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Case Report

Occult thoraco-abdominal injuries from an airbag and seatbeltMing-Yu Tsai ^{a,b}, Sai-Wai Ho ^{a,b}, Ying-Tung Yeh ^c, Chao-Bin Yeh ^{a,b,d,*}^a Department of Emergency Medicine, Chung Shan Medical University Hospital, Taichung, Taiwan^b Department of Emergency Medicine, Chung Shan Medical University, Taichung, Taiwan^c School of Dentistry, Chung Shan Medical University, Taichung, Taiwan^d School of Medicine, Chung Shan Medical University, Taichung, Taiwan

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Abstract

A combination of a seatbelt and airbags decreases the risk of injury for most body regions in motor vehicle crashes. Although the severity of injuries decreases, injuries still occur. We report a case of occult thoraco-abdominal trauma in a patient who was wearing a three-point seatbelt and had airbag protection. A 59-year-old man presented to the emergency department in shock after a motor vehicle accident. He was protected by a three-point seatbelt and airbag. Chest radiographs and focused assessment with sonography for trauma showed no abnormalities. However, computed tomography revealed multiple injuries in the chest and abdomen. This case report highlights occult thoraco-abdominal trauma in a victim protected by a seatbelt and airbag, which may be a pitfall for emergency physicians. Emergency physicians should understand the limitations of chest radiographs in trauma evaluation and carry out a complete evaluation of patients.

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Keywords: Seatbelt; Airbag; Thoraco-abdominal trauma

1. Introduction

Motor vehicle crashes mostly cause blunt abdominal trauma and some pulmonary trauma, which can be fatal.¹ Seatbelts in conjunction with airbags provide protection in vehicle crashes and reduce morbidity and mortality.² Here, we report a case of occult thoraco-abdominal trauma that was not evident on initial chest radiology in a patient with three-point seatbelt and airbag protection that might mimic normal status. After careful assessment and management, rib fractures and a spleen laceration with internal bleeding were diagnosed.

2. Case report

A 59-year-old man presented to the emergency department (ED) in shock after a motor vehicle accident. He was the

driver and had been restrained by a three-point seatbelt. His car hit a traffic island in a frontal collision and the airbag deployed. He was extricated by emergency medical services and transferred to the ED immediately. On arrival in the ED, he was drowsy with a Glasgow Coma Scale score of 14 accompanied by shortness of breath. His blood pressure was 83/50 mmHg, heart rate 61 beats/min, respiratory rate 16 breaths/min, body temperature 34.9°C, and oxygen saturation 85% on room air. A physical examination revealed middle-chest-wall ecchymosis and abdominal tenderness in the left upper quadrant. He was given 6 L/min oxygen by mask and 2500 mL of normal saline and 500 mL of lactated Ringer's solution intravenously. He also received two units of packed red blood cells in the ED. Radiographs of the C-spine, pelvis, and chest showed no abnormalities (Fig. 1). Focused assessment with sonography for trauma (FAST), including the sub-xiphoid (pericardium), right upper quadrant (Morrison's pouch), left upper quadrant (splenorenal space), and suprapubic views (cul-de-sac), showed no hemoperitoneum or pericardial effusion. Laboratory blood tests revealed a hemoglobin level of 15.3 g/dL. After his blood pressure stabilized to

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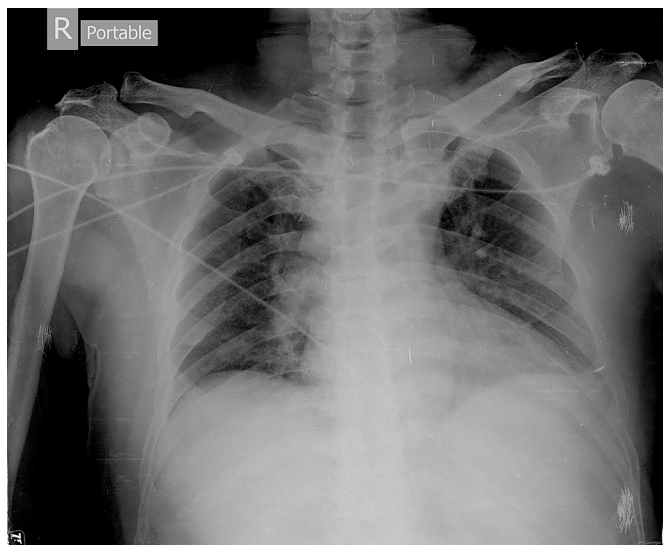


Fig. 1. Chest radiograph showing no significant rib fractures or chest contusions.

123/63 mmHg, contrast-enhanced chest and abdominal computed tomography (CT) scans were performed because of unexplained shock. The scans revealed bilateral lung contusions, fractures of the left fifth to seventh and right fifth and sixth ribs, and a grade II spleen laceration with internal bleeding (Fig. 2A and B). The patient was admitted to the surgical intensive care unit for conservative therapy. He was discharged from the hospital after 8 days without surgical intervention.

