CHEST TUBES

PURPOSE

To familiarize and acquaint the transfer Paramedic with the skills and knowledge necessary to adequately maintain a chest tube drainage system in the interfacility transfer environment.

OBJECTIVES

COGNITIVE

☑ Identify the indications for a chest tube
☑ Discuss the most serious potential problem of a chest tube and its treatment
☑ Explain the importance of drainage monitoring
☑ Discuss what should be observed for in the drainage
☑ State the procedure to reestablish chest tube patency
☑ Discuss the four primary functions of a chest tube
☑ Discuss the proper maintenance of chest tubes
☑ Explain the significance of constant bubbling in the seal chamber

PSYCHOMOTOR

☑ Observe the proper setup of a disposable chest tube drainage system

AFFECTIVE

☑ Defend the rationale for not routinely “milking” the chest tube
☑ Explain the importance of maintaining a “dependent loop”
OVERVIEW

The integrity of the lung is maintained by the negative pressure that is generated between the **visceral pleura** and the **parietal pleura**. If air is allowed to enter the potential space that exists between these two layers they will separate and the lung will collapse.

Chest tubes have four primary functions:

- Act as a drain for air and fluid that are present in the chest cavity
- To replace the negative pressure required for chest wall integrity
- To provide a water seal for the pleura which will prevent air from entering the system
- Prevent the drainage from flowing back into the patient

The typical disposable chest tube drainage unit consists of three separate chambers. In order, from the patient, they are the collection chamber, the water seal chamber, and the suction control chamber.

The collection chamber will hold approximately 2.5 liters and is the area from which the chest drainage will be received. The water seal chamber will be 2 cm in depth. This provides the correct negative pressure for the chest tube unit. Bubbling should only be seen in the seal chamber during exhalation. Constant bubbling indicates that there is an air leak in the system.

The final section is the suction control chamber which will be filled with water. This method is the safest way to regulate the amount of suction which is applied to the patient.

The insertion site of the chest tube may vary greatly depending on the patient’s condition. The second intercostal space is a suitable site for a simple pneumothorax. In the event the patient has a hemothorax they may have a tube inserted into the sixth through the eighth intercostal spaces since the fluid will drain into the lower areas of the chest.

INDICATIONS

Any event, whether injury or surgery, that disrupts the integrity of the chest wall may necessitate the placement of a chest tube.

MAINTENANCE

- If it is permissible, the ideal position for the patient with a chest tube is the semi-Fowler’s position.
• Air and fluid evacuation may be enhanced by turning the patient every 2 hours, if permissible.
• Frequently lift the latex tubing to drain into the collection chamber to prevent a possible obstruction.
• NEVER raise the chest tube drainage system above the level of the patient’s chest due to the fact that the contents will drain back into the patient.
• Fluctuations in the water seal chamber of two to four inches, when the patient breathes, are considered normal.
• Avoid creating loops in the drainage tube as clots may form.
• Encourage the patient to breathe deeply and to cough.
• Palpate the area around the insertion site for signs of subcutaneous emphysema.

**PROBLEMS**

The most serious complication of a chest tube is the development of a tension pneumothorax due to an obstructed drainage tube. A common cause of obstruction is not periodically lifting the tube thereby allowing the collected blood to clot. Frequent monitoring and draining of the latex tubing will prevent this from occurring.

In the case of inadvertent chest tube removal the open wound should be treated as an open pneumothorax (“sucking chest wound”). Use an occlusive dressing, taped only on three sides if possible, and monitor the patient for signs of a developing tension pneumothorax.

**DRAINAGE MONITORING**

Be certain that the chest tube drainage system is in full view so that you may observe the drainage for the following:

- Color
- Consistency
- Amount

Any sudden changes in drainage are cause for alarm and the transferring, receiving or medical control facility should be contacted:

- An increase in the amount of drainage may mean hemorrhaging
- A decrease in the amount of drainage may mean an obstruction or a failure of the system
PROCEDURE FOR REESTABLISHING TUBE PATENCY

In the event that the chest tube is no longer functioning, utilize the following procedure to reestablish patency:

- If permissible, reposition the patient
- If there is a clot visible in the tubing, straighten and raise the latex tubing to increase drainage
- Squeeze and release the tubing in an attempt to move the clot
- Only after the above steps have been attempted and failed should “milking” or stripping the tube towards the receptacle be attempted. “Milking” is a process where one pinches the latex tubing and, while maintaining pressure on the tubing, moves their fingers toward the receptacle.
- Routine stripping or “milking” of the chest drainage tube is to be avoided due to:
  - Generation of excessive negative pressures
  - Rupture of the alveoli
  - Persistent pleural leak