

## Traumatic abdominal wall hernia. Case report

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SUMMARY: Traumatic abdominal wall hernia. Case report.

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*Despite the high incidence of abdominal traumas, traumatic abdominal wall hernias (TAWHs) remain rare probably because of elasticity of the abdominal wall. The TAWH is due to blunt abdominal trauma with disruption of the abdominal wall muscles and fascia with intact overlying skin. TAWH can be classified into high energy injures (generally motor vehicle accidents) and low energy injures (impact on a small blunt object). Common example of the latter type is a fall onto a bicycle handlebar. The mechanism of the trauma includes sudden increase of intra-abdominal pressure and extensive shear forces applied to the abdominal wall. The diagnosis of TAWH is difficult in the Emergency Room because during the primary diagnostic process most attention is directed toward the detection of internal injures and TAWH can be missed.*

*In this article we report a case of TAWH caused by a work accident (an heavy steel tube fallen onto the abdominal wall of the patient from a height of five meters) with delayed diagnosis.*

RIASSUNTO: Ernia traumatica della parete addominale. Caso clinico.

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*Nonostante l'alta incidenza dei traumi dell'addome, i casi di ernia traumatica della parete addominale (ETPA) sono rari, probabilmente per la notevole elasticità della parete addominale. Una ETPA si realizza dopo un trauma chiuso dell'addome che abbia determinato la discontinuazione dei muscoli e delle fasce senza lesione della cute sovrastante. Le ETPA possono essere classificate, in base all'entità del trauma, come danni ad alta energia (generalmente da incidenti automobilistici) od a bassa energia, conseguenza di un impatto della parete addominale contro un piccolo oggetto a superficie smussa. Un tipico esempio di trauma a bassa energia è la caduta sul manubrio di una bicicletta. La diagnosi di ETPA è difficile in Pronto Soccorso perché durante il processo diagnostico primario l'attenzione è diretta verso la dimostrazione di eventuali lesioni di organi interni per cui una ETPA può non essere evidenziata.*

*In questo articolo riportiamo il caso di una ETPA verificatasi in seguito ad incidente sul lavoro (un pesante tubo di acciaio caduto sull'addome del paziente dall'altezza di circa 5 metri) e diagnosticata tardivamente.*

KEY WORDS: Abdominal wall - Hernia - Trauma.  
Parete addominale - Ernia - Trauma.

## Introduction

Traumatic abdominal wall hernia (TAWH) is a rare consequence of blunt force injury that causes a defect in the abdominal wall musculature and fascia without penetrating the skin.

The prevalence of TAWHs in blunt trauma patients at Trauma Centers in published series is approximatively 1% (1-4).

The mechanism of this injury includes a sudden increase in intra-abdominal pressure and extensive shear forces applied to the abdominal wall. The most frequently described type of TAWH is the "handlebar hernia" due to blunt trauma, caused by the end of a bicycle handlebar, that often occur in children even after relatively minor trauma.

The diagnosis of TAWH is rarely made. Morbidity due to TAWH, however, may be significant. In contrast, the wall defects resulting from penetrating trauma are usually recognized and repaired thus rarely leading to TAWH.

We report a rare case of TAWH by work accident with delayed diagnosis.

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## Case report

A 49-year-old man presented to the Emergency Room of another hospital soon after a work accident (an heavy steel tube fell to the abdominal wall from 5 meters height). Laboratory studies, chest radiographs, abdominal radiographs and ultrasonography (US) were normal. Then, he was discharged 48 hours after.

Seven days after, he presented to our Emergency Room with severe abdominal pain and constipation since about 36 hours. Upon physical examination, right abdomen was found to have a bulging mass, very painful, with definite round ecchymosis that seems to be not reducible hernia (Fig. 1). Abdominal radiographs demonstrated no residual colonic gas. In correspondence of the mass, US and computed tomography (CT) showed intestinal herniation through an abdominal wall defect into the subcutaneous space (Figs. 2 and 3).

