowel proximally. The defect in the broad ligament had to be widened in order to reduce the incarcerated small bowel; however, after reduction, the bowel was determined to be viable. Due to concern for future re-herniation, the fallopian tube, ovary, and suspensory ligament were removed, thus opening the entire right pelvic space and permanently eliminating the risk of recurrence. Following right salpingo-oophorectomy, the hernia defect no longer existed.

The patient was extubated without difficulty and was admitted to the surgical floor. She had rapid return of bowel function and tolerated advancements in diet without issue. She met criteria for discharge on postoperative day two and her entire postoperative course was without complication. She was seen as an outpatient for follow-up two weeks after surgery and was doing well without complaints.

Discussion

Internal hernias are responsible for approximately 0.6 to 6 percent of all small bowel obstructions and are due to congenital or acquired defects.^{3,4} Hernias through the broad ligament represent four to seven percent of all internal her-

nias.⁵ The first reported case of hernia through the broad ligament was discovered via autopsy by Quain in 1861.⁶ In 1934, Hunt first classified these hernias into three types: the fenestra type, which involves a defect in both peritoneal layers; the pouch type, which involves a defect in one of the two peritoneal layers; and the hernia sac type, which involves the double layer of peritoneum covering the herniated bowel.⁷ This was followed by Cilley in 1986 with an anatomical classification system for broad ligament defects with three types: type 1 defects occur caudal to the round ligament of the uterus, type 2 defects occur above the round ligament of the uterus, and type 3 defects occur in the mesoligamentum teres of the uterus.⁸ Potential causes of these defects are obstetrical trauma, prior surgery, and congenital abnormalities.⁹ Our case represents a hernia sac type according to Hunt's classification and a type 2 defect according to Cilley's classification, a combination that represents the rarest type of herniation through the broad ligament. This case also represents a broad ligament defect that was likely congenital since the patient had no previous surgical or obstetric history. This congenital defect is likely due to incomplete fusion of the paramesonephric ducts during embryonic development.¹⁰

No matter the cause of these defects or the classification of these hernias, surgical management appears to be mandatory since every case report published has required surgical correction.¹¹ Surgical management options include suture repair of the defect or salpingo-oophorectomy. Suture repair spares the patient from oophorectomy and is ideal in premenopausal females who desire future fertility. These repairs carry the risk of re-herniation of small bowel through the broad ligament, although more studies are needed to fully understand this complication. Another approach involves salpingo-oophorectomy, which is ideal for postmenopausal women, as in this case. This type of repair eliminates the potential for re-herniation through the defect by completely obliterating the borders of the hernia defect. Both approaches are well tolerated, but further studies are needed to determine long-term outcomes.

Delaying surgical repair can be detrimental to patient outcomes and lead to bowel incarceration or the need for reoperation.¹² In case reports by Demir and Redwine, broad ligament defects were noticed on laparoscopy performed for treatment of endometriosis.^{13,14} In both cases, these defects were left alone and not repaired. Both patients subsequently developed pain after these procedures due to herniation through the unrepaired defects, necessitating reoperation for herniorrhaphy. These reports show that not only is it necessary to surgically repair internal herni-

as through broad ligament defects, but also that surgeons should consider prophylactic repair if a broad ligament defect is incidentally noticed on laparoscopy. This can help prevent the possibility of future herniation and therefore the need for reoperation.

Conclusion

Internal hernia causing a small bowel obstruction through a broad ligament defect is exceedingly rare, but should be considered in female patients presenting with small bowel obstruction. Early identification of broad ligament defects is crucial to good outcomes since surgical management is required. Prophylactic repair of broad ligament defects should be done when noticed incidentally on laparoscopy to reduce future herniation risk. Laparoscopic management with either suture repair of the defect or salpingo-oophorectomy is safe, effective, and provides excellent short-term clinical outcomes. Long-term follow-up studies are needed to provide evidence based decisions for surgical management of this rare hernia.

Lessons Learned

Internal hernia through a broad ligament defect is very rare. The diagnosis should be considered in women presenting with small bowel obstruction who fail conservative management because surgical intervention is required. Prophylactic repair should be considered if defects are found incidentally in order to prevent hernia occurrence.

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