SUBJECT: Chest Tube Placement and Management **PAGE:** 1 of 3
SUPERCEEDS: Tube Thoracostomy Management (Apr 2019) **EFFECTIVE:** 5/04/2023

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PURPOSE:
To provide standard practices for inserting, managing, and removing a tube thoracostomy (e.g., chest tube).

Patient Selection:

- It has recently been shown that 80-90% of stable patients with a pneumothorax (PTX) **less than 35 mm on CT scan** (radial distance between the parietal and visceral pleura/mediastinum in a line perpendicular to the chest wall on axial imaging of the largest air pocket) or **less than 20% on chest x-ray** do not require a chest tube.[15,16,17] These patients should be monitored with a **repeat CXR in 6 hours**.[17]
- The data is more limited on ventilated patients. [18]
- There is also a 20% risk of morbidity associated with chest tube placement.[19]
- Patients with a small PTX (ave. size 25 mm) who do not get a chest tube have a two-day shorter length of hospital stay than those who received a chest tube (ave. size 37 mm) without other differences in outcomes.[20]
- Symptoms including **chest pain, tachypnea (RR >30), tachycardia (HR >120), shortness of breath, or desaturations** should warrant serious consideration of chest tube placement, regardless of PTX size.

PROCEDURE:

Insertion:

1. 2 grams of cefazolin should be given before tube thoracostomy placement to reduce empyema rates.[1,7,8,12] If performed emergently, cefazolin should be administered as soon as possible. If PCN or cephalosporin allergy, 600 mg clindamycin may be substituted.
2. Tube thoracostomy placement should be performed under maximum sterile conditions (full body drape, surgical gown, sterile gloves, cap, mask, and chlorhexidine skin prep) unless inserted under emergent situations.
3. Tube thoracostomy size should be left to the discretion of the performing surgeon, recognizing that 28 and 32 Fr chest tubes are equal in efficacy to 36 and 40 Fr chest tubes for managing hemothorax.[2]
4. "Pigtail" (14-Fr percutaneous) catheters successfully evacuate fluid and air from the chest with less pain and can be as effective as 28-32 Fr chest tubes in a single center RTC.[13] They are more challenging to place and have a higher complication rate of malposition than traditional tubes because there must be a window of air or fluid into which the wire must be threaded. They may be used at the attending surgeon's discretion.

Management:

1. Chest tubes should be placed to suction at -20cm H_2O for 24 hours after placement.
2. A daily AP radiograph should be obtained for all patients with a chest tube *in situ*.
3. Discontinue suction after 24 hours or when an air leak has been sealed - whichever is longer.
4. Following the removal of suction, a repeat chest radiograph should be obtained in 3 hours.[3]
5. Chest tubes should be removed when no significant residual effusion is present on CXR and when 24-hour drainage is < 200 mL.[4,5]
6. If the CXR continues to demonstrate the presence of a continued effusion 24 hours after the placement of tube thoracostomy, a chest CT scan (preferably with iv contrast) of the chest should be obtained to evaluate the adequacy of tube placement and the need for surgical procedure.[1]

Removal:

1. Chest tubes may be removed at end-inspiration or end-expiration.[6] Both methods are safe.
2. Following chest tube removal, an occlusive dressing should be placed over the skin exit site and affixed with an adhesive dressing.
3. A PA and lateral chest radiograph should be obtained within 1-3 hours after chest tube removal and evaluated for clinically significant pneumothorax or pleural effusion/hemothorax. An upright portable chest radiograph is acceptable if the patient cannot travel. If the patient is symptomatic after removal, empiric chest tube replacement without a radiograph should be considered.[6,10,11,14]

Performance Monitoring:

1. Administration of cefazolin (2 grams), or clindamycin (600 mg) if PCN allergy, prior to chest tube placement (excluding emergent OR/IR)

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