

Needle Thoracostomy

I. Introduction

Needle decompression is necessary when a patient exhibits signs and symptoms of a tension pneumothorax accompanied by extreme respiratory distress. It is a rare procedure but when used it may restore ventilation. A tension pneumothorax must be recognized and treated promptly. The indications and technique must be clearly documented whenever it is used.

II. Signs and Symptoms

A. Classic Tension Pneumothorax Signs and Symptoms

1. Progressive severe respiratory distress, tachypnea
2. Hypotension
3. JVD - jugular venous distention
4. Absent breath sounds on affected side
5. Signs and symptoms of shock
6. If patient intubated - increasing difficulty with ventilation
7. Hypoxia

B. Additional Tension Pneumothorax Signs and Symptoms

1. "Drum-like" percussion noted on affected side
2. Tracheal shift away from affected side
3. Hyperexpanded chest on affected side
4. Cyanosis
5. Narrowing pulse pressure
6. Tachycardia

III. Precautions

- A. Tension pneumothorax may occur as a complication of CPR or positive pressure ventilation.
- B. Misplacement of an endotracheal tube, i.e. right mainstem placement, may lead to asymmetry or absent breath sounds and can be mistaken for a left pneumothorax.
- C. Pulmonary contusion or simple pneumothorax have similar symptoms and occur more commonly than a tension pneumothorax.

IV. Indications

- A. The presence of a tension pneumothorax as evidenced by signs and symptoms consistent with tension pneumothorax.
- B. Consider performing bilateral needle thoracostomy on trauma patients in cardiac arrest, or in imminent pre-arrest states on a patient with chest injury where tension pneumothorax may be present.

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- C. If tension pneumothorax is present and needle thoracostomy is indicated, proceed to the procedure as rapidly as possible.

V. Procedure

- A. Determine if need for needle decompression of the chest exists
- B. Ensure that basic life support is being continued, i.e., airway management, hemorrhage control, etc.
- C. Assemble necessary equipment:
 - angiocath - 16g or larger
 - alcohol wipes or betadine
 - flutter valve or finger of rubber glove
 - tape
- D. Take Universal Precautions, including eye protection
- E. Expose entire chest
- F. Clean chest vigorously with alcohol or betadine
- G. Locate mid-clavicular line second intercostal space, on affected side
- H. In trauma cardiac arrest cases, perform bilateral needle thoracostomies in mid-clavicular line, second intercostal space
- I. Insert the angiocath so that it touches the upper margin of the rib, then slide it over the top of the rib into the second intercostal space. Attach flutter valve or rubber glove fingertip to the angiocath.
- J. Remove needle and advance catheter
- K. Tape securely
- L. Monitor patient and reassess for improvement frequently. May need to repeat procedure if catheter becomes kinked or occluded
- M. Properly document the procedure on the first care form

VI. Special Considerations and Complications

- A. Creation of pneumothorax if none existed
- B. Laceration of lung
- C. Laceration of blood vessels. Blood vessels run in a groove under each rib
- D. Infection. Clean site rapidly but vigorously. Use sterile gloves if possible
- E. Be prepared to intubate, if patient condition deteriorates
- F. Injury to heart or great vessels if needle is inserted too low
- G. An alternative needle thoracostomy site may include the fifth intercostal space, mid-axillary line. Caution should be exercised in the later stages of pregnancy

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when a higher (3rd) intercostal space should be used to avoid injury to the liver or spleen.

- H. Tube Thoracostomy will be needed if needle thoracostomy is performed.
- I. Penetrating wound to the chest alone should not be an indication for needle Thoracostomy.
- J. Sucking chest wound should be sealed, and released if signs of tension pneumothorax develop.
- K. Decreased or absent breath sounds, subcutaneous emphysema, or low pulse oximeter reading in a stable patient is not an indication for a needle thoracostomy.