CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 49 (2018) 153–157

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Reconstruction of traumatic lumbar hernias: A case report

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ARTICLE INFO

Article history:
Received 14 June 2018
Accepted 2 July 2018
Available online 7 July 2018

Keywords:
Lumbar hernia
Bone anchor hernia repair
Traumatic lumbar hernia
Pre-peritoneal lumbar hernia repair
Lumbar hernia case report

ABSTRACT

BACKROUND: Traumatic lumbar hernias are not common hernias that are encountered by general or plastic surgery teams, however it is important to understand the anatomy of the hernia in order to be able to correct the flank defect. In our patient, the oblique muscles were sheared off the iliac crest periosteum, however the attachments to the ribs and spine were maintained. We were able to successfully place a pre-peritoneal polypropylene mesh which was secured to the musculature, and re-approximate the oblique muscles to the iliac crest using Mitek QUICKANCHOR® sutures. Our case study has been reported in line with the SCARE criteria ([8] Agha et al., 2016).

CASE REPORT: The subject in our case was a 47-year-old gentleman who was involved in a motor vehicle accident, and sustained a traumatic lumbar hernia due to the 3-point seatbelt he was wearing. He was transported via ambulance to our trauma center.

CONCLUSION: Understanding the anatomy and mechanism of injury is the key to reconstructing traumatic lumber hernias. Although not required, mesh reinforcement has significantly reduced the recurrence of all hernias. This is the simplest and most effective way, in our opinion, to return the flank muscles to their native position while providing mesh reinforcement.

1. Background

Lumbar hernias have classically been divided into two categories, including congenital and acquired. Acquired lumbar hernias account for approximately 80% of cases, which are further subclassified as primary or secondary [1]. Primary lumbar hernias are those that have occurred spontaneously and have a multitude of predisposing factors including weight loss, pulmonary disease, age, and physical activity. Secondary lumbar hernias include post-surgical incision site hernias and traumatic lumbar hernias (TLH's), accounting for approximately 25% of cases [2]. Most of the English literature is focused on the acquired primary lumbar hernias which are divided into a superior and inferior triangle based on anatomic partitions. The superior triangle of Grynfellt hernia, the more common site of hernia development, is bounded superiorly by the 12th rib, anteriorly by the internal oblique, and posteriorly by the quadratus and erector spinae muscles. The inferior triangle of Petit hernia, is the smaller and less frequent site, is bounded inferiorly by the iliac crest, anteriorly by the external oblique and posteriorly by the latissimus dorsi muscle. These anatomical landmarks are appropriate for radiological and/or clinical classification of primary hernias, however in the case of TLH, where blunt trauma has sheared the muscle groups off the bony attachment, the boundaries are less consistent.

2. Case report

A 47-year-old man presented as an activated trauma to a community based trauma center following a motor vehicle collision. He was the restrained passenger in a vehicle that struck a pole at an estimated 40-50 mph. Initially his complaint was abdominal pain with subsequent inability to urinate. The patient also noted some chest wall discomfort secondary to the seatbelt. Upon arrival he was hemodynamically stable, however physical exam revealed generalized tenderness to the sternum and suprapubic regions. Gross hematuria was noted upon insertion of a urinary catheter. Subsequent computerized tomography scans identified a small non-displaced sternal fracture, as well as an intraperitoneal bladder rupture and right lumbar hernia in the area of Petit's triangle, with complete avulsion of the abdominal wall musculature from the iliac crest. (Fig. 1) No other internal injuries were identified. The patient underwent same day laparotomy with cystorrhaphy by the urology team. The traumatic lumbar hernia repair was discussed by the general and plastic surgery teams, and immediate repair was deferred due to the bladder injury as well as the fact it was generally asymptomatic. The remainder of the trauma admission was uneventful. Over the following six months the patient began having increasing pain at the hernia site. After re-evaluation by general and plastic

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https://doi.org/10.1016/j.ijscr.2018.07.002

