



Case report

Broad ligament hernia: Two contrasting ways to a common goal – Two case reports with review of literature

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ARTICLE INFO

Keywords:

Broad ligament hernia
Internal hernia
Laparoscopy
Small bowel obstruction
Bowel herniation

ABSTRACT

Introduction: Broad ligament hernia (BLH) is a rare but potentially life threatening condition. One of the two cases described here is the only reported case of BLH in recent literature, where marsupialisation was done. These two case reports comprise the only reported side by side pictorial comparison of the two laparoscopic surgical therapeutic options for BLH.

Presentation of cases: Both patients presented with classical symptoms and signs of acute intestinal obstruction. Imaging confirmed obstructed left BLH in case 2 and indicated a complete small bowel obstruction in case 1. Both cases were successfully managed laparoscopically. Both patients had an uneventful immediate postoperative recovery and have not had recurrence over a mean follow up period of 34.5 months.

Discussion: BLH is rare among all types of internal herniae. It accounts for only 4% of internal herniae and is a difficult condition to diagnose. The advent of computed tomography has increased chances of accurate preoperative diagnosis.

Conclusion: BLH can be successfully managed by minimally invasive surgery, even in the acute setting. When tightly entrapped bowel is unyielding; it is better not to risk injury to it by aggressive attempts at its reduction. It is safer to attempt widening of the defect into which it is entrapped, whenever feasible.

1. Introduction

Intestinal obstruction is a common clinical condition encountered in emergency rooms around the world. Internal herniae figure among its rare causes and account for just about 1–2% of all cases [1]. Internal herniae are protrusions of the viscera through defects in the mesentery or peritoneum, contained within the abdomen. Broad ligament hernia (BLH) is a rare type of internal hernia and accounts for just 4% of all internal hernias [1]. It is difficult to diagnose due to its vague symptomatology [2]. It is mostly diagnosed intra-operatively and incidentally, at surgery. The treatment has evolved due to advances in the field of minimal access surgery.

Both these cases were surgically managed in a tertiary care, corporate, academic teaching hospital. The case 1 in this paper is the only reported case of BLH in literature, managed successfully by marsupialisation instead of the conventional suture-closure. We herein report a unique laparoscopic pictorial comparative study of two contrasting ways to surgical therapy of this rare condition. This study is reported in line with the SCARE criteria [3].

2. Presentation of the cases

The details of patient demographics, clinical presentations, radio-diagnosis, surgical therapy, post operative recovery and follow up information of our 2 patients are summarized (Fig. 1). None of the 2 patients were on any medications. They did not have a family history of internal abdominal hernia. Both patients are homemakers and gave no history of any addiction/s (smoking, alcohol etc.), drug dependence or psychological condition. Both had an acute presentation. On admission to the hospital they were kept nil per oral on continuous naso-gastric tube suction and were administered injectable anti-spasmodic and anti-emetic medications and intravenous fluids. Case 2 was accurately diagnosed pre-operatively while case 1 was not (Fig. 2). Case 2 was operated upon immediately after diagnosis while case 1 was given a one day trial of conservative management, failing which, she was operated upon, the next day. Both the surgeries were performed by a specialist advanced laparoscopic gastrointestinal surgeon. In case 2, during/ immediately after administration of anaesthesia, the contents of the left BLH reduced spontaneously. Hence, when the laparoscope was inserted,

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Received 9 May 2021; Received in revised form 30 June 2021; Accepted 1 July 2021

