

How To Do Needle Thoracostomy

(Needle Decompression)

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Needle thoracostomy, also called needle decompression, is insertion of a needle into the pleural space to decompress a tension pneumothorax.

Needle thoracostomy is an emergency, potentially life-saving, procedure that can be done if [tube thoracostomy](#) cannot be done quickly enough.

Indications for Needle Thoracostomy

- [Tension pneumothorax](#) that must be decompressed before tube thoracostomy can be done

Contraindications to Needle Thoracostomy

- None

There are no contraindications because this procedure is only done because of an immediate threat to life which supersedes other considerations.

Complications of Needle Thoracostomy

- Pulmonary or diaphragmatic laceration
- Intercostal neuralgia due to injury of the neurovascular bundle below a rib
- Bleeding
- Infection
- [Pneumothorax](#) (if the procedure was done because of falsely suspected pneumothorax)
- Rarely, perforation of other structures in the chest or abdomen

Equipment for Needle Thoracostomy

- A 14- or 16-gauge needle (an over-the-needle catheter is best); 8-cm needles are more successful than 5-cm needles but increase the risk of injury to underlying structures
- Sterile gown, mask, gloves
- Cleansing solution such as 2% [chlorhexidine](#) solution

Additional Considerations for Needle Thoracostomy

- The urgency of the procedure is determined by the patient's condition. Hypotension suggests a more advanced tension pneumothorax requiring more urgent treatment.

Relevant Anatomy for Needle Thoracostomy

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- Neurovascular bundles are located at the lower edge of each rib. Therefore, the needle must be placed over the upper edge of the rib to avoid damage to the neurovascular bundle.

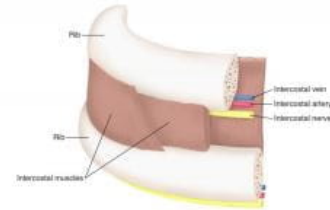
Positioning for Needle Thoracostomy

- Patient should be supine, lying on the back.

Step-by-Step Description of Needle Thoracostomy

- The preferred insertion site is the 2nd intercostal space in the mid-clavicular line in the affected hemithorax. However, insertion of the needle virtually anywhere in the correct hemithorax will decompress a tension pneumothorax.
- If time permits, prepare the area at and around the insertion site using an antiseptic solution such as [chlorhexidine](#).
- There is rarely time to provide local anesthesia, but if there is, inject 1% [lidocaine](#) into the skin, subcutaneous tissue, rib periosteum (of the rib below the insertion site), and the parietal pleura. Inject a large amount of local anesthetic around the highly pain-sensitive periosteum and parietal pleura. Aspirate with the syringe before injecting [lidocaine](#) to avoid injection into a blood vessel. Proper location is confirmed by return of air in the anesthetic syringe when entering the pleural space.
- Insert the thoracostomy needle, piercing the skin over the rib below the target interspace, then directing the needle cephalad over the rib until the pleura is punctured (usually indicated by a pop and/or sudden decrease in resistance).
- After doing a needle thoracostomy, insert a [chest tube](#) as soon as possible.

Rib Anatomy



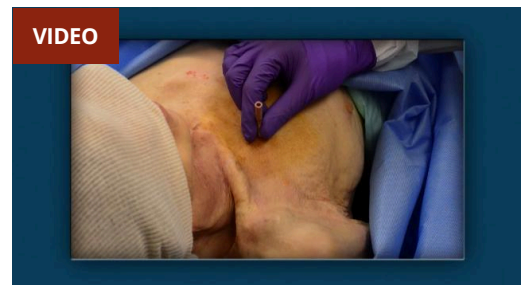
Aftercare for Needle Thoracostomy

- Chest x-ray should be done to confirm expansion of the lung and proper placement of the chest tube.

Warnings and Common Errors for Needle Thoracostomy

- Depending on the thickness of the chest wall, a longer needle may be needed.

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Tips and Tricks for Needle Thoracostomy

- After removing the needle, the catheter may become blocked due to kinking. Kinking is especially likely with smaller catheters, including 14 and 16 gauges. Some sources recommend using a larger 10-gauge needle and catheter ([1-3](#)).

References

1. [Aho JM, Thiels CA, El Khatib MM, et al](#): Needle thoracostomy: Clinical effectiveness is improved using a longer angiocatheter. *J Trauma Acute Care Surg* 80(2):272–277, 2016. doi: 10.1097/TA.0000000000000889
2. [Clemency BM, Tanski CT, Rosenberg M, et al](#): Sufficient catheter length for pneumothorax needle decompression: A meta-analysis. *Prehosp Disaster Med* 30(3):249–253, 2015. doi: 10.1017/S1049023X15004653
3. [Beckett A, Savage E, Pannell D, et al](#): Needle decompression for tension pneumothorax in Tactical Combat Casualty Care: Do catheters placed in the midaxillary line kink more often than those in the midclavicular line? *J Trauma* 2011 71(5 Suppl 1):S408–S412, 2011. doi: 10.1097/TA.0b013e318232e558

Drugs Mentioned In This Article
