

Pneumothorax

Definition of a pneumothorax

- Air in the pleural space leading to lung deflation. Pneumothoraces can be divided into:
 - **Primary:** otherwise “normal” lung
 - **Secondary:** underlying lung disease e.g. COPD
 - **Tension:** mediastinal shift and respiratory compromise

Epidemiology of pneumothoraces

- Approximately 10 per 100,000
- Male>Female (6:1)
- > 40 years often associated with COPD
- Smoking increases the risk of pneumothorax

Causes of pneumothoraces

- Spontaneous/ Primary
 - Thought to be due to congenital weakness of a pleural bleb
- Secondary
 - COPD, Asthma, Lung cancer, Pulmonary Fibrosis, TB, Sarcoid, CF, PCP
 - Marfans, Ehlers Danlos, Psuedoxanthoma elasticum
- Iatrogenic
 - Pleural aspiration or biopsy
 - CVP or pacemaker insertion
 - CPR
- Chest trauma
 - Penetrating chest injury
 - Tension pneumothorax is more likely in this group
- Intubation and ventilation
 - Especially with high pressures used

Presentation of a pneumothorax

- Pleuritic chest pain and shortness of breath
 - (but note may be asymptomatic)
- Signs:
 - Tachycardia and tachypnoea
 - Cyanosis
 - Tracheal deviation
 - Hyper-resonance to percussion
 - Decreased breath sounds
 - In tension pneumothorax:
 - Raised JVP, pulsus paradoxus, marked tracheal deviation, Tachycardia >135, hypotension, distended neck veins

Differential diagnosis of a pneumothorax

- Pleural effusion
- PE
- Pneumonia

- Pericarditis

Investigation of a pneumothorax

- ABG
 - Hypoxia, severity dependent on size of pneumothorax and respiratory reserve
- CXR
 - Will show characteristic rim around outside of lung
 - Size can be estimated by depth of rim at hilum
 - 2cm is approximately equal to 50% lung volume lost
 - In supine films, look for deep costophrenic sulci, darkened lung field and prominent heart border.
- USS Chest
 - Can be helpful to look for iatrogenic pneumothorax following US guided drain insertion/ pleural biopsy
- CT
 - Can detect occult pneumothoraces
 - Can be useful to differentiate bullae from pneumothorax
 - To look for causes of persistent leak in patients with non-resolving pneumothorax

Staging of pneumothorax

- Small vs Large
 - > 2cm rim between lung margin and chest wall at the level of the hilum

