

## A Case Report of a Laparoscopic Repair of a Penetrating Lateral Ventral Wall Hernia

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### Abstract

Lateral ventral wall hernias have been sparsely reported on in the English literature. They are rare and can be incisional, traumatic, spontaneous, or congenital. The vast majority are traumatic or iatrogenic. The traumatic lateral ventral wall hernias reported to date have concentrated solely on blunt force trauma, secondary to a motor vehicle collision. In this case report, we describe the laparoscopic mesh repair of a traumatic lateral wall hernia in a 51 year old stab victim, who presented in a delayed fashion a year after his initial stabbing. To our knowledge, this represents the first case report of a laparoscopic lateral ventral wall herniorrhaphy secondary to a penetrating trauma. Regardless of the aetiology, these defects are complex to repair and have a high recurrence rate, due partly to the lack of redundant fascia and the inability to effectively mobilize multiple the muscle layers of the abdominal wall. Repair options include an open primary tissue repair, open mesh repair, or laparoscopic repair. Case reports of open repairs demonstrate great complexity, requiring large incisions with high morbidity and recurrence rates. Given the paucity of available literature, there is currently no consensus regarding the optimal repair. Laparoscopic mesh repair allows for a tension-free repair, and spares the patient a large incision and a longer hospital stay versus open herniorrhaphy.

**Keywords:** Lateral Abdominal Wall; Traumatic Hernia; Laparoscopic Herniorrhaphy; Intra-Corporeal Suturing; Underlay Mesh Repair

### Introduction

Lateral ventral wall hernias (LVWH) are rare, and sparsely reported upon in the English literature [1]. These defects are anatomically defined as the territory bordered horizontally by the linea semilunaris and the oblique muscle conglomeration and vertically by the iliac crest to the costal margin [2]. Its medial border is lateral to the rectus abdominis muscle. Their aetiology may be incisional, traumatic, spontaneous or rarely, congenital [2-4]. Risk factors include advanced age, long-term steroid use and smoking [4].

The vast majority of LVWH are iatrogenic or traumatic, and the traumatic cases reported in the literature have been secondary to high-velocity blunt force trauma [1,2]. Traumatic lateral wall hernias, with a prevalence of approximately 1%, can go undetected if the overlying skin remains intact and displays no clinical signs of trauma [1]. Traumatic or iatrogenic disruption of the abdominal muscular innervation between the T7 and T12 spinal nerve roots can lead to a weakening of the lateral abdominal wall musculature and concomitant hernia formation [1]. Lateral wall defects can cause a disproportionate strain on the abdominal wall, leading to herniation, ligamentous strain injuries or lower back pain [2]. Clinical presentation may include non-specific signs such as localized tenderness, ecchymosis, or no sign at all [1].

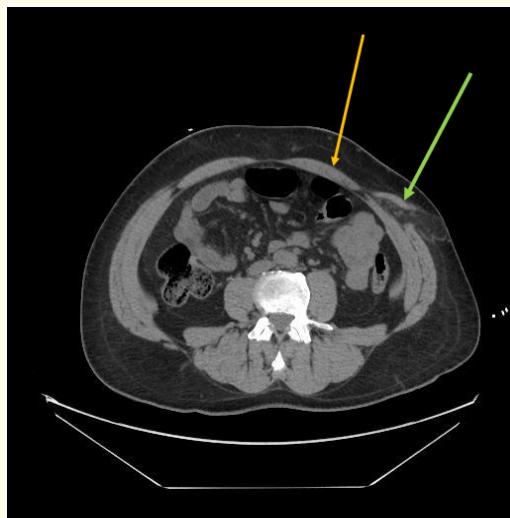
Surgery is indicated once the defect is detected, as the presence of a hernia can lead to the incarceration of omentum or bowel and possible strangulation [1]. There is no room for conservative management according to best available evidence. These defects can be complex to repair and present with a high recurrence rate, due to the lack of redundant fascia and inability to mobilize multiple abdominal muscle layers easily [1]. Repair options include an open primary tissue repair, open mesh repair, or a laparoscopic repair. Defects cephalad to the iliac crest can be repaired using a ventral incisional hernia repair technique [5]. Laparoscopic mesh repair is a good option, as it allows for a tension-free repair, and spares the patient a longer incision, more pain and a longer hospital stay versus an open repair [1,4].

