



## Review Literature On Pneumothorax

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### **Abstract: -**

Pneumothorax refers to air or gas in a pleura cavities and may be spontaneous ,traumatic or therapeutic. Pneumothorax is most commonly associated with emphysema, asthma and tuberculosis . pneumothorax may have as much clinical significance as a fluid collection in the lungs because it also causes compression , collapse, and ,atelectasis .

When defect acts as a flap valve and permits the entrance of air during inspiration but fails to permits the entrance of air during inspiration but fails to permits that creates the progressively increase pressure .

### **Key words :-**

Atelectasis , pneumothorax, emphysema , tuberculosis

### **Introduction:-**

Pneumothorax is on emergency condition of patient that should be treated immediately upon diagnosis. Pneumothorax is occur when an amount of air in chest increases markedly & one-way valve is formed leading to a tension.

When effective and proper treatment is given the pneumothorax is reversed unless this situation can progress & cause death of the individuals .

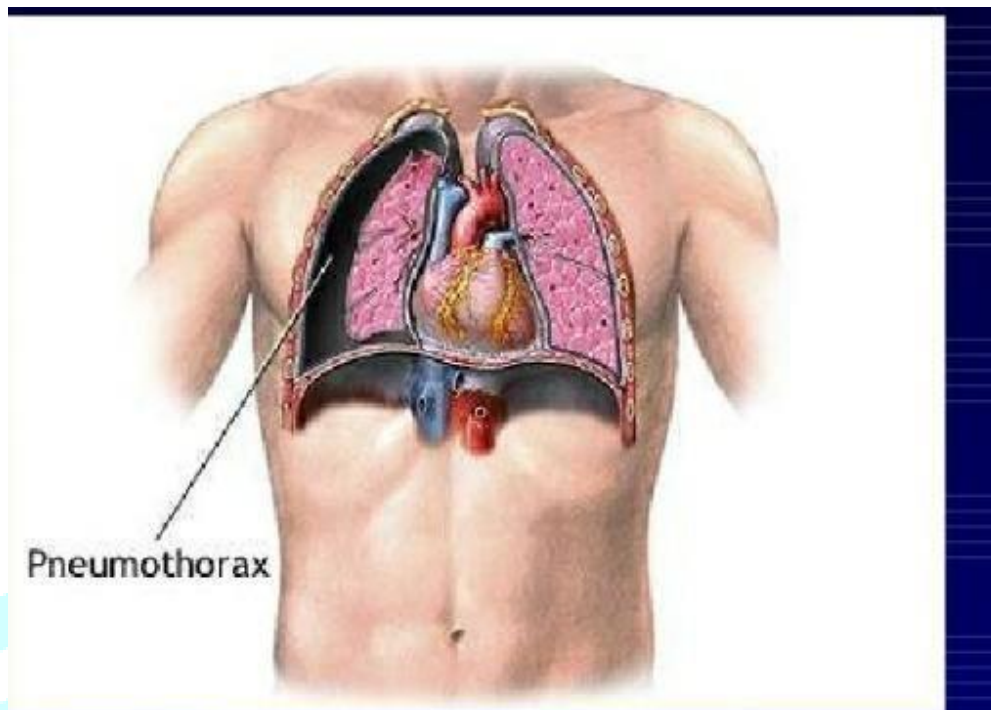
Pneumothorax can be caused by physical trauma to the chest is as a complication of medical or surgical intervention. The forms of disorder and medical attention can be vary so much extent .

Medical treatment involves inserting of a small tubes between the ribs or under the collarbone to release the gas that has collarbone to release the gas that has built up ,doctored prescribe various drugs to numb pain ,help remove toxins to prevent infection in the body .

This also require the serious attentions in the lungs diseases. Some pneumothorax may heads without any treatment. It may occur in young ,apparently healthy adults , usually men without any known pulmonary disease or as a result of sole thoracic or lungs disorder ,such as emphysema or a fractured rib .

Secondary pneumothorax occurs with rupture of any pulmonary lesion situated close to the pleural surface that allows inspired air to gain access to the pleural cavity. Such pulmonary lesions include emphysema, lung abscess, tuberculosis carcinoma, and many others.

Secondary Pneumothorax occurs in the presence of existing lung pathology (2).