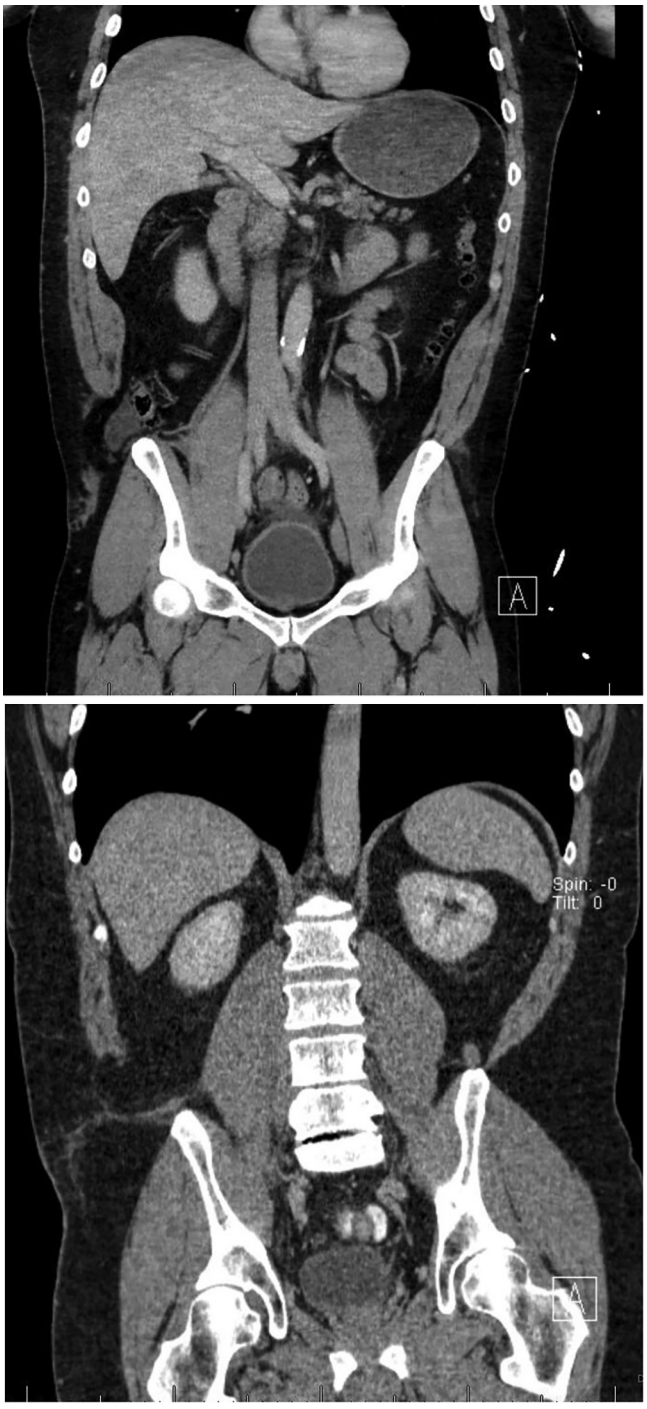

Fig. 1. a) Computed Tomography of patient during initial evaluation showing defect of oblique musculature. b) CT of patient during pre-operative planning phase showing same defect.

surgery departments, decision was made for surgical repair (Fig. 2a and b).

Operative technique began with dissection being carried out directly over the hernia. A preperitoneal plane was developed after the hernia sac was freed from all subcutaneous attachments, dissecting all layers of the abdominal wall away from the peritoneum in order to place a polypropelene mesh. (Fig. 3) A 6 × 6 cm defect was measured, and a 12 × 12 cm mesh was circumferentially sewn into place utilizing the abdominal wall musculature at the superior, medial and lateral aspects. The mesh was then anchored to the periosteum of the iliac crest in the caudal portion. Muscle flaps were created utilizing the external and internal oblique muscles to allow for coverage without undo tension. Predrilled holes along the iliac crest were formed and Mitek QUICKANCHOR® suture anchors, preloaded with double arm braided polyethylene/polyester composite sutures were used to secure the oblique musculature to the iliac crest, allowing precise and accurate approximation of the muscle back into its anatomic location (Fig. 3). A drain was placed within the dissected pocket and layered closure of the subcutaneous soft tissue layers and skin was performed.

Post operatively the patient has continued to progress well with no recurrence or gross limitations on follow up evaluations (Fig. 4).

