

Case Report

Giant Post-Traumatic Umbilical Hernia

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Abstract

Introduction: Traumatic Abdominal Wall Hernia (TAWH) is a rare kind of hernia. The diagnosis of TAWHs can be challenging and TAWHs may go undiagnosed for long periods of time.

Case presentation: A sixty-year-old male who had been involved in a car crash 10 years earlier was referred to us for a giant post-traumatic umbilical hernia. The clinical assessment revealed an irreducible huge hernia of the anterior abdominal wall with a port size of 7x13 cm containing intestinal loops with no radiological signs of ischemia or venous stasis. The patient underwent elective surgery consisting of an open approach with mesh.

Discussion: A study on 3,947 blunt trauma patients reported a 0.9% rate of TAWHs. The mechanisms hypothesized to lead to TAWHs are a sudden and marked increase in intra-abdominal pressure and/or acceleration-deceleration sheer forces impacting with a compressive seatbelt. The incidence of umbilical hernia reported in the literature is 2%. The diagnosis of TAWHs remains challenging owing to the patients' conditions at the time of trauma, and the TAWH may escape diagnosis for a long period of time. The timing for surgical repair is driven by the severity of the injury and the size of the TAWH. The use of mesh in TAWH repair is debated, it being necessary to weigh up the advantages and the disadvantages of using mesh. In conclusion, TAWH is a rare entity that is, however, likely to be underestimated as a result of other, often severe, traumatic injuries the patient may have sustained.

Keywords

- Abdominal
- Hernia
- Post-traumatic
- Wall

ABBREVIATIONS

TAWH: Traumatic Abdominal Wall Hernia; CT: Computed Tomography

INTRODUCTION

We describe the case of a 60-year-old man affected by a giant abdominal wall hernia that had occurred following a car crash. Traumatic Abdominal Wall Hernia (TAWH) is a rare kind of hernia. The first case was described in 1906 [1]; since then, approximately 250 cases have been reported in the literature (in both adults and children) [2]. Damschen *et al.* [3], defined TAWH as the herniation through disrupted musculature and fascia associated with adequate trauma, without skin penetration or any evidence of a prior hernia defect at the site of injury. A TAWH may be difficult to detect and consequently go undiagnosed for a long period of time after trauma. The most common causes of TAWHs are handlebar injuries in infants and motor vehicle collisions in adults [4]. The correct timing of surgical repair depends on the type, and severity, of any other clinical injuries caused by the trauma, the patients' general clinical conditions, the size of the hernia, and the risk of incarceration as well as of the protrusion of vital organs through the hernia sac [5].

CASE PRESENTATION

A sixty-year-old man of Caucasian Italian origin, who was obese (BMI 35.5), an alcoholic and who had been involved in a car crash 10 years earlier, was referred to us on account of a giant umbilical hernia. The trauma had also determined a sternal fracture and the fracture of the L1 lumbar vertebra. The patient reported that the hernia had appeared shortly after the accident and that it had grown significantly in size in the last two years. An abdominal examination revealed an irreducible huge hernia of the anterior abdominal wall. The overlying skin was thicker than normal and inflamed, though without any signs of fistulization (Figure 1). An abdominal CT scan revealed a massive umbilical hernia (with a 7x13 cm port) containing intestinal loops with no radiological signs of ischemia or venous stasis (Figure 2).

Owing to his history of alcoholism, the patient underestimated the hernia, allowing it to become giant. The hernia had become painful, highly unsightly and carried a significant risk of incarceration in the year before it came to our attention. The patient underwent elective surgery consisting of a direct approach using two separate incisions between the iliac spines, above and below the voluminous hernia. The sac contained the



Figure 1 Abdomen of the patient upon admission.



Figure 2 CT scan showing a massive umbilical hernia (7x13 cm port) containing intestinal loops with no signs of suffering and striated appearance of mesenteric vessels.

jejunum, the ileum and the right colon. Since the appendix was found to be stretched, an appendectomy was also performed (the histological examination revealed chronic appendicitis). The sac was removed with the skin and the subcutaneous fat (weighing 3 kg) (Figure 3). Exploration of the abdomen confirmed that the port size diameter was approximately 10 cm. The layers of the abdominal wall were sutured. This anatomical reconstruction was reinforced with an intra-abdominal polyester composite mesh (Parietex®) that had an overlap of at least 4 cm and was fixed with sutures (Figure 4). The post-operative results were satisfactory, and the patient was discharged after two days. In the early follow-up period, the patient developed superficial skin necrosis in the area of the abdominal wall associated with deglovement, which required secondary intention healing assisted by a vacuum-assisted closure system (Figure 5). The 1-year follow-up revealed very good functional and aesthetic results, without any recurrence (Figure 6).

