

STANDARDIZED PROCEDURE
NEONATAL / PEDIATRIC THORACENTESIS (NEEDLE ASPIRATION)
(Neonatal, Pediatric)

I. Definition

To insert a needle into the chest in order to evacuate air or fluid

II. Background Information

A. Setting:

Inpatient neonatal / pediatric patients or outpatient during Emergency Transport of neonatal / pediatric patients.

If appropriate, implement procedural support, if available- make sure Child Life is involved, and use age appropriate language and age appropriate developmental needs with care of children

B. Supervision

The necessity of the procedure will be determined by the Advanced Health Practitioner (AHP) in verbal collaboration with the attending physician or his/her designee. Ideally, the procedure will first be verbally discussed with the Attending Physician or Fellow, but if time does not permit for that, then the Attending or Fellow is to be notified as soon as possible after the procedure.

Direct supervision is necessary until competency is determined and the minimum number of procedures is successfully completed, as provided for in the protocol. After that time, the attending physician or his/her designee must be available.

Designee is defined as another attending physician or fellow who works directly with the supervising physician and is authorized to oversee the procedures being done by the AHP.

C. Indications

Decompression of tension pneumothorax or fluid accumulation (pleural effusions, chylothorax, empyema) in order to allow adequate lung expansion for ventilation. In an acute emergency, needle aspiration should be performed if the baby's cardiopulmonary status is unstable. After an emergency needle aspiration has been performed, a thoracotomy tube should be inserted.

D. Precautions/Contraindications

1. When the patient's vital signs are stable enough to allow placement of thoracostomy tube instead.
2. When air collection is likely to resolve spontaneously without patient compromise.

The AHP will notify the physician immediately under the following circumstances:

1. Patient decompensation or intolerance to the procedure
2. Outcome of the procedure other than expected

STANDARDIZED PROCEDURE
NEONATAL / PEDIATRIC THORACENTESIS (NEEDLE ASPIRATION)
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III. Materials

1. 30 ml disposable syringe
2. 3-way stopcock
3. 23 gauge scalp vein needle or 18-22 gauge angiocath with T-connector for neonates, or 14-22 gauge angiocath with T-connector for pediatric patients
4. ChloroPrep
5. Specimen bottles if fluid is to be obtained
6. Sterile gloves
7. Morphine Sulfate or other pain medication (if time permits)

IV. Neonatal / Pediatric Thoracentesis

A. Pre-treatment evaluation

1. If time permits, premedicate infant for pain control and/or sedation. Assess need for further medication throughout the procedure.
2. Monitor the patient's cardiorespiratory status & oxygen saturations throughout the procedure.

B. Set up (if applicable)

1. The equipment is assembled as follows:
 - a. Connect the 3-way stopcock to the syringe.
 - b. Connect the tubing of the scalp vein needle to the 3-way stopcock, or connect angiocath to T-connector and then connect that to the 3 way stopcock.
 - c. Turn the tap "off" to the remaining outlet (to the atmosphere).

C. Patient Preparation

If time permits, inform the patient/family of the treatment plan, otherwise notify them after the procedure is completed.

D. Procedure

Pneumothorax

1. Perform time out with all appropriate steps.
2. Position the patient supine or in the sitting position. Remember that air as distinct from fluid rises to the top.

STANDARDIZED PROCEDURE
NEONATAL / PEDIATRIC THORACENTESIS (NEEDLE ASPIRATION)
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3. The second interspace is used in the midclavicular line (MCL). Prep the area with ChloroPrep. Allow to dry.
4. Enter the pleural cavity through the second interspace in the MCL just above the third rib. This is to avoid damage to the intercostal vessels, which run immediately beneath each rib. Angle the needle at 45 degrees and direct toward the mediastinum. On entry into the pleural cavity, a slight "pop" is often felt. The distance varies with the size of the child and depends on the distance between the skin and the pleural cavity (thickness of ribs, muscles, subcutaneous fat, etc). In neonates, it is usually less than 15 mm.
5. The needle is steadied in this position. Either an assistant or the operator then withdraws the plunger of the syringe. If air is present, there is free withdrawal. Withdrawal continues until resistance is met. If the plunger is withdrawn to its fullest extent (30 ml) without resistance, the tap is turned "off" to the patient and the contents of the syringe expelled to the atmosphere. The tap is again turned "off" to the atmosphere and withdrawal is repeated. This process is repeated until resistance is finally met, or a chest tube is placed. At this point slowly remove the needle while maintaining suction on the syringe.
6. The thoracentesis site requires no after-care. The patient must be watched closely for signs of reaccumulation. If this should occur and give rise to significant distress, a chest drain should be inserted (see procedure for Neonatal / Pediatric Chest Tube Insertion) and connected to an underwater seal. In an emergency or situations in which a tube cannot be placed, repeated needling will buy time until the definitive measures can be carried out.