Management of a pneumothorax

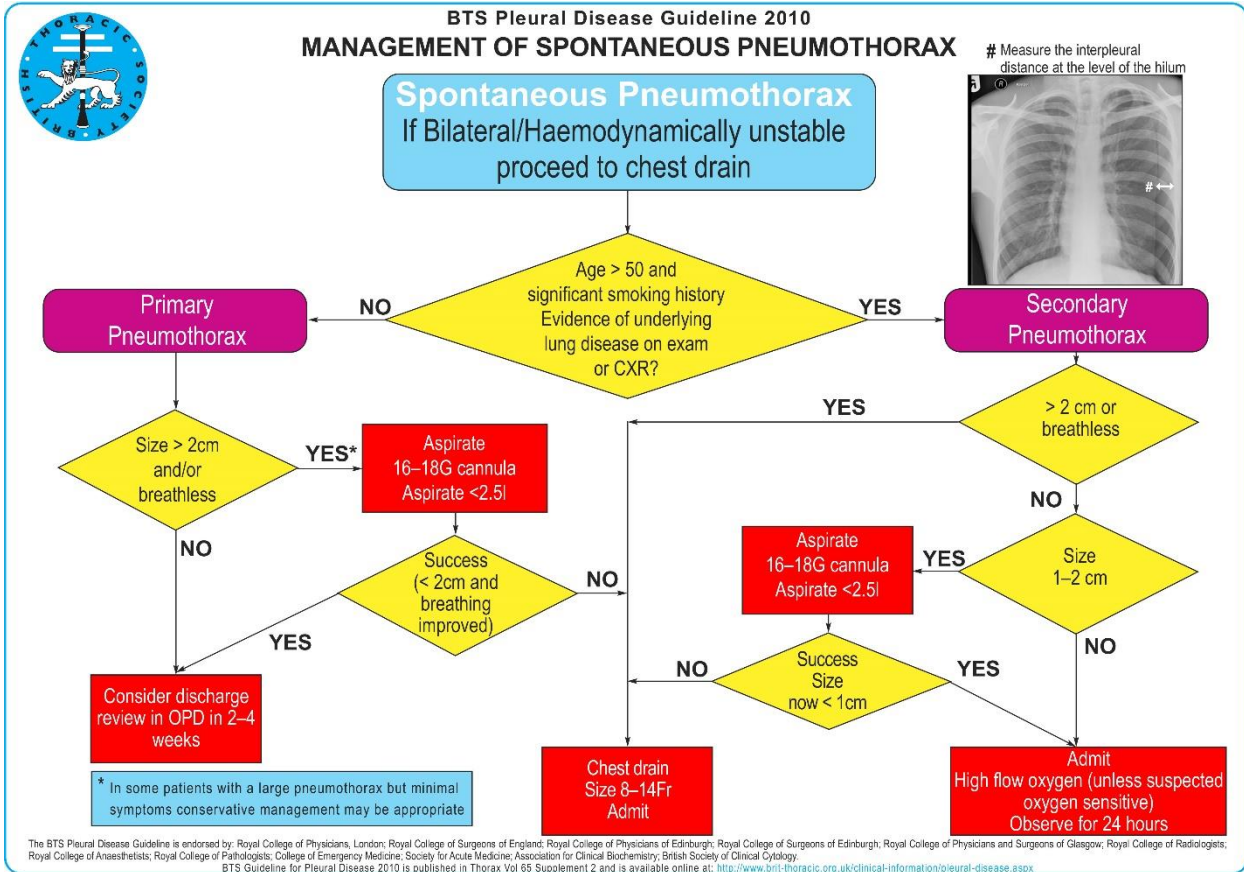
- Observation In small primary pneumothorax without significant shortness of breath.
- Patients with primary or secondary pneumothorax and significant breathlessness should undergo active intervention
 - Supportive oxygen therapy
 - Needle aspiration or chest drain (see BTS algorithm below)
 - Suction
 - High volume low pressure suction systems
 - Risk of re-expansion pulmonary oedema

Further management of a pneumothorax

- Surgical
 - Those with persistent air leak at 48 hours should be discussed with thoracic surgeons.
 - Surgical management options include:
 - Open thoracotomy and pleurectomy (give lowest recurrence rates)
 - VATs with pleurectomy and pleural abrasion (better tolerated)
 - Surgical chemical pleurodesis
- Medical pleurodesis
 - Considered for patients refusing/ not fit enough for surgery
- Ambulatory management with Heimlich valve
- Smoking cessation

Treatment of tension pneumothorax (a medical emergency):

- High-flow oxygen
- Emergency needle decompression
 - Large cannula, second intercostal space (just above third rib), mid-clavicular line
 - Converts tension to a simple pneumothorax
- Followed by chest drain insertion for definitive management



Complications of pneumothoraces

- Respiratory failure
- Conversion to tension pneumothorax
- Bronchopleural fistula
- Recurrence

Prognosis in pneumothorax

- Good if treated but recurrence is common: up to 30% overall.
- Mortality low, but increased in secondary versus primary pneumothorax

Common questions concerning pneumothorax:

- When can patients fly after a pneumothorax?
 - Only following complete resolution of a pneumothorax
- What about diving post pneumothorax?
 - Should be permanently avoided unless the patient has undergone bilateral surgical

pleurectomy and has normal lung function and CT chest scan postoperatively.

- What is catamenial pneumothorax?
 - Pneumothorax in women at the time of menstruation, often due to endometriosis
 - 90% in right lung
 - Treatment involves surgical and hormone therapy