

## Case Report

# Transection of Rectus Abdominis Following a Seatbelt Injury: A Case Report

Dabbagh M\*; Maazouz A; Hablaj H; Sabur M; EL Azzaoui I; Lamghari M; Bensal; Najih M; EL Kaoui H; Moujahid M; Bouchentouf M; Bounaim A

Department of General Surgery, Mohammed V Military Hospital, Rabat, Morocco

\*Corresponding author: Dabbagh M

Department of General Surgery, Mohammed V Military Hospital, Rabat, Morocco.

Tel: 212668699621

Email: mahmoud.dabbagh@um5r.ac.ma

Received: May 12, 2023

Accepted: June 02, 2023

Published: June 09, 2023

## Abstract

**Background:** With the introduction of the use of seatbelts in cars, mortality following motor vehicle collisions has decreased significantly. They have, however, introduced a set of injuries comprising abdominal wall bruising and intra-abdominal injuries. Injuries may consist of traumatic abdominal wall disruption. Closed rupture of rectus abdominis following seatbelt related trauma is rare.

**Case Presentation:** We present the case of a 68 years old male who presented with a closed rupture of the rectus abdominis without other intra abdominals injuries, following a high velocity road traffic accident. He was brought in with an acute abdomen and a seatbelt sign upon which the decision was made to perform emergency laparotomy. After further management, the patient was discharged with no further complaints.

**Conclusion:** Our case highlights the need for suspicion, investigation and subsequent surgical management of intra-abdominal injury following identification of this rare consequence of seat belt trauma.

**Keywords:** Seat belt; Abdominal injuries; Rectus abdominis; Hemoperitoneum

## Introduction

When the seat belts were introduced in cars, morbidity and mortality rates following motor vehicle crashes dropped considerably [1].

Most blunt injuries are due to falls and road traffic accidents [2]. A traumatic abdominal wall is rare, occurring after a high velocity impact of a blunt object on the abdominal wall. In motor vehicle collisions, the wearing of a seatbelt has reduced mortality by 45% and the risk of serious injury by 50% [3]. The likelihood of intra abdominal injury in patients with a seatbelt sign is increased up to 4-20 percent [4,5]. However it is associated with certain abdominal injuries. Solid viscus organs are especially afflicted in patients with a mal-positioned lap belt [6].

Here, we report the case of an aged male with a massive hemoperitoneum caused by complete transection of the rectus abdominis muscle, we briefly review the literature.

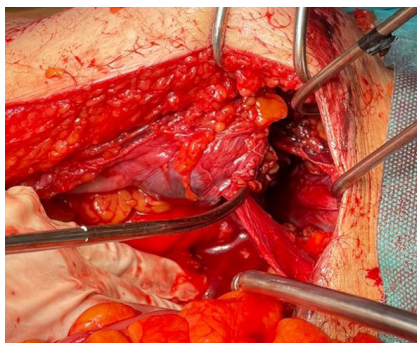
## Case Presentation

A 68-year-old male sustained injuries as a driver, wearing a three-point seat belt, in a car involved in a head-on collision with a traffic light pole.

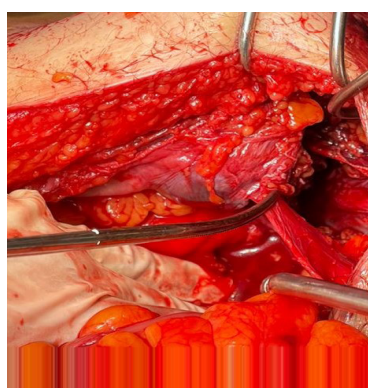
On admission, primary survey revealed a combative hemodynamically unstable patient requiring sedation and intubation, and tachycardia of 115bpm, his Blood Pressure (BP) of 06/30 mmHg which responded to intravenous fluid replacement. Abdominal examination revealed a soft abdomen, diffusely tender, with bruising to flanks and in the distribution of the seatbelt, from left hypochondrium to right inguinal region and a left lower abdomen contusion.

A Focused Abdominal Sonography for Trauma (FAST) showed free fluid around liver, spleen, mesenteries and the pelvic cavity.

Since at that point the patient was always hemodynamically unstable, he underwent an emergency laparotomy through the midline who revealed a massive hemoperitoneum and complete transection of the right left abdominis muscle (Figure 1 and 2) exactly beneath the seat belt sign and devascularization of the skin under the areas of seat-belt related bruising. The attached peritoneum was also ruptured. Along the small intestines some bleeding from small mesenterial tears was suture-ligated. Approximately 2 liters of blood were evacuated from the abdominal cavity. Hemostasis was achieved by applying su-



**Figure 1:** Intraoperative photo reveal complete disruption of the left rectus abdominis.



**Figure 2:** Operative photo shows transection of the left rectus abdominis.

ture-ligations proximal and distal to the cut ends of the muscle, the abdominal wall muscles were repaired in a layer-by-layer manner using interrupted monofilament absorbable sutures. No other source of hemorrhage was identified besides the transected muscle. After leaving a drain in this area the abdomen was closed primarily and the patient was transferred to the intensive care unit.