Fluid Accumulations

1. Perform time out with all appropriate steps.
2. Place the patient in the supine position.
3. Prep the skin over the 4th or 5th intercostal space in the mid-axillary line (MAL) with ChloroPrep. Allow to dry.
4. Insert the needle just above the 5th or 6th rib. A "pop" may be felt as the needle transversed the pleura.
5. Aspirate as for pneumothorax (above) expelling fluid to the outside as necessary. Appropriate specimen bottles should be available.
6. The procedure is completed when no more fluid can be obtained, or a chest tube is placed. If a chest tube will be placed, it is best to leave some of the fluid in place to

STANDARDIZED PROCEDURE
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allow a safer chest tube insertion (to buffer the lungs). The site should be covered by a sterile dressing, as continued leakage may occur.

E. Follow-up treatment

1. CXR to determine continued presence of air or fluid.

F. Termination of treatment

Needle thoracostomy will be discontinued when:

1. Chest tube is placed.
2. Air or fluid is evacuated and does not reaccumulate.

G. Potential Complications:

1. Lung puncture
2. Pneumothorax
3. Bleeding
4. Liver puncture
5. Infection
6. Hypovolemia if draining large amounts of fluid

IV. Documentation

A. Documentation is in the electronic medical record

1. Documentation of the pretreatment evaluation and any abnormal physical findings.
2. Record the time out, indication for the procedure, procedure, type and size of needle / catheter used, amount of air or fluid removed, EBL, the outcome, how the patient tolerated the procedure, medications (drug, dose, route, & time) given, complications, and the plan in the note.

B. All abnormal findings are reviewed with Attending or supervising physician

V. Competency Assessment

A. Initial Competence

1. The AHP will observe the procedure in its entirety at least once. Under the direct supervision of the attending physician the AHP will perform neonatal / pediatric thoracentesis successfully **three** times and will be evaluated for competence and technical skill.

STANDARDIZED PROCEDURE
NEONATAL / PEDIATRIC THORACENTESIS (NEEDLE ASPIRATION)
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2. The AHP will demonstrate knowledge of the following:
 - a. Medical indication and contraindications of neonatal thoracentesis
 - b. Risks and benefits of the procedure
 - c. Related anatomy and physiology
 - d. Consent process (if applicable)
 - e. Steps in performing the procedure
 - f. Documentation of the procedure
 - g. Ability to interpret results and implications in management.
3. The AHP will ensure the completion of competency sign off documents and send them directly to the medical staff office.

B. Continued proficiency

1. The AHP will demonstrate competence by successful completion of the initial competency.
2. Each candidate will be initially proctored and signed off by an attending physician. AHPs must perform this procedure at least **three** times per year. In cases where this minimum is not met, the AHP must demonstrate skill with this procedure in a simulation or skills lab, or the attending, must again sign off the procedure for the AHP. The AHP will be signed off after demonstrating 100% accuracy in completing the procedure.
3. Demonstration of continued proficiency shall be monitored through the annual evaluation.
4. A clinical practice outcomes log is to be submitted with each renewal of credentials. It will include the number of procedures performed per year and any adverse outcomes. If an adverse outcome occurred, a copy of the procedure note will be submitted.

VII. RESPONSIBILITY

Questions about this procedure should be directed to the Chief Nursing and Patient Care Services Officer at 353-4380.

VIII. HISTORY OF POLICY

Initial policy approved 1986 by CIDP and EMB

Revised 4/89, 1/93, 5/01, 7/03, 12/05, 6/08, 2/11

Revised most recently July 2012 by Subcommittee of the Committee for Interdisciplinary Practice

Reviewed most recently July 2012 by the Committee on Interdisciplinary Practice

Approved most recently July 2012 by the Executive Medical Board and the Governance Advisory Council.

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