

Critical Decisions in the Management of Thoracic Trauma



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KEYWORDS

• Thoracic trauma • Resuscitation • Resuscitative thoracotomy • POCUS • EFAST

KEY POINTS

- Every trauma patient should undergo a rapid clinical examination to screen for traumatic injuries to the thorax.
- There are several imaging modalities that should be considered in the emergency department, which include ultrasound, plain radiographs, and computed tomography scan. It is important to be aware of the indications and pitfalls of each.
- Many thoracic injuries can be managed nonoperatively. Invasive bedside procedures, such as chest tube placement, are critical skills for all emergency medicine physicians who treat trauma patients.
- Resuscitative thoracotomy is a procedure that should be familiar to the emergency medicine physician and is indicated for select patients following penetrating and blunt trauma.

INTRODUCTION

The initial assessment of any injured patient must proceed expeditiously and in a systematic fashion. Injuries to the thorax are common after both blunt and penetrating trauma and, therefore, all patients who present to the emergency department (ED) after trauma should be screened for thoracic injury according to the Advanced Trauma Life Support (ATLS) protocol.¹ Because chest injury can impact each of the ABCs (Airway, Breathing, and Circulation), a rapid evaluation of the chest is performed early in the evaluation of the injured patient to look for any life-threatening injuries. Non-life-threatening injuries to the thorax are detected as part of the detailed secondary survey.

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HOW DO I MANAGE LIFE-THREATENING THORACIC INJURIES?

In the thorax, immediately life-threatening injuries include tension pneumothorax, massive hemothorax, open pneumothorax from a chest wall defect, and cardiac or great vessel injury. These injuries and their management in the ED are reviewed here.

DECOMPRESSING THE CHEST IN A HYPOTENSIVE PATIENT WITH THORACIC TRAUMA

Although shock in the trauma patient is hemorrhagic until proven otherwise, consideration of a tension pneumothorax should occur with any hypotensive trauma patient. The practical clinical findings associated with tension pneumothoraces include hypotension and tachycardia with poor oxygenation. The classically described absent ipsilateral breath sounds can be difficult to detect in the noisy, chaotic trauma bay, and tracheal deviation may be missed if a cervical collar is in place. Therefore, clinical suspicion should remain high even when breath sounds are equivocal.

If a tension pneumothorax is suspected, the chest should be rapidly decompressed. A chest radiograph (CXR) is unnecessary and potentially harmful if it delays intervention. An ultrasound probe, if readily available in the trauma bay, can be placed on the chest to assess lung sliding, the absence of which is suggestive of pneumothorax. However, tension pneumothorax is a clinical diagnosis, and the clinician should not wait for radiographic confirmation before intervening.

In the classic description of needle decompression, a large-bore angiocatheter is placed into the pleural space at the second intercostal space in the midclavicular line (2IC/MCL). More contemporarily, the fifth intercostal space at the anterior axillary line has been found to yield greater success rates because of decreased chest wall thickness at that site.^{2,3} Needle decompression may fail in up to 58% of cases when performed at the 2IC/MCL position.⁴ Because of this, needle decompression as a means to treat tension pneumothorax should be limited to settings in which finger thoracostomy or chest tube placement is not feasible.

The first portion of tube thoracostomy, in which decompression of the pleural space is achieved by opening the parietal pleura and confirming entry by inserting a finger into the pleural space (referred to by some as a finger thoracostomy), is a better and more reliable means for decompressing the thorax. A scalpel is used to make a 2-cm to 3-cm skin incision in the fourth or fifth intercostal space in the anterior axillary line and then is used to cut through the subcutaneous fat and intercostal muscle. A small cut is made in the pleura and the physician's finger is then used to widen the opening into the pleural space, thereby decompressing the chest. This should take mere seconds to perform and should be followed up with the insertion of a chest tube through the aperture as soon as time and the patient's condition permit. The clinician will know the pleural space has been entered with the evacuation of a gush of air or blood, and the patient's hemodynamics should normalize accordingly. If they do not, another etiology for the patient's altered physiology must immediately be considered. Entering the pleural space under direct visualization with digital confirmation provides visual and tactile feedback that the pleural space has been decompressed. This is not true for needle decompression, in which the absence of air return may simply be a result of the catheter becoming kinked, blocked, or malpositioned.

Which Patients Require Tube Thoracostomy?

Pneumothoraces and hemothoraces causing respiratory or circulatory compromise require drainage by way of chest tube connected to a closed suction system and underwater seal. A large hemothorax can present with absent breath sounds, poor oxygenation, or hypotension, but is more typically detected on supine CXR by

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