

# Traumatic Abdominal Wall Hernia

Rajdeep Singh, Robin Kaushik, and A.K. Attri

*Department of Surgery, Government Medical College and Hospital, Chandigarh, Haryana, India.*

A traumatic abdominal wall hernia (TAWH) is a rare type of hernia, which follows blunt trauma to the abdomen, where disruption of the musculature and fascia occurs, with the overlying skin remaining intact. The case of a sixty five year old female that developed a TAWH, following the collapse of the roof of her house, is reported. She underwent a laparotomy for suspected liver injury, followed by repair of the hernia using a fascia lata graft taken from the thigh. The etiology, pathogenesis and management of this rare hernia are discussed.

**Key Words:** Blunt abdominal trauma, hernia, laparotomy, hernia repair, fascia lata

## INTRODUCTION

A TAWH is an unusual type of hernia that may follow from a blunt injury to the abdomen. Despite an overall increase in the incidence of blunt abdominal trauma, cases of TAWH remain rare, probably due to the elasticity of the abdominal wall resisting the shear forces generated by a traumatic impact.<sup>1</sup>

Although first described by Selby in 1906,<sup>1,2</sup> very few cases of TAWH have been reported in the literature. Strict criteria for diagnosing a TAWH were first laid down by McWhorter in 1939, and are as follows: an immediate descent of the hernia following trauma; severe pain in the region of injury; prostration; symptoms severe enough to call the patient attention within the first 24 hours; and no hernia prior to the trauma.<sup>3</sup> These have been slightly modified to additionally include: intact skin over the site of herniation and

no evidence of a peritoneal sac during surgery.<sup>2,3</sup>

Here, the case of a sixty five year old female patient with a TAWH is reported.

## CASE REPORT

A sixty five year old female patient presented to the emergency with severe pain and swelling of the left lower abdomen following the collapse of the roof of her house. The patient was asleep when the incident occurred, but noticed abdominal swelling immediately after being extricated from the rubble. She was admitted within a few hours of sustaining the injury.

A general examination revealed tachycardia and pallor. Examination of the abdomen revealed a large (approximately 15 by 15 cm) hernia in the left lumbar and iliac regions that extended towards the umbilicus. Visible peristalsis could be seen within. There were no signs of peritonitis or external injuries.

Investigations revealed hemoglobin of 8.6g %, with normal total and differential counts. Her other signs were all within normal limits. An ultrasound of the abdomen revealed minimal free fluid within the abdomen, with a doubtful hematoma in the left lobe of the liver. As the patient could not afford a computerised tomogram (CT) scan, an operation was performed after adequate preparation.

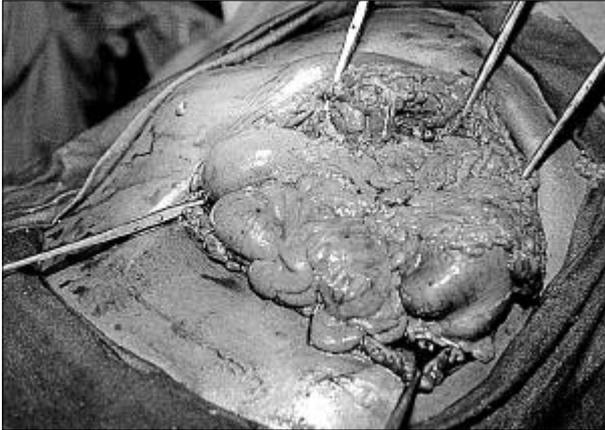
A laparotomy was performed by a transverse incision, more towards the left, so the hernia could be tackled simultaneously. All the fascial and muscle layers were found to be disrupted, with the absence of peritoneum over the entire hernia area (Fig. 1). Bowel loops (small bowel and sigmoid colon) were encountered immediately

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Reprint address: requests to Dr. Robin Kaushik, House No. 132, Sector 6, Panchkula 134 109 Haryana, India. Tel: 91-0-172-570944, Fax: 91-0-172-570944, E-mail: robinkaushik@yahoo.com



**Fig. 1.** Intra-operative photograph showing a large defect in the anterior abdominal wall with bowel loops visible within it.

below the skin. There was no evidence of any intra-abdominal injury. After reconfirming the absence of any other injury within the abdomen, attention was paid to the closure of the large abdominal wall defect. The unhealthy, devitalized abdominal muscles were thoroughly debrided, with primary closure deemed impossible due to the extensive tissue loss. A fascia lata graft was harvested from the left thigh, and sutured to the muscle sheath all around the margins of the abdominal wall defect, using a prolene 000 suture. The skin was then closed over a closed suction drainage system.

