### CHEST TUBES:

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**Type:** Core Policy

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<tr>
<td>Patient Services Policy and Procedure Council</td>
<td>Paula Webb, DNP, RN, NEA-BC</td>
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**Date of Issue:** April 2013

**Contact Person:** Patient Services Policy and Procedure Council

**Supersedes:** March 2011

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**PURPOSE:**

To provide optimal drainage from the intrapleural space in order to reestablish normal intrapleural pressures.

**A. PRE-PROCEDURE ASSESSMENT**

1. Assess hematologic and coagulation studies.

2. Assess baseline cardiopulmonary status.
   - Vital signs
   - Breath sounds
   - Chest excursion
   - Skin color
   - SpO2
   - Level of consciousness
   - Cardiac rhythm
   - Pertinent labs, such as ABG and coagulation profiles.

**REMARKS**

To assess risks for bleeding, notify physician of any abnormal findings.

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**B. INSERTION**

**PERFORMED BY:** Physician with assistance of RN or LVN
EQUIPMENT:

Sterile Supply
1. Thoracotomy Tray or Chest Tube Tray

Stores
1. Thoracotomy Tubes:
   - Pedi-tray: 8-14 Fr
   - Adult tray: 18-28F
2. Drainage System
3. Gauze dressing/ Tegaderm (per physician preference)

Floor Stock
1. Benzoin
2. Sterile gloves
3. Tape
4. Chloraprep
5. Emergency chest tube kit
   - Pair of blue plastic clamps
   - Petroleum jelly or petroleum gauze
   - Sterile 2X2s
6. Antimicrobial patch, optional (if patient > 27 week gestation and greater than 1 week gestational age)

Surgery/Sterile
1. Suture

Pharmacy
1. Local Anesthetic
2. Analgesia and/or sedative

Radiology
1. Most recent chest x-ray (if requested by physician)

PROCEDURE

<table>
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<th>PROCEDURE</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>1.</td>
<td>Obtain surgical consent.</td>
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<tr>
<td>2.</td>
<td>Follow manufacturer’s directions to prepare closed chest drainage collection. Fill suction chamber to prescribed level.</td>
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<tr>
<td>3.</td>
<td>IV access should be in place. Oxygen, pulse ox and crash cart must be readily available due to possible hemodynamic compromise.</td>
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<td>4.</td>
<td>Perform hand hygiene.</td>
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<tr>
<td>5.</td>
<td>Obtain baseline vital signs</td>
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6. Time out/verification process as per PS 573 - Surgical/Invasive Procedure Verification Process.

7. Administer analgesic/sedative as ordered. Monitor patient according to sedation guidelines. Mild sedation and pain medication are recommended to help prevent vagal symptoms.

8. Position patient, immobilize if needed.

9. Set up sterile field. Open necessary equipment onto field (i.e., chest tube).

10. Assist physician with preparing skin using chloraprep, draping the area and inserting the chest tube.

11. Following chest tube placement, connect catheter to the chest drainage system using aseptic technique. Place emergency equipment chest tube kit at bedside.

12. Cleanse skin. Antimicrobial patch may be applied at physician discretion. Apply sterile, clear occlusive dressing over dried insertion site. Some physicians may prefer that the insertion site be left open to air. This requires a physician order.

13. Assist with taping tube to the chest. Secure all connections with tape or with plastic chest tube bands. Make sure tubing has slack and is secured to the bed in the PICU/NICU. Tubing pinned to patient's diaper/gown on floor.

14. Order a chest x-ray per physician's instruction/protocol after tube is secure.

15. Document procedure on appropriate documentation record.
   a. Pre-procedure assessment
   b. Size and location of catheter
   c. Appearance of insertion site and type of dressing.
   d. Quality/quantity of drainage returned
   e. Fluctuation in water seal and/or presence of air leak
   f. Patient's tolerance of procedure
   g. Physician performing procedure.
PROCEDURE

16. Assess and document chest tube site/dressing, integrity of system, quality and quantity of drainage, presence of air leak, fluctuation in water seal chamber at least every shift.

17. Change dressing using aseptic technique if dressing becomes soiled.

C. DRAINAGE SYSTEMS

1. Chest Drainage System to be used for pressures up to 20cm H20 or dry suction chest tube chamber between -10 and -40 cm H20. Chest drain must be connected to child before initiating suction. Fully open suction control stopcock to “ON” position.

2. Emerson Pleural Pump – to be used when pressures are ordered that are greater than 20cm H20. See Appendix A.

D. ASSESSMENT

1. At the beginning of each shift and at least every 8 hours (or per unit standard), assess the following:
   a. Presence of absence of breath sounds, friction rub
   b. Respiratory rate
   c. Drainage
      • Amount
      • Color
      • Consistency
   d. Presence/absence of subcutaneous air
   e. Insertion site
      • Amount of drainage on site dressing
      • Dressing present and secured
      • During dressing change, observe for signs/symptoms of infection
      • Check migration or tube and integrity of skin sutures

   REMARKS

Assess for respiratory variations on the water seal and drainage of pleural fluid to verify proper functioning. Drainage should be documented per physician order.
PROCEDURE

f. Suction
   - Set dial setting to ordered suction on dry chamber. In wet suction, add appropriate amount of water to ordered suction.
   - Connect to suction source as prescribed.