To our knowledge, based on a review of current literature, there have been no reports to date of lateral ventral wall hernias occurring secondary to penetrating trauma and their subsequent repair. In this case report, we describe the laparoscopic mesh repair of a traumatic lateral wall hernia in a 51 year old stab victim, who presented in a delayed fashion 14 months after the initial trauma.

### Case Report

A 51 year old male patient presented with left flank pain and swelling secondary to a lateral abdominal wall hernia 14 months after being stabbed in this area. The initial stab wound was repaired with non-absorbable suture and he was subsequently discharged home. The swelling became clinically apparent one month after the initial attack but the patient did not seek medical attention as there was no pain. One year after the initial trauma, he developed abdominal wall pain and presented for surgical evaluation.

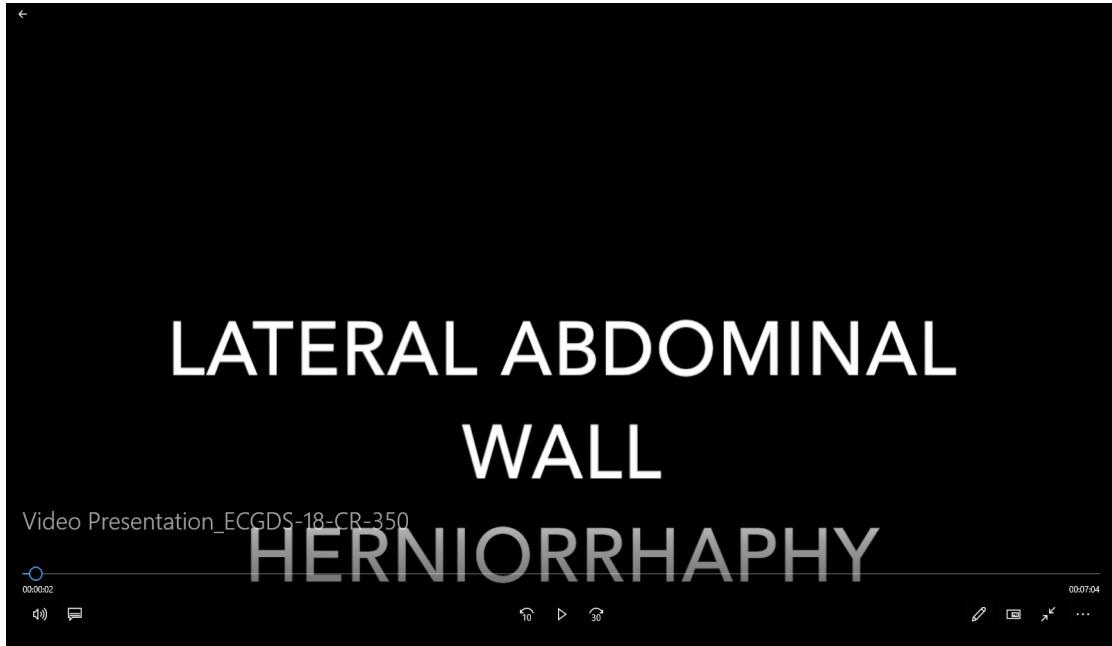
His medical history was significant for diabetes mellitus, hypertension, depression, chronic back pain and smoking. He had no previous abdominal surgery. Clinical examination revealed two left-sided defects, one along the anterior axillary line at the level of the umbilicus, and a second at the anterior axillary line, immediately inferior to the left subcostal margin. Both were tender to palpation. A computerised tomography (CT) scan of his abdomen confirmed the diagnosis, with the largest defect measuring 1.6 x 6.1cm (Figures 1a and 1b). After a discussion about the risks, benefits and surgical alternatives with the patient, the decision was made to proceed with a laparoscopic repair of the hernia defect. The patient signed an informed consent for surgery and video recording of the procedure.