**Fig.1.pneumothorax**

#### **Causes:-**

- Tobacco smoking
- Molecular genetics
- Industrial hazards
- Air pollution

The evidence provided by statistical and clinical observation establishing a positive relationship. The amount of daily smoking. The tendency of inhale and the duration of the smoking habit. Cessation of smoking for 10 years reduce risk but never to control levels.

Clinical evidence is obtained largely through observation of historical changes in the lining epithelium of the respiratory tract in habituated smokers more than 120 substances have been counted in cigarette smoke, many of which are potential carcinogens. Experimental work has consisted mainly of attempts to induce cancer in experimental animals with extract from tobacco smoke.

Air pollution may play an important role. Pleural effusion, the presence of fluid in the pleural space, can be either a transudate or an exudate.

A pleural effusion that is a transudate is termed hydrothorax. It can cause a shift of the mediastinum and compromise a thermodynamic stability. Air can enter the intrapleural space through a communication from the chest wall or through the lung parenchyma across the visceral pleura. (3)

**Symptoms: -**

This symptoms trends no the life threatening this way required emergency treatment this is serious condition for patient some time the death way occur due to shortness of the breath due to low of oxygen.

Primary spontaneous pneumothorax tends to occurs in a young adult without underlying lung problem people who are affected by a PSP more commonly occur during changes in atmosphere pressure , explaining to some extent why episode of pneumothorax may happens in clusters .

Symptoms in SSP tends to be more severe than in PSP ,as the unaffected lungs are generally unable to replace the loss of function in the affected lungs .

## 1) Shortness of breath

Pneumothorax have various causes these is caused chest injury , lungs disease , ruptured air blister ,

Mechanical ventilation , are the risk factors .

More the damaged due to lungs tissue and occurs the collapse. The air is leak into the space that the surroundings of the lungs . The ruptured lungs tissue leads to lost of the air into space . (4)

**Diagnosis: -**

Diagnosis of a pneumothorax by physical examination alone can be difficult. Other symptoms in similar symptoms include a hemothorax . A small spontaneous pneumothorax may cure without treatment and require only monitoring. This approach may be most appropriate in people who have no underlying lung disease.

The diagnosis of the pneumothorax done by using of the chest x-ray in some case computerized tomography also used.

Ultrasound imaging also used and X-ray or computed tomography (CT) . In the non-serious situation doctors will firstly examine the physical look of the person's for signs of the disorders.

Doctors questioned the patients about their medical history and various bad habit . Doctors use x-ray to take the images of the chest and look for signs of inhaled fully and hold their breath.

Ct scans are used to get a better image of the lungs them x-ray provides . Ultrasound provides a quick way to view the size and severity of the pneumothorax which prevents permanent damage or death. (5)

