Pneumothorax : Causes, Symptoms and Treatment

Pneumothorax occurs when the parietal or visceral pleura is breached and the pleural space is exposed to positive atmospheric pressure, negative pressure is required to maintain lung inflation.

When either pleura is breached, air enters the pleural space and the lung or a portion of it collapses.

Types of pneumothorax

1.Simple, traumatic and tension pneumothorax
2.Simple (spontaneous) pneumothorax

Most commonly occurs as air enters the pleural space through the rupture of able or bronchopleural fistula.

Spontaneous pneumothorax may occur in an apparently healthy person in the absence of trauma due to the rupture of an air-filled bleb, or blister, on the surface of the lung. It may be associated with diffuse interstitial lung disease and severe emphysema. Its also called closed pneumothorax.

This occurs most commonly in underweight male cigarette smokers between 20-40 years of age.

Traumatic pneumothorax occurs when air escapes from a laceration in the lung itself and enters the pleural space or enters the pleural through a wound in the chest wall.

Causes of pneumothorax

- Blunt trauma (e.g. rib fractures) or penetrating chest trauma.
- Abdominal trauma (e.g. stab wounds or gunshot wounds to the abdomen) and from diaphragmatic tears.
- Invasive thoracic procedures (i.e. thoracentesis, transbronchial lung biopsy, insertion of subclavian line.
- Traumatic pneumothorax is often accompanied by hemothorax (collection of blood in the pleural space resulting from torn intercostals vessels, lacerations of the great vessels and laceration of the lungs.
- Hemopneumothorax often both blood and air are found in the chest cavity.

Open pneumothorax

It occurs when the wound in the chest wall is large enough to allow air to pass freely in and out of the thoracic cavity with each attempted respiration.

Because a rush air through the hole in the chest wall produces sucking sound such injuries are termed sucking chest wounds. In such patients not only does the lung collapse, but the structures of the mediastinum (heart and great vessels) also shift towards the uninjured side with each

inspiration and in the opposite direction with the expiration.

This is termed as mediastinum flutter or swing and it produces serious circulatory problems.

Tension pneumothorax

This occurs when air is drawn into the pleural space from a lacerated lung or through a small hole in the chest wall. It may be a complication of other types of pneumothorax. Air that enters the chest cavity with each inspiration is trapped: it cannot be expelled during expiration through the air passages or the hole in the chest wall.

With each breath, tension (positive pressure) is increased within the affected pleura space. This causes the lung to collapse and the heart, the great vessel and the trachea to shift toward the affected side of the chest (mediastinal shift)

Relieve considered a medical emergency.

Signs and symptoms of pneumothorax

The patient's history reveals sudden, sharp, pleuritic pain.

Patients may report that chest movement, breathing and coughing exacerbate the pain. He may also report shortness of breath.

An inspection typically reveals asymmetrical chest wall movement with overexpansion and rigidity on the affected side.

Patients may appear cyanotic in tension pneumothorax he may have distended neck veins pallor, he may exhibit anxiety.

Palpation may reveal cracking beneath the skin indicating air in the tissue and decreases vocal trinity.

In tension pneumothorax, the patient may disclose tracheal deviation away from the infected side and a weak and rapid pulse.

Percussion demonstrates hyper resonance on the affected side.

Auscultation may disclose decreased or absent breath sounds over the collapsed lung.

In tension pneumothorax patients may be hypertensive spontaneous pneumothorax that releases only a small amount of air into the pleural space may cause no signs and symptoms.

Diagnosis of pneumothorax

Radiological examination including chest x-rays reveal air in the pleural space and possibly a mediastinal shift which confirms the diagnosis.

Arterial blood gas studies may show hypoxemia possibly accompanied by respiratory acidosis and

hypercapnia .

Medical management

Management depends on its cause and severity.

The goal of treatment is to evacuate the air or blood from the pleural space.

If tension type is suspected the patient should immediately be given a high concentration of supplemental oxygen to treat the hypoxemia and pulse oximetry should be used to monitor oxygen saturation.

In an emergency situation, tension pneumothorax can be decompressed or quickly converted to a simple by inserting a large bone needle (14 gauge) at the 2nd intercostals space.

A chest tube is inserted to drain the fluid and air.

Antibiotics usually are prescribed to combat infection from contamination.

An emergency thoracotomy may also be performed in the emergency department if there is a suggested cardiovascular injury.

Complications

Extensive pneumothorax or tension pneumothorax can lead to fatal pulmonary and circulatory impairments
Patient teaching

Reassure the patient by explaining what pneumothorax is what causes it and all diagnostic tests, and procedures.

Explain to the patient that chest tubes will make him more comfortable.

Encourage the patient to perform deep-breathing exercises every hour when awake to facilitate ventilation