**Figure 1a:** CT scan axial view showing the external oblique rupture due to previous penetrating trauma from a stab wound (green arrow) lateral to the left rectus abdominis (orange arrow).



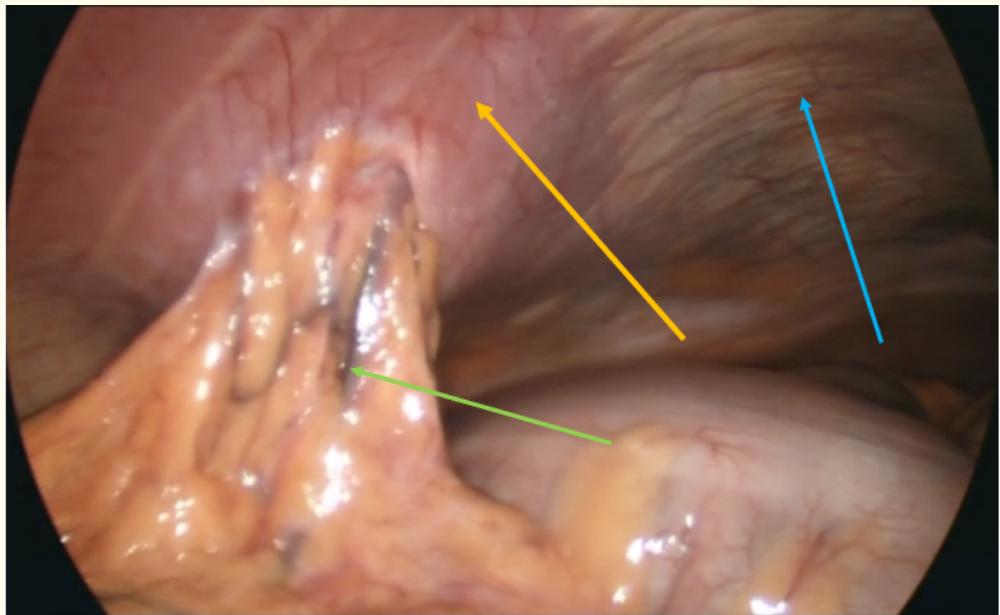
**Figure 1b:** Rupture of the transversus abdominis and internal oblique lower down than the external oblique rupture on the abdominal wall creating the lateral abdominal wall hernia (green arrow) lateral to the left rectus abdominis muscle (orange arrow).