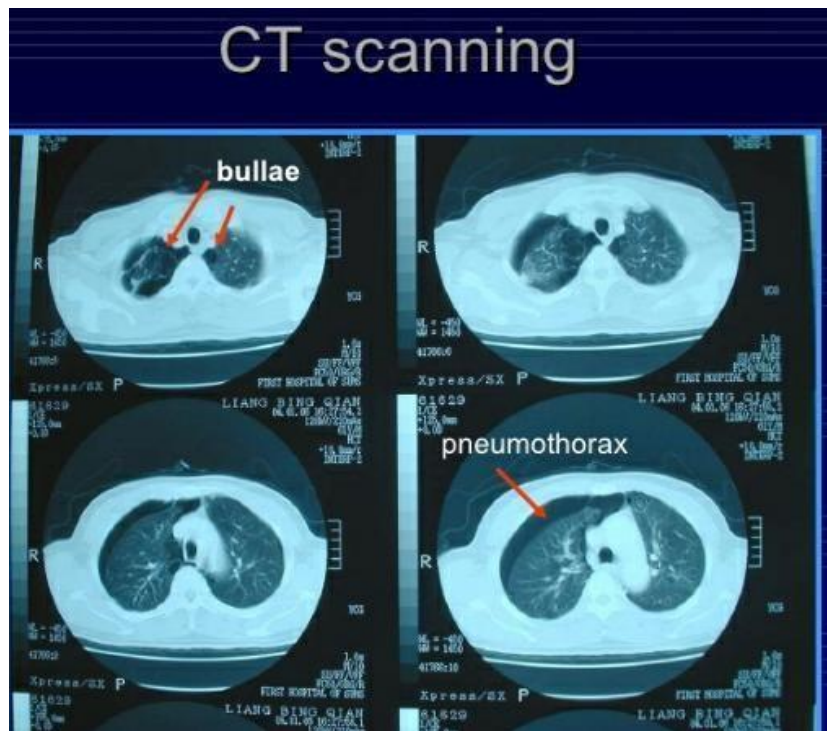


Fig .2.C T scanning

## Classification of Pneumothorax

1. Primary
2. Secondary

### 1. Primary Pneumothorax

Primary Pneumothorax is considered the one that occurs without an appeared cause and in the absence of without lung disease . A primary spontaneous pneumothorax tends to occur in a young adult without underlying lung problem . More commonly occure during changes in the atmosphere. It is rare to cause a tension pneumothorax.

The cause of the primary Pneumothorax has not been identified .

- Severed risk tours are identified such as smoking, male sed, rouily history of Pneumothorax.
- PSP tends to occur in young adult without underlying lung problems.
- Chest pain & mild breathlessness are main symptom.

### 1. Secondary Pneumothorax

- Occur due to chest diseases they mostly observed in patient with chronic obstructive disorder (Copd)
- Which are have approximately 70 % cases.

Tuberculosis, necrotizing, pneumonia, pneumocystis cariri lung cancer, sarcoma , Secondary Pneumothorax occur in the presence of the existing lung Pathology

Involving the lung sarcoidornis, endometriosis, cystc fibrosis, rheumatoid arthritis incense the risk of the Pneumothorax

## Traumatic Pneumothorax :-

- Traumatic Pneumothorax occurs when the chest wall is pierced, such as when a stab wound & gunshot wound allows it to enter the pleura space.
- Traumatic Pneumothorax occur with rib fractures being more common in this group
- This occurs to patients who already receiving mechanical ventilator for some other person.

## Etiology & Pathogenesis:-

- When a communication develops between an alveolus or other intrapulmonary air space and pleura space.
- Air will flow into the pleural space until there is no longer a pressure difference or until the communication is sealed.
- When a communication develops through chest wall between the atmosphere and the pleural space.
- Air enters the pleural space until the pressure gradient is elevated and the communication is closed.
- There are several possible complications of pneumothorax.
- A ball valve leak may create a tension pneumothorax that shifts the mediastinum.
- Compromise of the pulmonary circulation may follow and may even be fatal.
- If the leak seals the lung is not reexpanded within a few weeks.
- In these cases, serious fluid collects in the pleural cavity and creates hydro pneumothorax. (6)

