

## Traumatic Abdominal Wall Hernia: A Case Report

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Traumatic abdominal wall hernia is a rare condition that can follow any blunt trauma to the abdomen. Generally there has been an increase in the incidence of blunt abdominal trauma, although the case of traumatic abdominal wall hernias are rare. Probably due to the elasticity of the abdominal wall for resisting the shear forces generated by a traumatic impacts. In this case, we are reporting 1 rare case, diagnosed as an abdominal wall hernia associated with herniation of bowel loops due to blunt trauma without intra-abdominal injury including peritoneum. [ J Trauma Inj 2017; 30: 70-73 ]

**Key Words:** Blunt trauma, Abdominal hernia, Laparoscopy, Herniorrhaphy, Mesh

### I. Introduction

Traumatic abdominal wall hernia (TAWH) is a rare type of abdominal wall hernia that refers to the herniation of abdominal contents caused by a disruption of the abdominal wall musculature and fascia without damage to the overlying skin, where there must be no history of prior abdominal wall injury in the herniated area. The incidence of TAWH is low despite the overall rise of incidences of blunt trauma to the abdomen, which is speculated to be due to the elasticity of the abdominal wall that buffers the shock of shearing forces generated by a traumatic impact. TAWH was first described by Selby(1) in 1906. TAWH is occasionally delayed or missed in diagnosis.

Although TAWH is not directly fatal, it should be not diagnosed, as it could induce life-threatening complications if associated with incarceration or strangulation. Cases of nonsurgical treatment for most solid organ damage following an abdominal trauma are on the rise, and development of abdominal computed

tomography (CT) has eliminated the need for exploratory laparotomy in some cases.

In this article, we report one case of TAWH following blunt abdominal trauma with relevant review of literature.

### II. Case Report

A 58-year-old male patient was presented at the emergency room with polytrauma inflicted in a traffic accident one hour prior to admission. Where the patient was on a motorcycle and crashed into an oncoming vehicle. The patient presented with forehead laceration, precordial pain, pelvic pain, and right hand pain. At the time of admission, his vital signs read 131/97 mmHg-96 beats/min-20 breaths/min-36.5°C, and peripheral blood test at the emergency room showed hemoglobin 13.3 g/dL, hematocrit 37.6%, WBC 6600/mm<sup>3</sup>, and platelet count 259000/mm<sup>3</sup>. Serologic findings showed amylase 94 mg/dL, bilirubin 0.6 mg/dL, AST/ALT 105/96 IU/L, and blood sugar

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196 mg/dL. Serum electrolyte test was normal, and urinalysis showed no abnormal findings, such as hematuria. Radiologic findings showed multiple right rib fractures (5, 6, 7 and 8th) with hemothorax, abdominal wall rupture in the right lower quadrant, and L5 transverse process fracture without other abdominal solid organ injuries. The patient was treated at our hospital for liver laceration from a motorcycle accident 5 years ago, and clinical and radiologic findings at the time did not suggest abdominal wall injury. There was a swelling of about 12 cm×12 cm in the abdomen and showed mild abrasions and subcutaneous hemorrhage in the site of defect without signs of a bulging mass (Fig. 1, 2).

Laparoscopic surgery was performed to confirm the



**Fig. 1.** The skin abrasion and ecchymosis without skin laceration on right lower quadrant.

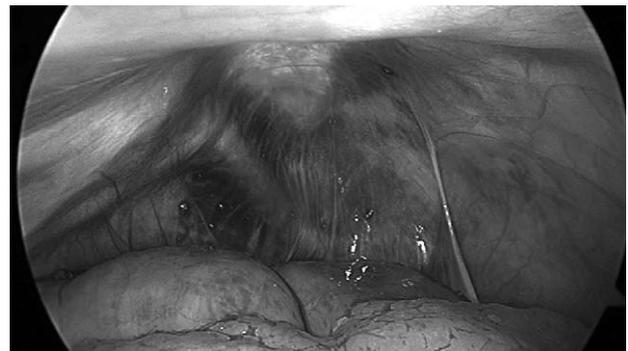


**Fig. 2.** Abdomino-pelvic CT scan shows that external and internal oblique muscle and transversus abdominis muscle are herniated with damage around the anterior superior iliac spine of the pelvic bone.

absence of intraperitoneal injuries. A 12-mm trocar was placed to insert the laparoscope for visual examination. We confirmed an absence of intraabdominal organ injuries as well as hemoperitoneum, but there was swelling of the abdominal wall along the external and internal oblique muscle and transversus abdominis muscle. The initial plan was to repair the hernia with surgical mesh, but upon confirmation of absence of injuries in peritoneum and intraabdominal organs, we made a 12-cm incision in the right lower abdomen and separated and approximated the external oblique muscle to the internal oblique muscle. Then a proline mesh was used to reinforce the abdominal wall, and restoration of the peritoneum was laparoscopically confirmed before closing the incision. The patient resumed regular diet on POD 3 and was transferred to orthopedic surgery for additional treatment for L5 transverse process fracture on POD 11. The patient was discharged on POD 65 without any complications (Fig. 3).

