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Repair of a traumatic flank hernia: A case report and literature review

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Abstract

Lumbar and flank hernias are rare, and the ideal repair approach remains debated. There have been fewer than 1500 lumbar/flank hernias reported in the literature, and cases due to traumatic injury are even rarer. In this case report, we describe a traumatic flank hernia in a patient who was pinned between two motor vehicles, an accident that resulted in avulsion of the oblique muscles from the iliac crest.. Additional traumatic injuries included bucket-handle injuries of the ileum requiring small bowel resection, and multiple orthopedic injuries. After initial small bowel resection and resuscitation, subsequent imaging demonstrated the new anastomosis herniating into an 11 cm × 6 cm flank hernia with avulsion of the oblique muscles. The hernia was repaired primarily with iliac crest bone anchors and no mesh placement. Recovery was uncomplicated, and the patient was discharged to an acute rehabilitation unit. At 12 months post-repair, there is no recurrence.

Keywords:

Bone anchor, emergency general surgery, flank hernia, lumbar hernia, trauma

Introduction

Lateral abdominal wall hernias (LAWHs), comprised of flank and lumbar hernias, are uncommon and have rarely been reported. Flank hernias are defined as bordered by the costal margin, iliac crest, and spine.[1] Flank hernias occur lateral to the rectus sheath and involve disruption of the oblique muscles. Repair poses a significant challenge due to the abdominal wall contour, flexibility/mobility of this region, and limited data to guide the optimal approach. In this report, a traumatic flank hernia is described with primary, nonmesh repair with durable results in the setting of polytrauma and bowel compromise. Permission to perform this study was obtained from the Institutional Review Board and data use committee. As no patient personal health information was used, including any identifiers, signed consent was not obtained from the patient. Data sharing is not applicable to this article as no datasets were generated or analyzed during this study. This article was prepared in accordance with the ethical standards of the Declaration of Helsinki

Case Report

A 46-year-old male (body mass index: 31 kg/m^2) presented after being pinned between two cars. On initial assessment, the patient was hemodynamically unstable and a Focused Assessment with Sonography in Trauma examination demonstrated abdominal free fluid. The patient was taken emergently to the operating room for exploratory laparotomy. During the index procedure, he was found to have large-volume hemoperitoneum from arterial bleeding from the small bowel mesentery caused by two bucket-handle injuries of the ileum, which required resection with primary anastomosis. The patient was then admitted to the intensive care unit (ICU)

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for resuscitation. Postoperative imaging demonstrated a large right-sided anterolateral flank hernia with detachment of the oblique muscles from the iliac crest. The new small bowel anastomosis was located within the hernia. Ongoing resuscitation was performed in the ICU for 48 h after the index operation, and after clinical stabilization, the patient was returned to the operating room for repair of the traumatic flank hernia. He was placed in the left lateral decubitus position, and the bed was flexed to increase the distance between the costal margin and iliac crest. An oblique incision was made 3 cm superior and parallel to the iliac crest, and an 11 cm × 6 cm abdominal wall defect containing small bowel with the recent anastomosis was identified. The oblique and transversus abdominus musculature had avulsed from the iliac crest, leaving a thin rim of muscle and fascia remaining on the anterior aspect of the bone. The internal oblique, external oblique, and transversus abdominus muscles were dissected cephalad to create a musculocutaneous flap, which was reapproximated to the iliac crest. Anteriorly, the internal oblique and transversus abdominus muscles were reapproximated to the residual fascia using #1 Prolene (Ethicon Inc., polypropylene suture, Raritan, New Jersey, USA) in an interrupted horizontal mattress fashion. More posteriorly, Mitek 2-0 Ethibond bone anchors (Ethicon Inc.), placed in approximately 1-cm intervals, were used to provide fixation. The external oblique was then incorporated using #1 looped PDS (Ethicon Inc., polydioxanone suture), the subcutaneous tissue reapproximated with running 3-0 Vicryl suture (Ethicon Inc., polyglactin suture), and the skin closed with staples. Total operative time was 191 min. Postoperative recovery was uncomplicated. He was discharged to rehabilitation on postoperative day 16. To date (12 months since repair at the time of writing), there is no postoperative complication or hernia recurrence.

Discussion

Repair of LAWHs remains a challenge for abdominal wall surgeons. There have been fewer than 1500 LAWHs reported in the literature.[2] Hernia formation specific to a post-traumatic blunt mechanism is even less common.[3] Etiology of flank hernias can be congenital (20%), spontaneous (55%), or incisional/traumatic (25%).[4] The risk of incarceration for flank hernia is low (< 10%) given the wide neck; however, when symptomatic, the treatment of choice is operative repair.[4] Repair of traumatic flank hernias most commonly involves open repair with mesh (59.8%), open primary suture repair (23.7%), or a laparoscopic procedure (11%).[3]

While multiple reports exist detailing repair of these hernias, there are no randomized controlled trials that provide high-quality evidence to guide the optimum repair. There are multiple case series highlighting the use of a wide preperitoneal dissection with placement and fixation of non-absorbable mesh.[1,4-7] These studies had recurrence rates ranging from 0% to 16%, with the largest of these series by Salvino *et al*.[1] including 142 patients with a recurrence rate at 30 months of 3.5%. These studies reinforce the importance of wide mesh overlap to reinforce the flexible and contoured lateral abdominal wall. Additionally, while the traditional thought was that all traumatic LAWHs needed exploratory laparotomy and immediate repair, there have been reports of nonoperative management or delayed closure with success.[8] Indeed, most available literature describes delayed closure of the defect.