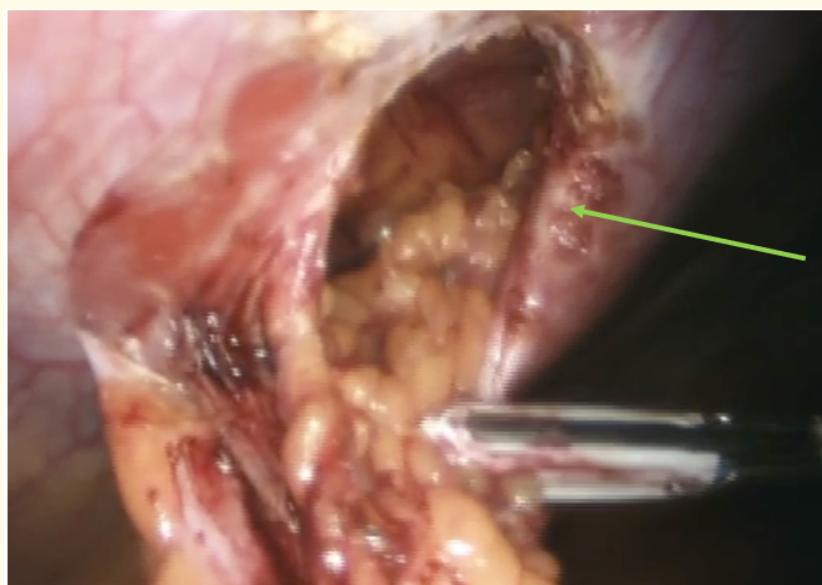
### Technique

Intra-operatively an infraumbilical skin incision was made, followed by entry with a Veress<sup>®</sup> needle and creation of a pneumoperitoneum. A 12 mm disposable port and camera were introduced at this site, followed by a 10mm epigastric port just left of the falciform ligament and a 5 mm port suprapubically in the midline. The patient was then positioned in Trendelenburg with left tilt for optimal visualization.

Despite the original stab incision in the left flank, the hernia neck was visualized inferiorly at the defect along the transversalis muscle, just lateral to the rectus abdominis (Figure 2). The operative steps are shown in figures 2-5.



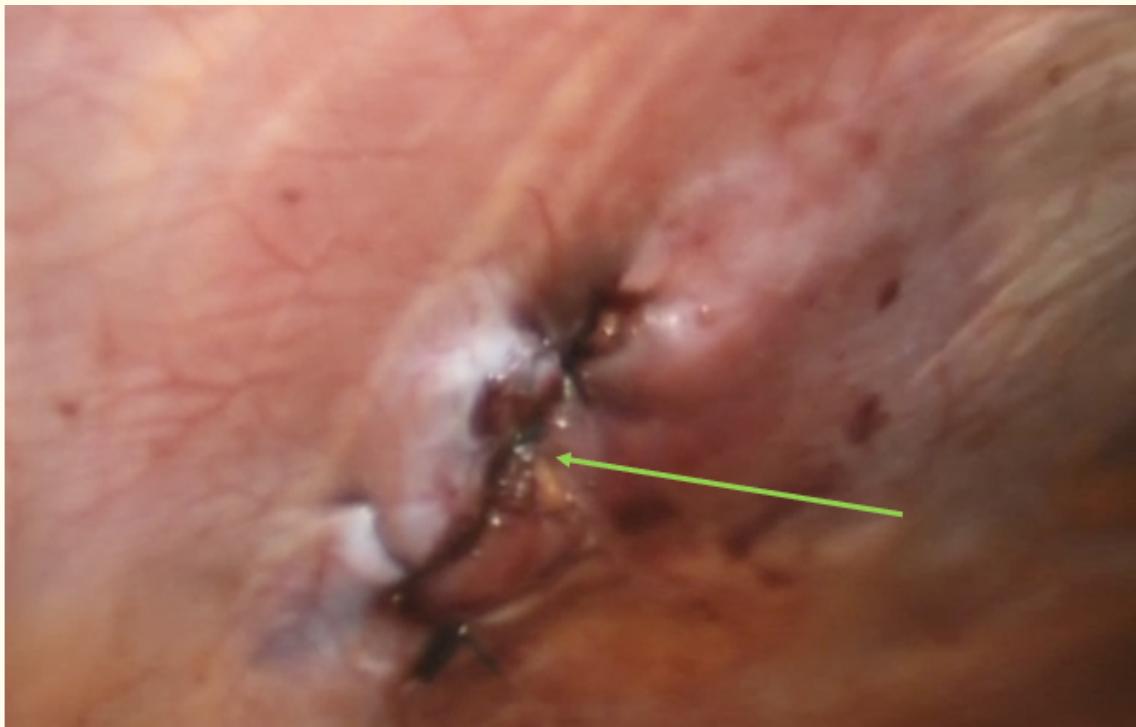
**Figure 2:** Incarcerated omentum (green arrow) penetrating the transversus abdominis (orange arrow), lateral to the rectus abdominis (blue arrow). Note the extremely thin parietal peritoneum.



