

Large or Small: An Analysis of Chest Tube Size Selection for the Management of Traumatic Hemothorax

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Introduction

- Chest tubes are the standard of care for management of traumatic hemothorax and hemopneumothorax.
- Pigtail catheters (14 Fr) are a less invasive treatment option compared to large bore chest tests.
- Previous studies have compared the efficacy of small bore pigtail catheters versus large bore chest tubes with no significant differences found in outcomes based on size.
- Few guidelines exist to help physicians select the optimal chest tube size.

Objective

To evaluate provider practice patterns of chest tube sizes for patients with chest trauma.

Methods

- Retrospective Chart Review:** Small bore (<19 Fr) vs. Large bore (>20 Fr) thoracostomy tubes.
- Inclusion:** Consecutive adult patients who underwent tube thoracostomy for traumatic hemothorax or hemopneumothorax at an urban Level 1 Trauma Center from January 2016 to December 2021.
- Primary Outcomes:** Indication for chest tube placement based on injury pattern including mechanism of injury (MOI), injury severity score (ISS), and abbreviated injury scale (AIS).
- Secondary Outcomes:** Retained hemothorax, insertion related complications, and duration of chest tube placement.
- Univariate analyses were performed.

Results

- 352 patients were included in the study, with 86.9% of patients (n=306/352) receiving large bore chest tubes.

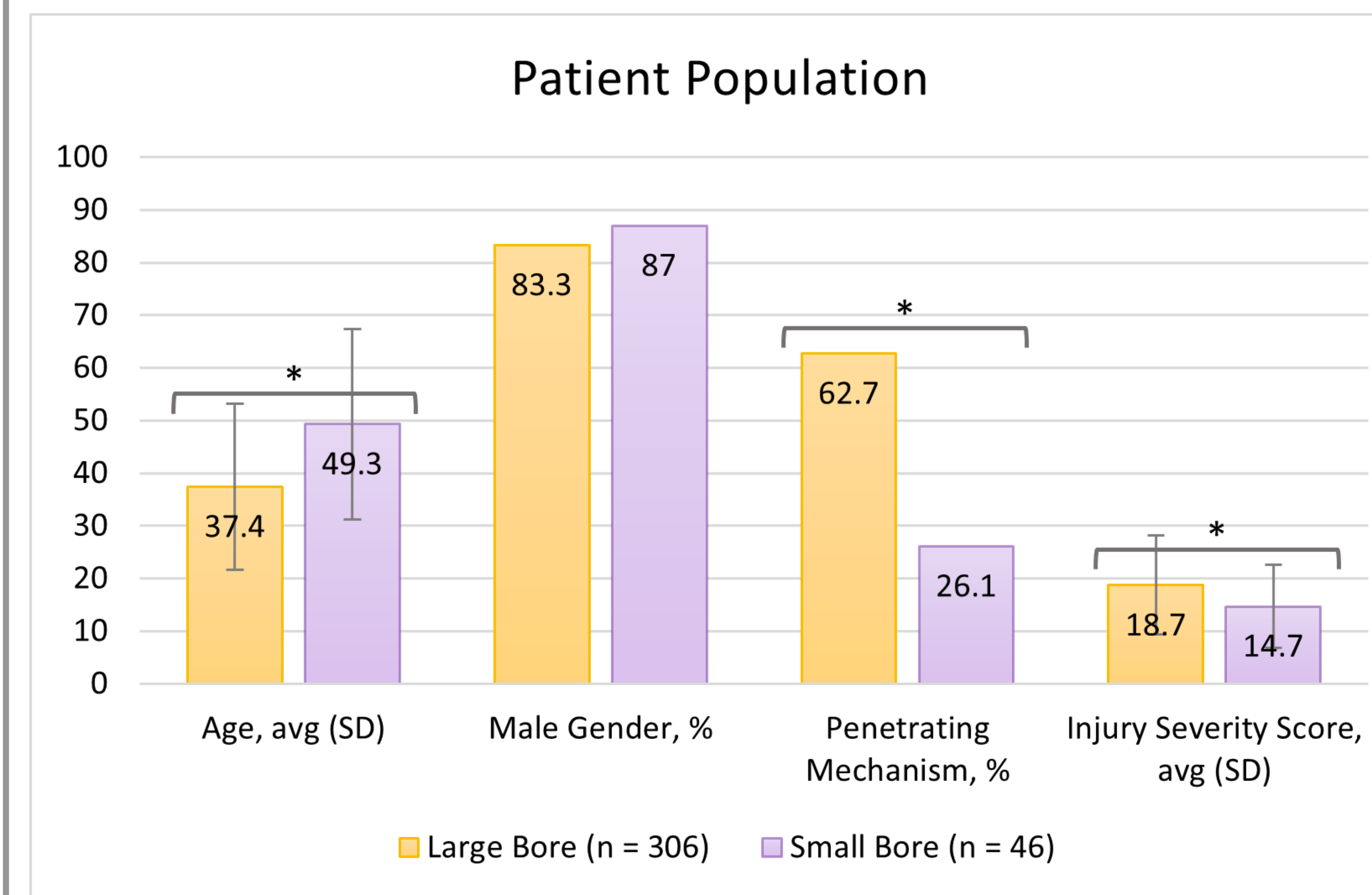


Figure 1. Patient demographics. Asterisk represents significant difference ($p < 0.05$).

