NEEDLE THORACOSTOMY: ADULT / ADOLESCENT

INDICATION:

Decompression of tension pneumothorax causing hemodynamic instability in a chest injury victim.

IMPORTANT: absence of breath sounds and/or shortness of breath alone are not sufficient to indicate a tension pneumothorax. Any of the signs and symptoms listed below must be associated with at least hypoxia **OR** hemodynamic instability to justify a needle thoracostomy.

SIGNS AND SYMPTOMS OF TENSION PNEUMOTHORAX CAUSING HEMODYNAMIC INSTABILITY:

Signs include:

- Chest injury, either blunt or penetrating (often with flail chest, palpable subcutaneous air, or "sucking" chest wound on side of suspected pneumothorax).
- Absence of breath sounds on the side of the suspected pneumothorax (if breathing); while presence of breath sounds on side without pneumothorax.
- Distended neck veins.
- Circulatory collapse, manifested by hypotension or signs of poor perfusion
- Respiratory arrest

Symptoms include:

- Progressive dyspnea (shortness of breath)

EQUIPMENT:

- 3.25 inch ARS chest decompression needle (10 G, catheter over needle); or 14 G, minimum 2.5 inch catheter over needle
- Antiseptic skin wipes
- Sterile Vaseline gauze or 4" X 4" dressings and tape

PROCEDURAL GUIDELINES:

- Base Contact (if in the setting of an MCI, remote rescue, or tactically unstable scene proceed without base contact and document).
- Explain procedure to patient if conscious.
- ~~Assemble equipment:~~
- ~~Identify second intercostal space, midclavicular line.~~ Select one of two insertion sites based on body habitus, choosing an area with the least soft-tissue depth and easiest access
- :
    - Between second and third intercostal space, midclavicular line, OR
    - Between the fourth and fifth intercostal space, anterior axillary line

Special consideration: Pregnant patients should have the procedure performed between the third and fourth intercostal spaces in the anterior axillary line

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- Prepare site with sterile skin wipe.
- Insert needle usingNeedle insertion using steady pressure and ninety degree angle (perpendicular) to chest wall in lower aspect of the second intercostal space within the midclavicular line.
- Advance needle until one of the following are recognizedUpon advancing the needle, one of the following should be recognized:
  - A sudden rush of air is expelled through the needle
  - A "popping" or "giving way" is felt as the tip of the needle enters the chest cavity
  - Blood or fluid is expelled through the needle
- Remove needle and leave catheter in place (do not reinsert needle into catheter due to risk of shearing apart plastic catheter). Upon removing the needle, leave the catheter in place and do not reinsert the needle due to catheter shearing risk.
- Secure catheter with Vaseline gauze alone or 4" X 4" dressing and tape.
- Assess and document any improvement in respiratory status and hemodynamic status.

DOCUMENTATION

- Indication for procedure
- Site selected for placement
- Number of attempts
- Outcome of placement (i.e respiratory status, hemodynamic status)

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ANTERIOR AXILLARY
Avg depth 3.42cm
(2.82-4.05)

MID CLAVICULAR
Avg depth: 4.28cm
(3.9-4.7)

Laan D V., Vu TDN, Thiels CA, et al. Chest wall thickness and decompression failure: A systematic review and meta-analysis comparing anatomic locations in needle thoracostomy. Injury. 2015:14–16.

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INDICATION:
Decompression of tension pneumothorax causing hemodynamic instability in a pediatric chest injury victim.

SIGNS AND SYMPTOMS OF TENSION PNEUMOTHORAX:

Signs include:

- Chest injury, either blunt or penetrating (often with flail chest, palpable subcutaneous air, or "sucking" chest wound on side of suspected pneumothorax).
- Absence of breath sounds on the side of the suspected pneumothorax (if breathing); with presence of breath sounds on side without pneumothorax.

Symptoms include:

- Progressive dyspnea or respiratory arrest
- Poor perfusion and altered mental status.

