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Case Report

Taking the bull by the horns: Patient trampled by bull requiring surgical fixation of multiple rib fractures including rib 11☆,☆☆

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ABSTRACT

Rib fractures are a serious problem in thoracic trauma resulting in high morbidity and mortality. Surgical stabilization in the management of rib fractures is gaining more popularity and recognition as outcomes continue to show positive results, however, there is still hesitancy among the trauma community to recommend this intervention. Although there still remains questions as to which patients to provide surgical stabilization to in the non-flail rib fracture patient population, surgical stabilization of rib fractures have been shown to be extremely beneficial in those patients with flail chest and should be strongly considered in this patient population, especially if they require ventilatory support. Here we present a 62-year-old female with severe chest wall deformity from 21 rib fractures after being trampled by a bull. This included a flail segment and a severely angulated 11th rib fracture piercing through the lung into the retroperitoneum. Furthermore, we also introduce a new technique for stabilization of rib fractures that are more posterior. Given the fact we surgically intervened early in our patient with severe chest wall trauma, she had a very favorable outcome, allowing her to be discharged from the hospital in a timely fashion with minimal overall morbidity.

Introduction

Rib fractures are among the most common injuries following blunt trauma [1]. They occur in approximately 10% of all traumatically injured patients and are associated with significant pulmonary-related morbidity and mortality [1–3]. Although vast improvements have been made in the care of rib fracture patients, including surgical stabilization of rib fractures (SSRF), outcomes for this population still remain poor with limited change over the past decade [1,3].

Despite an increased appreciation and utilization of SSRF, there still is hesitancy to recommend patients presenting with rib fractures undergo this operation [1,3]. In fact, data from the National Trauma Data Bank(NTDB) indicates that less than 1% of patients with flail chest receive SSRF [1,3], an indication clearly evident in recent literature [4–6]. Furthermore, there is uncertainty about which patients without a flail segment would benefit from SSRF, likely due to a lack of evidence-based research surrounding this patient population [1,2,7].

In an effort to better guide SSRF among the trauma community, various consensus statements and guidelines have been proposed based on current research [1,2]. One of the current guidelines from the Rib Fracture Colloquium 2016 states “repair of ribs 1,2, 11

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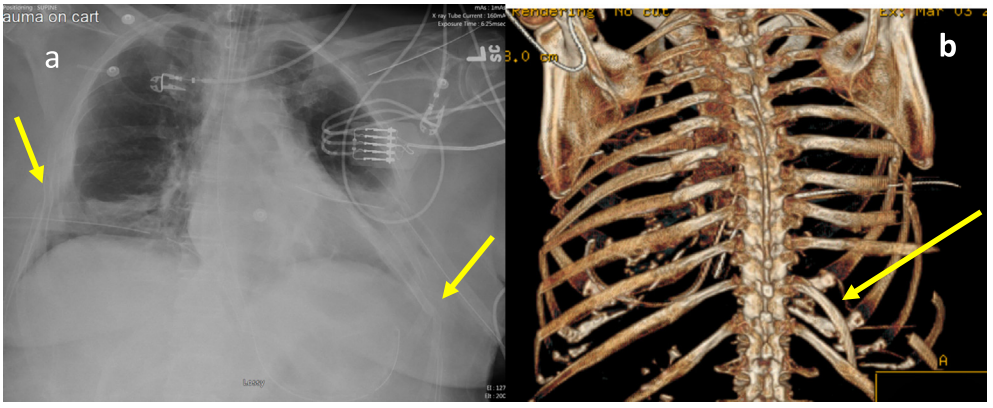

Fig. 1. a Chest X-ray demonstrating severe chest wall deforming (Arrows) and early pulmonary contusions. b 3D reconstruction of chest showing severe deformity on the right with significant angulation of rib 11 (Arrow) and flail segment on the left.

and 12 does not confer additional benefit in terms of either chest wall stability or pain control. In highly select circumstances…repair of these ribs may be considered" [1]. Below, we present one of these rare circumstances where surgical stabilization of rib 11 was necessary.

Case presentation

A 62-year-old female was rammed in the chest and trampled by a bull after falling to the ground. She was initially unconscious and subsequently intubated in the field. Upon arrival to our institution, she was found to have a small subarachnoid hematoma(SAH). She was also noted to have ligamentous injury of her cervical spine, a grade 2 liver laceration and right adrenal hemorrhage. Furthermore, she was found to have a displaced left scapular fracture. Most significantly, she was diagnosed with severely displaced right-sided fractures of ribs 4–12 and left-sided fractures of ribs 3–11 fractures with a flail segment of left-sided ribs 5–7, causing significant chest wall deformity (Fig. 1). Bilateral pulmonary contusions and hemopneumothoraces, for which chest tubes were placed, further complicated this injury. Lastly, the patient's right-sided 11th rib fracture was sharply angulated, piercing through the lung into the retroperitoneum (Fig. 2).

She was subsequently admitted to the intensive care unit(ICU). No surgery was required for either the SAH or cervical ligamentous injury per neurosurgical consultation. Orthopedic surgery was consulted and recommend an arm sling only for the scapular fracture. Given the severity of the patient's rib fractures, including the flail segment and persistent air leak from the right lung, the decision was made to perform bilateral SSRF including rib 11 on the right given its severe deformity.

On hospital day 4, the patient was taken to the operating room(OR) to undergo right-sided SSRF. After placing her in the left lateral decubitus position, a muscle-sparing SSRF was performed preserving the latissimus dorsi and serratus anterior muscles. Upon

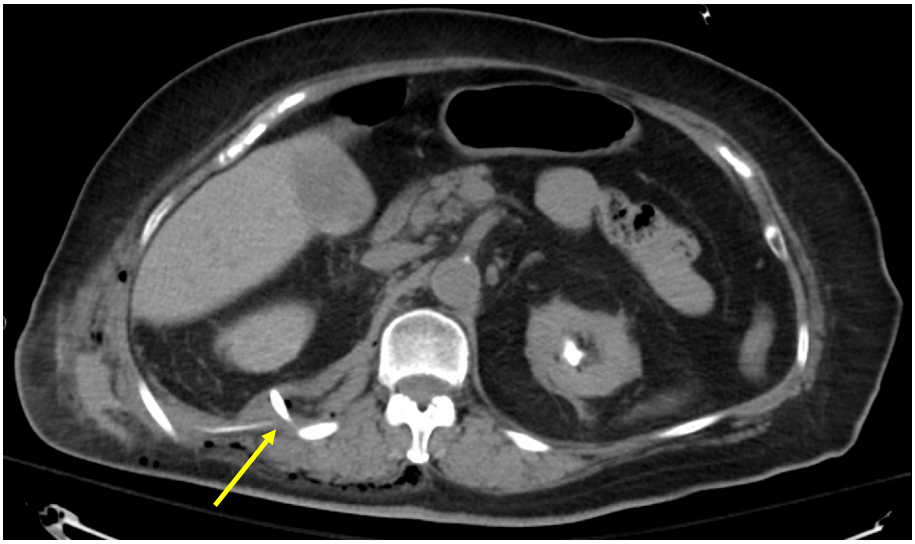

Fig. 2. Axial CT scan of the chest showing severe angulation of rib 11 piercing through the right lower lung lobe into the retroperitoneum (Arrow).