A Novel Chest Tube Device Improves Technique With Ease of Use, Faster Insertion Times, and Shorter Skin Incisions

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Nicole Vetter, MD
University of Connecticut

Objectives: To compare a minimally invasive chest tube insertion device called the Reactor™ by Sharp Medical Products (SMP-R) with the traditional open technique (OT) of tube thoracostomy using three variables: subjective level of difficulty, time to chest tube insertion, and skin incision length.

Methods: Emergency medicine residents (PGY-2/PGY-3, N = 21) participated placing chest tubes through a porcine rib model. Each resident performed two trials with each technique (SMP-R and OT) in a randomized order. Data were collected on a single day in June 2016 at an urban academic hospital. In preparation, participants watched a five-minute instructional video of the SMP-R and were allowed a practice trial to familiarize themselves with the device. Research personnel recorded time to chest tube insertion (measured from time of skin incision to passage of the tube through ribs) and length of skin incision. Residents reported a subjective level of difficulty for each trial on a scale of 1-10. Residents also provided their experience (based on number of chest tubes placed) and confidence on a 1-10 scale with chest tube insertion. Averages for the two trials on each measure were calculated and compared using the Wilcoxon Signed Rank test. Effect of residency year, first device used, and reported experience and confidence were also analyzed with Wilcoxon Signed Rank test and Spearman correlations.

Results: Data from the SMP-R trials resulted in a statistically significant difference from the OT trials. Chest tube insertion with the SMP-R showed lower ratings of difficulty (2.0 v 3.0, p = 0.006), faster insertion times (10sec v 17sec, p = 0.001), and shorter skin incisions (28mm v 31mm, p = 0.019). None of the resident attributes (year, first device, confidence, experience) had a significant effect on the main outcomes.

Conclusion: Use of the SMP-R device improves chest tube insertion among emergency medicine residents with its ease of use, faster time to chest tube insertion, and shorter length of incision when compared to the traditional tube thoracostomy technique.