



# Rancho Los Amigos National Rehabilitation Center

## DEPARTMENT OF NURSING

### POLICY AND PROCEDURE

**SUBJECT: CHEST TUBE INSERTION AND  
MANAGEMENT**

**Policy No.: C144**  
**Effective Date: 06/1995**  
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**Purpose:** To provide the nurse with guidelines when assisting with chest tube insertion and caring for a patient with a chest tube.

**Provider's Order Required:** No

**Performed by:** RN

**Policy Guidelines:**

1. A patient with a chest tube will have two rubber-tipped Kelly clamps or Pean clamps available at all times.
2. Chest tube dressing changes are performed daily or as ordered by the provider.
3. The drainage system is changed if a malfunction is suspected, there is an air leak that cannot be found, or the collection chamber is full.
4. Following insertion of a chest tube, the patient's vital signs are documented every hour for 4 hours, then per unit routine or as ordered by the provider. The provider is informed of changes in patient status.
5. The amount and type of drainage in the collection chamber is observed and documented every hour during the first 4 hours following chest tube insertion and then every 8 hours and PRN.
6. If a patient is admitted from another facility with a chest tube in place, the nursing staff will consult with the provider and request a change to the hospital-approved closed drainage system.

**PROCEDURAL STEPS:**

**I. ASSISTING WITH INSERTION OF A CHEST TUBE**

Equipment for Chest Tube Insertion:

- Lidocaine local anesthetic (0.5% or 1%)
- Sterile gowns, gloves, caps, goggles (or masks with face shields)
- Antiseptic wipes
- Chlorhexidine –based antiseptic swabs
- Sterile syringes (5 and 10 mL)
- Needles 22G and 25G
- Sterile chest tube insertion tray
- Sterile chest tube
- Suture materials (2-0 or 3-0 silk with cutting needle
- 4X4s
- Adhesive tape
- Sterile chest tube drainage system
- Sterile marker
- Prescribed sedative
- Prescribed pain medication
- Stethoscope

**Note:** Some items may be included in the prepackaged chest tube trays.

## A. Preparation of Patient

1. Identify patient using 2 patient identifiers
2. Explain the procedure to the patient
3. Validate that there is an informed consent signed by the patient and/or guardian
4. Ensure patient has a patent IV line
5. Review medical record for diagnostic exam or lab results and report any abnormalities to provider
6. Determine if patient has allergies to the antiseptic solution and latex
7. Complete the Timeout verification process and documentation
8. Obtain baseline vital signs and assess respiratory status
9. If the patient is to receive sedation, refer to Administrative Policy and Procedure B815 Moderate Sedation
10. Assist the patient to the position indicated by the provider.  
**Key Point:** Patient positioning depends on location of the air or fluids to be drained and patient's clinical status

## B. Preparation of equipment

1. Set up wall suction system
2. Gather all necessary equipment and inspect items' integrity and expiration dates
3. Perform hand hygiene and don PPE
4. Prepare sterile field
5. Place chest tube drainage system on sterile field
6. Fill air leak monitor with sterile water or sterile saline per manufacturer's instructions

## C. Assisting the Provider

1. When prompted by provider, disinfect rubber stopper of the lidocaine vial with an alcohol pad, invert the bottle and hold it for the provider to withdraw the anesthetic
2. After tube insertion connect the chest tube to the closed chest-drainage system and check for rise and fall of the water column (tidaling)
3. Place the drainage collection system below the level of the patient's chest
4. Tape all connection points in the chest drainage system
5. Once the provider has sutured the chest tube to the skin, don sterile gloves and assist provider in the application of an occlusive dressing by placing a 4X4 under the chest tube, another one over the chest tube and securing it with tape
6. Anchor the chest tube on the chest wall with 2" adhesive tape
7. If suction is prescribed, turn on suction machine to prescribed level. Attach suction tubing from the suction to the connector of the closed drainage system. Ensure the bellows expand to the mark indicating proper vacuum operation
8. Obtain STAT portable chest x-ray as ordered by provider  
**Key Point:** A chest x-ray confirms tube position and lung expansion

## II. CARE OF THE PATIENT POST CHEST TUBE INSERTION

- A. Compare patient's vital signs and respiratory assessment after insertion of chest tube with baseline assessment
- B. Document patient's vital signs in the medical record every hour for 4 hours, then per unit routine or as ordered by the provider. Inform the provider of changes in patient status.
- C. Assess patient's respiratory status including
  1. Breath sounds
  2. Chest symmetry
  3. Quality and rate of respirations
  4. Oxygen saturation

