

# **Diseases of the pleura**

**pneumothorax:** is the presence of air in the pleural cavity, there are many **.1**  
:classifications for pneumothorax include

## **:Classifications**

### **:A. pathophysiological classification**

**closed pneumothorax:** when air enter the pleural cavity but no further **.1**  
.movement of air in and out the pleural cavity

**open pneumothorax:** when air move freely in and out the pleural cavity (also **.2**  
.called sucking wound)

**tension pneumothorax:** when air move in one direction toward the pleural **.3**  
cavity, build up the pressure gradually until the pressure change from negative to  
positive inside the pleural cavity and when exceeding the pressure in the RT atrium  
it causes diastolic collapse and insufficient filling of the RT atrium with subsequent  
.valuable reduction in cardiac output and circulatory collapse

**B. classification according to severity:** for proper assessment of the severity,  
chest C-T scan or tow views Chest X-Ray is mandatory, accordingly pneumothorax  
.classified into: **1. Mild 2. Moderate 3. Severe**

### **:C. etiological classification**

**:traumatic pneumothorax (t.pneumothorax) .1**  
.Blunt trauma **.1**

**Penetrating trauma.** the penetrating trauma is divided into **.2**  
**a. accidental.** (stab wound, missile injuries, etc...)  
**.b. iatrogenic**

**.Diagnostic (FNAC and true cut biopsy).1**

**Therapeutic** (an old method for treatment of pulmonary TB).**2**

**:spontaneous pneumothorax(s.pneumothorax) .2**

**a. primary:** no visible or detectable underlying cause constitutes about 15-  
20% of s.pneumothorax, it is more common in male, asthenic group, and more on RT  
side, it may be due to **ruptured pulmonary bleb, rupture of cystic defect of the**  
**.pleura and teared visceral pleura**

**b. secondary:** due to visible or detectable underlying cause, it divided into  
**.Tuberculous:** due to pulmonary or pleural tuberculosis **.1**

**:Non-tuberculous:** due to other causes include **.2**

**.a. obstructive pulmonary disease (COPD, bronchial asthma)**

**b. Pneumonia**

**c. Lung malignancy**

**.d. Ruptured hydatid cyst or other pulmonary cysts**

**e. Spontaneous esophageal rupture**

**:Complications of pneumothorax**

**.pleural effusion .1**

**.empyema .2**

**.tension pneumothorax, leads to mediastinal shift and circulatory collapse .3**

**.respiratory failure in elderly patient with chronic obstructive air way diseases .4**

## **:Treatment**

- A. bed rest, O2 administration, and observation if mild pneumothorax in young patient with no or minimal symptoms
  - B. needle aspiration but with risk of lung injury
  - C. chest tube in the safety triangle (bonded by anterior axillary fold, posterior axillary fold and the 5<sup>th</sup> or 6<sup>th</sup> rib) anterior to the mid axillary line to avoid injury to the long thoracic nerve
  - D. bronchoscopy if fail to expand the lung in spite of all the above measures
  - E. pleurectomy: is the removal of the visceral pleura that trapped the lung and prevent adequate expansion, done through thoracotomy or thoracoscopy
- catamenial pneumothorax: is a rare form of pneumothorax occur within 72hrs. # of the onset of menstruation in patients between 30-40 yrs. Of life, it is either due to congenital diaphragmatic fenestration allow passage of air through the peritoneum to the pleural cavity or due to presence of ectopic endometrial tissue in the pleura (endometriosis)**

**hemothorax:** is the presence of blood in the pleural cavity, it is of 2 types **.2**

## **:Classification**

- A. **traumatic hemothorax:** due to **blunt** or **penetrating** chest trauma or in **post-operative** patients
- B. **spontaneous hemothorax:** due to the following possible underlying causes
  - pulmonary causes:** TB, non-TB pneumonia and AV malformation **.1**
  - pleural diseases:** torn vascular adhesion **.2**
  - malignancy:** primary and metastatic tumors **.3**
  - abdominal pathology:** hemoperitoneum with associated diaphragmatic tear **.4**
  - blood dyscrasia:** hemophilia **.5**
  - thoracic vascular cause:** ruptured diseased great vessel **.6**

## **:Clinical features**

dyspnea, chest pain and syncope (due to hypotension), Signs of hypovolemic shock, tachycardia, hypotension, sweating and decreased urine output and may be altered sensorium due to decreased cerebral blood flow, if left untreated or improperly treated it may end with **clotted hemothorax** with deposition of fibrin on the visceral pleura causing fibrosis with trapping of the lung (**trapped lung syndrome**)

## **:Treatment**

- .resuscitation and correct signs of hypovolemia **.1**
- thoracostomy tube for drainage of the pleural cavity and decompression of the lung **.2**
- thoracotomy needed early if the initial blood loss exceeds 1500 ml or the ongoing loss is more than 200ml/hr. for few hrs **.3**