3. Discussion

The introduction of seatbelts has had a significant impact in reducing mortality and serious injury from motor vehicle accidents. Seatbelts can prevent victim ejection, spread the force from sudden deceleration, and limit contact of the victim with the interior of the car.³ Airbags provide supplemental protection against injury to the chest and head. A combination of seatbelts and airbags further decreases the risk of injury in most body regions.⁴ However, airbags or the seatbelt itself can cause different types of unusual injury, as documented in previous case reports.^{5–8} Knowing the mechanism of injury is important in trauma. Emergency physicians should be aware of potential injuries in high-energy blunt trauma such as motorcycle, pedestrian, and motor vehicle accidents involving a speed change greater than 20 mph or in which the patient is ejected. Advanced trauma life support courses recommend chest radiography in the initial evaluation of trauma patients. However, Wisbach et al found that 35.6% of 660 patients with a negative initial chest radiograph had missed findings that were confirmed by chest CT.⁹ Moreover, CT sometimes changes the management of chest trauma patients.¹⁰ Kaiser et al found that chest CT is safe and cost-effective in older male patients with blunt abdominal or extremity trauma after a negative chest radiograph.¹¹ Our patient had bilateral lung contusions, and fractures of the left fifth to seventh and right

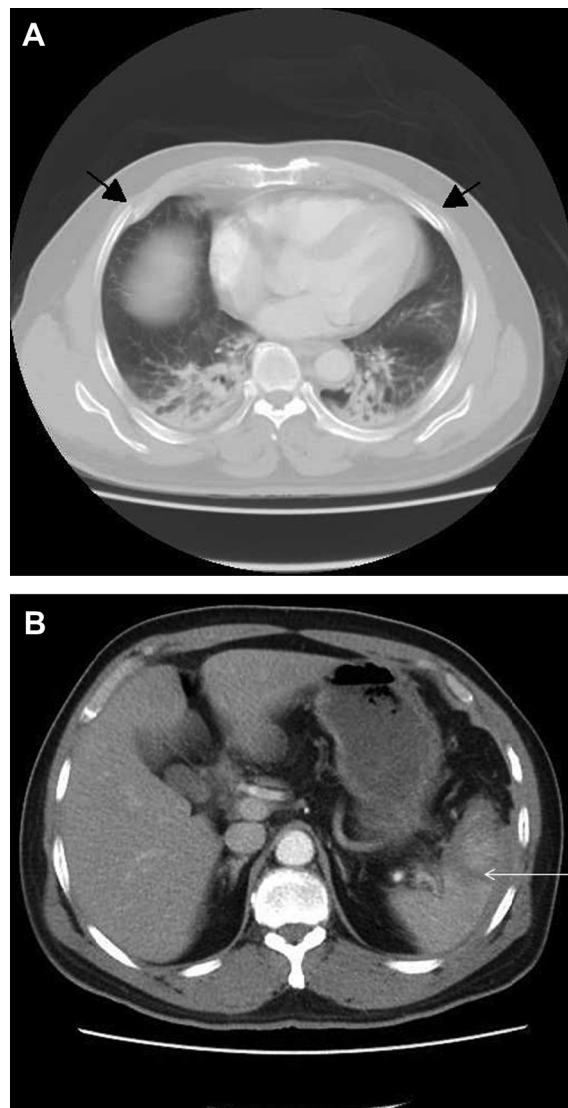


Fig. 2. (A) Contrast-enhanced computed tomography scan of the chest illustrating bilateral lung contusions and bilateral rib fractures (arrows). (B) Contrast-enhanced computed tomography scan of the abdomen illustrating a Grade II spleen laceration (arrow).

fifth and sixth ribs according to CT after a negative chest radiograph. Although there was no change in the management of our patient, CT could provide a definite diagnosis of an emergency condition that could be fatal.

4. Conclusion

This case report highlights that occult thoraco-abdominal trauma in a patient protected by a seatbelt and airbag may be a pitfall for emergency physicians. Emergency physicians should understand the limitations of chest radiographs and FAST in trauma evaluation and carry out a complete evaluation of patients.

References

- Demetriades D, Murray J, Charalambides K, et al. Trauma fatalities: time and location of hospital deaths. *J Am Coll Surg.* 2004;198:20–26.

2. Cummins JS, Koval KJ, Cantu RV, et al. Do seat belts and air bags reduce mortality and injury severity after car accidents? *Am J Orthop*. 2011;40:E26–E29.
3. Hendey GW, Votey SR. Injuries in restrained motor vehicle accident victims. *Ann Emerg Med*. 1994;24:77–84.
4. Cummins JS, Koval KJ, Cantu RV, et al. Risk of injury associated with the use of seat belts and air bags in motor vehicle crashes. *Bull NYU Hosp Jt Dis*. 2008;66:290–296.
5. Sugimoto T, Omura A, Kitade T, et al. An abdominal aortic rupture due to seatbelt blunt injury: report of a case. *Surg Today*. 2007;37:86–88.
6. Chiba D, Sano H, Nakajo S, et al. Traumatic deltoid rupture caused by seatbelt during a traffic accident: a case report. *J Orthop Surg*. 2008;16:127–129.
7. Cunningham K, Brown TD, Gradwell E, et al. Airbag associated fatal head injury: case report and review of the literature on airbag injuries. *J Accid Emerg Med*. 2000;17:139–142.
8. Salam T, Stavrakas P, Wickham L, et al. Airbag injury and bilateral globe rupture. *Am J Emerg Med*. 2010;28:982.e5–982.e6.
9. Wisbach GG, Sise MJ, Sack DI, et al. What is the role of chest X-ray in the initial assessment of stable trauma patients? *J Trauma*. 2007;62:74–78.
10. Barrios C, Malinoski D, Dolich M, et al. Utility of thoracic computed tomography after blunt trauma: when is chest radiograph enough? *Am Surg*. 2009;75:966–969.
11. Kaiser ML, Whealon MD, Barrios Jr C, et al. Risk factors for traumatic injury findings on thoracic computed tomography among patients with blunt trauma having a normal chest radiograph. *Arch Surg*. 2011;146:459–463.