### Tension pneumothorax

Tension pneumothorax can develop from either a spontaneous

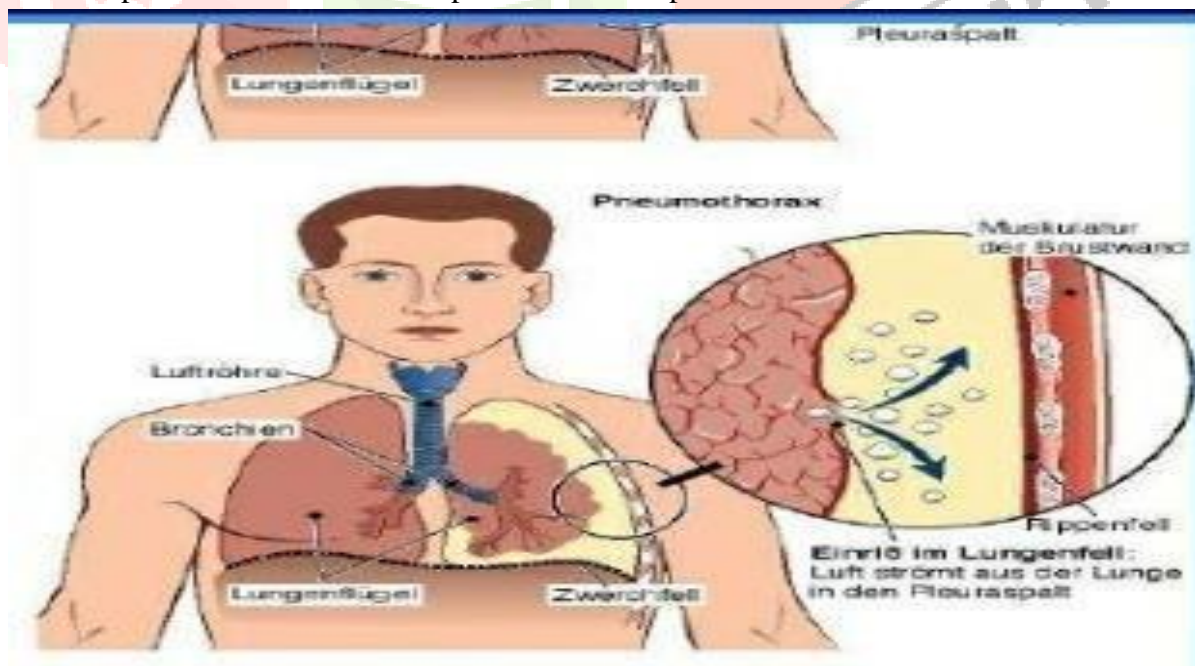


Fig .3 tension pneumothorax

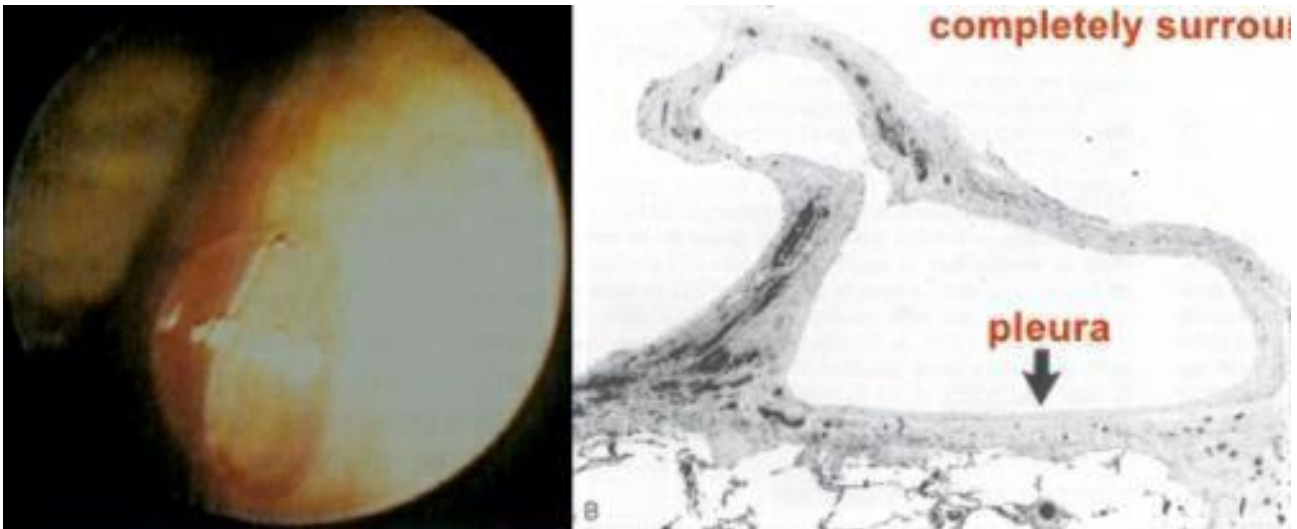
- With prolong collapse, the lungs becomes vulnerable to infection , as does the pleural cavity when communication between it and the lung persists .
- Secondary Pneumothorax tends to be recurrent if the predisposing condition remains . What's is less readily understood is that simple pneumothorax is also recurrent.

The collection of whole blood in the pleural cavity , and is almost always a fatal complication of a rupture intra thoracic aortic aneurysm .