### III. Discussion

Blunt abdominal trauma could cause injuries to the abdominal wall or organs within the abdomen, but the incidence of traumatic abdominal wall hernia (TAWH) is considerably low.(2-7) Fernando et al.(7) reported that TAWH develops in about 0.9% of patients sustaining blunt abdominal trauma. Once patients, who have suffered blunt trauma to the abdomen arrive at the ER, TAWH could be diagnosed, via meticulous physical examination and radiologic testing, such as abdominal CT. A bulging mass in the abdomen could be observed during physical examination of patients



**Fig. 3.** Laparoscopic view shows bulging peritoneum. There was no peritoneal injury and solid organ injury.

with abdominal wall hernia, which should be differentially diagnosed with abdominal wall hematoma. (8) The patient in this case only showed mild abrasions and subcutaneous hemorrhage in the site of defect without signs of a bulging mass, but an abdominal wall defect was diagnosed based on an abdominal CT.

Herniation usually develops in the anatomically vulnerable areas along the anterior abdominal wall, which is caused by a sudden rise of intraabdominal pressure as a result of trauma; thus, TAWH is most commonly seen in the lower abdomen, particularly along the lateral borders of the rectus abdominis muscle, and the inguinal region.(3) The diagnostic criteria of TAWH were first proposed by Lane et al.,(2): development of the hernia should be immediate or delayed with no skin lacerations following blunt trauma to the abdomen, and the patient must not have a history of hernia in the injury site and show no signs of hernia sacs on surgical findings. For a TAWH to develop, the abdominal pressure must be adequately elevated to disrupt the abdominal wall musculature, which requires a rapid and strong traumatic force. Cases could be classified based on the type of muscle damage, size of defect, and degree and location of injury, as well as based on the energy of injury into high-energy and low-energy injuries.(2) High-energy injuries include car and motorcycle accidents, pedestrian accidents involving cars or motorcycles, and fall accidents. In such cases, injuries are inflicted by a transfer of an adequate amount of energy to the body, although the overlying skin remains intact. Understanding such injury mechanisms is an important aspect of determining the treatment modalities.

Surgeons must be aware that TAWH could show signs and symptoms of pain, tenderness, swelling, and peritonitis caused by accompanying organ damage, and that common accompanied injuries include gastric or intestinal perforations, laceration of the mesosigmoid, and retroperitoneal hematoma.(5,6) Although an emergency ultrasound would be the most efficient method of examination for patients showing unstable vital signs at the time of injury, the presence of injury-induced hematoma or intestinal gas may hinder diagnosis via ultrasound. CT is currently the highest standard in the diagnosis of patients who have suf-

fered a blunt force trauma showing hemodynamic stability, which is highly useful for identifying the presence of any intraabdominal organ injuries.

In this case, the patient sustained a high-energy injury and showed normal vital signs at the emergency room. Visual and palpation examinations showed no evidence of intraabdominal organ damage. Upon confirming the absence of any intraabdominal organ injuries via clinical and radiologic testing as well as laparoscopic examination, the authors made an incision, repaired the abdominal wall hernia, and performed clinical observations. Small defects are treated with primary sutures without the use of prosthesis, but mesh reinforcement may be safer for large hernias even when primary sutures would suffice. Of course, mesh should be avoided in cases involving enteric damage and contamination, including open wound injuries, and for cases that involve severely contaminated open wounds, secondary or delayed repair should be performed than primary repair of the defect.

#### IV. Conclusion

Although traumatic abdominal wall hernia (TAWH) is not immediately life-threatening, it is important to address it immediately upon diagnosis because accompanying organ injuries may lead to intestinal incarceration or strangulation, or diffuse peritonitis, mesenteric laceration, and hemoperitoneum caused by intestinal perforation, which would seriously disrupt the patient's hemodynamic state. Furthermore, using a mesh would be efficient for reinforcing the herniated area if the absence of peritonitis, mesenteric laceration, and hemoperitoneum are confirmed laparoscopically.

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