- D. Observe and document the integrity of the system, the amount, and description of the drainage in the collection chamber:
  - 1. Every hour during the first 4 hours, then minimally every 4 hours, or as determined by the provider, and any time there is a change in patient condition
  - 2. Mark the amount of drainage in the collection chamber at the end of each shift. Indicate the date and time
  - 3. Immediately report to provider a sudden increase in drainage or bright red blood or red free-flowing drainage which could indicate hemorrhage
- E. Maintain proper position and patency of the drainage system at all times
  - 1. Prevent tubing kinks
  - 2. Make sure patient is not lying on the tubing
  - 3. Maintain collection unit in upright position at all times
  - 4. Maintain straight drainage from the bed to the closed drainage system unit avoiding dependent loops
- F. Check dressing at the insertion site each shift. Dressing should be reinforced if necessary to maintain an airtight system.
- G. Dressing change is to be done daily and PRN
- H. Keep the two clamps on the collection device for ready access in the event of disconnection or severe leakage.  
**Key Point:** Clamping of chest tube is not recommended, this increases the risk of tension pneumothorax. If disconnection occurs or is needed, promptly submerge the tube 1-2 inches in a 250 mL bottle of sterile water to establish a seal. If clamping is necessary, for example, when changing the drainage system, clamp only momentarily.
- I. Assess for and treat pain using a combination of pharmacological and non-pharmacological methods.
- J. Encourage patient to increase mobility as appropriate and to perform cough and deep breathing exercises. This may help drain the pleural space and re-expand the lungs.

### III. REPORTABLE CONDITIONS

- A. Rapid shallow breathing
- B. Cyanosis
- C. Chest pain or pressure
- D. Abnormal vital signs
- E. Sudden increase in drainage or excessive bleeding
- F. Subcutaneous emphysema

### IV. SYSTEM MAINTENANCE

- A. Check suction level at least once a shift and PRN.
- B. Assess for air leaks at all connection sites and under the dressing at the beginning of each shift and PRN.
- C. Watch for leaks of air in the drainage system as indicated by continuous bubbling in the water-seal chamber.  
**Key Point:** Immediately notify MD if there are excessive bubbles.
- D. Keep the drainage tubing free of dependent loops.
- E. If drainage is bloody or thick, small segments of the tubing may need to have a gentle squeeze and release motion in small segments of the chest tube between your fingers to keep it patent.  
**Key Point:** Do not milk or strip the chest tube because it results in transient high pressure in the pleural space and can cause damage to the pleural tissue.
- F. Maintain sterile water level in the drainage system as necessary to the prescribed amount. Replace water lost through evaporation.
- G. Assess for fluctuation in fluid level.
- H. Check for availability of the two clamps at the beginning and end of each shift and PRN

- I. If there is an accidental tube dislodgement, place a sterile dressing on the insertion site and tape on three sides only. This allows air to escape on the fourth side preventing the development of a tension pneumothorax

## V. OBTAINING A SPECIMEN

### Equipment Required for Specimen Collection:

- Sterile gloves
  - Alcohol swabs
  - 18 gauge needle & 5-10 ml syringe
  - Sterile specimen container
  - Labels
- A. The specimen may be obtained from the self-sealing connecting tube or from the sampling port on the collection drainage system
  - B. After performing hand hygiene and donning sterile gloves, clean the surface of the connecting tube or sampling port with an alcohol swab
  - C. Aspirate sample using an 18 gauge needle and syringe
  - D. Place sample in sterile specimen container and send to the lab per usual practice

## VI. CHANGING A CHEST TUBE DRESSING

### Supplies for Chest Tube Dressing Change:

- Clean gloves
  - Sterile gloves
  - Chlorhexidine applicators
  - Medicated ointment as ordered
  - Skin protectant
  - Petroleum gauze
  - 4X4 gauze pads
  - Silk tape
  - Plastic bag
- A. Dressing changes are performed daily
  - B. Gather and prepare supplies
  - C. Perform hand hygiene
  - D. Don clean gloves
  - E. Remove the existing dressing and discard
  - F. Examine insertion site and surrounding skin for signs of infection or subcutaneous emphysema  
**Key Point:** Air may leak into the surrounding tissues and cause crepitus, this must be reported to the provider as it may indicate tube misplacement or blockage and can lead to complications
  - G. Remove and discard gloves
  - H. Perform hand hygiene
  - I. Don sterile gloves
  - J. Clean site using Chlorhexidine swab for 30 seconds
  - K. Apply medicated ointment if ordered
  - L. Apply skin protectant around the site if needed to protect skin against moisture
  - M. Apply petroleum gauze around insertion site to create a seal  
**Key point:** Moisture from the petroleum gauze may cause skin breakdown. If this is noted, consider using dry dressing only
  - N. Place a drain gauze at the insertion site under the chest tube and another over the chest tube
  - O. To seal the insertion site from any air entry and escape, place a 4x4 gauze pad on top of the drain dressings and cover the dressing with wide adhesive tape creating an occlusive dressing

- P. Ensure that tube is properly secured to prevent accidental dislodgement
- Q. Label dressing with date, time, and initials
- R. Remove gloves
- S. Perform hand hygiene

