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The relationship between injury severity and fracture of the first and/or second ribs in blunt chest trauma

Ashraf F Hefny¹, Nirmin A Mansour², Taoufik Zoubeidi³, Sherif A Fathi⁴, Eyad Raya⁵, Mai A Soliman⁶

¹ Department of Surgery, College of Medicine and Health Sciences, UAE University, and Tawam Hospital, Al Ain, UAE; ² Ambulatory Health Services, SEHA, Abu Dhabi, UAE; ³ Department of Statistics, UAEU, UAE; ⁴ Department of Surgery, Faculty of Medicine, October 6th University, Cairo, Egypt, UAE; ⁵ Emergency Department, Madinat Zayed Hospital, Abu Dhabi, UAE, ⁶ Department of Internal Medicine, Ain Shams University, Cairo, Egypt

Introduction

The anatomically well-protected first and second ribs require a high-energy trauma to be fractured. This trauma can cause serious injuries to the chest and other extra-thoracic body regions (1, 2). We aim to study fractures of the first and/or second ribs in blunt chest trauma (BCT) patients and their relation to injury severity and mortality.

Patients and methods

We retrospectively collected data from all patients who were admitted to Al Ain Hospital with blunt chest trauma from December 2014 through January 2017. The Injury details of all BCT patients were retrieved from Al Ain Hospital trauma registry. Data included demography, mechanism of injury, vital signs, Glasgow Coma Score (GCS) on admission, injured body regions, management, Injury Severity Score (ISS), New Injury Severity Score (NISS), and outcome including length of hospital stay (LOS), and mortality. A comparison between BCT patients who sustained first and/or second rib fractures and other patients without fractures was performed.

Results

During the study period, there were 4779 patients included in the Trauma Registry of Al-Ain Hospital, 669 (13.9%) patients had blunt chest trauma. Fractures of first and/or second ribs were present in 49 (7.3%) of blunt chest trauma patients. The group consisted of 42 (85.7%) males and 7 (14.3%) females; the majority were due to motor vehicle collisions in 36 (73.5%) patients (Table 1). Upper extremity injury was significantly associated with patients with first and/or second rib fractures compared to other patients without fractures (p < 0.001, Pearson Chi-Square) (Figure 1). Flail chest, surgical emphysema, and pneumothorax were significantly higher in patients with fractured first and/or second ribs (p = 0.011, Fisher's Exact Test, p = and p < 0.001, Pearson Chi-Square; 0.010, respectively). Injury severity parameters such as ISS, NIS, and ICU admission were significantly higher in patients with fractured first and/or second ribs (p = 0.007, p = 0.035, and p = 0.05, Pearson Chi-Square; respectively). The mean (Std. Deviation) of hospital length of stay in patients with fractured first and/or second ribs was 7 (7.7) days which was not statistically significant compared to others (p = 0.246 Pearson Chi-Square). One patient died with first and/or second rib fractures group (overall mortality 2%) compared with 14 (2.3%) patients without fractures which was not statistically significant (p = 1.0, Fishers exact test).

Table 1: Mechanism of injury in patients who had fractures of the first and/or second ribs in blunt thoracic trauma patients, Al-Ain Hospital, UAE

Mechanism	Frequency	Percent
Motor Vehicle Collisions	36	73.5
Fall less than one meter	2	4.1
Fall more than one meter	7	14.3
Hit by falling objects	1	2.0
Others	3	6.1
Total	49	100

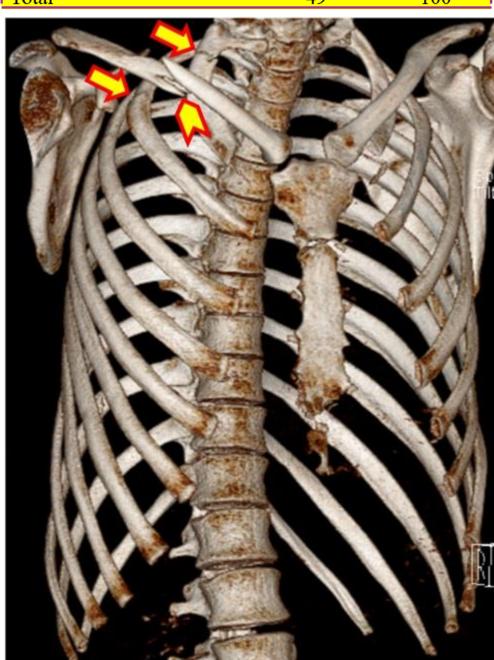


Figure 1. 27-year-old male, fell from more than two-meter height. CT scan of the chest showed bilateral apical small pneumothorax, surgical emphysema, right 1st and 2nd ribs fracture (arrow), right clavicle fracture (arrowhead), and left 1st rib fracture.

Conclusions

First and/or second rib fractures in blunt chest trauma patients indicate a high-energy type of trauma with serious injuries. Meticulous evaluation should be paid to avoid missing other serious injuries.

References

1- Fokin A, Wycech J, Picard E, Weisz R, Puente I. Is First Rib Fracture a Culprit or a Sign of Injury Severity? It Is Both. J Orthop Trauma. 2018 Aug;32(8):391-396

2. Tsimpinos M, Chrysikos D, Demesticha T, Piagkou M, Troupis T. Fracture of the Second Rib: An Indirect Sign of Serious Trauma Like Fracture of the First Rib? J Chest Surg. 2023 Nov 5;56(6):431-434. doi: 10.5090/jcs.23.072...