TITLE: CHEST TUBE INSERTION IN THE INFANT (nur15)

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ISSUED FOR: Nursing
RESPONSIBILITY: RN-Neonatal Services

PURPOSE: To evacuate trapped air, thereby allowing for adequate lung expansion, cardiac output and oxygenation in the infant.

KNOWLEDGE BASE:
1. Thoracic air leak describes a collection of gas in pleural cavity, a potential space between the thin membrane that lines the chest cavity and the thin membrane that lines the lungs. The pleural space normally contains a thin layer of lubricating fluid that allows frictionless movement of the lungs during respiration. An excess of fluid (hemothorax or pleural effusion), air (pneumothorax) or both in this space alters intrapleural pressure and causes partial or complete lung collapse. Chest tube insertion permits the drainage of air or fluid from the pleural space.

2. Thoracic drainage uses gravity and may use suction to restore negative pressure and remove any material collected in the pleural cavity.

PATIENT EDUCATION: The physician has primary responsibility for parent education. However, the nurse is responsible for reinforcing the explanation.

EQUIPMENT:
1. Infant/Child Instrument Tray
2. 8 F Fuhrman pleural/pneumopericardial drainage set (pigtail)
3. Sahara Infant Pleur-Evac drainage system
4. 4-0 silk suture
5. Bioclusive dressing
6. Suction manometer
7. Sterile connecting tubing
8. Suction canister
9. Sterile gown and gloves
10. Hat and mask
11. Safety pin
12. Adhesive tape
13. Sterile Utility Marker
14. 1% Lidocaine with sterile syringe and 25-gauge needle (optional)
15. Transilluminator
16. Soft bindings
17. 2 green plastic hemostats, Vaseline gauze and a clear dressing are to be left at bedside
1. **ASSISTING WITH CHEST TUBE INSERTION.**

   a. Assemble and set up equipment at patient's bedside. Trays, clamps, and drainage system available on chest tube cart in unit. Follow package instructions for assembly and setup of drainage system and drainage sets. This system can be used with or without suction and with or without water.
   
   b. Perform Time Out
   
   c. Position and restrain patient as physician desires. Sedate as ordered.
   
   d. Ensure that drainage system is assembled prior to needle and chest tube insertion by physician. Follow instructions to add purified water via the filled syringe provided, to drainage system.
   
   e. Monitor vital signs, oxygen saturation, and patient's response to procedure. Make physician aware of any change in status.
   
   f. Have chest tube clamps available for use to clamp tube after insertion.
   
   g. Leave end of tubing covered to maintain sterility until physician connects it to the patient's chest tube.
   
   h. After the physician inserts the chest tube, proceed to connect drainage tubing with the chest tube. Unclamp the drainage tubing and slowly turn suction on until at level ordered by physician.
   
   i. Confirm that suction is working properly by looking for orange float in suction window and the word “yes” at the “Negative Pressure Indicator”.
   
   j. Physician suture the tube to secure and mark position with sterile utility marker on the tube and infant chest. (If physician does not mark position of tube, the nurse should do it)

2. **DRESSING PIGTAIL CHEST TUBE INSERTION SITE**

   a. Using sterile technique use transparent dressing (use larger (2x3) bioclusive) to further secure the chest tube. This dressing also provides clear view to the site and seals the insertion site to help prevent air leakage.
   
   b. Chest x-ray needs to be done to confirm placement
   
   c. Next, take 2 Steri-Strips and chevron chest tube to infant’s skin just below the bioclusive dressing.
   
   d. All tubing connections must be taped using white adhesive tape. Criss-cross method recommended, and has been noted to be most secure and problems of slipping or loosening can quickly be noted and corrected. With simple wrap around method there can be slippage and air leakage
underneath but not readily seen because tape looks intact.

e. Sedation and pain medication should be available, as needed. Some restraint may be needed during procedure, but should be used minimally.

f. Keep two chest tube clamps readily available at bedside, for emergency.

1. REMOVAL OF CHEST TUBE
   a. Equipment: Assemble the following for the physician’s use:
      b. Sterile gloves
      c. 2x2’s
      d. Bioclusive
      e. Prepare patient and medicate for pain, as needed.