#### VII. CHANGING THE COLLECTION DRAINAGE SYSTEM

- A. The drainage system is changed if a malfunction is suspected, there is an air leak that cannot be found, or the collection chamber is full
- B. Perform hand hygiene and don gloves
- C. Open the new collection drainage system and assemble per manufacturer's instructions
- D. Turn off suction
- E. Trace the tubing to the insertion site to ensure the correct chest tube will be accessed
- F. Remove the tape from the connections
- G. Instruct the patient to perform the Valsalva maneuver to force air out for the pleural space and to keep air from entering when tube is disconnected  
**Key Point:** If the patient can't perform the maneuver, make the drainage system switch at the end of exhalation on a spontaneously breathing patient, or at the end of inspiration on a ventilator patient
- H. Briefly clamp the chest tube close to the insertion site
- I. Using sterile technique disconnect the old chest tube drainage system and connect the new one
- J. Unclamp the tube and instruct the patient to breath normally
- K. Make sure all connections are secure and taped
- L. Ensure tube is properly secured to prevent accidental dislodgement
- M. Observe for fluctuation of fluid in the connecting tubing
- N. Document changing of the chest tube collection system along with characteristics of fluid drainage, and total amount collected in the medical record

#### VIII. TRANSPORTING THE PATIENT WITH A CHEST TUBE

- A. If the patient is on suction, verify with the provider that a period off suction is acceptable. If acceptable, turn off the suction regulator and disconnect at suction connector.
- B. Hang the unit along the side of the stretcher below the patient's chest level, coiling the connecting tubing on the stretcher, and maintaining straight drainage to the closed drainage system.  
**Key Point:** The closed drainage system must be below the chest level and in an upright position to prevent backflow fluid into the pleural cavity.
- C. Keep the clamps available during transport in case of accidental disconnection.  
**Key Point:** Unless disconnected, do not clamp chest tube during transport.

#### IX. ASSISTING WITH REMOVAL OF CHEST TUBE

##### Supplies for Chest Tube Removal:

- Petroleum gauze
- 2 sterile 4x4 gauze pads
- Waterproof pad
- Sterile gloves and non-sterile gloves, mask, gown, goggles
- Suture removal set
- 2" silk tape
- Chlorhexidine applicators
- Kelly clamps (two per chest tube)
- Scissors
- Specimen collection cup
- Suture kit (as needed)
- Adhesive closure strips

- A. Removal of the chest tube may be indicated if:
  - 1. Amount of drainage has decreased to 50-200mL for the last 24 hours
  - 2. Chest x-ray shows lung re-expansion
  - 3. Patient's respiratory status has improved
  - 4. Fluctuations are minimal or absent in the water-seal chamber of the collection device
- B. Prepare patient and assess anxiety level and need for emotional support.
- C. Administer analgesics as ordered at least 20 minutes before the procedure
- D. Perform hand hygiene and don gloves
- E. Position patient in a semi-fowlers position on the unaffected side to facilitate chest tube access
- F. Discontinue suction
- G. Remove existing dressing and cleanse the site with chlorhexidine applicators
- H. Place petroleum gauze on top of the three 4"x4" gauze pads
- I. Instruct the patient to perform a gentle Valsalva maneuver. If patient is on ventilator, the chest tube will be removed during peak inspiration.  
**Key Point:** During the tube removal, avoid a large sudden inspiratory effort which may produce a pneumothorax
- J. Assist the provider as needed as he removes the chest tube, sutures the site, and seals the thoracostomy site with the petroleum gauze dressings
- K. Apply an occlusive dressing securely with 2" adhesive tape.
- L. Auscultate breath sounds bilaterally and monitor patient for signs of respiratory distress every hour for 4 hours then per unit routine
- M. Obtain a portable chest x-ray as ordered.
- N. Dispose of used equipment properly.  
**Key Point:** Discard soiled chest tube in a bio-hazardous plastic bag and place in soiled utility room.
- O. Twenty-four hours after the chest tube has been discontinued, remove the petroleum gauze dressing and apply dry dressing. Change the dressing PRN or as ordered until wound is healed.
- P. Document date, time, and the name of the provider who removed the chest tube, and patient assessment in the medical record.

## X. DOCUMENTATION

- A. Initial documentation will be entered upon chest tube placement, when performing system maintenance care, and post removal of the chest tube. Documentation should include:
  - 1. Respiratory assessments before and after insertion
  - 2. Pre and post procedure status
  - 3. Type and amount of drainage
  - 4. Diagnostic tests ordered and completed
  - 5. Specimens sent to lab
  - 6. Fluctuating fluid levels
  - 7. Abnormal leaks and clots
  - 8. Dressing and or drainage collection system set-ups (including size of tube and suction settings)

## XI. PATIENT EDUCATION

- A. Assess the patient and significant others' understanding of the purpose of the chest tube
- B. Instruct patient to turn, reposition, deep breathe, and cough (if able) to prevent complications related to immobility and accumulation of secretions.  
**Key Point:** Encourage patient to request pain medication for chest discomfort to facilitate coughing, deep breathing and mobility
- C. Instruct patient and significant others to report signs and symptoms of respiratory distress
- D. Document all education and materials provided in the medical record.

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**Reviewed by:** Dulce Dones, MSN, RN

**References:**

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