

Blunt Trauma Rupture of the Lateral Abdominal Wall – A Case Report

Abstract

Traumatic abdominal wall hernias (TAWH) are mostly a consequence of high-energy mechanisms where tangential forces come in to contact with a large surface area resulting in disruption of subcutaneous tissue, fascia and muscle. The lack of success in managing these is primarily due to the avulsion of muscle directly off bone leaving a lack of tissue for anchoring sutures. We present a 59 year old lady who developed a TAWH following a motor vehicle accident, managed with a novel laparoscopic and open hybrid approach as a definitive emergency surgical treatment with minimal morbidity whilst preserving the basic principles of hernia repair & trauma. We conclude that in stable patients with no other acute issues immediate definitive treatment of TAWH can be performed through a combination of laparoscopic and open techniques.

Keywords: Trauma; Abdominal wall hernia; Laparoscopy; Open surgery

Case Report

Volume 2 Issue 4 - 2015

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Received: October 21, 2015 | **Published:** December 14, 2015

Abbreviations: TAWH: Traumatic Abdominal Wall Hernia

Introduction

Traumatic abdominal wall hernia (TAWH) refers to a full thickness defect of the abdominal wall following blunt trauma in the context of no pre-existing hernia [1]. Despite the relatively high volume of blunt abdominal trauma, abdominal wall disruption is rare and poses a management challenge for the treating surgeon. Even when disruption does occur, there can be co-existing intra-abdominal or extra-abdominal visceral injuries that take priority in management [2]. Currently, fewer than 100 cases of blunt trauma abdominal wall rupture and herniation have been reported and there remains controversy as to the approach to management of these cases-including the need for surgery, the approach to surgery, timing and techniques of repair [3]. We present our experience with a case of lateral abdominal wall rupture following a motor vehicle accident.

Case Presentation

A 59-year-old female driver was involved in a head on motor vehicle accident. She presented to the emergency department haemo dynamically stable with a GCS score of 15. Examination revealed bruising, swelling and tenderness on the right flank and an open undisplaced left knee patella fracture. CT scan revealed complete disruption of right external oblique, internal oblique and transversus abdominis with bowel herniation, though no other significant visceral injuries see Figure 1.

A diagnostic laparoscopy was performed to assess for any additional injuries missed on imaging-none were found. The herniated bowel was reduced and a transverse incision was made over the defect site to facilitate proper anchoring of the avulsed muscle to the iliac crest with sutures. 0 Vicryl sutures were used for mass closure of muscle and anterior sheath, then 3-0 Vicryl to Scarpa's fascia and staples to skin. Subsequently, there was conversion back to laparoscopy to allow for a sublay polypropylene mesh repair. Upon completion, the orthopaedic surgeons took over for washout and repair of the left patella fracture. 6-month follow

up has shown no sign of hernia recurrence. Post-operatively the patient developed an ileus, which resolved after seven days. She was discharged home two weeks after admission with her pain well controlled.



Figure 1: CT abdomen with horizontal section around the level of the bifurcation of the aorta (L4 vertebra) showing right-sided abdominal wall disruption with bowel herniation through defect.

Discussion

Blunt trauma related abdominal wall hernias are rare [4]. They form when there is sufficient blunt force applied to the abdomen over a large surface area to disrupt the muscle and fascial layers but not the skin due to its high elasticity [5]. The acute rise in intra-abdominal pressure causes herniation of abdominal viscera through the newly formed defect. The location of the defect is often separate to the site of impact-tending to be at anatomically weak sites such as lateral to the rectus sheath and the inguinal region [6]. In adults, the most commonly reported mechanism of traumatic abdominal wall hernias is motor vehicle accidents where the driver/passenger is wearing a lap seatbelt [4]. In children, bicycle handle bar injuries constitute the majority of the cases [3].

The management of traumatic abdominal wall hernias remains controversial [1]. There is currently limited evidence for the treating surgeon to rely upon when faced with questions such as whether to operate or not in the first place, how to approach an operation (e.g. midline laparotomy and hernia repair; laparotomy over hernia site and repair; diagnostic laparoscopy and hernia repair), when to perform an operation (emergency vs. delayed), and whether to use mesh or not [1,3,7,8].

Historically, emergency midline laparotomy was advocated in all patients with traumatic abdominal wall hernias due to the perceived high rates of co-existing visceral injury which can be more easily detected and managed through this method [3,9]. Tiong et al. [8] argues that CT scanning is not reliable on its own in cases where hollow viscus injury or mesenteric tears are suspected. It is unclear the true rate of intra-abdominal injury associated with traumatic abdominal wall disruptions with reports in the literature varying from 33%-100% [10]. Even with a midline laparotomy approach, a lateral or posterior abdominal wall hernia may be inaccessible and hence another incision over the hernia site will be necessary.

More recently, Netto et al. [4] made three recommendations for the management of traumatic abdominal wall hernias based on a retrospective study of 34 patients. Firstly, the mechanism of injury should be considered when deciding on whether surgery is required, with motor vehicle accidents carrying higher risk than other mechanisms such as handlebar injuries. Secondly, clinically apparent hernias are more likely to be associated with significant intra-abdominal visceral injuries compared to those purely detected on CT scan, and hence are more likely to need urgent midline laparotomy. Thirdly, hernias only evident on imaging can be managed non-operatively due to the low risk of incarceration and strangulation. The authors make no conclusion on the role of laparoscopy.

Laparoscopy has been shown to be a safe method of evaluating intra-abdominal injury in haemodynamically stable trauma patients with no visceral injuries on CT scan [11]. The advantage of laparoscopy is that it can save a patient from the risks associated with a large midline laparotomy including adhesion formation, increased post-operative pain, prolonged hospital admission and incisional hernia. Additionally, it allows a more accurate skin incision over the hernia site for repair [8].

Our patient sustained a traumatic abdominal hernia through a high-risk mechanism—a motor vehicle accident wearing a lap seat belt. She had a clinically palpable hernia, but was haemodynamically stable and had no visceral injuries on CT scan. According to Netto et al. [4] criteria, the patient should receive an urgent midline laparotomy due to the risk of intra-abdominal injury in those with clinically apparent hernias. We opted for an initial diagnostic laparoscopy due to the previously mentioned benefits and achieved good results.

With regard to surgical technique used to repair a traumatic abdominal wall hernia—both primary repair and mesh repair have been used successfully [12]. When mesh is used, a composite mesh may be superior to polypropylene mesh due to less adhesion formation [13]. Primary repair is preferred when there is a small sized defect, perforation of hollow intra-abdominal viscera or high risk of tissue necrosis (such as high velocity injuries) due to the risk of mesh infection [14].

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