DISCUSSION

TAWH is an uncommon type of abdominal wall hernia that is caused by a traumatic injury and was first described in 1906 by Shelby¹. A study on 3,947 blunt trauma patients reported a 0.9% rate of TAWHs [6]. The mechanisms hypothesized to lead to TAWHs are a sudden and marked increase in intra-

abdominal pressure and/or acceleration-deceleration shear forces impacting with a compressive seatbelt [7]. In a review recently published in the literature, *Henrotay et al.*, report that the hernia occurred in the infraumbilical abdomen in 37 cases and in the supraumbilical abdomen in 10 cases, with no plausible correlation being detected between the mechanism of injury and the location of the hernia [8]. The site of the injury in that review was: right upper quadrant in 12% of patients, right lower quadrant in 47%, left upper quadrant in 8%, left lower



Figure 3 Operative sample. Skin with hernia sac (weighing approximately 3 kg).



Figure 4 Abdominal wall defect repaired with mesh and vicryl 2 stitches.



Figure 5 Surgical site infection.



Figure 6 Aesthetic and functional results at 1-year follow-up.

quadrant in 26%, lumbar in 4% and umbilical in only 2%. Our patient sustained an umbilical hernia, which is, as reported in the literature, an uncommon type of TAWH and may explain why it went unnoticed. In accordance with *Liasis et al.* [2], we presume that the prevalence of infraumbilical over supraumbilical hernias is due to the presence of a natural point of reduced resistance in the lower abdomen, the softness of the abdominal wall in that area, and the increased intra-abdominal pressure that area is subjected to during trauma.

Different TAWH classifications have been proposed.

1. *Wood et al.* [9], described three categories based on the size of the rupture and the cause of the injury: The lower quadrant abdominal defects and hernias caused by blunt trauma most commonly from a handlebar
2. Larger defect hernias that follow motor vehicular crashes.
3. Intra-abdominal bowel herniation into rents in the retroperitoneum.

Lane et al. [10], classified TAWHs in two types according to the type of energy of the injury.

- Low energy injuries following impact on small blunt objects.
- High energy injuries following automobile and pedestrian collisions.

The diagnosis of a TAWH remains challenging owing to the patient's overall conditions at the time of the trauma, and a TAWH may go undiagnosed for a long period of time. A detailed physical examination is the first step in the diagnosis [3]. However, a TAWH may escape detection because of the patient's clinical conditions, which may be severe and include abdominal organ lesions. In cases in which the hernia has caused a critical condition associated with hemodynamic instability and abdominal organs lesions, immediate surgery consisting of an explorative laparotomy may be indicated. In cases in which the presentation is delayed or the patient's clinical conditions at the time of injury are stable, a CT scan or a magnetic resonance may be used to accurately study the hernia and the hernial contents [11,12].

The timing for surgical repair is driven by the severity of the injury and the size of the TAWH; indeed, in case of severe injuries, stabilization of the patient's clinical conditions is mandatory and TAWH repair must be delayed; by contrast, in the presence of a small abdominal defect associated with internal organ herniation, a laparotomy should be considered in order to avoid visceral incarceration [13]. The laparoscopic approach should be limited to delayed TAWH repair or to TAWH repair without concomitant organ injuries [4], as well as to cases in which excess skin removal is not required. *Al Beteddini et al.*, found four different factors that affect the timing and the type (open or laparoscopic) of the operation: 1. the size of the abdominal wall defect; 2. the timing of its diagnosis; 3. the presence of associated intra- and extra-abdominal lesions; 4. the advent of minimally invasive procedures, including the surgeon's expertise in laparoscopic surgery [14].

The use of mesh in TAWH repair is debated; tension-free surgery combined with mesh is a good way to repair the abdominal defect and prevent recurrences. However, in case of internal organ injuries, mesh carries a risk of infection. Following the introduction of biological mesh, it is now possible to use mesh at the time of trauma, even in the presence of organ injuries. It is therefore necessary to weigh up the advantages and disadvantages of using mesh. In conclusion, TAWH is a rare entity that is, however, likely to be underestimated as a result of other, often severe, traumatic injuries the patient may have sustained.

