



PNEUMERIC

Why Capnospot®

Small. Lightweight. Lifesaving.

Decompression of tension pneumothorax via needle thoracostomy is lifesaving, with pre-hospital decompression reducing 24-hour mortality rates by 25%.⁽¹⁾

With the potential to improve decompression rates, reduce the number of procedures, and reduce wasted procedures and costs⁽⁴⁾, Capnospot® eliminates the guesswork of accurate thoracostomy and lets you know you are in.



The Problem

The current method of judging needle decompression success using a “gush of air” and clinical signs are subjective. Capnospot® indicates if the decompression is non-therapeutic, or if the catheter loses patency, it will revert to its original color⁽⁴⁾.



Confidence

Even well-trained providers with correct equipment have needle thoracostomy failure rates of 10–50%^(2,3). More accurate than the current standard of care⁽⁴⁾, Capnospot® provides objective visual confirmation of decompression success or failure by using nearly instant (<5 seconds)⁽⁴⁾ color change, ideal for noisy pre-hospital environments.

Versatility

Small, lightweight, and compact, Capnospot® is compatible with all decompression devices and functions in low-light environments.



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2. J. M. Aho, C. A. Thiels, M. M. El Khatib, D. S. Uhl, D. V Laan, K. S. Berns, E. B. Habermann, S. P. Zietlow, M. D. Zielinski, Needle thoracostomy: Clinical effectiveness is improved using a longer angiocatheter., J. Trauma Acute Care Surg. 80, 272-7 (2016).
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Tension Pneumothorax Decompression with Needle Thoracostomy Colorimetric Capnography

Background

Tension pneumothoraces comprise a mixture of respired gases at pressures higher than atmospheric and arise from air leaks within the respiratory system. Increasing volume of the pneumothorax increases intrathoracic pressure relative to cardiac filling pressures in the right atrium, leading to inflow failure, subsequent outflow failure, and eventual cardiopulmonary decompensation and death.

Rapid decompression of tension pneumothorax, via needle thoracostomy (NT), is a lifesaving maneuver allowing intrathoracic and atmospheric pressure equilibration and restoration of cardiac filling. While the technique appears simple, the data regarding the efficacy of needle decompression is controversial. Even if all the major variable factors such as chest wall thickness, anatomic location, optimal rigidity of the decompression catheter, and catheter length are accounted for, it remains difficult for field providers to rapidly confirm therapeutic decompression.

Original guidelines recommend operators utilize auditory cues for a “gush of air” and to assess for improvements in vital signs and cardiorespiratory function in an austere loud prehospital environment which is often impossible.

Detection and visual recognition of respired gases during decompression is a simple method for improving needle thoracostomy. The gaseous composition of the tension pneumothorax is similar to that of endrespiratory gas, with an increased partial pressure of carbon dioxide when compared to the normal atmosphere, which makes colorimetric capnography an ideal confirmatory test.

The Advanced Approach

The Capnospot® is based on colorimetric capnography and removes the subjectivity of correct needle thoracostomy placement. The device provides immediate, rapid and accurate confirmation of success or failure of placement and aids to decrease the rate of mortality in prehospital situations.

The effectiveness of Capnospot is backed by a study that generated and utilized a swine model of penetrating thoracic trauma to model tension pneumothorax physiology. The test demonstrated that by incorporating colorimetric capnography into the decompression device, needle thoracostomy led to improved success rates of decompression and earlier detection of success compared to currently used standard of care metrics. Additionally, we have conducted man pilot studies which demonstrate similar results in trauma patients. Pneumeric, Inc. has exclusively licensed the technology from Mayo Clinic and received FDA clearance along with a superiority claim.

Updated Guidelines

New guidelines published by NAEMSP in November 2024 for prehospital chest decompression for tension pneumothorax state that “When within scope of practice, EMS clinicians should use needle thoracostomy as the primary strategy for pleural decompression of tension pneumothorax...” and “EMS systems must investigate and adopt strategies to confirm successful pleural decompression at the time thoracostomy is performed.”

The only approach that addresses these NAEMSP recommendations is the Capnospot® Pneumothorax Decompression Indicator.