Available online 20 July 2021

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	Case-1	Case- 2
Age	35 years	42 years
Clinical presentation	Features suggestive of bowel obstruction- colicky abdominal pain, vomiting, obstipation since 2 days. The patient underwent cesarean section 10 days back.	Features suggestive of bowel obstruction like abdominal pain, bilious vomiting, constipation since 1 day. There was no history of previous abdominal surgery.
Examination findings	Distended, tympanic abdomen with marked central and lower tenderness, hyperperistalsis and an empty rectum on per rectal exam	Distended, tympanic abdomen with lower mild tenderness, normal bowel sounds and minimal soft normal colored stools noted on per rectal exam
Preoperative diagnosis	No	Yes
Blood investigations	Leukocytosis – 14,000	Leukocytosis- 15000
X- Ray Abdomen (Erect)	Multiple air fluid levels in step ladder pattern in central abdomen	Multiple air fluid levels in lower abdomen
CECT Abdomen	Revealed free fluid and a transition zone between proximal two-thirds and distal one-third of the small bowel to the left side of the uterus. There was failure of the oral contrast to pass across	Showed several dilated small bowel loops with an abrupt transition in the left lower abdomen in the region of the left broad ligament. At the zone of transition, there appeared to be herniation of distal ileum along with its mesentery posterior to the broad ligament through a defect in the left broad ligament suggesting a broad ligament hernia
Diagnostic laparoscopy	Internal herniation of the small bowel through a 5-cm defect in the left broad ligament	A 3 cm defect was noted in the left broad ligament, no bowel entrapment most probably due to spontaneous reduction of the contents
Treatment	Laying open of the defect in the broad ligament due to massive distention, edema & friability of the proximal small bowel	The defect was suture closed
Duration of surgery / Length of stay	50 minutes / 6 days	60 minutes / 4 days
Immediate postoperative recovery / Recurrence of symptoms	Uneventful / No	Uneventful / No
Duration of follow up	37 months	32 months

Fig. 1. Summary of patient demographics, clinical features, workup, treatment and follow up information.

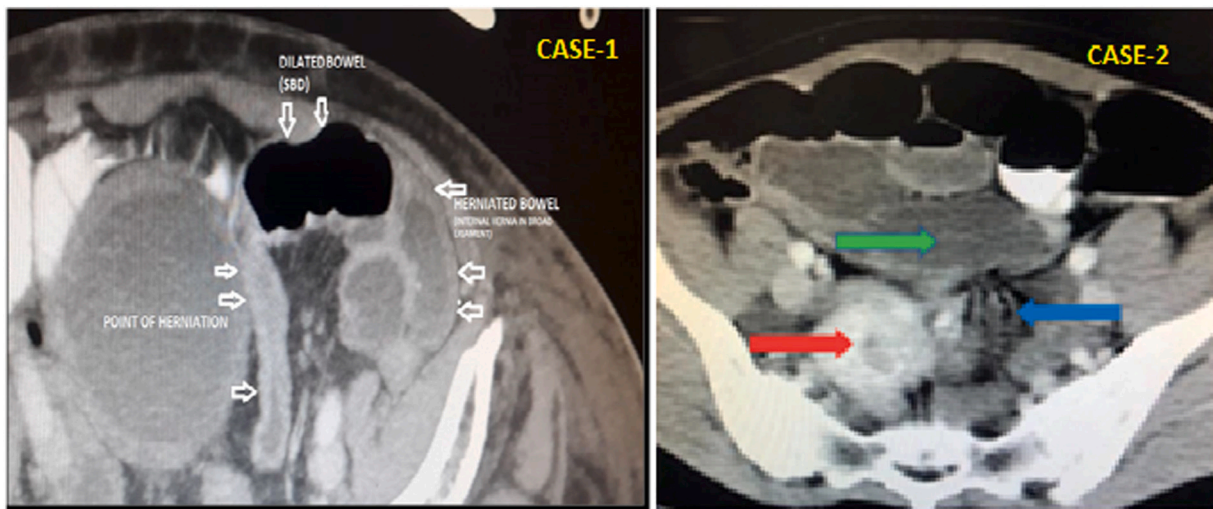


Fig. 2. Comparison of CECT Abdomen axial views – Case 1 shows the point of transition in the small bowel to the left side of the uterus. Case 2 shows contrast filled dilated small bowel with holdup & slow movement in the left lower abdomen. Green arrow shows free fluid in the pelvis, red arrow shows fibroid uterus slightly deviated to the right & blue arrow shows small bowel with developing ‘mesenteric swirl’ – all suggestive of a left BLH.