REMARKS
To adjust height of water in seal column and when connected to suction, depress the manual vent, located on back at top of chest tube chamber, until the float valve releases down the water column and decreases to proper level. Do not lower water seal column if suction is not hooked up to patient.

g. Presence of air leak in wet chest tube chamber system
   - Bubbles in air leak meter window
   - Assess for adequate amount of fluid in the air leak chamber

h. Connections-taped and secure
i. Position-system is below chest level at least 1 foot.
j. Chest Tube Emergency Equipment
   - Pair of plastic clamps
   - Petroleum jelly or petroleum gauze
   - Sterile 2X2s

E. MILKING CHEST TUBES

PROCEDURE

1. Occlude chest tube between thumb and forefinger about 6-8 inches from insertion point with non-dominant hand.

REMARKS
Avoid exerting pulling force on the chest. If chest tube becomes dislodged follow section I.

2. To milk tubing, with dominant hand use first two fingers and thumb to compress the tubing together. Continue to compress and release going from patient towards the drainage system.

3. Document on appropriate form:
   a. Procedure
   b. Time
   c. Results
   d. Patient response to procedure
F. **STRIPPING CHEST TUBES (With Physician’s Order Only)** Stripping chest tubes should not be done if the chest tube is in place due to a pneumothorax.

**PROCEDURE**

1. Occlude chest tube between thumb and forefinger about 6-8 inches from insertion point with non-dominant hand.

2. Lubricate dominant hand with lubricant such as hand-lotion. Grasp the chest tube with dominant hand and firmly squeeze the fingers together. Slide fingers down the tubing going from patient towards the drainage system. Release dominant hand fingers, and then release non-dominant hand.

3. Document on appropriate form:
   a. Procedure
   b. Time
   c. Results
   d. Patient response to procedure

**REMARKS**

Strip as ordered.

G. **TRANSPORTING A PATIENT WITH CHEST TUBES**

**EQUIPMENT:**

1. Transport vehicle
2. Adhesive tape
3. Rubber tipped clamps
4. Chest drainage system
5. Gauze dressing

**PROCEDURE**

1. Disconnect suction drainage system from wall suction.

2. Transfer patient from bed to transport vehicle.

3. Secure tubing and drainage system to transport vehicle.

4. Take gauze dressing and clamps with patient during transport.

**REMARKS**

Pin chest tube to diaper or patient gown when moving patient.

Keep drainage system below chest level. Avoid tension on insertion site.

Keep drainage system upright at all times to maintain water seal.
H.  **CHANGING OF CHEST TUBE CHAMBER**

**EQUIPMENT:**
1. Appropriate chamber
2. Sterile water
3. 2 Clamps/hemostats

**PROCEDURE**

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<thead>
<tr>
<th>PROCEDURE</th>
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<tr>
<td>1. Fill water seal chamber to proper volume.</td>
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<td>2. Fill water suction chamber to volume ordered by physician.</td>
<td>If using dry chest tube, inflate balloon to appropriate level.</td>
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<tr>
<td>3. Place chest tube chamber on floor next to old chamber.</td>
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<td>4. Use clamps/hemostats to clamp chest tube and use clamp on large bore tubing to clamp as well.</td>
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<td>5. Disconnect large tubing from old chamber and attach to new chamber.</td>
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<td>6. Disconnect all clamps and connect to wall suction.</td>
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<td>7. Assess patient and chest tube chamber.</td>
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I. **CHEST TUBE DISLODGEMENT**

**EQUIPMENT**
1. Suture removal kit
2. Petroleum gauze or surgilube and gauze
3. Tape – microfoam or occlusive
PROCEDURE

1. If tube comes out, cover insertion site with either petroleum gauze or surgilube and gauze and secure with tape.

2. Check vital signs.


REMARKS

If sutures still intact, clip with scissors from suture removal kit.

J. REMOVAL OF CHEST TUBES

PERFORMED BY:

NICU: Physician, NNP, RN’s
OTHER AREAS: Physician or PNP with RN or LVN assistance or RN’s with documented competency.

EQUIPMENT:

1. Suture removal set (disposable or non-disposable)
2. Petroleum gauze (1x8) optional/ KY Jelly
3. Gauze sponges
4. Adhesive Tape
5. Culturette or sterile specimen container (as ordered)

PHARMACY:

1. Analgesia per physician order

REMARKS

Consider using a child life specialist.

PROCEDURE

1. Perform hand hygiene.

2. Remove dressing.

3. Open gauze sponges, set aside. If requested by physician, open petroleum jelly gauze.

4. Cut suture at insertion site and place gauze over site. Remove chest tube at end of inspiration.

5. If culture of tip is ordered, cut tip of catheter off into specimen container with sterile scissors. Send to lab.

6. Securely tape gauze dressing in place.

7. Discard tubing and drainage system in bio-hazardous container.

REMARKS

The physician may or may not request petroleum jelly gauze.

Have patient blow as tube is pulled out, if possible.

Date and time dressing.
   a. Procedure
   b. Time
   c. Patient response to procedure.

   Complete respiratory rate assessment including:
   a. Respiratory rate and rhythm
   b. Symmetry of chest movement
   c. Use of accessory muscles
   d. Oxygen saturations and skin color

**RESEARCH REFERENCES:**


**LITERATURE REFERENCES:**


EMERSON
Post-Operative Pumps

A Tip of catheter in air space at apex of lung
B Tip of catheter in fluid at lowest point in thorax

Back of Emerson pump

55-1D, Connector

55-7, Large tubing secondary bottle to pump

55-22, Cap assembly

55-7 Tubing
55-5 Tubing

55-22 Secondary cap
55-20 Secondary bottle
55-200 Triangular stand
55-35 Caster
55-24 Triangular tray

55-1 Drainage tubes
55-10 Connectors
55-9 Stopper
55-21 Primary cap
55-20-A Primary bottle
55-2 Bottle tubes
55-25 Graduated scale

55-20-B Secondary trap bottle
55-20-A Primary trap bottle

55-2 Bottle tubes

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ATTACHMENT A