Demographics

- Large bore chest tubes were more frequently placed in...
 - Younger patients (37.4 +/- 15.7 vs. 49.3 +/- 18.1 years old, $p < 0.0001$)
 - Patients with penetrating MOI (n=192/306, 62.7% vs n=12/46, 26.1%, $p < 0.0001$)
 - Patients with higher average ISS (18.7 +/- 9.4 vs 14.7 +/- 7.9, $p = 0.006$).

Outcomes

- Patients who received a large bore chest tube had a higher incidence of retained hemothorax (n=108/306, 35.3% vs n=7/46, 15.2%, $p = 0.01$).
- No significant differences were found between the pigtail and chest tube groups with respect to insertion-related complications, chest tube duration, need for an additional chest tube, surgery for retained hemothorax, and hospital length of stay ($p > 0.05$).

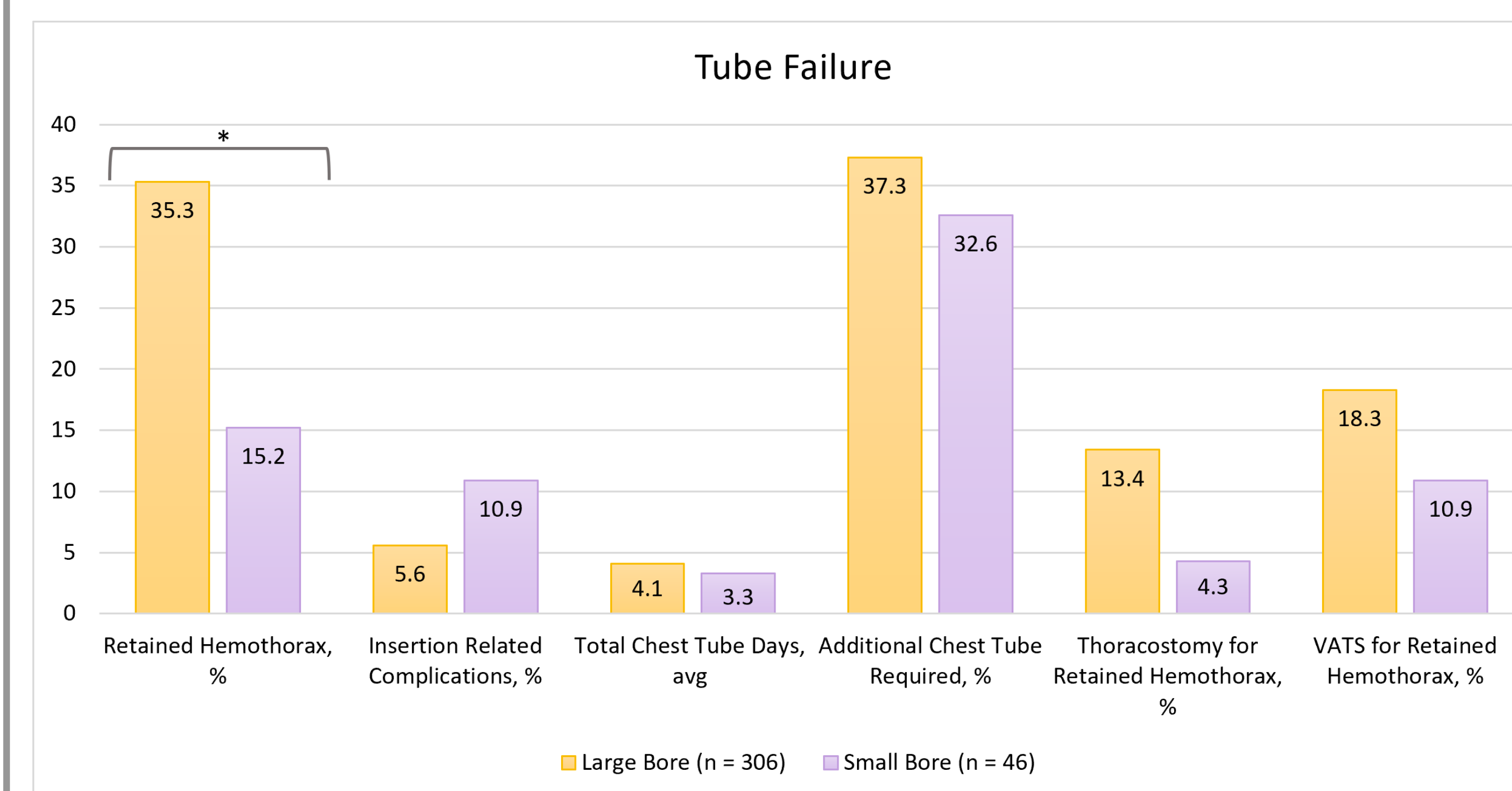


Figure 2. Retained hemothorax (%), insertion related complications (%), total chest tube days (avg), additional chest tube required (%), thoracostomy or retained hemothorax (%), and VATS for retained hemothorax (%) shown in patients who received large bore (>20 Fr) vs. small bore (<19 Fr) thoracostomy tubes. Asterisk represents significant difference ($p < 0.05$).

Summary

- This study found a higher portion of large bore chest tubes still being placed, in particular for younger patients with penetrating trauma and more severe injuries.
- While patients who received large bore chest tubes showed higher incidence of retained hemothorax, no significant differences were found in overall hospital course and no benefit to improve the incidence of retained hemothorax.

Future Directions/Conclusions

- Evidence based guidelines are needed to help providers determine the optimal size chest tube to place.

References

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