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OBJECTIVES

• Understand the anatomy of the chest and the structures involved in breathing
• Explain and understand rib fractures, pneumothorax and hemothorax
• Recognize the priority nursing interventions involved in treating chest injuries

THE CHEST

• **Upper Respiratory Tract**: Nose, sinuses, pharynx, larynx and epiglottis
• **Lower Respiratory Tract**: Trachea, bronchi, bronchioles, alveoli and lungs
• **Accessory Muscles**
• **Diaphragm**
• **Ribcage**
RIB FRACTURE

• Most common injury to the chest wall
• Typically due to blunt trauma to the chest
• Manifestations of a rib fracture include pain (especially during inspiration/coughing) and bruising at the site of injury
• Often resolve spontaneously and the main focus is pain management (NSAIDs and analgesics) to allow for effective breathing
• Diagnosis confirmed via chest x-ray

RIB FRACTURE

• Flail chest (free-floating section of chest wall) can occur if multiple consecutive ribs are fractured
• Displaced fractured ribs can penetrate the pleura and result in a pneumothorax or hemothorax
PNEUMOTHORAX

- Occurs when air accumulates in the pleural space
- Can occur due to trauma, lung disease, or spontaneously
- Various types of pneumothorax
- Diagnosis via chest x-ray

**PNEUMOTHORAX**

- **Open** (Sucking Chest Wound)
  - Result of penetrating trauma or impalement
  - Chest cavity exposed to outside air
  - Significant hypoventilation as lung collapses

- **Closed**
  - Chest wall is intact, no communication between chest cavity and outside air
  - Caused by an existing lung injury (e.g. cancer)

- **Tension**
  - Air enters and gets trapped in pleural space
  - Increased pressure causes compression of the lung, heart, and mediastinum
PNEUMOTHORAX

- Chest tubes with drainage typically used to allow lungs to re-expand
- Thoracentesis can be used to remove fluid in the pleural space
- Invasive interventions not needed when patient is stable with minimal air/fluid accumulation; provide supportive measures as the condition resolves spontaneously

HEMOTHORAX

- Blood in the pleural space
- Occurs due to trauma, invasive procedures, or underlying conditions
- Causes dyspnea, dullness to percussion, decreased hemoglobin and may cause shock
- Diagnosis through lab tests (e.g. hemoglobin, arterial blood gases), chest x-ray, and signs and symptoms
- Thoracentesis or thoracotomy with chest tube drainage to remove blood and relieve pressure in pleural space
- Empyema: purulent fluid in the pleural space
CHEST TUBE DRAINAGE

- Chest tubes are surgically placed and air-tight dressings are used to cover the puncture wounds
- Proper tube placement is confirmed by chest x-ray
- A water seal drainage system is often used to prevent air/fluid from moving back into the chest cavity
- Typically not emptied unless it is full to prevent risks of contamination or malfunction
- The system has three chambers for drainage collection, water seal, and suction control

CHEST TUBE DRAINAGE

- Fluid and air collected from the patient enters the chamber
- Air moves into the water seal and causes intermittent bubbling
- Continuous bubbling indicates an air leak (physician should be notified)
- The system is connected to external suction (e.g. on the wall)
CHEST TUBE DRAINAGE

Management of the Drainage System
• Keep the drainage system below the level of the patient’s chest
• Ensure all tubes are connected and check patency of the tubes
• Check the water level and check for bubbling (should be intermittent)
• Check and document the color, characteristics and amount of fluid
• Monitor patient status and manage pain from puncture wounds

Rib fractures are the most common chest injury and typically resolve on their own with pain management interventions.
Pneumothorax occurs when air enters the pleural space and can be classified as an open (sucking chest wound), closed or tension pneumothorax.
Hemothorax occurs when blood enters the pleural space.
The priority nursing intervention is to maintain adequate respiratory function and cardiac output.
Interventions typically include chest tube drainage and thoracentesis or thoracotomy.

SUMMARY
REFERENCES