**Figure 3:** Reduction of the incarcerated omentum through the hernia neck (green arrow).



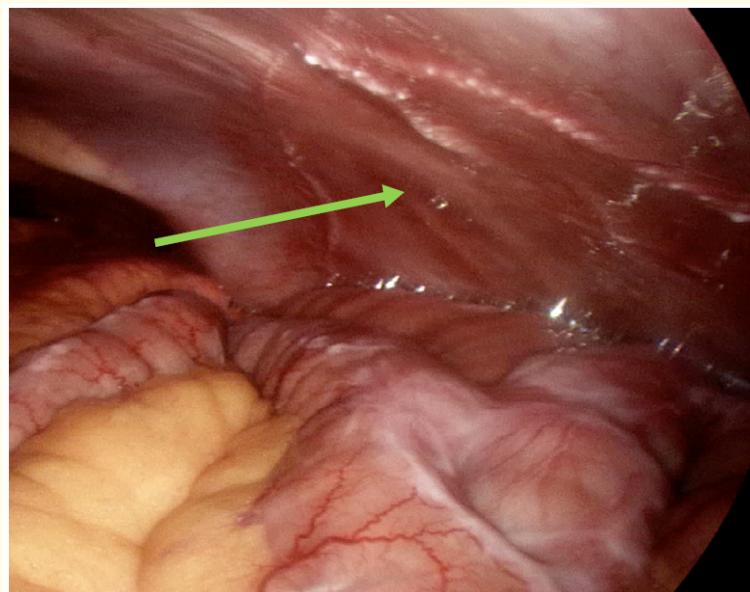
**Figure 4a:** Laparoscopic closure of the hernia neck with nonabsorbable suture.



**Figure 4b:** Hernia neck approximation (green arrow).



**Figure 5:** Underlay mesh application and the completed repair.



**Figure 6:** Fully incorporated mesh (green arrow) seen during a laparoscopic cholecystectomy on the same patient 15 months later.

The patient made an uneventful recovery and remains asymptomatic with no clinical or radiological evidence of a recurrence at 1-year follow-up.

### Discussion

Lateral ventral wall hernias are rare and sparsely reported upon with a prevalence of 1% [1]. Since the initial report following a motor vehicle collision in 1906, there have been 40 case reports in the English literature. The number of occult cases have increased with the advent of CT imaging [1,6]. The aetiology of the reported cases include blunt force trauma, incisional herniae, or rarely, as a congenital occurrence [3].

To our knowledge, this is the first reported laparoscopic repair of a lateral ventral wall hernia secondary to penetrating trauma. A unique anatomical feature of this hernia is the penetration of the external oblique muscle superior to the peritoneal penetration which leads us to believe that the knife wound originated higher up on the left flank before entering the peritoneum lower down by penetrating the internal oblique and transversus abdominis muscles (Figure 1a and 1b). Adding to the uniqueness of our repair is the intracorporeal suturing of the hernia neck with nonabsorbable suture prior to the application of an underlay mesh repair (Figure 4a and 4b).

The published literature shows that open repairs can be complex, requiring large incisions with high morbidity and recurrence rates [1]. The complexity arises from the insertion of the three abdominal wall muscles i.e. transversus abdominis, internal and external oblique muscles forming an aponeurosis that envelops the rectus abdominus muscle and forms the rectus sheath. A large hernial defect often requires reconstruction of the lateral abdominal wall musculature which adds to the complexity of the repair. There is currently no consensus regarding the most effective repair given the rarity of this condition [2].

A dual layer Ventralite ST<sup>®</sup> mesh was used. This mesh has an inner prolene layer and an outer hydrogel layer facing the bowel which reduces the rate of bowel adhesion. A pre-peritoneal repair could not be performed as the parietal peritoneum was quite thin and could not be adequately mobilized (Figure 2).

## Conclusion

Laparoscopic mesh repair has been reported elsewhere in the literature for repair of a traumatic ventral wall hernia secondary to high-velocity blunt force trauma [1] and proved to be a safe and effective option for our patient. Ultimately, the timing and method of surgical intervention for traumatic lateral ventral wall hernias should be evaluated on an individual basis based on the clinical presentation, radiological findings and the surgeon's expertise with this condition.

## Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

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