



Critique of 'Management of post-traumatic retained hemothorax: A prospective, observational, multicenter AAST study'[☆]

Rahma Salim, Mazin A. Tuma*, Rifat Latifi, Hassan Al Thani

ABSTRACT

Background: The natural history and optimal management of retained hemothorax (RH) after chest tube placement is unknown. The intent of our study was to determine practice patterns used and identify independent predictors of the need for thoracotomy.

Methods: An American Association for the Surgery of Trauma multicenter prospective observational trial was conducted, enrolling patients with placement of chest tube within 24 h of trauma admission and RH on subsequent computed tomography of the chest. Demographics, interventions, and outcomes were analyzed. Logistic regression analysis was used to identify the independent predictors of successful intervention for each of the management choices chosen and complications.

Results: RH was identified in 328 patients from 20 centers. Video-assisted thoracoscopy (VATS) was the most commonly used initial procedure in 33.5%, but 26.5% required two and 5.4% required three procedures to clear RH or subsequent empyema. Thoracotomy was ultimately required in 20.4%. The strongest independent predictor of successful observation was estimated volume of RH ≤ 300 cc (odds ratio [OR], 3.7 [2.0–7.0]; $p < 0.001$). Independent predictors of successful VATS as definitive treatment were absence of an associated diaphragm injury (OR, 4.7 [1.6–13.7]; $p = 0.005$), use of perioperative antibiotics for thoracostomy placement (OR, 3.3 [1.2–9.0]; $p = 0.023$), and volume of RH ≤ 900 cc (OR, 3.9 [1.4–13.2]; $p = 0.03$). No relationship between timing of VATS and success rate was identified. Independent predictors of the need for thoracotomy included diaphragm injury (OR, 4.9 [2.4–9.9]; $p < 0.001$), RH > 900 cc (OR, 3.2 [1.4–7.5]; $p = 0.007$), and failure to give perioperative antibiotics for initial chest tube placement (OR 2.3 [1.2–4.6]; $p = 0.015$). The overall empyema and pneumonia rates for RH patients were 26.8% and 19.5%, respectively.

Conclusion: RH in trauma is associated with high rates of empyema and pneumonia. VATS can be performed with high success rates, although optimal timing is unknown. Approximately, 25% of patients require at least two procedures to effectively clear RH or subsequent pleural space infections and 20.4% require thoracotomy.

Trauma Surgery Section/Department of Surgery, Hamad Medical Corporation, Doha, Qatar

*Corresponding author. Email: mazin615@yahoo.com

[☆]Critique of: Joseph DuBose et al. Management of post-traumatic retained hemothorax: A prospective, observational, multicenter AAST study J Trauma Volume 72, Number 1 January 2012.

<http://dx.doi.org/10.5339/jemtac.2012.11>

Published: 12 June 2012
© 2012 Salim et al., licensee Bloomsbury Qatar Foundation Journals. This is an open access article distributed under the terms of the Creative Commons Attribution License CC BY 3.0 which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

COMMENTARY

Hemo and pneumothorax are major consequences of chest injuries and are very common in trauma practice. While the initial management of most post-trauma hemothorax is chest tube drainage [1], the management of subsequent retained hemothorax (RH) and the predictors of success of such management are not clear. In an attempt to answer these questions, the American Association of Trauma Surgery (AAST) conducted a prospective observational trial in 20 trauma centers across North and South America. Three hundred and twenty-eight patients who developed a retained hemothorax following chest tube placement within the first 24 h after trauma admission were studied. All patients had a CT scan for diagnosis [2].

This is an important study as it emphasizes that most of the blunt trauma related to retained hemothorax can be successfully treated non-operatively, and video-assisted thoracoscopy (VATS) is the most widely accepted treatment in case of failure of conservative treatment. In addition, this paper re-emphasizes the importance of peri-procedural antibiotic use before chest tube insertion.

Most patients successfully treated non-operatively were patients with blunt trauma (37.3% vs. 55.7%, $p_{o.004}$). This finding is important as most cases of retained hemothorax worldwide are caused by blunt trauma. In our trauma center at the Hamad Medical Corporation, more than 95% of chest injuries are caused by blunt trauma as per our data registry. The study also importantly highlighted that non-operative management was more successful in patients treated initially with larger chest tubes > 34 Fr size (40.3% vs. 55.5%, $p_{o.02}$). This issue however is a controversial one. In a recent study, chest tube size did not impact the efficacy of drainage, rate of complications (including retained hemothorax), need for additional tube drainage, or invasive procedures [3].

Despite all these findings, as with any other multi-center study where various factors are difficult to control, this study was not without limitations. Firstly, the total number of patients who required chest tubes during the study period is unclear. Secondly, the true incidence of RH is not known. Despite the fact that CT scans are better in predicting the need for thoracoscopic evacuation of RH than chest x-rays [4], this exposes the patient, perhaps, to unnecessary radiation, in addition many trauma surgeons worldwide do not request CT scans in such cases. The justification for a CT scan is therefore necessary to outline whether this was performed for chest evaluation or for other reasons.

Another major element of concern in this study was the high frequency of empyema despite the fact that 65.5% of chest tubes were placed in the trauma room. This could be explained by two factors. Firstly, only 40.6% of patients were reported as having antibiotics at the time of chest tube insertion, and secondly, during placement of chest tubes in emergency settings, some of the sterile technique principles may have been breached. Overall, however, this is an important study that will impact the way both initial hemothorax and subsequently retained hemothorax in patients with blunt trauma are managed.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest

References

- [1] ATLS Student Course Manual Eighth Edition 2008.
- [2] Joseph DuBose et al. Management of post-traumatic retained hemothorax: a prospective, observational, multicenter AAST study. *J Trauma*. 2012 Jan;72:1.
- [3] Inaba Kenji et al. Does size matter? A prospective analysis of 28–32 versus 36–40 French chest tube size in trauma. *Journal of Trauma and Acute Care Surgery*. 2012 Feb;72:2, 422–427.
- [4] Velmahos G.C. Predicting the need for thoracoscopic evacuation of residual traumatic hemothorax: chest radiograph is insufficient. *J Trauma*. 1999 Jan;46:1, 65–70.