

Prehospital Needle Decompression Patient Outcomes



Harrison Travis; Gilbert Andry; Colin Rutner MD; Elizabeth Lacy; Kaleb Derouen; Alison Smith, MD, PhD; Patrick Greiffenstein, MD

Background

- Tension pneumothoraces (TPT) identified in the prehospital setting require prompt prehospital needle decompression (PHND) and can be done by trained emergency medical services (EMS) providers
- TPT rely on clinical suspicion for diagnosis and PHND is not without risk
- EMS protocols changed in 2016, no longer requiring physician orders to preform PHND
- Patients who received PHND are also likely to receive tube thoracostomy in the hospital, which also carries additional risks
- The aim of this study was to determine the incidence of complications from PHND when it was performed in patients lacking at least one clinical criterion

Methods

- A retrospective, single-center chart review was performed of all adult trauma patients undergoing pre-hospital needle decompression (PHND) from 2016 through 2022 at an urban Level 1 trauma center
- The charts of patients who received PHND but lacked at least one clinical criterion for PHND per state EMS protocols were reviewed
- Prehospital criteria include:
 1. Cardiac arrest
 2. Systolic blood pressure (SBP) <90 mmHg
 3. Heart rate (HR) > 120
 4. Respiratory rate >29
- Patient demographics, procedures, complications, and clinical outcomes including length of stay (LOS) were recorded

Results

- A total of 273 patients underwent PHND, with prehospital cardiac arrest accounting for 157 (57.5%, 157/273) patients
- A total of 114 patients were included, and we identified 87 (76.3%, 87/114) who did not meet at least one clinical criterion
- The majority of patients in this cohort (88.5%, n=77/87) required a chest tube and 28.6% (n=22/77) may have had an iatrogenic pneumothorax from PHND
- Approximately 5.7% (5/87) of patients were admitted as a consequence of pneumothorax caused by PHND with an avg LOS of 2.8 Days (+/-1.3) among this cohort
- Additionally, there were 3 vascular injuries in this population due directly to PHND that required emergency operative repair

Conclusion

This study shows the negative consequences of PHND when performed without clear indications. Several patients underwent unnecessary procedures with significant clinical consequences. Future efforts should focus on refining prehospital protocols and appropriate training of prehospital emergency personnel.