The patient underwent surgery. The skin incision was made on the mass. The small bowel, with initial vascular suffering, was herniated into the subcutaneous fat layer through a left abdominal wall defect of about 3 cm. The defect was in external and internal oblique muscle and transverse muscle of abdomen. There was no perforation or ischemic change of the herniated viscus. The wall defect was closed using extraperitoneal not absorbable polypropylene round mesh placed on the muscular plane with an overlap of 4 cm. Patient's postoperative course was uneventful. He was discharged 3 days after. At 2-year follow-up there is no recurrence.

## Discussion

At present the most common mechanism of injury leading to a TAWH is motor vehicle collision especially in young people. Shelby (5) was the first to report a TAWH following trauma in 1906. The TAWH can be classified on the basis of the mechanism of trauma into low or high energy injuries (6). Low energy injuries occur after impact on a small blunt object and typically have no associated intra-abdominal injury. The mechanism of injury is mainly due to a tangential shearing type of insult that produces a disruption of the muscle fibers. High energy injuries are sustained during motor vehicle accidents or automobile versus pedestrian accidents or falling from heights. In high energy blunt trauma the muscular disruption is often related to pelvic ring or costal fractures. In automobile accidents the seatbelts riding up the iliac crest, causing avulsion of abdominal wall musculature from the bone, also occurs (6). Differing patterns of muscular and fascial disruption can occur due to the different types of force involved as well as the tensile properties of the various areas in the abdominal wall. The anatomical defects vary from small tears to large disruption.

Dimyan et al. (7) reported on the injury due to blunt trauma caused by the end of a bicycle handlebar and was the first to use "handlebar hernia" to describe these injuries. This type of hernia is often reported in children; with this mechanism the low force of impact occurs in a small area to disrupt muscle and fascia but not the skin because it is more elastic and it is not penetrated.



Fig. 1 - The skin on right abdomen with round ecchymosis.



Fig. 2 - Ultrasonography shows intestinal herniation through the abdominal wall defect.

Although blunt trauma to the abdominal wall is fairly common occurrence, a TAWH remains a rarely repor-



Fig. 3 - Computed tomography confirms the intestinal herniation through the abdominal wall defects into the subcutaneous layer.

ted event even if, with the increasing of CT scan in trauma, there has been an increase in the number of occult TAWH being reported (6). So, more of these injuries will be properly and readily identified.

The diagnosis of TAWH is often not easy especially in low-energy trauma without skin laceration. During the primary diagnostic process, most attention is directed toward the detection of internal injuries and TAWH can be missed.

Large subcutaneous masses following trauma are easily diagnosed at initial examination but may be misdiagnosed as an abdominal wall hematoma; in these ca-

ses the presentation of a TAWH can be delayed after several years from trauma too (8-11). Sometimes a mass thought to be hematoma was a TAWH non recognized until strangulation occurs.

In the multitrauma patients, US of the abdominal wall is widely used for the first evaluation in the emergency room and can be helpful for primary diagnosis (12).

Generally the sensitivity and specificity of US is not high at first examination because the wall defects without skin lacerations are not a priority during the initial assessment.

The CT has a higher sensitivity and specificity and also enables better imaging of the abdominal wall and the intrabdominal organs (10).

Our case report demonstrates how difficult is the diagnosis of TAWH. In patients with abdominal trauma, especially when vital signs are good, primary diagnosis is directed towards the detection of internal injuries more dangerous to life. If US does not demonstrate internal injuries, second step should be directed to the study of the wall, in the site of pain, where there is evidence of hematoma or ecchymosis.

## Conclusions

Traumatic hernia of the abdominal wall is a rare type of hernia because the abdominal wall is elastic and can tolerate big pression on muscles.

A high level of clinical suspicion is required for diagnosis because of the high rate of associated injuries. In these cases the first aim is to detect internal injuries but, if dynamics of the trauma and clinical examination suggest a suspicion of TAWH, it requires CT scan and/or US for the study of the abdominal wall.

Surgery with primary repair of the defect is the definitive treatment in cases of traumatic hernia.

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