

Thoracic Trauma



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KEYWORDS

- Chest trauma • Thoracic trauma • Pneumothorax • Hemothorax • VATS
- Rib fractures • Pulmonary contusion

KEY POINTS

- Management of chest wall injuries requires multidisciplinary approach highlighted by multimodal pain management and occasionally operative intervention.
- Rib fixation is an evolving field that require additional study to delineate the most appropriate candidates for this therapy.
- Pneumothorax should be treated immediately with tube thoracostomy if tension physiology is present. Otherwise, symptomatic or enlarging pneumothoraces or hemothoraces should be evacuated.
- Retained hemothoraces of more than 300 mL in volume should be preferentially treated with videoassisted thoracoscopic evacuation unless prohibitive operative candidate.
- Tracheobronchial injuries are definitively diagnosed bronchoscopically and should be treated by surgical repair, if possible, after securing the airway.

CHEST WALL INJURY

Chest wall injury is one of the most common in trauma, present in 10% or more of all trauma admissions.¹ It is also a significant marker of mortality, injury severity, and associated injuries.¹⁻³ In isolation, chest wall injury is a powerful predictor of pulmonary deterioration and complications.³⁻⁵ The effect seems to be greatest in older populations with increased ventilator days, and pneumonia and acute respiratory distress syndrome rates compared with younger cohorts with similar injury patterns.⁴⁻⁷

Flail chest, most commonly defined as 3 or more consecutive ribs fractured in multiple locations, can significantly alter chest wall mechanics and result in serious respiratory complications. Flail segments can cause paradoxical chest wall motion, which

Disclosure Statement: The authors have nothing to disclose.

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Surg Clin N Am 97 (2017) 1047–1064

<http://dx.doi.org/10.1016/j.suc.2017.06.009>

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can effect respiratory mechanics throughout the respiratory cycle (**Fig. 1**).⁸ The impact of this injury is significant. More than 80% of patients with flail chests require admission to the intensive care unit (ICU) and nearly 60% will require mechanical ventilation with a 20% tracheostomy rate. The injury has a significant effect on in-hospital complications because 20% will develop pneumonia and up to 7% will develop sepsis.⁹

This diagnosis is suspected in patients with chest wall pain after injury. Crepitus, chest wall asymmetry, paradoxical breathing, and dyspnea are often present. Chest radiographs can identify many rib fractures, particularly significantly displaced fractures. Sternal fractures and nondisplaced rib fractures are often only identified with computed tomography (CT) imaging.

The management of these injuries requires a multidisciplinary approach with 3 primary components: pain management, respiratory therapy, and mobility. Anesthesia, nursing, and respiratory and physical therapy all play significant roles in the successful management of patients with chest wall injury.

Pain management consists of 3 basic categories: nonregional analgesia, regional anesthetics, and surgical fixation. Surgical fixation will be discussed elsewhere in this review. Nonregional analgesia, primarily oral and intravenous analgesics, is often the initial therapy for pain management for mild to moderate chest wall injury. Because of the relative dearth of clinical research in this area, this initial approach is essentially an adaptation of postoperative pain control approaches. Recent emphasis on reducing opioid use has increased the push for multimodal analgesia. Multimodal analgesia is defined as simultaneous use of a combination of analgesics that each have different mechanisms of action and thus target different receptors in the peripheral and/or central nervous system.¹⁰ A recent joint practice guideline from the Eastern Association for the Surgery of Trauma (EAST) and the Trauma Anesthesia Society noted very limited data describing multimodal analgesia in management of blunt thoracic trauma. However, they were able to conditionally recommend the use of

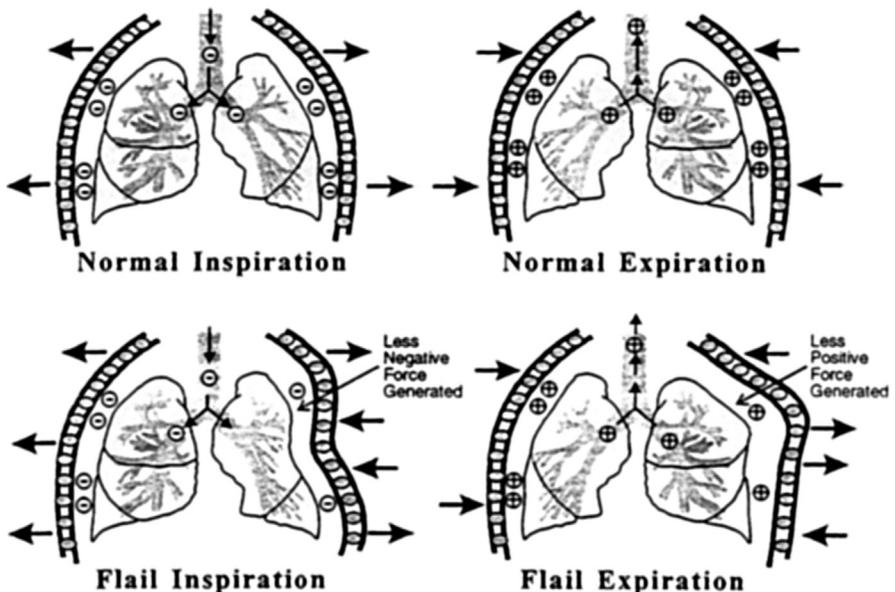


Fig. 1. Flail chest physiology. (From Mayberry JC, Trunkey DD. The fractured rib in chest wall trauma. *Chest Surg Clin N Am* 1997;7(2):253; with permission.)

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