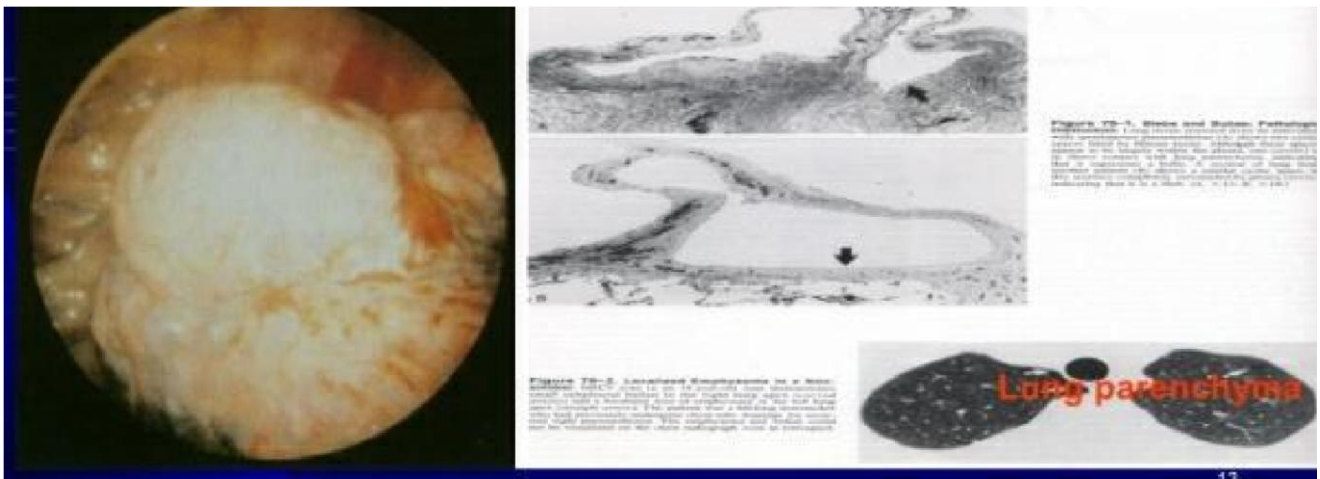
- With hemothorax in contrast to blood pleural effusion, the blood clots within the pleural cavity .
- Cyclothorax is a pleural collection of a milky lymphatic fluid containing microglobules of lipids .
- the total volume of fluid may not be large , but cyclothorax is always significant because it implies obstruction of the major lymph ducts , usually by an intrathoracic cancer .
- This entity is encountered in relatively young people appears to be due to rupture of small , peripheral , usually atypical sub pleural blebs and usually subside spontaneously as the air is absorbed .
- The thoracic cavity is the space inside the chest that contains the lungs , heart and numerous major blood vessels .
- On each side of the cavity , pleural membrane covers the surface of lungs.
- Primary spontaneous pneumothorax occurs at rest , although some cases occur during diving and high altitude flying . (7)
- Catamenial pneumothorax is a rare form of secondary spontaneous pneumothorax that occurs within 48 hours of the onset of menstruation in pre menopausal women and sometimes in post also who are taking estrogen .
- the causes is intra thoracic endometriosis , possibly due to migration of peritoneal endometrial tissue through diaphragmatic defects or mobilization .
- This condition develops when injured tissue forms a one way valve , allowing air inflow with inhalation into the pleural space and prohibiting air out flow .
- As the pressure increases , the ipsilateral lungs collapses and causes hypoxia . Hypoxia results as the collapsed lungs on the affected side and the compressed lungs on the contralateral side compromise effective gas exchange.
- This hypoxia and decreased venous return caused by compression of the relatively thin walls of the atrial impair cardiac function .
- Linking of the inferior venal cava is thought to be the initial event restricting blood to the heart . It is most evident in trauma patient who are hypovolemic with reduced venous blood return to the heart .

**Thoracoscopic studies:-**

- Blebs
- Air filled spaces between the lung parenchyma and the visceral pleura.
- Blebs were presumed to be more common in those classically at risk of pneumothorax due to mechanical factors .
- In primary spontaneous pneumothorax, blebs can be found in 77% of cases , compared 6% in general population without a history .

**Fig .4 . Blebs****Bullae:-**

- Air filled spaces within the lung parenchyma itself .
- In secondary spontaneous pneumothorax ,vulnerable in lungs tissue are caused by a variety of disease.
- The rupture in the bullae in cases of severe emphysema .
- Area of necrosis may precipitate episode of pneumothorax, although the exact mechanism is unclear.
- The upper pulmonary lobe grows more quickly than the vasculature , causing a lack of blood supply and development of bullae .
- In the tall individual ,the negative pleural cavity pressure is increased at the upper pulmonary pressure increases.



**Fig .5. Blulle**

**Treatments:-**

- The main achievement in the treatment of pneumothorax is to relieve the pressure on your lungs
- The treatment way in dude observation needle aspirations chest tube insertion, nonsurgical repair or surgery .
- Treatment depends on the physician that is going to handle the patients.
- Pulmonary medical thoracoscopy (minimally invasive ) one port while thoracic surgeon use a surgery suite and two parts .
- In traumatic pneumothorax, chest tubes are usually inserted and these patients are handled by thoracic surgeon as other chest organs might be affected.
- If mechanical ventilation is required , the risk of tension pneumothorax is greatly , increased and the insertion of chest tube is mandatory .