The patient was discharged after 15 days in good medical condition. After a few months of follow-up he made a good recovery. He was referred to a physiotherapist to start core-stability exercises.

### Discussion

The introduction of seatbelts in the 1960s, and increased compliance with their use has reduced mortality and changed the injury profile associated with motor vehicle collisions [7,8]. Wearing a seat belt is known to cause injuries, especially when the seatbelt is not worn correctly. However, it is effective in reducing life threatening injuries when used correctly [9]. Seat belt injuries can cause abdominal wall rupture. The mechanisms by which it can cause damage are sudden deceleration and shearing forces. The harmful effects of it are aggravated by improper placement of the belt [4,10].

Previous reports documented that intra abdominal injuries were characterized by a high rate of gastrointestinal injuries in belted versus unbelted victims [11]. In our case, the transected muscle was identified as the only source of bleeding leading to hemorrhagic shock. The CT scan is able to demonstrate the injury to the rectus muscle. A sensitivity of 98% to assess abdominal wall disruption with a CT scan has been reported [12], but in our case the unstable state of the patient led us directly to an emergency exploratory laparotomy.

However, the trauma surgeon should bear in mind that although tears of the rectus muscles may result in severe hemor-

rhage, and could be accurately diagnosed by a CT scan, they should only serve as a red flag for the presence of other significant intra abdominal injuries.

When a patient presents with a seatbelt sign, the clinician should have a high index of suspicion for both intra-abdominal injury and abdominal wall rupture. When a laparotomy is performed, abdominal wall integrity should also be assessed especially when subcutaneous emphysema is present. Higher risk of hollow visceral injury has been reported when patients present with a seatbelt sign but substantial injury to the abdominal wall itself after blunt trauma is very rare [13]. Management of the abdominal wall disruption depends on the time of diagnosis, the extent of the injury and the concomitant injuries.

In conclusion, intra-abdominal injuries after motor vehicle collisions are well reported and people with a seatbelt sign have a higher likelihood of having intra-abdominal injuries when presented. Abdominal wall disruption however, is a rare injury and in case of non-operative management may lead to traumatic abdominal wall hernia.

### Conclusion

Whilst seatbelts have been responsible for a decreasing mortality and decreased severity of injuries from road traffic accidents, seatbelt related injury patterns arise from the transfer of kinetic energy to the abdominal wall and internal visceral organs, both intra and retro-peritoneal. The presence of rupture of rectus abdominis muscle secondary to seat belt injury should raise the suspicion of intra-abdominal injury. Surgical repair remains the treatment for encountered bowel injuries.

Public health strategies should continue to advocate seatbelt use with an additional focus on the correct manner in which to use a seatbelt in order to reduce the mortality from road traffic accidents.

### Author Statements

#### Conflicts of Interest Statement

The author has no conflicts of interest to declare. The author alone is responsible for the content of this manuscript.

### Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

### Ethical Approval

Ethical approval is not required at our institution for an anonymous case report.

### References

1. Campbell BJ. Safety belt injury reduction related to crash severity and front seated position. *J Trauma*. 1987; 27: 733-739.
2. Hom J: The risk of intra-abdominal injuries in pediatric patients with stable blunt abdominal trauma and negative abdominal computed tomography. *Acad Emerg Med*. 2010; 17: 469-475.
3. Dennis RW, Marshall A, Deshmukh H, Bender JS, Kulvatunyoun N, et al. Abdominal wall injuries occurring after blunt trauma: Incidence and grading system. *Am J Surg*. 2009; 197: 4137.
4. Wotherspoon S, Chu K, Brown AF. Abdominal injury and the seat-

- belt sign. *Emerg Med (Fremantle)*. 2001; 131: 61-65.
5. Nishijima DK, Simel DL, Wisner DH, Holmes JF. Does this adult patient have a blunt intra-abdominal injury? *JAMA*. 2012; 307: 1517-1527.
  6. Biswas S, Adileh M, Almog G, Bala M. Abdominal injury patterns in patients with seatbelt signs requiring laparotomy. *J Emerg Trauma Shock*. 2014; 7: 295-300.
  7. Traffic safety facts: 2010 data. 2010.
  8. NRA. Survey on Seatbelt usage in Ireland 2005.
  9. Dawson LK, Jenkins NH. Fatal intraabdominal injury associated with incorrect use of a seat belt. *J Accid Emerg Med*. 1998; 15: 437-438.
  10. 3 EJT: Sato TB. Effects of seat belts and injuries resulting from improper use. *J Trauma*. 1987; 27: 754-758.
  11. Rutledge R, Thomason M, Oller D, Meredith W, Moylan J, et al. The spectrum of abdominal injuries associated with the use of seat belts. *J Trauma* 1991; 31: 820-825.
  12. Burt BM, Afifi HY, Wantz GE, Barie PS. Traumatic lumbar hernia: report of cases and comprehensive review of the literature. *J Trauma*. 2004; 57: 1361-1370.
  13. Suhardja TS, Atalla MA, Rozen WM. Complete abdominal wall disruption with herniation following blunt injury: case report and review of the literature. *Int Surg*. 2015; 100: 531-539.