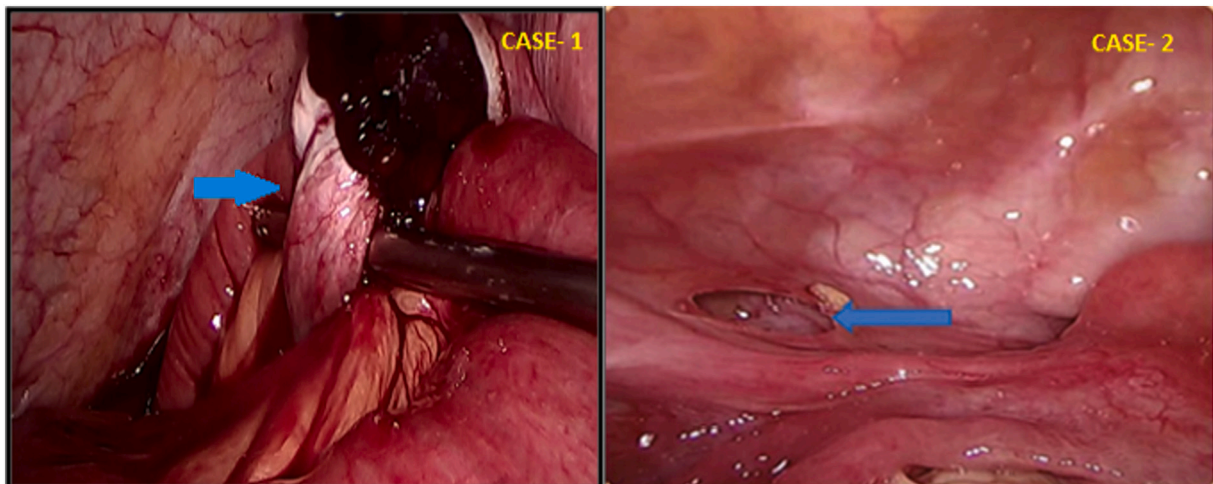


Fig. 3. Comparison of laparoscopic ‘first look’ appearances: Case 1 - blue arrow shows herniated small bowel through the broad ligament defect & the overlying normal ovary with gangrenous fallopian tube. Case 2 - blue arrow shows the defect after presumed spontaneous reduction of entrapped bowel.

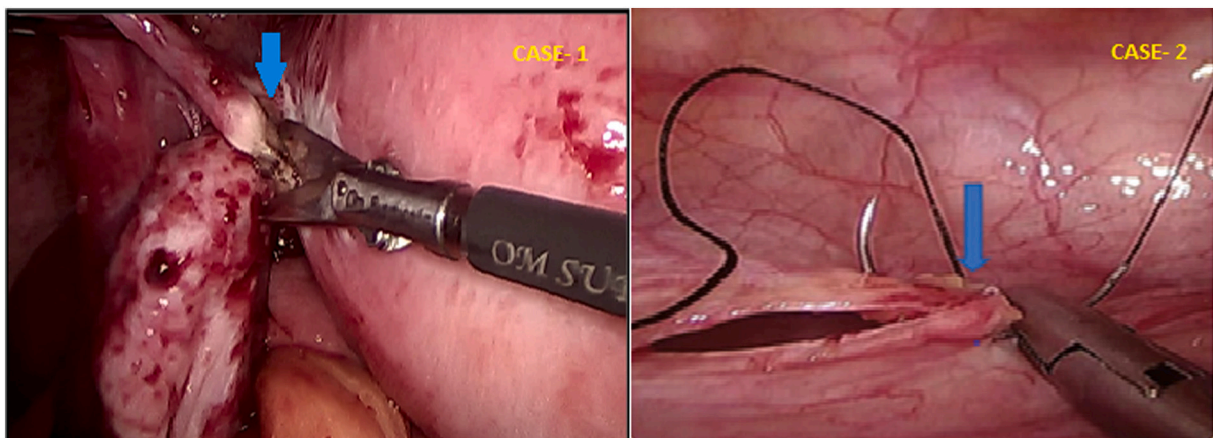


Fig. 4. Comparison of surgical therapy: Case 1 - blue arrow shows division of utero-ovarian ligament being performed on the way to marsupialisation of the defect. Case 2 - blue arrow shows the broad ligament defect being suture closed.