2. Note final amount of drainage and discard container in biohazard box.

3. Perform Time Out

4. Removal is performed neonatologist and/ or NNP

5. Position patient as requested by physician.

6. Don sterile gloves and remove the chest tube dressing and discard them.

7. Cleanse site with Chloraprep, allow to dry, cleanse with sterile water

8. After removing Pig Tail chest tube, place transparent dressing over puncture site.

3. CARE OF PATIENT AFTER CHEST TUBE INSERTION

a. Look for improvement in oxygen saturation, heart rate, color and work of breathing. Assess lung sounds after chest tube insertion, with each assessment, and at any time patient shows signs of respiratory distress or worsening of condition. Notify physician at once if problem noted.

b. Turn and position infant on unaffected side to facilitate air evacuation since air rises.

c. Monitor level of agitation and/or pain.

 d. Check for fluctuation of drainage in tubes or drainage system. When air leak from lungs is sealed off, no bubbling will be present in the air leak indicator area.

e. Monitor output from catheter every shift and PRN unless otherwise ordered. Call physician if sudden increase in amount of drainage.
f. Note the pressure of the suction remains unchanged with each assessment.

g. If dressing becomes soiled, check with physician before changing. Leave Vaseline gauze in place to protect seal. Note hematomas and amount and consistency of drainage and chart specifically.

h. Any dependent loop of tubing containing fluid will obstruct flow and create backpressure, especially to an air leak. Simply coil the tubing flat on the bed and let it run directly down to the drainage container.

i. Chest tube stripping is not recommended.

4. PROBLEMS THAT CAN OCCUR

a. Excessive bubbling: check all connections and re-tape, as necessary. Check insertion site and tape securely to skin, if necessary. Apply occlusive dry sterile dressing to insertion site. If the above is not successful, the nurse can assess for air leak by clamping and unclamping the chest tube for a few seconds at intervals along the tube, beginning at the patient. If the bubbling stops, then the air leak is in the patient. If the bubbling persists, the leak is in the tubing. Clamp at intervals along the length of the tubing to determine the exact location of the leak (i.e., it may be a loose connection, a cracked tube, etc.) Notify the physician if leak is new and determined to be in the chest. Otherwise, change whatever part of setup is leaking.


c. Chest tube falls out: Quickly seal off insertion site, using Vaseline gauze and op site dressing. Notify physician at once.

d. Subcutaneous emphysema: Check skin area around and above insertion sites for crepitus (crackling puffy areas) with every assessment. If present or increasing, notify physician.

e. Tension pneumothorax: This can occur if tubes are clamped for more than a few seconds, if the chest tube system is improperly assembled, or spontaneously. Symptoms are sudden worsening of condition as evidenced by tachypnea, retractions, grunting, cyanosis, irritability, and either tachycardia or bradycardia, absent breath sounds on affected side, increasingly diminished breath sounds on unaffected side, drop in saturation on pulse oximeter, asymmetrical chest movements, heart sounds may be shifted, shift of mediastinum
to unaffected side, cardiac arrhythmias, and
decreased cardiac output (decreased peripheral
circulation and distended neck veins.) Trans
illuminate the chest, call the physician STAT, and
have equipment ready for needle aspiration and
new chest tube insertion.

NOTE: NEVER DELAY TREATMENT OF A
PNEUMOTHORAX TO OBTAIN A CONFIRMATORY
CHEST X-RAY.

DOCUMENTATION:

Electronic Medical Record (EMR)

1. Document the procedure and the initial amount and type of
drainage; date and time drainage began; type of system;
amount of suction used; absence or presence of bubbling
and/or fluctuation in water-seal container; respiratory rate
and quality, areas of crepitus; patient’s response to
procedure.

2. With every assessment document the amount, color and
quality of drainage; presence or absence of bubbling;
patient’s respiratory status; dressing condition; pain
medicate or sedation; any nursing actions enlisted, if
applicable. Amount of suction, fluctuation and absence or
presence of bubbling should be documented hourly.

3. On removal, document the procedure; amount of drainage
in drainage system, patient’s response and any other
pertinent information.

REFERENCE(S):

Merenstein GB & Gardner SL. 2011. Handbook of Neonatal

(5th Ed.) J.B. Lippincott Co: Philadelphia,

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