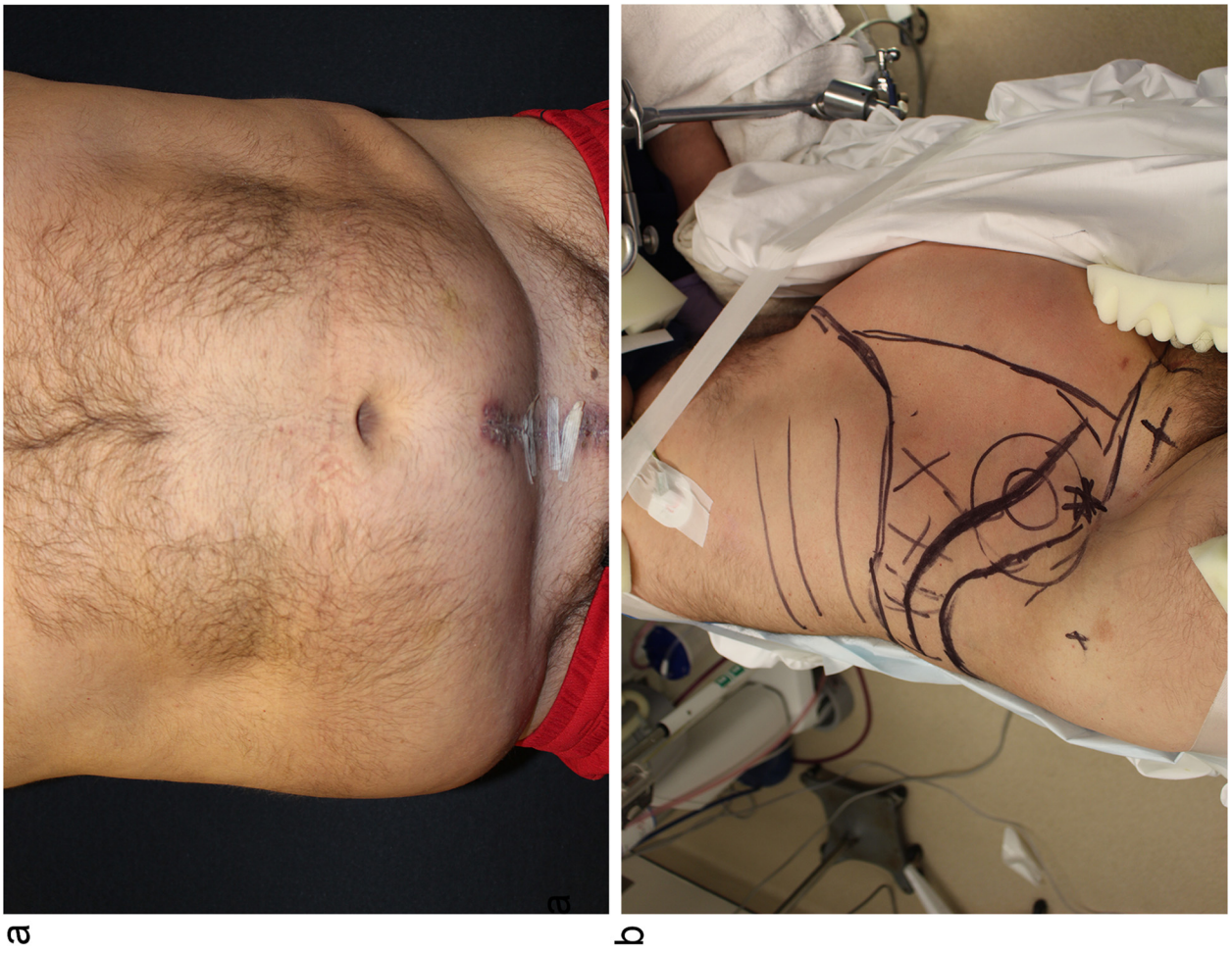

Fig. 2. a) Patient pre-operatively showing significant bulging of right flank. b) Pre-operative marking of associated defect and landmarks (Head top of image, feet bottom of image).