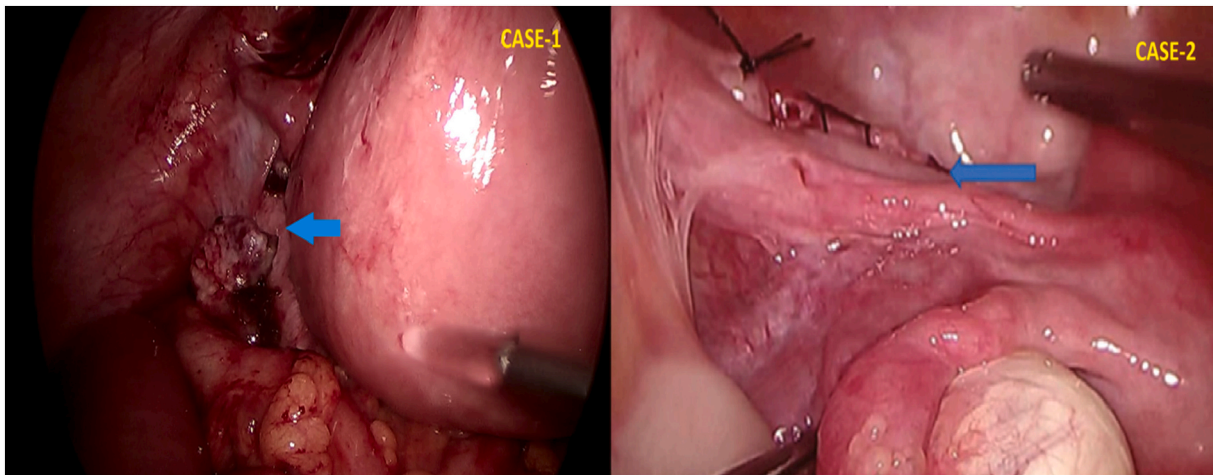


Fig. 5. Comparison of end results: Case 1 - blue arrow shows the marsupialised broad ligament defect with released small bowel. Case 2 - blue arrow shows the suture closed broad ligament defect.

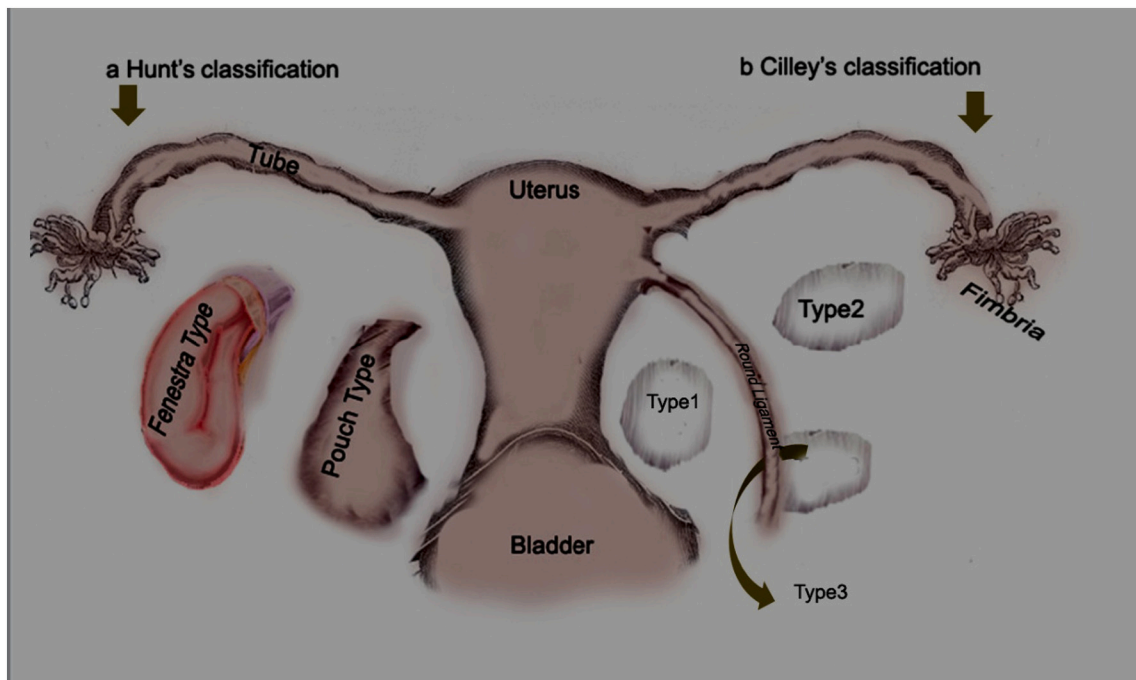


Fig. 6. Schematic diagram showing classifications of broad ligament hernia.