The patient suffered sudden intra-operative hypotension, and subsequently developed the ECG changes of an acute myocardial infarction. Although the surgery was uneventful, the hypotension remained refractory, and treatment for the acute myocardial infarction was initiated. She responded badly in the post-operative period, and finally succumbed to her cardiac condition the first post-operative day.

## DISCUSSION

A TAWH is uncommonly encountered in routine clinical practice, despite the fairly common occurrence of blunt abdominal trauma.<sup>2,5</sup> The mechanism of injury required to produce such a hernia is complex, and requires the application of a sudden, tangential, shearing force of moderate

intensity distributed over an area large enough to prevent penetration, but small enough to remain localised.<sup>1,2,4,5</sup> Disruption of the muscles and fascia follow such an injuring force, but the skin remains intact due to its inherent elasticity. Herniation is usually seen along the anatomic weak points of the anterior abdominal wall, rather than at the actual site of impact, because of the sudden rise in intra-abdominal pressure that leads to a “blow out” at these weak points. Hence, TAWH are commonly seen in the lower abdomen, lateral to the rectus sheath, and the inguinal region. Therefore, it must be borne in mind that the site of herniation does not indicate the site of impact, which is important when dealing with an abdominal trauma.<sup>1,2,4-6</sup> Traumatic supra-umbilical and flank herniae are associated with higher incidences of solid and hollow organ injuries than TAWH at other sites.<sup>1</sup>

A TAWH can be classified as “focal” or “diffuse”. Focal injuries usually result in small herniae, and are rarely associated with significant intra-abdominal findings. They arise due to direct injury from small objects (e.g. bicycle handlebars). Another type of focal TAWH is an autopenetrating injury, which occurs when a blunt trauma causes a bone injury that in turn pierces the abdominal wall (e.g. fracture of rib). Diffuse TAWH arise as a result of pressure and shearing forces, and are usually associated with significant intra-abdominal injury (in upto 60% of cases). Pressure injuries typically occur as seat belt acceleration-deceleration injuries, where rapid deceleration forces are applied through the seat belt, while the victim continues in a forward direction. This may lead to intestinal, mesenteric or visceral injury by direct compression between the lap belt and the spinal column, shearing across the lap belt (that acts as a fixed point), or by a sudden rise in the intra-abdominal pressure. Shear injuries, although rare, are the most severe, and result in tearing of the muscles from their bony supports.<sup>2,7</sup>

The management of a TAWH depends on the nature of the associated injuries and the hemodynamic status of the patient.<sup>8</sup> The signs and symptoms may be variable due to the presence of multiple injuries and the difficulty of an examination. Although a large hernia would produce an

obvious bulge, smaller herniae may not be appreciable on clinical examination. Computerized tomography (CT) has established itself as the gold standard in the initial assessment of a blunt abdominal trauma, especially in hemodynamically stable patients, where tenderness may preclude proper physical examination. CT clearly defines the muscle and fascial planes, any defects or disruptions within, herniation of the intra-abdominal contents, as well as their nature and the presence or absence of any associated injuries.<sup>6,8,9</sup>

Surgery is recommended for a TAWH.<sup>2,9</sup> Although a layered primary closure, using non-absorbable sutures, has been recommended,<sup>1,3,9</sup> surgical repairs are not always straightforward. The type of repair to be performed must take into account the size of the defect and the associated intra-abdominal injury, with the long-term aim of preventing a recurrence.<sup>1</sup> The surgeon must conduct a thorough debridement of all non-viable tissues to appreciate the exact extent of any defects.<sup>1</sup> It may not always be possible to perform a layered primary repair, and the use of mesh may be recommended where a tension free primary closure is not possible, or the defect is large.<sup>9</sup> However, it must be remembered that perforation of a hollow viscus is an absolute contra-

indication to the use of mesh.

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