In this case, the flank hernia was repaired primarily, without mesh, after the index procedure for bowel injury in the setting of polytrauma. Many of the studies reviewed here include patients undergoing elective repair with wide mesh placement. These repairs in the elective setting show promising results. However, in the case of traumatic flank hernia, there are high rates of concomitant injury, polytrauma, and bowel injury. This case suggests that primary repair of traumatic flank hernias may be safe and effective in the setting of polytrauma and bowel injury, although further studies are needed.. Importantly, the use of bone anchors in these circumstances may obviate the need for a mesh, which could reasonably decrease complications in a potentially contaminated field. Indeed, there have been multiple reports demonstrating the efficacy of primary repair without mesh[9] and the potential benefits of bone anchors in such repairs.[10]

Literature Review of Traumatic Flank Hernia

A thorough review of the literature regarding repair of specifically traumatic flank hernias was performed. A PubMed search using the terms "traumatic flank hernia" was performed with a time setting from 2020 to 2026. This yielded a total of 29 results, with the most relevant reviewed and summarized here.

Kearney and Dumanian[11] presented a case series of traumatic flank hernias with four patients experiencing complete avulsion of the lateral abdominal wall musculature from the iliac crest. In their method, bone anchors are not used. Instead, 2-cm strips of macroporous polypropylene mesh were secured with a heavy suture to the iliac crest after drilling. These meshes were then secured to the oblique musculature. The strips of mesh acted as large lines of suture that reapproximated the oblique musculature and could distribute the tension more effectively compared with standard monofilament suture. The entire dissection and repair was performed

in the retroperitoneal space. Average operating time was 114 min. The authors reported an average follow-up of 24 months with no report of hernia recurrence. This study is limited as the patient acuity and time interval from initial injury are not mentioned. Additionally, all repairs were done by a single surgeon.

Azimi-Ghomi *et al.* reported a traumatic flank hernia with avulsion of the oblique musculature from the 11th and 12th ribs.[12] The hernia space contained bowel, which was reduced successfully. The defect was closed with a 15 cm × 15 cm polypropylene mesh, which was secured to the 11th rib periosteum and to the external/internal oblique fascia. The patient was discharged on postoperative day 3, but there is no report on the patient's follow-up.

A novel technique of dual open and laparoscopic with use of a sublay and onlay mesh is described by Heo and Kim[13] in a patient presentation similar to the case presented here. A Parietene composite mesh (Covidien, Minneapolis, MN, USA) was placed laparoscopically and secured using tacks and suture to the transversus abdominus muscle. This was covered by closing the peritoneum behind the mesh. An open approach was then initiated, and an onlay Prolene mesh (Ethicon) was placed after suture repair of the internal oblique. This technique does not require any bone anchoring; however, there is no follow-up on recurrence in this case report. Aubrey *et al.*[14] performed a similar repair in a series of 10 patients using a hybrid open and robotic repair technique. In this case series, there were no documented recurrences or complications with a mean patient follow-up of 34 months.

Muca *et al.*[15] performed totally extraperitoneal robotic repair of traumatic flank hernias in eight patients. This technique involved a transversus abdominus release and large mesh overlap. No patients had recurrence on follow-up in this case series.

The current literature suggests that traumatic flank hernias can be managed in an immediate or delayed fashion, using an open, laparoscopic/robotic, or hybrid approach with or without mesh. The variability in care allows for a patient-specific surgical approach. Without specific guidelines regarding location, size, or acuity of traumatic flank hernias, each case should be carefully evaluated individually by the operating surgeon. Most literature describes an open or hybrid mesh repair in a delayed fashion, which can reasonably be performed in patients with no other intra-abdominal injury or peritonitis on initial presentation. In this case of a flank hernia with polytrauma requiring bowel resection and a potentially contaminated field, immediate repair without mesh was employed successfully without recurrence to date.

Conclusion

Flank hernias pose a challenge to surgeons as they are complex and relatively rare. Despite a lack of strong evidence in the form of randomized controlled trials, many case series and reports demonstrate the efficacy of primary or mesh repair. This case demonstrates the safety of primary repair of a traumatic flank hernia with iliac crest fixation after damage control surgery.

Author contributions

FAK: concept and design of study or acquisition of data or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, and final approval of the version to be published. JD: drafting the article or revising it critically for important intellectual content, and final approval of the version to be published. AJ: drafting the article or revising it critically for important intellectual content and final approval of the version to be published. MZ: drafting the article or revising it critically for important intellectual content and final approval of the version to be published. This manuscript has been read and approved by all the authors; the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work.

Ethical policy and Institutional Review Board statement

This case report was approved by the Cottage Health Data Use Committee (DUC) on June 17, 2025 (Institutional Review Board No.: 25-74re). Patient informed consent was waived.

Declaration of patient consent

In accordance with Santa Barbara Cottage Hospital policy, patient informed consent was waived.

Data availability statement

Data sharing does not apply to this article as no datasets were generated and/or analyzed during the current study.

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Conflicts of interest

There are no conflicts of interest.

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