In keeping with reports in the literature, our case was a good candidate for prompt TAWH repair at the time of accident, if it had been detected. We correctly decided to use a mesh approach owing to the size of the defect and the absence of any organ injuries.

Pardhan et al., reported a median time of diagnosis of TAWHs following admission to hospital of 18 hours, with a median time of surgery from diagnosis of 15.5 hours [15]. These data are markedly in contrast to our experience.

Surgical Site Infection (SSI) has been reported to be a common complication in patients who have undergone TAWH surgery; *Coleman et al.*, described a TAWH case series of 80 patients, 2 of whom experienced a SSI similar to that observed in our case [16].

In conclusion, as the diagnosis of a TAWH remains challenging, the first recommendation to follow is to assume it may be present. A TAWH should always be ruled out in trauma patients in the emergency room setting by performing a CT scan or an MRI to detect a possible abdominal wall defect, bearing in mind that such defects might not always be present at the time of the accident. In accordance with *Al Beteddini et al.*, we believe that surgery should always be performed in the presence of a small abdominal wall defect at the time of the accident, and that mesh use should be adopted only in the absence of abdominal organ lesions so as to avoid any recurrences.

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REFERENCES

1. Shelby CD. Direct abdominal hernia of traumatic origin. JAMA. 1906; 47: 1485-1486.
2. Liasis L, Tierris I, Lazarioti F, Clark C, Papaconstantinou HT. Traumatic abdominal wall hernia: is the treatment strategy a real problem?. J Trauma Acute Care Surg. 2013; 74: 1156-1162.
3. Damschen DD, Landercasper J, Cogbil Th, Stolee RT. Acute traumatic abdominal hernia: case reports. J Trauma. 1994; 36: 273-276.
4. Moremen JR, Nakayama DK, Ashley DW, Astin M, Nolan TL. Traumatic disruption of the abdominal wall: lap-belt injuries in children. J Pediatr Surg. 2013; 48: 21-24.
5. Ballard DH, Kaskas NM, Jahromi AH, Skweres J, Youssef AM. Abdominal wall hernia and aortic injury secondary to blunt trauma: case report and review of the literature. Int J Surg Case Rep. 2014; 5: 1238-1241.
6. Netto FA, Hamilton P, Rizoli SB, Nascimento Jr B, Brenneman FD, Tien H, et al. Traumatic abdominal wall hernia: epidemiology and clinical implications. J Trauma. 2006; 61: 1058-1061.
7. Kulvatunyou N, Bender JS, Albrecht RM. Traumatic abdominal wall hernia classification. J Trauma Acute Care Surg. 2013; 75: 536.
8. Henrotay J, Honoré C, Meurisse M. Traumatic abdominal wall hernia: case report and review of the literature. Acta Chir Belg. 2010; 110: 471-474.
9. Wood RJ, Ney AL, Bubrick MP. Traumatic abdominal hernia: a case report and review of the literature. Am Surg. 1988; 54: 648-651.
10. Lane CT, Cohen AJ, Cinat ME. Management of traumatic abdominal wall hernia. Am Surg. 2003; 69: 73-76.
11. Van den Berg JC, de Valois JC, Go PM, Rosenbusch G. Groin hernia: can dynamic magnetic resonance imaging be of help? Eur Radiol. 1998; 8: 270-273.
12. Aguirre DA, Santosa AC, Casola G, Sirlin CB. Abdominal wall hernias: imaging features, complications, and diagnostic pitfalls at multi-detector row CT. Radiographics. 2005; 25: 1501-1520.
13. Jahromi AH, Sweres J, Sangster G, Johnson L, Samra N. What we know about management of traumatic abdominal wall hernia: review of the literature and case report. Int Surg. 2015; 100: 233-239.
14. Al Betedini OS, Abdulla S, Omari O. Traumatic abdominal wall hernia: a case report and literature review. Int J Surg Case Rep. 2016; 24: 57-59.
15. Pardhan A, Mazahir S, Rao S, Weber D. Blunt Traumatic Abdominal Wall Hernias: A Surgeon's Dilemma. World J Surg. 2016; 40: 231-235.
16. Coleman JJ, Fitz EK, Zarza BL, Steenburg SD, Brewer BL, Reed RL, et al. Traumatic abdominal wall hernias: Location matters. J Trauma Acute Care Surg. 2016; 80: 390-396.

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