just the defect in the broad ligament was identified without any entrapped bowel loops. In case 1, there was no spontaneous reduction of contents and the patient had entrapped small bowel along with markedly dilated proximal small bowel, which was edematous and inflamed. Also the fallopian tube was gangrenous (Fig. 3). Hence a decision to marsupialize the defect and perform a salpingectomy was taken, while preserving the blood supply of the ovary (Fig. 4). This is the only reported case of BLH in recent literature, in which the hernial defect was laid open, for the aforementioned reasons. Thus, in patients who have tightly entrapped, edematous, friable, distended and irreducible bowel within an internal hernia, it is preferable to avoid aggressive taxis and risk bowel injury, where possible. In case 2, due to spontaneous reduction of contents of the BLH, the defect was suture closed (Figs. 4 & 5). These 2 surgeries were performed with the patient in supine position and firmly fixed/strapped to the table, so as to allow steep Trendelenburg, reverse Trendelenburg as well as right and left side up positions. The

operating surgeon stood on the contralateral side with the monitor at the ipsilateral foot end. Postoperatively both patients were kept nil-per-oral and were administered injectable antibiotics and intravenous fluids. Case 1 was started on oral feeds (initially liquid followed by semisolid) on postoperative day (POD) 3 while case 2, on POD 2; after resumption of bowel sounds and per rectal passage of flatus. Both tolerated the oral feeds well and were discharged from the hospital on POD 4 and POD 3 respectively. On their outpatient department follow up visits (POD 10), their wounds had healed well and they were asymptomatic. At the time of writing this paper, a telephonic interview was conducted with them; 37 and 32 months after their respective surgeries. None of the patients reported recurrent symptoms in the interim and they continue to be asymptomatic.

Sr no.	Authors[Ref. No.]	Side/Age	History of Surgery	Preoperatively Diagnosed	Mode of Surgery/Contents	Special Comments
1	Rohatgi and Joshi, [7]	Left/35 years	Day 10 post Cesarean section	Yes	Laparoscopy/Small Bowel Loops	Only case in recent literature where Marsupialization was done
2	Fernandes et al. [9]	3 cases Left/35 years, 43 years, and 51 years	None	Yes	Open/Small Bowel Loops	Defect closure done
3	Matsunam et al. [10]	Left/36 years	Cesarean section	Yes	Laparoscopy/Small Bowel Loops	Defect closure done
4	Koizumi et al. [11]	Right/41 years	None	Yes	Needlescopy/Small Bowel Loops	Use of 2-3mm instruments, defect closure done
5	Sugishita et al. [12]	Left/71 years	Right Ovarian cyst Surgery	Yes	Laparoscopy/Small Bowel Loops	Defect closure done

Fig. 7. Review of recent literature on BLH [9–17].

3. Discussion

Broad ligament defect leading to bowel obstruction was first reported by Quain in 1861 [4]. BLH is also known as the Allen and Masters syndrome, since they were the first to publish a case series on BLH, in 1955. The etio-pathogenesis of a broad ligament hernia is not known but the causes can be grouped as either congenital or acquired. Congenital broad ligament defects are generally bilateral whereas acquired defects are mostly unilateral. Causes of acquired defects are previous surgery, pregnancy, birth related trauma or previous pelvic inflammatory disease which increases the intra-abdominal pressure.

The first classification of broad ligament defects was described in 1934 on the basis of peritoneal involvement of the defect, by Hunt [5] (Fig. 6).

1. Fenestra type: Presence of defect in the two peritoneal layers (most common).
2. Pouch type: Defect affects only one layer of the peritoneum.
3. Hernia sac type: The bowel is lined by a weak layer of peritoneum leading to formation of an internal hernia within a sac.

In 1986, Cilley et al. proposed the classification based on anatomical location [6,7].

1. Type I: defect caudal to the round ligament.
2. Type II: defect above the broad ligament including defects in the suspensory ligaments of the ovary, mesosalpinx and the utero-ovarian ligament.
3. Type III: defect between the round ligament and the broad ligament (through the meso-ligamentum teres).