EQUIPMENT

- o 1.25 inch, 16 gauge catheter over needle if estimated weight 40 Kg (90 lbs) or less , use adult decompress ion needle (minimum 2.5 inch length) if estimated weight greater than 40 Kg.
- o Antiseptic skin wipes
- Sterile Vaseline gauze

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PROCEDURAL GUIDELINES:

- Make base contact (if in setting of an MCI, remote rescue, or tactically unstable scene proceed without base contact and document).
- Explain procedure to patient if conscious and able to understand.

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- Select one of two insertion sites based on body habitus, choosing an area with the least soft-tissue depth and easiest access
- :
  - o Between second and third intercostal space, midclavicular line, OR
  - o Between the fourth and fifth intercostal space, anterior axillary line
- Assemble equipment:
  - o 1.25 inch, 16 gauge catheter over needle if estimated weight 40 Kg (90 lbs) or less , use adult decompress ion needle (minimum 2.5 inch length) if estimated weight greater than 40 Kg.
  - o Antiseptic skin wipes
  - o Sterile Vaseline gauze
- Identify second intercostal space, midclavicular line.
- Prepare site with sterile skin wipe.

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- Insert needle using steady pressure and ninety-degree angle (perpendicular) to chest wall in lower aspect of the second intercostal space within the midclavicular line.
-
- Upon advancing the needle, one of the following should be recognized:
  - Advance needle until one of the following are recognized:
    - A sudden rush of air is expelled through the needle
    - A "popping" or "giving way" is felt as the tip of the needle enters the chest cavity.
    -
  - Upon removing the needle, leave the catheter in place and do not reinsert the needle due to catheter shearing risk..

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DOCUMENTATION
- Indication for procedure
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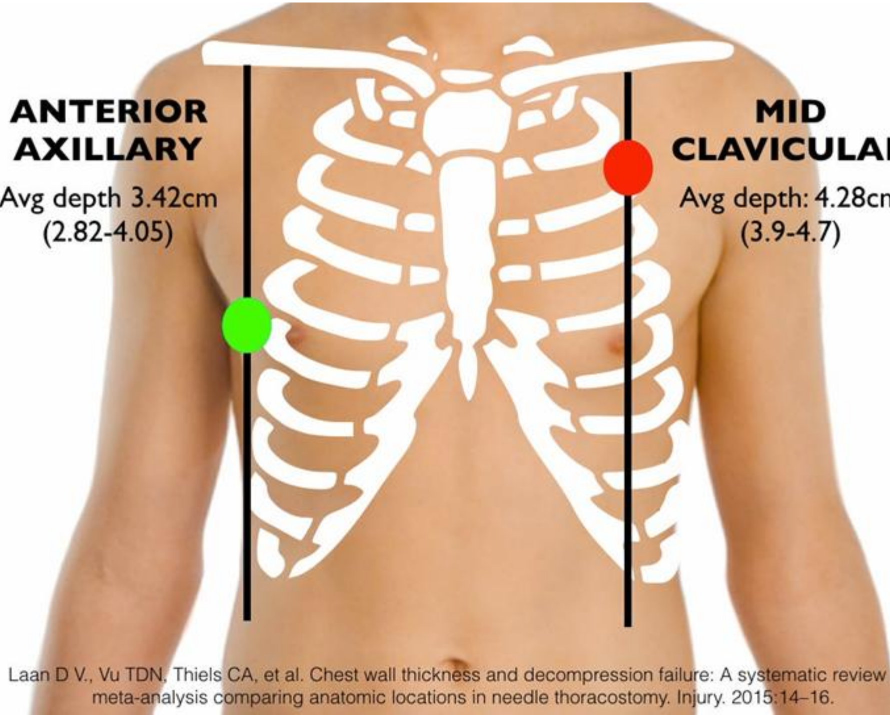

- Air, blood or fluid is expelled through the needle when chest cavity has been entered
  - Once chest cavity is entered, advance needle and catheter ¼ inch and no further, remove needle, leaving catheter in place.
  - Arrange Vaseline gauze at base of catheter to stabilize and seal area and leave in place (do not reinsert needle into catheter due to risk of shearing apart plastic catheter).

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