Evaluation of a novel thoracic entry device versus needle decompression in a tension pneumothorax swine model.

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INTRODUCTION:
Tension pneumothorax (tPTX) remains a major cause of preventable death in trauma. Needle decompression (ND) has up to a 60% failure rate. American Journal of Surgery, January 2018.

DEFINITION: BTW (Bladed trocar with 36FR cannula) and BTWO (bladed trocar alone) refer to the Reactor™ chest tube insertion device from Sharp Medical Products, LLC.

METHODS:
Post-mortem swine used. Interventions were randomized to 14G-needle decompression (ND, n = 25), bladed trocar with 36Fr cannula (BTW, n = 16), bladed trocar alone (BTWO, n = 16) and surgical thoracostomy (ST = 11). Simulated tPTX was created to a pressure (p) of 20 mmHg.

RESULTS:
Success (p < 5 mmHg by 120 s) was seen in 41 of 68 (60%) interventions. BTW and BTWO were consistently more successful than ND with success rates of 88% versus 48% in ND (p < .001). In successful deployments, ND was slower to reach p < 5 mmHg, average of 82s versus 26s and 28s for BTW and BTWO respectively (p < .001). Time to implement procedure was faster for ND with an average of 3.6s versus 16.9s and 15.3s in the BTW and BTWO (p < .001). Final pressure was significantly less in BTW and BTWO at 1.7 mmHg versus 7 mmHg in ND animals (p < .001).

CONCLUSION:
Bladed trocars can safely and effectively tPTX with a significantly higher success rates than needle decompression.