

PROCEDURE

TITLE: CHEST TUBE DRAINAGE SYSTEM

PURPOSE To outline nursing management of patients with pleural chest tubes and disposable closed drainage systems.

LEVEL: ___ Dependent ___ Independent ___ Interdependent

SUPPORTIVE DATA:

1. Chest tubes are inserted to evacuate air/and or fluid from the pleural space, to re-establish and maintain normal intrathoracic pressures, and to facilitate lung re-expansion.
2. Invasive procedure consent form and time out form necessary

INSERTION

Equipment

1. Thoracostomy tray
2. Chest tube – size and type specified by physician
3. Chest drainage system
4. Sterile gowns, gloves, drapes, procedure cap, mask, goggles
5. Bottle of sterile saline or water
6. Sterile connecting tubing
7. Wall suction canister and gauge
8. 60ml and 10ml luer-lock tip syringes
9. Assorted needles
10. Sutures – physician preference
11. Local anesthetic – physician preference
12. Petroleum gauze, sterile 4 X 4s and drain sponges, 2-3 inch adhesive tape
13. Antiseptic solution such as chloraprep stick or providine-iodine (if allergy noted to iodine use chloraprep)
14. #10 scalpel
15. Conscious sedation per policy if ordered by physician.
16. Signed consent and time out form

Procedure

1. Gather equipment needed.
2. Wash hands.
3. Set up chest drainage system according to manufacturer's instructions. *Note: Save manufacturer's instructions for future reference regarding chamber change and specimen collection.* The physician will specify the amount of suction (i.e. amount of fluid in suction chamber).
4. Assist physician with insertion
5. Attach connecting tubing to chest drainage unit and wall suction (if suction is ordered). Increase continuous wall suction until gentle bubbling is noted in suction chamber. *Note: excessive suction will only create noise and rapid evaporation of water in suction control chamber.*
6. Place chest drainage system on floor stand or hang on side of bed. Remember, keep drainage system upright and below patient level at all times.
7. Tape all tube connections. Apply adhesive tape in "spiraling" fashion.
8. Dispose of used materials accordingly.

PATIENT
POSITIONING AND
EDUCATION

Patient is to be propped and fully supported in positions that promote optimum comfort, breathing and pulmonary drainage

1. Place patient in semi fowlers at 30 to 45 degrees unless contraindicated
2. Ambulate patient and/or out of bed to chair as ordered
3. Turn and reposition patient side to side every two hours
4. Instruct patient to cough and breathe deep every two hours. Instruct patient on how to splint wound with pillow.
5. Keep drainage system below patient at all times.

CARE/MAINTENANCE:

1. Water levels are checked every shift by turning off suction **briefly** to see where water level settles. Add sterile saline or water to suction chamber and water seal chamber to maintain appropriate levels. Remember to turn suction back on after checking water levels.
2. If suction is ordered, adjust continuous wall suction to maintain gentle bubbling in suction chamber.
3. Never routinely clamp tubes.
4. Prevent dependent loops by coiling excess tubing next to patient in bed.
5. Change drainage collection chamber when it reaches capacity. Change according to manufacturer's instructions.
6. Check chest tube dressing every shift and PRN. Document any drainage. Change dressing PRN.

ASSESSMENT:

Assess the following parameters on initial insertion/admission and according to patient acuity.

1. Respiratory rate, effort, chest symmetry, breath sounds
2. Note amount and type of drainage as dictated by unit policy and PRN. Document this information on Input/Output sheet and on collection chamber itself.
3. Check to make sure connections are secured and taped.
4. Outline any drainage on chest dressing, include time and date. Change dressing PRN according to physician preference. If not preference indicated, apply occlusive dressing of petrolatum gauze (i.e. Vaseline® gauze) around chest tube where it enters skin. Next apply two or more drainage sponges (split sponges) oriented at 90 degrees to each other. Tape dressing with adhesive tape, date, time and initial dressing
5. Assess and document any bubbling in water seal chamber. Bubbling indicates the presence of an air leak. If bubbling is intermittent, it's from the pleural space. Constant or excessive bubbling usually indicates a loose connection or leak in the drainage system itself. Bubbling normally decreases over time as the pleural air leak resolves. A sudden start or cessation of bubbling warrants immediate attention.
6. Assess and document tidaling/fluctuation. Tidaling is the movement of fluid in the water seal chamber tube and the chest tube itself. Tidaling indicates the chest tube is functioning properly as fluctuations indicate the changes in intrathoracic pressures. The absence of tidaling may indicate the chest drainage system is blocked or the lung has fully expanded.
7. Note presence of subcutaneous emphysema and its location. Mark borders of subcutaneous emphysema with a skin marker to track its spread or resolution.