Tension pneumothorax is usually treated with urgent needle decompression.

There are several causes where silent lungs is observed and needle decompression may be required before transport to The hospital upon the site of the accident.

- The treatment includes antibiotics, pain medicines ,sedatives .
- Antibiotics are used to give a help treat or prevent on infection. NSAIDs are used to reduce the pain before increases severity. Sedatives are given to help you stay calm and relax.
- The asthma seal is a specially designed device that adheres to the chest wall and through a valve like mechanism , allows air to escape but not to enter the chest .
- Further investigation of may be performed as an outpatient ,at which time x ray are repeated to confirm improvement. , and advice given with regard to preventing recurrence .
- 
- There is however given at a high flow rate may accelerate resorption as much as four fold .the gas within the pleural cavity gas .
- Oxygen is absorbed 62 times faster than nitrogen and carbon dioxide Is absorbed 23 times faster than oxygen.
- When the patient inhales 100% oxygen , nitrogen will disappear from the pleural cavity , leaving only oxygen, which is absorbed faster from the pleural cavity into veins . (8)



**Goals :-**

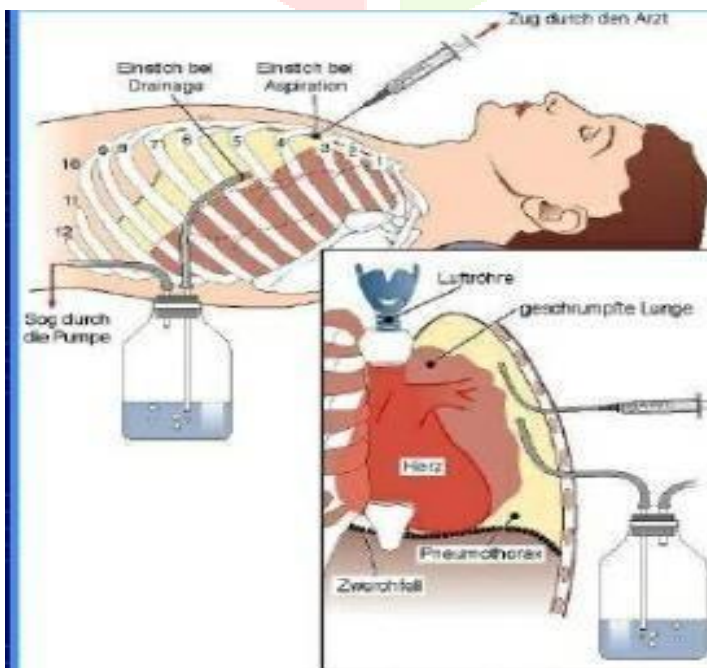
- To promote lung expansion
- To eliminate the pathogenesis
- To decrease pneumothorax recurrence

Treatment options according to

- Classification of pneumothorax
- Pathogenesis
- Pneumothorax frequency
- The extension of lung collapse
- Severity of disease
- Complication and concomitant underlying diseases
- Treatment of depend on the physician that is going to handle the patient.

**Aspiration:-**

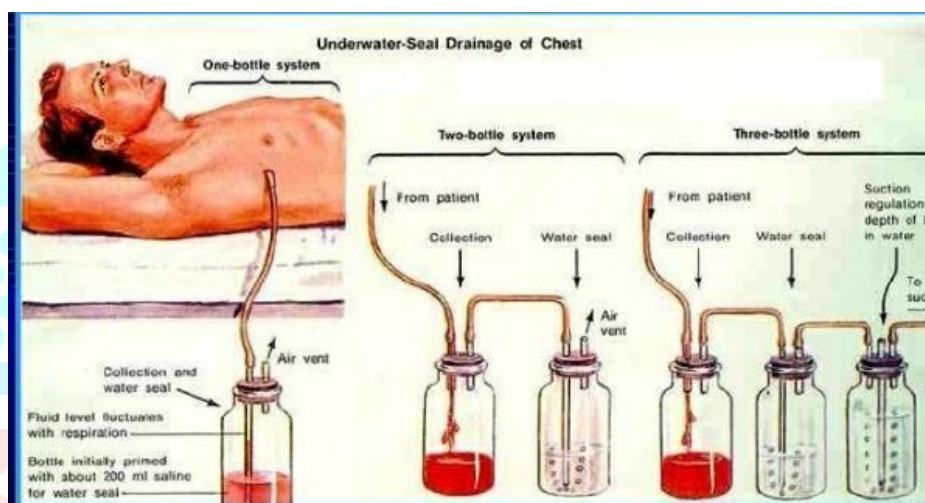
- Reducing the size by aspiration is equally effective as the insertion of a chest tube.
- In order to program this procedure administration of local on aesthetic is necessary inserting a needle
- Upto 2.5 liters of air is used in adults
- When comared to tube draingatge first live aspiration in PSP reduces the no of people requing hospital andmission significout without increasing the risk of complication
- Aspiration may also be considered in secondary pneumothorax of modern size without breathlessness
- American professional guidelines states that alla large pneumothorax even those deu to PSP should be treated with chest pain .
- If there has been significant reduction reduction in the size of the pnemothorax on subsequent x ray
- Aspiration reducing the size by aspiration is equally effective as the insertion of a chest tube (9)

