



**\*Signs and Symptoms of Tension Pneumothorax:**  
 Patient breathing unassisted and history of chest trauma with:

- Chest Pain
- Asymmetrical breath sounds / chest movement
- Tachycardia
- Hypoxia
- Respiratory distress / tachypnea / dyspnea

**Patient Safety Considerations**

- A seal created over an open pneumothorax has the potential for the development of a closed tension pneumothorax

**Consider Differential Diagnosis:**

- Pleural effusion
- Hemothorax
- Consolidated pneumonia

**\*\*FMR**

- If trained and equipped

**Infection Prevention and Control Considerations**

- Appropriate PPE must be worn while caring for all suspected ILI patients
- N95 respirator is mandatory with any Aerosol Generating Medical Procedure (AGMP)
- The patient should wear a procedure mask, if tolerated. Oxygen can be administered while the patient is wearing the procedure mask via nasal cannula. If the patient requires additional oxygen, a NRB can be used with the accompanying procedure mask

## Etiology

A pneumothorax is a collection of air between the outside surface of the lung and the inside surface of the chest wall. These two surfaces are lined with a smooth membrane called pleura and normally are in contact with each other, but they can become separated when air, fluid or blood collects between them. Collection of air in this space leads to the collapse of lung tissue, and compromised ventilation and perfusion.

Pneumothorax may be classified as:

1. Open
  - a. Caused by trauma
  - b. Air moves freely in and out of the pleural space through the defect in the chest wall
  - c. Also called a sucking chest wound
2. Closed (Simple)
  - a. Can occur due to trauma or medical causes
  - b. Can occur spontaneously
  - c. Air does not move out of the pleural space
3. Tension
  - a. Closed or open pneumothorax where the intrathoracic pressure is greater than atmospheric pressure
  - b. Occurs because the injury causes a one-way valve that allows air into the pleural space but then seals preventing its release; with each breath, the volume of air and the pressure in the pleural space increase

Signs and symptoms of pneumothorax:

1. Open
  - a. Dyspnea
  - b. Hypoxia / Cyanosis
  - c. Frothy blood at wound site
  - d. Asymmetrical breath sounds / chest expansion
2. Closed
  - a. Dyspnea
  - b. Hypoxia / Cyanosis
  - c. Sharp pain provoked by respirations / cough
  - d. Asymmetrical breath sounds / chest expansion
3. Tension
  - a. Patient breathing unassisted and history of chest trauma with:
    - Chest pain
    - Asymmetrical breath sounds / chest movement
    - Tachycardia

- Hypoxia or increasing FiO<sub>2</sub> requirement
  - Respiratory distress / tachypnea / dyspnea
- b. Patient receiving positive pressure ventilation with:
- Asymmetrical breath sounds / chest movement
  - Subcutaneous emphysema
  - Tachycardia
  - Sudden onset of Hypotension / pulseless electrical activity (PEA)
  - Hypoxia or increasing FiO<sub>2</sub> requirement
  - May also present with increased airway resistance

Pneumothorax is more likely to occur in patients with:

1. COPD / asthma - Assess the asthmatic patient for pneumothorax immediately post intubation as these patients are highly susceptible to barotraumas
2. Conditions that are being ventilated
3. Medical procedure that compromises chest wall – e.g. chest tube
4. Previous history of spontaneous pneumothorax
5. Blunt chest trauma
6. Rib fractures / flail chest
7. Open neck trauma
8. Excessive coughing
9. Hemothorax
10. Air medical environments as low ambient air pressure can lead to rapid development of tension pneumothorax

#### **Patient Safety Considerations**

- A seal created over an open pneumothorax has the potential for the development of a closed tension pneumothorax that may require needle decompression
- Development or worsening of a tension pneumothorax is more likely in patients receiving positive pressure ventilation. The presence of air entry is unreliable in ruling out tension pneumothorax

## **Interventions**

### **Dressings**

1. Apply an occlusive dressing taped on three sides to create a flutter valve on an open pneumothorax or utilize a commercial product
2. Frequently reassess the patient and the dressing for signs of a developing tension pneumothorax