The classical radiological features of broad ligament hernia were first described by Balthazar et al. The investigation of choice is a contrast enhanced computed tomography (CECT) of the abdomen [8]. The classical features suggestive of a broad ligament hernia are closed loop obstruction, small bowel dilatation, double transition point in the pelvic location lateral to the uterus, slight deviation of the uterus to the contralateral side and the presence of free fluid in the pelvis.

With the recent advances made in the field of minimal access surgery, laparoscopic surgery has become an important tool in the armamentarium of the surgeons in making a prompt diagnosis and early management of this rare and potentially dangerous surgical condition [18]. A review of recent literature on BLH is summarized (Fig. 7).

4. Conclusion

BLH is a rare clinical entity which requires a high index of suspicion for it to be detected in both, patients presenting with symptoms of acute

Sr no.	Authors[Ref. No.]	Side/Age	History of Surgery	Preoperatively Diagnosed	Mode of Surgery/Contents	Special Comments
6	Takeyam <i>et al.</i> [13]	Left/52 years	H/o two par-turitions	Yes	Single incision laparoscopy (SILS)/ sigmoid colon	Only case in recent literature done by SILS – Defect closure done
7	Coronado <i>et al.</i> [14]	Bilateral/36 years	None	Yes	Laparos-copy/Small bowel loops	Probably congenital as no history of past surgery and bi-laterality
8	Toolabi <i>et al.</i> [15]	Left/37 years	None	Yes	Laparos-copy/Small Bowel Loops	Defect closure done
9	Zemour <i>et al.</i> [16]	Right/35 years	H/o Small Bowel sur-gery	Yes	Open/Small Bowel Loops	Defect closure done

Fig. 7. (continued).

intestinal obstruction; as well as those who present with vague recurring lower abdominal symptoms. Prompt diagnosis and early management is necessary to prevent life threatening complications associated with BLH. Following the advent of minimal access surgery, BLH can be successfully managed by laparoscopy, even in acute settings.

Timeline of events.

Day	Events – case 1	Events – case 2
0	Presented with intestinal obstruction and underwent investigations	Presented with intestinal obstruction and underwent investigations
1	Given trial of conservative management	Underwent laparoscopic suture-closure of left BLH defect
2	Underwent diagnostic laparoscopy followed by marsupialisation of left BLH	Kept nil-per-oral on antibiotics & intravenous fluids
3	Kept nil-per-oral on antibiotics & intravenous fluids	Passed flatus and started on liquids followed by semisolid diet, which was tolerated
4	Passed flatus and started on liquids per orally	Had 1st bowel movement & was discharged
5	After liquids were tolerated, started on semisolid diet	
6	Had 1st bowel movement & was discharged	
POD 10	On 1st follow up visit - asymptomatic	On 1st follow up visit - asymptomatic

Abbreviations: BLH-broad ligament hernia, POD-post operative day.

Sources of funding

None.

Ethical approval

This type of study does not require any ethical approval at our institution.

Consent

Written informed consent was obtained from the patients for publication of these case reports and accompanying images. Copies of the written consents are available for review by the Editor-in-Chief of this journal on request.

Contributor

Natasha Nanda, M D: Selection & markup of radiology pictures.

Registration of research studies

Not applicable.

Guarantor

Abhijit Joshi.

Sr no.	Authors[Ref. No.]	Side/Age	History of Surgery	Preoperatively Diagnosed	Mode of Surgery/Contents	Special Comments
10	El-Madi <i>et al.</i> [17]	Left/13 months	None	Yes	Open/Urinary Bladder	Rare developmental defect associated with ipsilateral ovarian hypoplasia, renal agenesis and ureter blind ending which had VUR, normal functioning right pelvic kidney

Fig. 7. (continued).

Provenance and peer review

Not commissioned, externally peer-reviewed.

CRediT authorship contribution statement

- 1) Yash Rohatgi: Writing – Original draft, Visualization.
- 2) Rafique Umer: Writing – Original draft, Visualization.
- 3) Vanita Raut: Writing – Review & Editing, Supervision.
- 4) Abhijit Joshi: Conceptualization, Validation, Resources, Writing – Review & Editing, Visualization, Supervision, Project administration.

Declaration of competing interest

None.

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