Managing Chest Drainage

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1. Case Study:
   Mr. Jones is 77 years old who is directly admitted to your floor from a local nursing home with a urinary tract infection and urosepsis. He is alert and oriented to name and place. Vital signs are: Temp: 39.3, B/P: 135/78, HR: 105, RR:18. Assessment is unremarkable except for the presence of cloudy, foul smelling urine in his foley catheter. After three attempts at inserting a peripheral IV, it is determined that he will require the insertion of a central line for fluid and antibiotic administration. Dr. Zealous is the house officer on call, and comes to the floor to insert a triple lumen catheter in the right subclavian vein.

   Twenty minutes after the triple lumen catheter insertion, Mr. Jones develops shortness of breath. On assessment his vital signs are: B/P: 155/90, HR: 118, RR:28. Auscultation of the lungs reveals decreased breath sounds on the right. Mr. Jones appears acutely dyspneic, and slightly cyanotic. Pulse oximetry is 88%.

1. What is the most probable cause of Mr. Jones’ dyspnea?

2. What are the treatment priorities for Mr. Jones?

3. What steps would help detect this complication in its early stages?

4. How could this complication have been avoided?
Indications for chest drainage:

a. Pneumothorax: air in the pleural space
   i. Spontaneous
   ii. Traumatic
   iii. Iatrogenic
   iv. Tension
   v. Open
b. Mediastinal drainage: air or blood in the mediastinum
   i. Post-CABG
   ii. Air
c. Pleural
   i. Effusion: serous fluid in the pleural space
   ii. Empyema: infected fluid in the pleural space

Introduction of air, fluid, or blood into the pleural space results in loss of negative pressure. The vacuum in the pleural space acts to pull on the lung tissue and keeps the lung open. Therefore, loss of negative pleural pressure will allow the lung to collapse.

The purpose of a chest tube and chest drainage system is to restore negative pressure to the pleural space and re-expand the lung.
Nursing Care During Insertion

- Ensure analgesia during placement
- Sterile technique
- Sutured in place to prevent dislodgment
- Attach to drainage system
- Sterile, occlusive dressing
- Confirm placement

After the chest tube is successfully placed, it is connected to a chest drainage device (PleuraVac, Thoraclex, etc).
The Chest Drainage System

Chest drainage systems contain three chambers, like the three-bottle systems (fig 1). These three chambers (bottles) are fused into one convenient plastic device illustrated in figure 2.

a. Suction control
   i. Water column
   ii. Dial control
b. Water seal
c. Collection chamber
Avoiding Complications

a. Avoid “stripping” to decrease trauma

b. Report drainage that exceeds 100 cc/hr

c. Keep tubing free from obstruction

d. Maintain sterile, occlusive dressing
**Critical Situations**

a. Tension pneumothorax  
b. Sudden \( \uparrow \) or \( \downarrow \) in drainage  
c. Disconnected tubing  
d. Damaged system

**Common Problems**

a. System fell over  
   i. Baffles?  
   ii. Inspect for damage  
   iii. Inspect for fluids in water seal  
b. Patient transfer  
   i. Disconnect from suction  
   ii. Leave valve on suction tubing open  
   iii. Reconnect to suction after transfer  
c. Specimen collection  
   i. Draw from tubing  
d. Water level has changed  
   i. Refill with syringe through refill ports  
e. Clots  
   i. Prevent them by preventing dependent loops  
   ii. “Milk” them down tubing  
f. Replacing the system

**Components of a properly functioning chest drainage system:**

- Gentle bubbling in the suction chamber  
- No bubbling in the water seal  
- Gentle rising and falling in the water seal with respiration

**Chest Tube Removal**

a. Lung re-expansion  
b. Preparation for removal  
   i. Pain control  
   ii. Evidence of re-expansion  
c. Dressing  
   i. Sterile, occlusive
Additional Resources

Print:

On-line:
www.pneumothorax.org is a great source for information about pneumothorax
www.the-abg-site.com has lots of information about arterial blood gases.
www.ventworld.com has lots of information about respiratory and ventilator care.

Thank you for using Managing Chest Drainage!

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