PRACTICE GUIDELINE

Effective Date: 9-17-04 Manual Reference: **Deaconess Trauma Services**

TITLE: CHEST TUBE INSERTION

PURPOSE: To outline the indications for chest tube insertion and provide a procedure guideline for chest tube insertion (thoracostomy) in the trauma patient.

GUIDELINES:

1. Indications:
    a. Pneumothorax: when diagnosed by chest x-ray.
    b. Hemothorax: when diagnosed by chest X-ray.
    c. Hemopneumothorax: when diagnosed by chest x-ray.
    d. Subcutaneous emphysema of the chest wall in a patient who has sustained blunt chest wall trauma requiring ventilator support or general anesthesia.
    e. Severe blunt chest wall trauma with multiple fractured ribs requiring ventilator support or general anesthesia in which there is a risk for development of pneumothorax.

2. Equipment:
    a. A chest tube insertion tray.
    b. A chest tube drainage system, with underwater seal.
    c. Chest tubes, at least a 32 French.
    d. Skin preparation solutions and gauze.
    e. Suturing material to secure chest tube.

3. Procedure:
    a. A basilar chest tube is placed for a traumatic hemopneumothorax. It should be inserted with the patient lying in the supine or lateral decubitus position with the injured side up if possible. A size 32 Fr. or larger tube should be used.
    b. The steps for inserting the tube are basically the same regardless of whether it is an apical or basilar one and are as follows:
        i. Shave and prepare the skin over a wide area of the chest wall.
        ii. Drape the area with four towels or sterile barriers.
        iii. Infiltrate the skin with a local anesthetic and block the intercostals nerves with 2-5ml of anesthetic medially and laterally to the incision. Infiltrate the pleura.
        iv. Make a 2.5-3 cm long incision well into the subcutaneous tissue.
        v. Insert a curved Mayo scissors or curved Kelly clamp and separate the tissues so as to create a tunnel or tract in the direction in which the tube is to be inserted. Continue developing this tract all the way in to the pleura. Remove the scissors or clamp and explore the tract with the gloved finger from time to time to make sure the tract is going in the right direction.

vi. After the pleural cavity has been entered, insert the gloved finger to explore for adherent lung and then further enlarge the opening in the pleura by inserting a large Kelly or Peon clamp and spreading it.

vii. Select the tube to be used. Note the location of the holes and the distance of the proximal hole to the tip of the catheter.

viii. Grasp the tip of the tube with a long Kelly (Peon) clamp to that the long axis of the clamp is almost parallel to the long axis of the tube. Measure the distance that you want the tube to extend into the chest and either note or mark the proposed point of the emergence of the tube with another small clamp on the tube at this point.

ix. Insert the tube into the chest using the large Kelly (Peon) clamp as a guide. Remove the large Kelly (Peon) clamp as soon as the tube has reached the desired position in the chest, but do not remove the smaller clamp marking the point of emergence of the tube. Palpate to ensure that the tube has entered the chest.

x. Suture the tube to the skin with a suture of #0 or #1 silk. Only after these sutures are placed may the smaller clamp on the tube be removed.

xi. Obtain a sample of any fluid that emerges through the tube for culture if indicated.

xii. Connect the tube to the underwater seal chest drainage apparatus and tape the connection between the end of the tube and the plastic connector as well as the connection between the plastic connector and the rubber tubing to the chest drainage apparatus.

xiii. Place Vaseline gauze dressing around the tube.

xiv. Obtain a portable chest x-ray to check for the position of the tube.

4. Indications and procedure of removing chest tubes:
    a. May be removed when there has been no air leak through the tube for 24 hours after the patient has been on water-seal for 24 hours and when the drainage of fluid through the tube is less than 100ml in 24 hours. The only exception to this rule is when the tube has been inserted for pneumothorax and the patient is on the ventilator, the tube should be left in for a minimum period of 7 days, regardless of whether it is functioning or not.
    b. The tube should be removed quickly, at the peak of inspiration and valsalva, with pressure on a gauze dressing held simultaneously over the oblique tube tract right next to the tube thoracostomy incision. A portable chest x-ray is obtained 6 hours after chest tube removal to make certain there has been no recurrence of pneumothorax.

5. Patients should be instructed not to fly, scuba dive, or be in high altitude climate for 6 weeks. If aeromedical transfer to another institution is anticipated, then the chest tube should be left in place.

REFERENCES:

- Deaconess Trauma Guideline Manual, EMERGENCY RESUSCITATIVE THORACOTOMY.
- Deaconess Trauma Guideline Manual, PATIENT IN EXTREMIS FLOWCHART.
- Deaconess Trauma Guideline Manual, ENDOTRACHEAL INTUBATION & AIRWAY MANAGEMENT.

REVIEWED DATE	REVISED DATE
JAN 05	JAN 08
JAN 06	
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