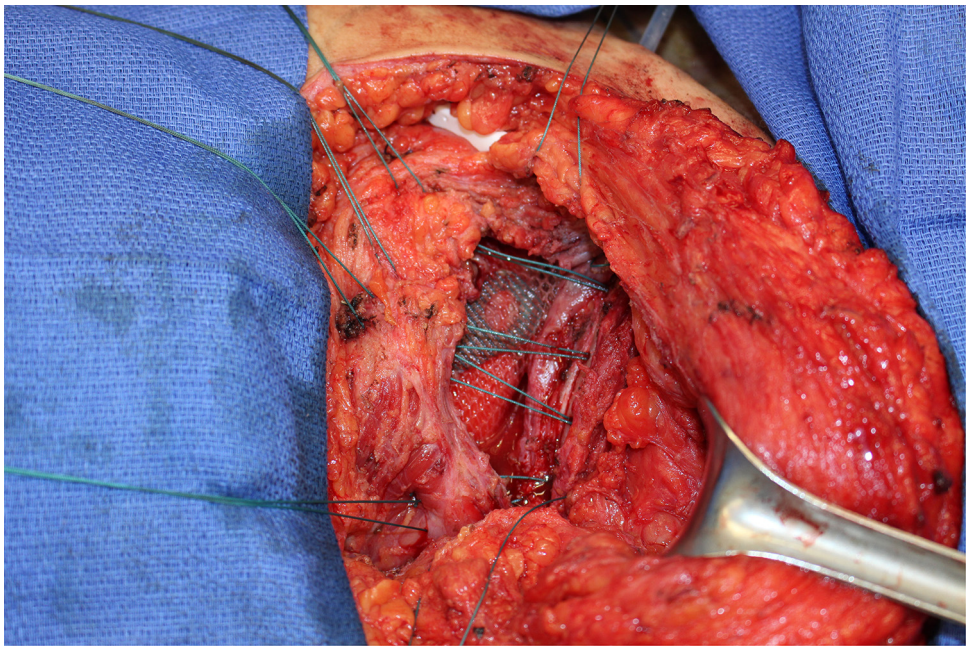

Fig. 3. Showing operative placement of the mesh in preperitoneal space and bone anchors approximating the oblique muscles to the iliac crest (Iliac Crest to right of image, oblique muscle to left of image).

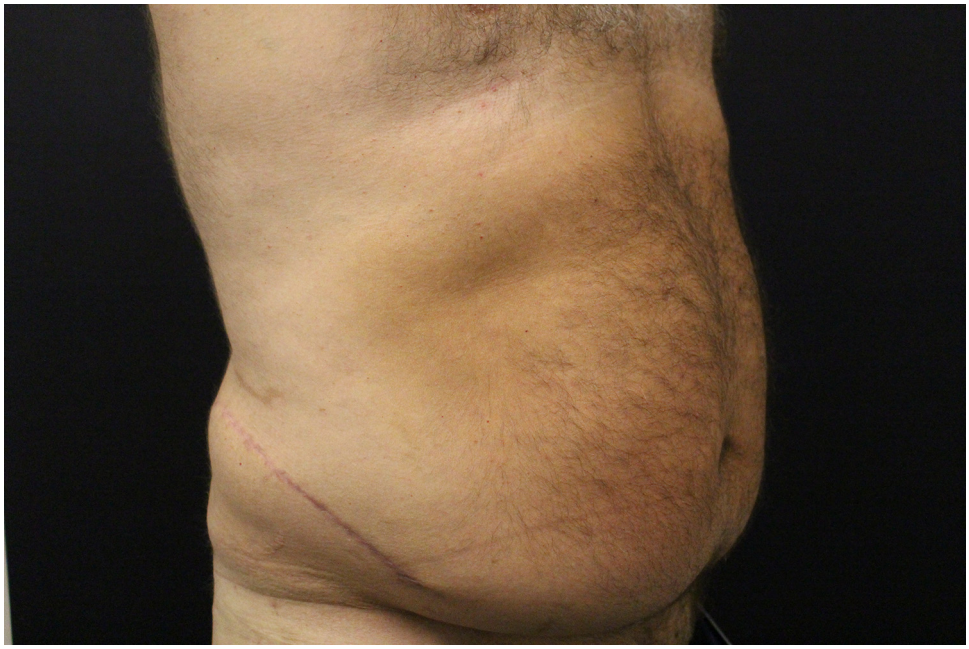

Fig. 4. Patient 6 months post-op. Note the lack of flank bulge and well healed scar.

3. Discussion

The majority of TLH's are due to motor vehicle accidents, where the causative mechanism is thought to be due to a combination of increased intra-abdominal pressure and lateral shearing forces occurring during the deceleration phase [1,3]. As the lateral shearing force disrupts the musculature from the iliac crest, little to no soft tissue is left for appropriate fixation of the muscle and or mesh for support for operative repair. Previous authors have discussed trans-iliac holes, bone anchors, and various other laparoscopic techniques to allow fixation [5–7].

4. Conclusion

Traumatic lumbar hernias are an uncommon encountered anatomic disturbance. The understanding of the anatomy and conceptualization of the forces that cause such an insult help in the decision making process during the reconstructive effort. At our institution, the collaboration between general surgery and the plastic surgery service allows a multi-disciplinary approach to repairing such defects. A multitude of methods to repair and re-approximate the flank musculature has been described. In our patient, the force that sheared the oblique musculature off the iliac crest periosteum allowed us the opportunity to utilize bone anchors when securing the muscle back down to the bone. Additionally, in our patient we

were able to avoid entry into the peritoneal cavity while securing the mesh to the oblique musculature with adequate overlap.

Conflicts of interest

None.

Sources of funding

None.

Ethical approval

Exempt, IRB approval number: CP 2017-126.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

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Registration of research studies

Case Report not first in man, UIN not required.

Guarantor

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