**Catheter aspiration :-**

**Fig .5.cathetr aspiration**

Intercostal tube :-

- Intercostal tube is the most definitive initial treatment of a pneumothorax.
- These are typically inserted in an area under the axilla called safe triangle .
- Intercostal tube are required that have not respond to needle aspiration.
- They are connected to a one way valve system that allows air to escape , but no to re enter ,the chest
- Intercostal tubes are used first line when pneumothorax occurs in people with aids usually dur to underlying pnemocystis pneumonia .
- As this condition is associated with prolonged air leakage .
- Bilateral pneumothorax is relative common in people with pneumocystic pneumonia and surgery is often required .



**Fog . 7 . Intercostal aspiration**

**Surgery :-**

Surgery is essential or necessarily to close the air leak . Surgery can be performed through small incision , using a tiny fibre optic camera and narrow ,long handles surgical tools .

For the surgery of the pnemothorax doctor of departments includes pulmonary medicines ,radiology, thoracic surgery, radiology research.

- 1) Thoracotomy
- 2) Pleurectomy

The surgical thoractomy done for pneumothorax for identification of any source of air leakage and stapling of blobs , which is followed by pleurectomy of the other pleural layer and pleural abrasion of the inner layers is considered most effective .

Before the procedure of the surgery you may receive the local anaesthetic at your skin this give to numb the area and dull your pain so you feel more comfortable during your procedure or surgery.

Needle aspiration is a process during which a needle covers with a tube is put through your skin and into pleural space .

Chest tube may be placed to remove air blood ,or fluid from around your collapsed lungs. This allows your lungs to fill up air when you breath and helps your heart beat normally .

Pleurisies is such as iodine or talc powder to irritate the walls of your pleural space video -assisted thoracoscopy surgery is surgery done to look inside your chest with a video scope during surgeon .pleuridesis is a procedure that permanently eliminates the pleural space and attaches the lungs to the chest wall .

Good results are obtained with thoracotomy with identification of any source of air leakage and stapling of blades followed by pleurectomy.

Tetracycline , minicycline or doxycycline are used for the achievement of chemical pleurodesis .

Results of chemical pleurodesis tend to be worse than when using surgical approaches. But talc pleurodesis has been found to have few negative long term consequences in younger ppeople.

In a clinically stable patient diagnosed with a large pneumothorax or a clinically unstable patient , AACP recommends chest tube placement, except in patient s diagnosed with a very small pneumothorax and respiratory symptoms. (10)

### **Conclusion:-**

The treatment and diagnosis of the pnemothorax depend on the training of the pulmonary physician who handles such a patients . If the medical thoracoscopy can be applied then it could be the first option. The medical thoracoscopy has not provided previously a solution for a patient then a thoracic surgeon or an experienced general surgeon should take over to provide a solution for patients. There are various types of the pneumothorax . (11)

According to the types of the pnemothorax treatment are divided . That why the diagnosis of the type of pneumothorax is essential .

Pneumothorax are treated according to the severity of the pain. The greatest clinical attention attracted by the spontaneous idiopathic pneumothorax. Pneumothorax can be difficult to diagnose and to treat . A person needs to work closely with their doctor to make sure the treatment is going in right direction .

Doctors may prescribe various drugs to numb pain , helps remove toxins or prevent the infection in the body . Some people may need oxygen if their lungs capacity is sufficient (12,13)

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