**chylothorax:** is the presence of chyle or lymph in the pleural cavity, the lymph from the digestive system is highly rich in triglycerides drained by the lymphatic channels to the thoracic duct, any obstruction or disruption to this duct within the thoracic cavity lead to chylothorax. The drain identified by its turbid and milky like appearance, since chyle contains very high level of triglycerides, and it is **.3**

important to distinguish this condition from pseudo-chylothorax (pleural effusion with high level of cholesterol), which caused by more chronic inflammatory processes

**:Etiology**

- .congenital atresia to the thoracic duct, or birth trauma to the thoracic duct .1
- .traumatic, exogenous injury mostly happened with penetrating chest injury .2
- neoplastic, malignant tumor of the lymphatic tissue or malignant embolization .3
- .of the thoracic duct
- .infection, tuberculosis .4

**:Diagnosis**

Pleural fluid when drained appears milky, does not clot, contains fat (rich with triglycerides), fat soluble vitamins and antibodies

**:Treatment**

**conservative:** consist of insertion of chest tube to drain the effusion, correction of fluid and electrolytes disturbances, absolute restriction of diet containing triglycerides, and nutritional supplementation .1

**surgery:** includes ligation of the thoracic duct distal to the site of disruption, or at the site just above the diaphragm. The thoracic duct is so small and some time it may be missed intraoperatively, so the patient is asked to eat a diet which is rich with fat(cream) in the early morning of the day of operation, so it can be identified by the lymph that discharging from the site of disruption .2

**pleural effusion:** is the accumulation of fluid in the pleural cavity due to excessive transudation or exudation of the interstitial fluid from the pleural surface, it may signify some systemic or pleural diseases. Its effect depends on the amount of the fluid that accumulated in the pleural cavity (mild, moderate and severe or massive), and the status of underlying lung. It can be classified into two types according to the level of protein content of the fluid .4

**:Classification**

.%A. **transudate:** protein content **less** than **3gm**

.%B. **exudate:** protein content **more** than **3gm**

**Diagnosis:** clinically the patient presenting with dyspnea, chest pain and symptoms of the underlying disease, radiologically the chest X-ray shows concave meniscus sign

**:Etiology**

**transudate:** heart failure, renal failure, hepatic failure and other conditions .1

**exudate:** tuberculous pleurisy, malignancy and other diseases .2

**:Treatment**

**aspiration(thoracentesis):** under totally a septic condition, needle aspiration of the pleural fluid at site of safety triangle or posterior infrascapular site .1

**chest tube** with slow decompression if the amount of the fluid is massive or there is significant generalized pulmonary problem and in border line cardiac state .2

If the effusion is recurrent or the recurrence is highly anticipated and in malignant effusion we should obliterate the pleural cavity permanently by one of the two

ways

**chemical pleurodesis:** after complete evacuation of the pleural cavity, a 10-20ml of fluid containing material like tetracycline that induces intense inflammatory .1

process in the visceral and parietal surfaces is infused in the pleural cavity, ends with .firm adhesion between the two surfaces and obliteration of the cavity  
**pleurectomy:** is the removal of the whole pleura and allow the lung to be .2  
.adherent to the chest wall row surface opposing another row surface

**empyema:** or **pyothorax**, it is the accumulation of pus or purulent fluid in the .5  
pleural cavity, usually the patient is febrile, tachycardic and tachypneic with  
:diminished breath sound on the affected side. It passes into three stages

**:Stages of empyema**

.A. **acute phase:** the patient is toxic and the pleural fluid is clear

**B. transitional phase:** the patient is less toxic and the fluid getting more turbid  
.with decrease in the size of the lung

**C. chronic phase:** the patient less toxic but debilitated, the parietal pleura become  
thick and the visceral pleura forming a peel that trapping the lung leading to a  
.condition called trapped lung syndrome, the fluid amount is less but so thick

**:Treatment**

correction of the general condition of the patient including the nutritional state, .1  
fluid and electrolytes balance, correction of anemia and any other co-morbidity like  
.diabetes

chest tube insertion to drain pus from the pleural cavity, a sample of pus should .2  
.be send for AFB study, culture and sensitivity, PH, LDH and protein content

antibiotic cover should be initiated as early as possible starting with broad .3  
spectrum antibiotic then according to the results of culture and sensitivity, to be  
continued until the sign of toxicity subsided. These measures in most of the patient  
is sufficient but if the patient passed into the state of trapped lung syndrome so at  
that time the patient needs surgery i.e. thoracotomy with empyemectomy or  
decortication (removal of parietal and visceral pleura). It is better to wait 2-3 months  
.before considering surgery

