

Thoracic Trauma

Which Chest Tube When and Where?



Tamas F. Molnar, MD, PhD, DSc, FETS^{a,b,*}

KEYWORDS

• Chest trauma • Traumatic hemo/pneumothorax • Emergency surgery • Mass casualty • Triage

KEY POINTS

- Penetrating and blunt trauma (with or without rib fracture) needs different tactics according to mechanism of injury.
- Selective conservatism and drainage surmounted pleural space control are dominating optimally invasive chest trauma management.
- Massive bleeding and/or trapped intrapleural air causing high intrathoracic pressure are the 2 main catastrophic but potentially survivable events, in which decompression by a drain offers a simple and efficient solution in 90% to 95% of all cases.
- Many failed but still existing dogmas and misunderstandings surrounding hemo/pneumothorax, ill interpretation of “horror vacui pleurae,” prevents a more proactive surgical attitude toward this method among nonthoracic surgeons and allied specialists.
- Experience-based convictions and received wisdom prevails as only a limited number of statistically controlled evidence exists.

INTRODUCTION

Life is really simple, but we insist on making it complicated (Confucius).

Only a few life-threatening conditions in trauma surgery are potentially manageable by a simple and straightforward intervention with a good chance of success. Chest drainage, the release of murderously high intrapleural pressure caused by accumulated and trapped blood (hemothorax) and/or air (pneumothorax) is just that sort of minor surgery offering a dramatic effect. In spite of the uncomplicated clinical picture of tension hemo/pneumothorax, the uncomplicated decision making and the simplicity of the procedure, missed/failed pleural decompression might be responsible for up to 33% of the preventable

fatalities typically in combat and in a lesser but increasing degree in civilian environments.^{1,2} Changing urban criminal/terrorist action injury profiles^{3,4} and challenges of mass casualty care and disaster medical management equally warrant a more focused analysis of the seemingly simple and frequently neglected intervention of chest drainage. The rapid clinical decline caused by the compression of the underlying lung and mediastinum with profuse bleeding highlights the importance of the prehospital care and/or first medical responder treatment of these patients. However, chest injury is only an element of a complex severe clinical scenario in a good number of serious cases. Approximately 60% of multi/polytrauma patients suffer chest trauma

Disclosure Statement: The author has nothing to disclose.

^a Department of Operational Medicine, Faculty of Medicine, University of Pécs, H7622 Pécs, Szegedi út 12, Hungary; ^b Thoracic Surgery Unit, Department of Surgery, Aladar Petz Teaching Hospital, H9032 Győr, Vasvari Pál utca 2-4, Hungary

* H.7625 Magaslati u 35 II.8, Pécs, Hungary.

E-mail address: tfmolnar@gmail.com

Thorac Surg Clin 27 (2017) 13–23

<http://dx.doi.org/10.1016/j.thorsurg.2016.08.003>

1547-4127/17/© 2016 Elsevier Inc. All rights reserved.

among other injuries.⁵ Thoracic injury is responsible for the death in 1 of 4 or 5 fatalities. Quick and efficient control of the pleural space by drainage plays a double role in the context of current resuscitation concept (CBABC) at least in military trauma paradigm⁶ by removing intrapleural blood (Catastrophic Bleeding) and relieving compromised breathing (B) at the same time. The evidence-based scientific approach of the state of art in hemo/pneumothorax is not a trouble-free zone due to a practically complete lack of externally controlled data. The literature is rich in audit-style retrospective reports in which the results with chest drainage for trauma cases are described and discussed.^{7,8} However, as usual, the devil lurks in the particulars. What insertion technique using what type and size of drain, followed by which tactics of suction treatment; these questions are considered scientifically irrelevant, too down-to-earth details, and therefore remain unreported. Chest drainage is the Cinderella in the shadow of heroic surgeries of major torso trauma. Autoreflective reports present the success of their own method, which is excellent. Publications are ruled by an extremely high success rate: 90% to 95% of all penetrating chest wound cases are treated exclusively by intercostal chest drains (ICDs).^{9,10} In fact, no more than 18% to 22% of all injuries involving the thorax require chest drainage for pneumo/hemothorax and approximately 1 in 10 to 14 initially drained patients has to undergo major thoracic surgery.⁵ Sixty percent to 75% of all chest drainages are performed for penetrating injuries. Distribution of hemothorax and pneumothorax as indications are roughly equal, whereas the last third of the group consists of the combined, that is, hemopneumothorax cases.¹⁰

Acute trauma-related pleural space management by chest drains is a field of received wisdom, in which the basic principles are neither questioned nor investigated in full depth. The present article is the result of an attempt of a structured review of the problems and of the annotated listing of the orthodox solutions rather than an analysis of nonexistent evidence.

A distillate of personal experience of 30 years filtered through the recent literature on chest drainage in trauma is presented. Other articles in this issue should be consulted especially where retained hemothorax and primary thoracic empyema¹¹ are concerned. Chest trauma is discussed “per se,” as an acute event; therefore, the role of chest drainage in treatment of sequelae and consequences of thoracic injuries is not discussed here.

SURGICAL TECHNIQUE

Rudyard Kipling delineated the framework of the discussion of chest drainage technicalities in trauma. “I keep six honest serving-men. They taught me all I knew. Their names are What and Why and When and How and Where and Who.”¹² The only modification required is the rearrangement of the names into a when-why-where-what-how-who sequence, as art of surgery has a different logic from poetry.

When

One of the beauties of chest drainage in thoracic trauma is that the decision-making process does not contain a lot of steps: in extremis no imaging is needed at all before the procedure. Vast clinical experience teaches that physical examination has an utmost importance here.^{7,9,13}

Chest drainage should be performed immediately whenever the serious suspicion of tension pneumothorax or massive hemothorax^{5,14} is aroused based on clinical signs in a patient who has shortness of breath or is simply hypoxic. The clinical signs are as follows: decreased deflection on one side of the chest cage, no or minimal breathing sounds are audible on the affected side, drumlike sounds with percussion in case of pneumothorax and dullness for hemothorax, and the trachea palpated in the sternal notch is pressed to the opposite side. Pulse oximetry can provide adjunctive informations, just like extended focused assessment sonography in trauma (e-FAST). Level 2 recommendation supports the use of e-FAST in chest trauma.¹⁵ Chest radiograph (CXR), the oldest imaging method of diagnosing pneumo/hemothorax has a reported disappointing sensitivity of less than 50%.¹⁶ Excluding occult and minimal (<10%) pneumothorax and if only significant pneumothoraces are counted, then this value is significantly higher. Computed tomography (CT) has a near 100% sensitivity, but it is far from being the optimal diagnostic tool in unstable patients. e-FAST has a sensitivity of 77% for pneumothorax with a negative predictive factor just below 100%.¹⁷

Why

Mechanism of injury: that is, blunt versus penetrating trauma, dictates different surgical decision making. Generally speaking, penetrating injuries entering the pleural space nearly always call for a chest drain, with 2 exceptions. On one hand, there are those penetrating, usually impaled injuries, that are obvious straightforward thoracotomy cases (see later in this article) without prior

Download English Version:

<https://daneshyari.com/en/article/5725484>

Download Persian Version:

<https://daneshyari.com/article/5725484>

[Daneshyari.com](https://daneshyari.com)