REPORTABLE
CONDITIONS:

The following conditions are to be reported to the physician:

1. New or extending subcutaneous emphysema.
2. Any deterioration in vital signs, respiratory distress, clogged tubes, hypovolemic shock or excessive water seal leak (i.e. continuous leak not attributable to the system).
3. Bleeding in excess of 150ml/hr X 2 hours.
4. Any irregularity in function of drainage system.

EMERGENCY MEASURES

Disconnection. If the chest tube becomes disconnected:

1. **Immediately** re-connect to the drainage system or submerge the chest tube in a bottle of sterile saline or water to 2-4cm below the water surface. If possible, quickly clean the exposed chest tube with an alcohol swab prior to reconnection to the drainage system.
2. Re-secure connection with adhesive tape using a spiral application technique.
3. Once suction/water seal is re-established, assess the patient's respiratory status including bilateral breath sounds and notify physician.

Dislodgement. If tube is accidentally pulled out:

1. Promptly apply Vaseline gauze and several 4 X 4s; tape on three sides only (allows air to escape but not be drawn in).
2. Have physician paged STAT and prepare for new tube insertion.
3. Remain with the patient and monitor vital signs and oxygen saturation; observe for decreased BP, increased HR, increased RR, tracheal shift.

Tension Pneumothorax:

1. Observe for acute respiratory distress characterized by increased respiratory rate, shallow respirations, decreased breath sounds, asymmetrical breathing, increased heart rate, decreased blood pressure, cyanosis, tracheal shifting, failure of chest tube and/or water seal chamber to fluctuate.
2. Notify physician STAT and prepare for new tube insertion, STAT chest x-ray as ordered.
3. Remain with patient; place in high fowlers position; monitor vital signs every 5 minutes; check for chest tube occlusion, i.e. kinked, clamped or clots in tube – if possible relieve obstruction immediately.

Excessive Air Leak: If water seal chamber bubbling is continuous and excessive, check patient and system for air leak.

1. Clamp chest tube briefly close to chest wall; if bubbling stops, then air leak is inside patient; **unclamp tube (to prevent possible tension pneumothorax) and notify physician STAT**
2. If bubbling continues, clamp tubing briefly moving downward until source is found. Once clamp is below leak, bubbling will stop. Secure all connections and retape. Notify physician if bubbling continues.
3. Check insertion site for source of air leak by applying gentle pressure around site with hands. If bubbling stops, change dressing by applying new Vaseline gauze and occlusive dressing; notify physician if dressing change unsuccessful in stopping air leak.

CHEST TUBE REMOVAL:

A licensed nurse may assist the physician with removal of chest tube.

Equipment Needed

1. Sterile gloves
2. Two chest tube clamps or Kelly clams
3. Petrolatum gauze and 4 X 4 dressings
4. 2" or 3" adhesive tape
5. Suture removal set

Note: If a "pursestring" suture was not placed at time of tube insertion, the physician will need a suture set and sutures to close the wound once the tube is removed.

Procedure

1. Pre-medicate patient as ordered.
2. Explain procedure to patient.
3. Place patient in semi-fowlers position.
4. Prepare materials for physician, maintaining sterility.
5. The physician will clamp tubes to prevent the leakage of body fluids.
6. Physician will instruct patient to take a deep breath in and hold it. This maneuver maximally inflates the lungs and prevents air from entering the pleural space.

7. The physician will pull out the tube and apply occlusive dressing.
8. Dispose of hazardous waste as per hospital policy.
9. Date, time and initial dressing. Write "DO NOT REMOVE FOR 48 HOURS" on dressing.
10. Assess respiratory status after tube removed.
11. Obtain chest x-ray post removal if ordered by physician. Chest tube size and location

DOCUMENTATION:

1. Date and time of procedure
2. Name of physician who inserted the chest tube
3. Chest tube size and location
4. Suction level
5. Drainage color, type and amount of initially obtained
6. Presence/absence of bubbling in air leak chamber
7. Presence/absence of tidaling (fluctuation of drainage)
8. Presence/absence of subcutaneous emphysema, location and size of area. Mark borders of subcutaneous emphysema with skin marker for further assessment
9. Patient's respiratory status/assessment following procedure (i.e. respiratory rate, depth, effort, chest expansion symmetry)

REFERENCES: