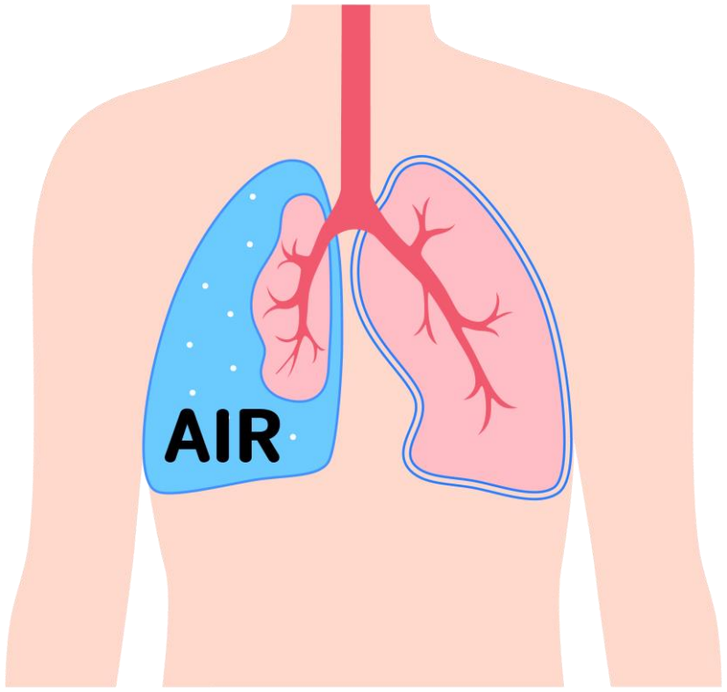
슬기로운 1년차 생활+

일반흉부편

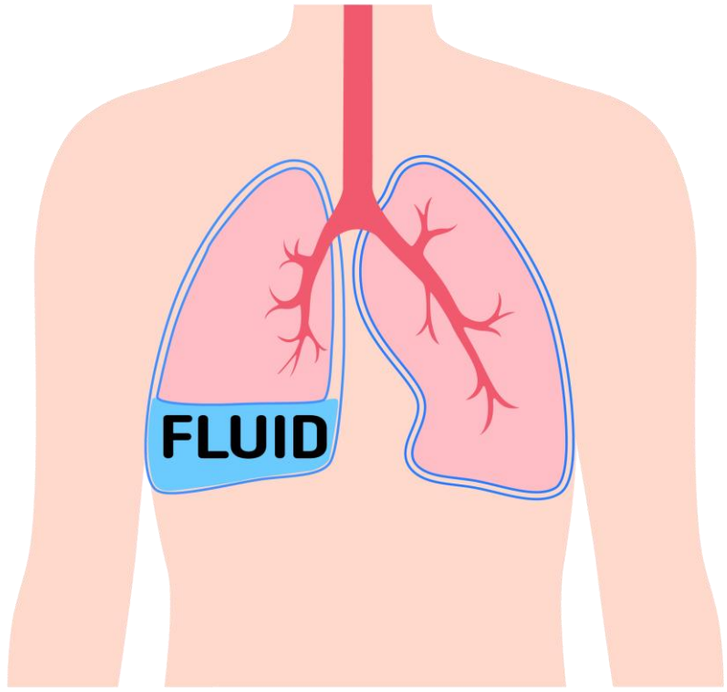
Jun Hee Lee

Department of Thoracic and Cardiovascular Surgery,
Korea University Guro Hospital

Today's agenda



1. Pneumothorax

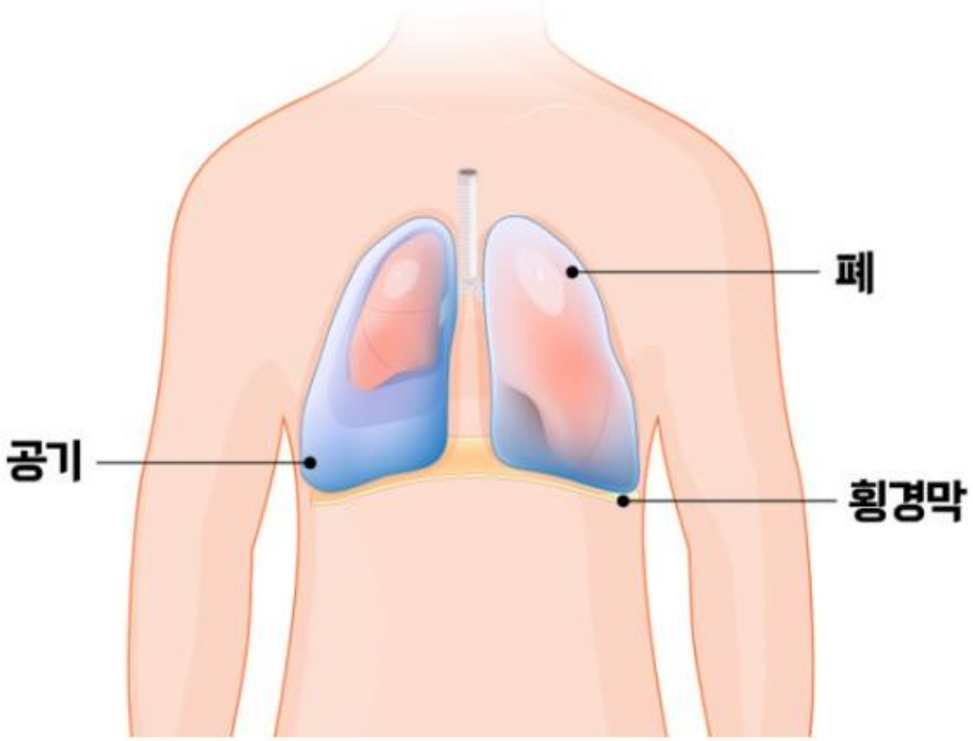


2. Pleural effusion

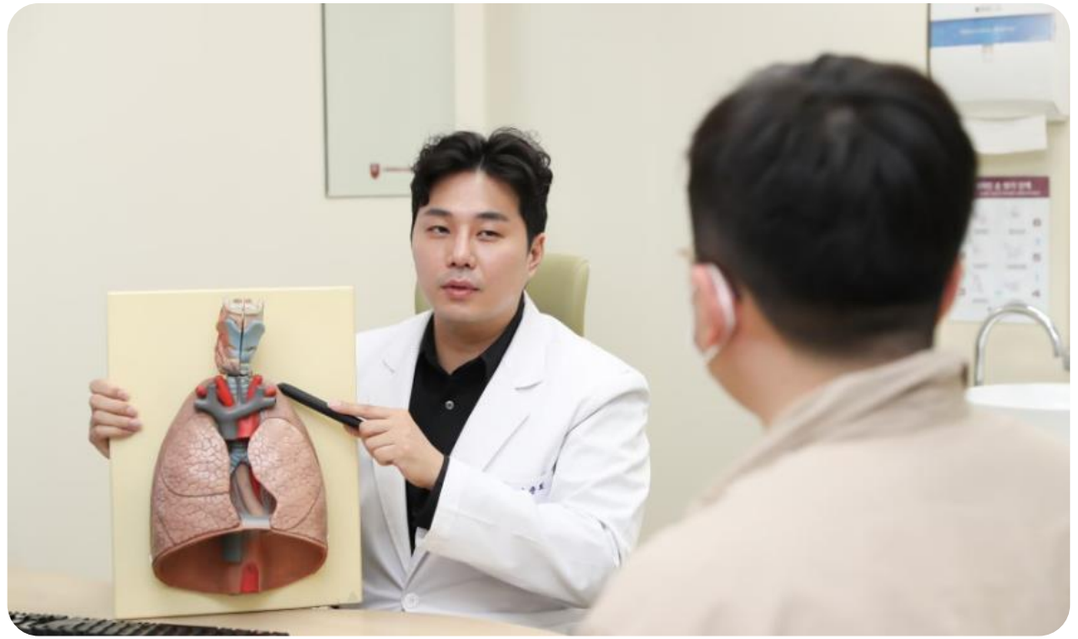
Pneumothorax : Introduction

기흉 Pneumothorax

공기주머니에 해당하는 폐에 구멍이 생겨 공기가 새고
이로 인해 흉막강 내에 공기나 가스가 고이게 되는 질환



고려대학교구로병원
KOREA UNIVERSITY GURO HOSPITAL



Pneumothorax : Epidemiology (KOREA)

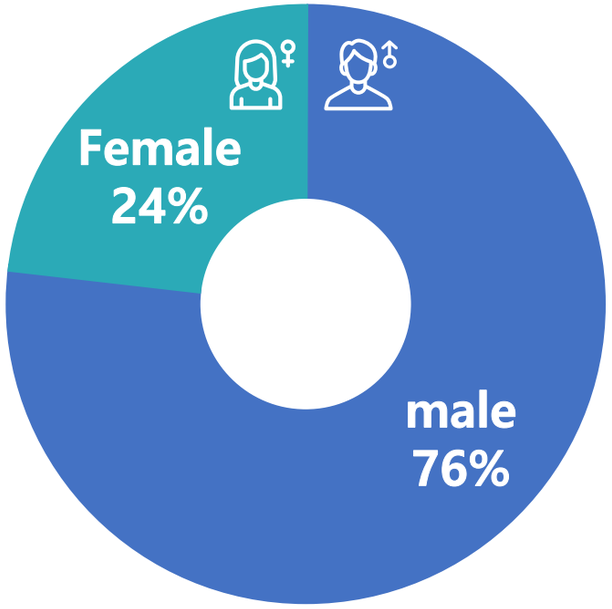
슬기로운 1년차 생활+

AGE

2020~2022 Age distribution among pneumothorax patients

SEX

Sex distribution among pneumothorax patients



Two peaks of incidence

- Between 20-30 years: Primary spontaneous PNX (PSP)
- Between 60-70 years: Secondary spontaneous PNX (SSP)

Male >> female

- Smoking prevalence
- Anatomy?, hormonal differences?. physical activity ?

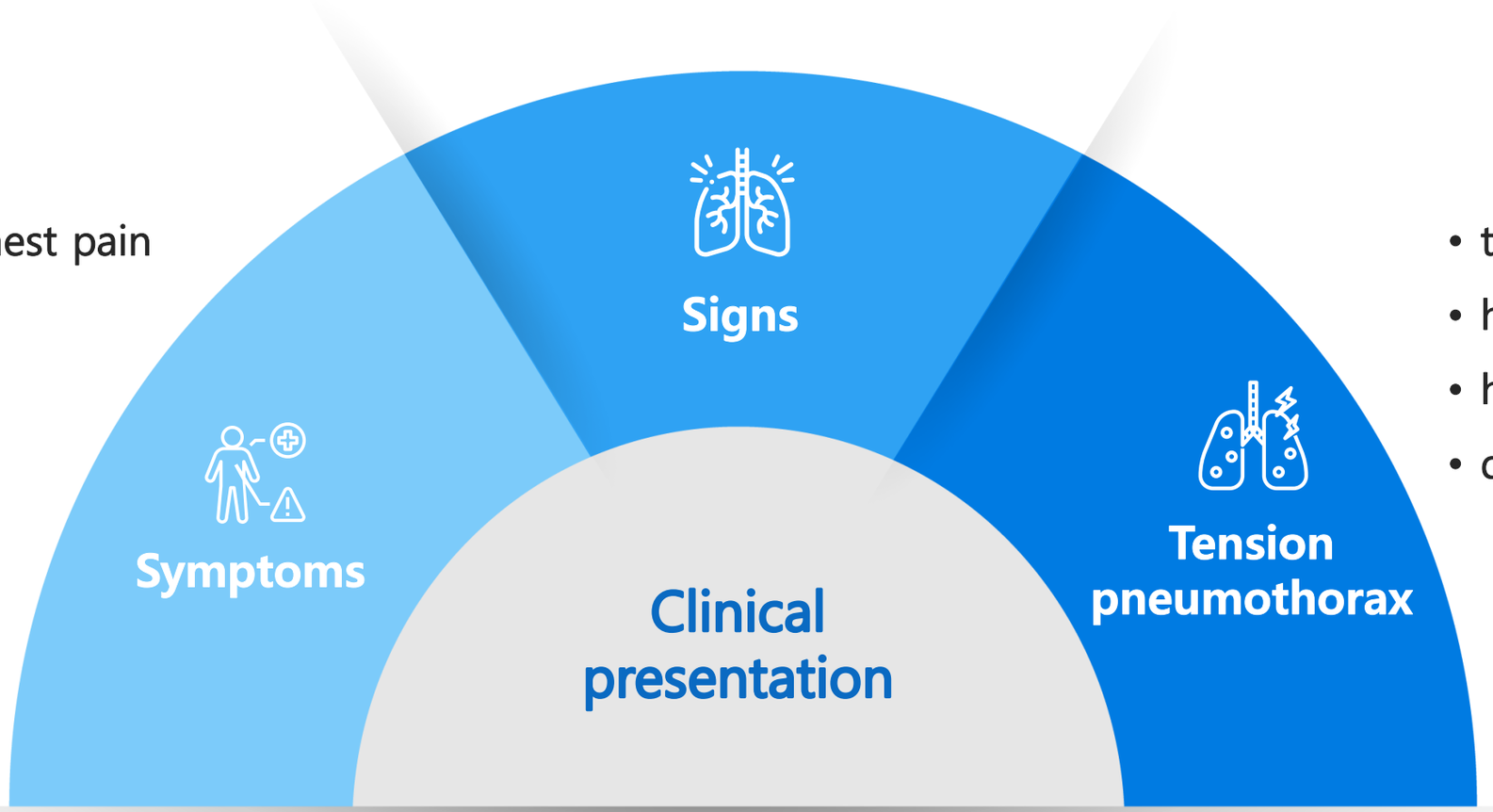
Pneumothorax : Type

Pneumothorax

- **Traumatic**
  - **Iatrogenic**
    - Interventional procedure
    - Positive pressure ventilation
  - **Non-iatrogenic**
    - Penetrating trauma
    - Blunt trauma
- **Spontaneous**
  - **Primary**
  - **Secondary**

Ref. : Graundy et al. 2012

Pneumothorax : Clinical presentation



- acute pleuritic chest pain
- dyspnea
- cough

- decreased breath sounds
- hyperresonance
- decreased chest movement

- tracheal deviation
- hypotension
- hypoxemia
- distended neck veins

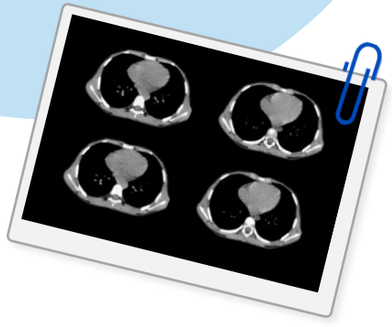
Pneumothorax : Diagnostic imaging

Chest X-ray

- visible pleural line
- absent lung markings peripherally

CT chest

- more sensitive
- detects small pneumothorax



Ultrasound

- absence of lung sliding
- Barcode/stratosphere sign

Pneumothorax : Diagnosis

Chest X-ray

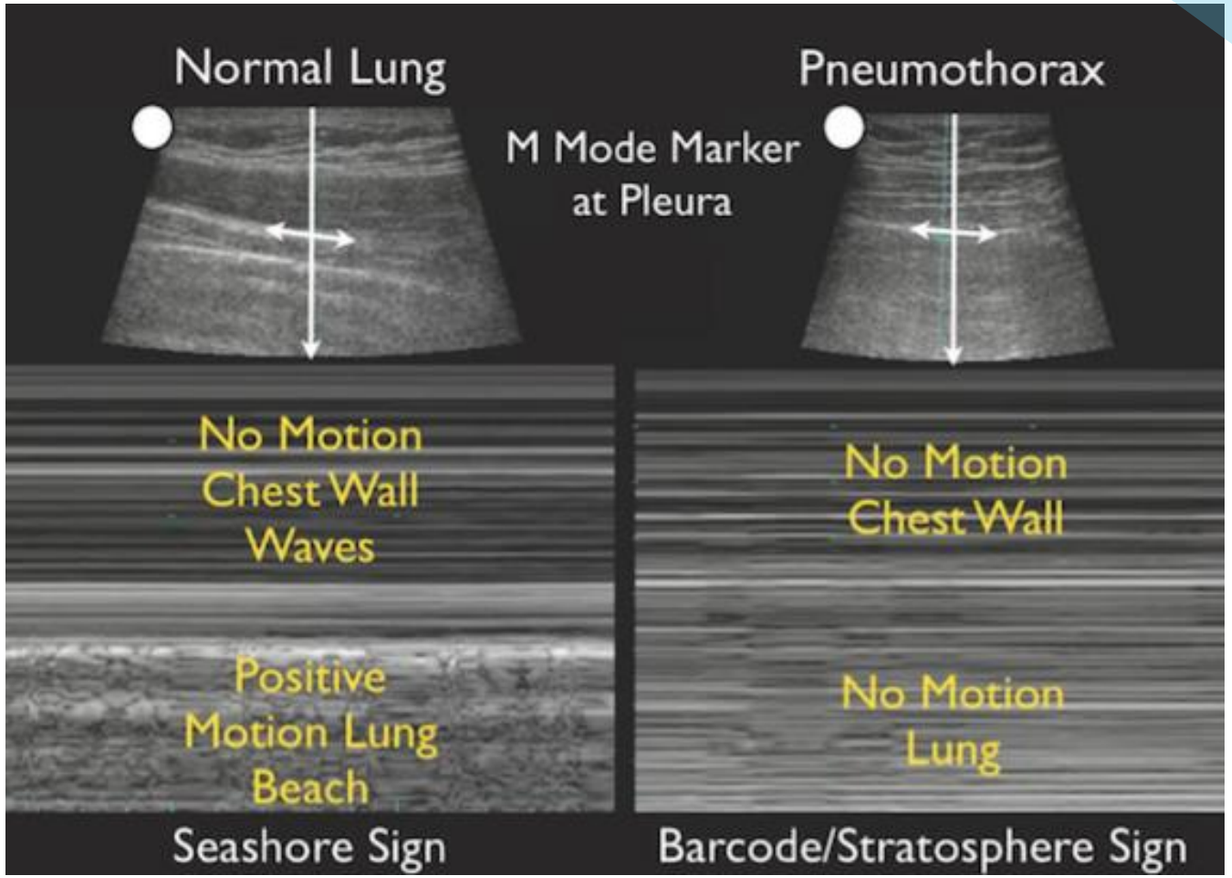
Chest CT

Pneumothorax : Diagnosis

Ultrasound

higher sensitivity than a supine chest x-ray for the identification of pneumothorax after blunt trauma and can be used at point-of-care.

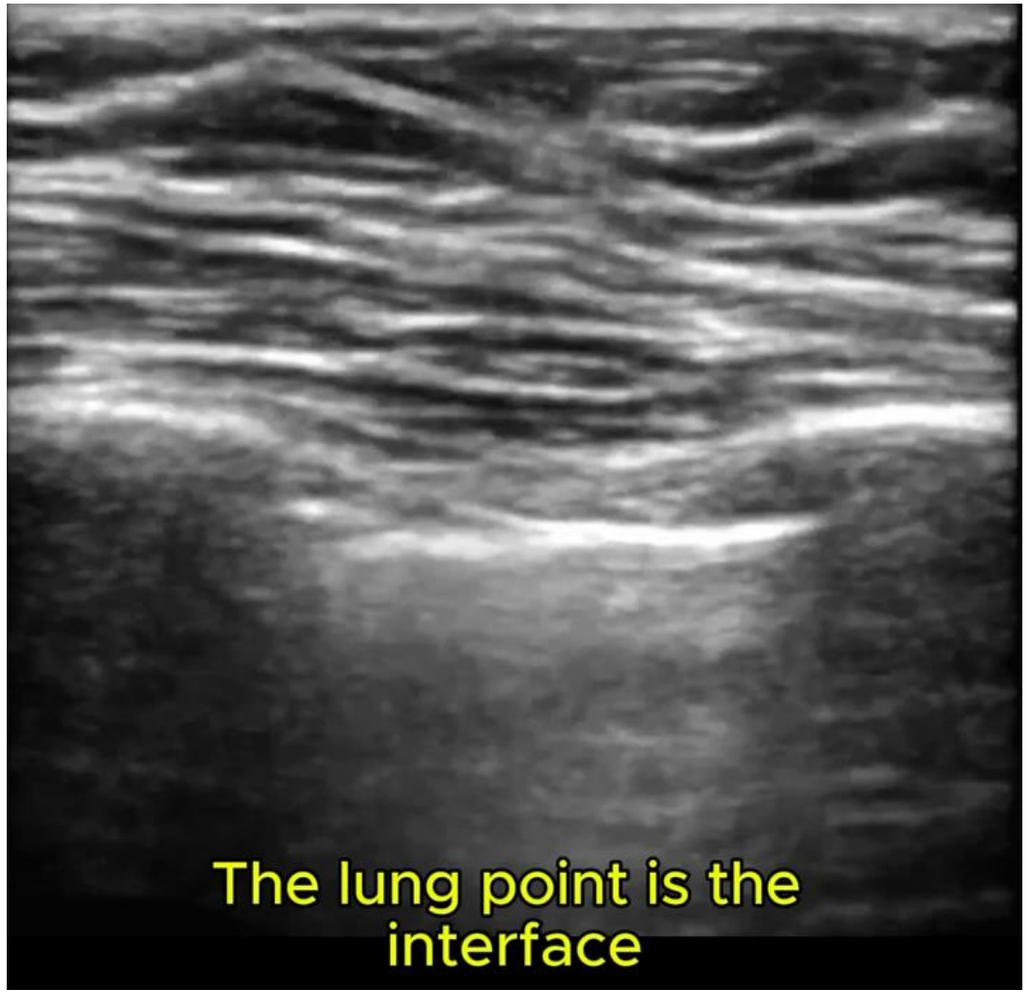
Normal Lung Sliding ("ants marching on a line")



Pneumothorax : Diagnosis

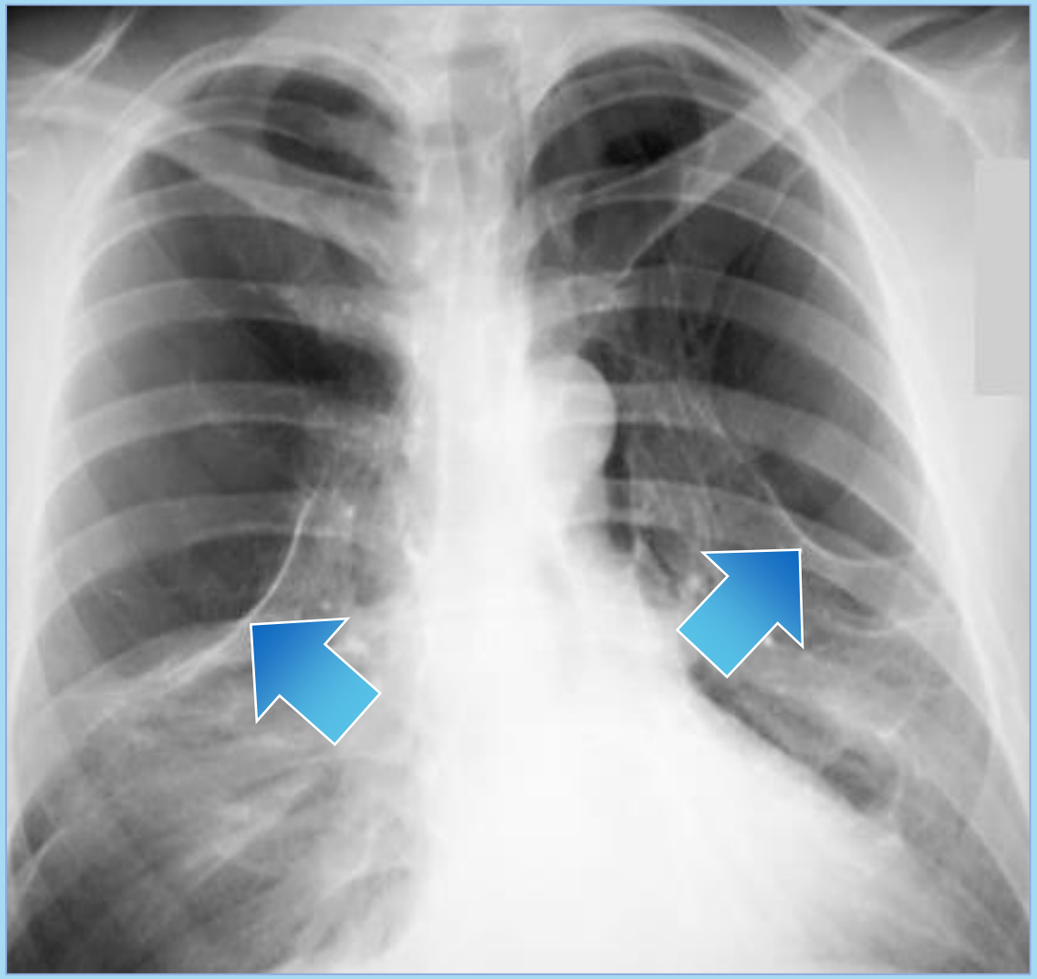
Ultrasound

Lung point



Pneumothorax : Radiologic differential diagnosis

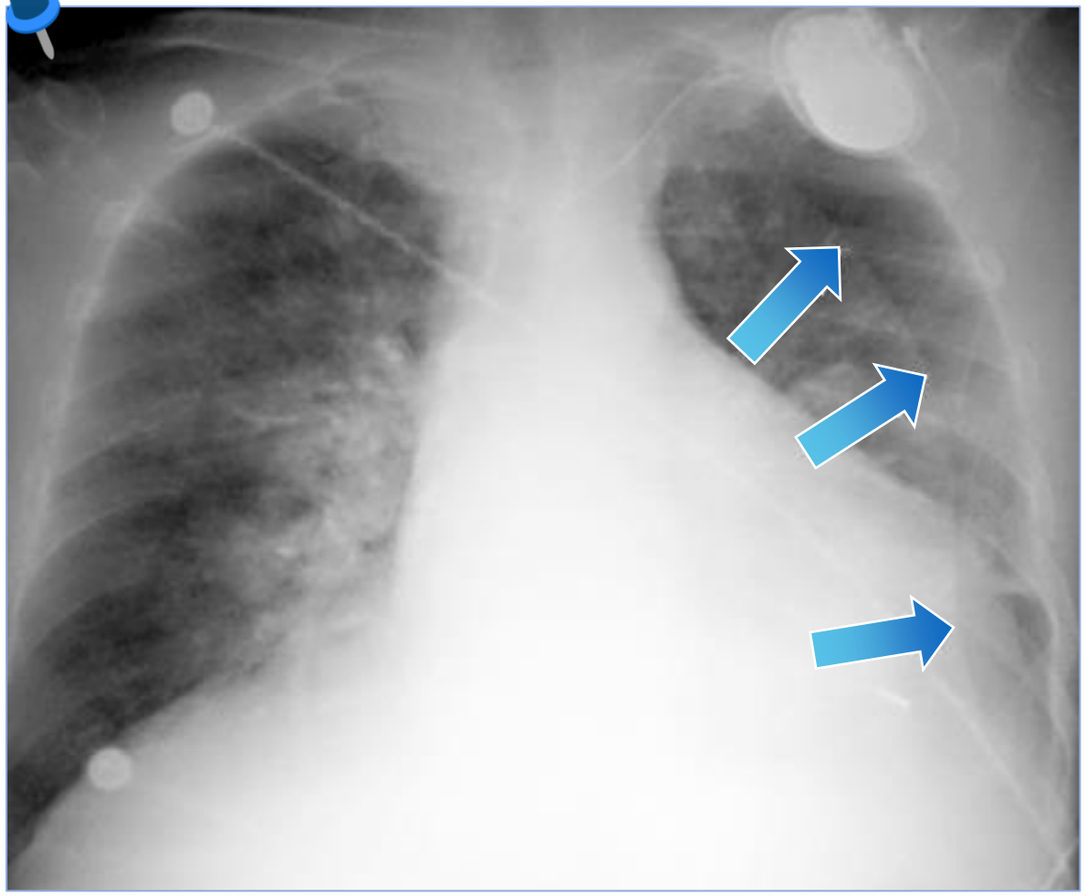
슬기로운 1년차 생활+

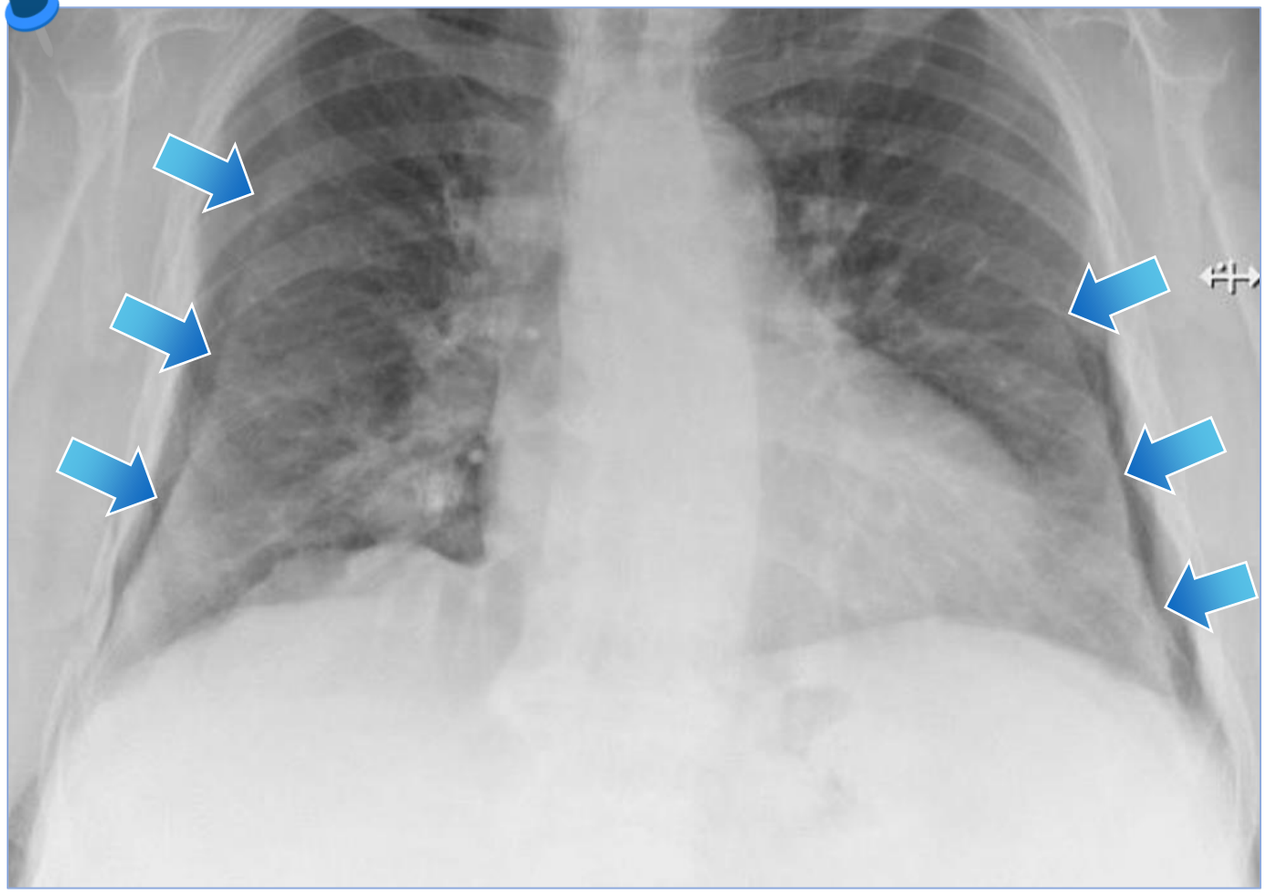


Bulla mimicking pneumothorax

Pneumothorax : Radiologic differential diagnosis

Skin fold mimicking pneumothorax





Pneumothorax : Treatment

Depends on type, size, symptoms, underlying disease

Observation

- small
- asymptomatic
- stable primary spontaneous pneumothorax

Oxygen therapy

- accelerates resorption

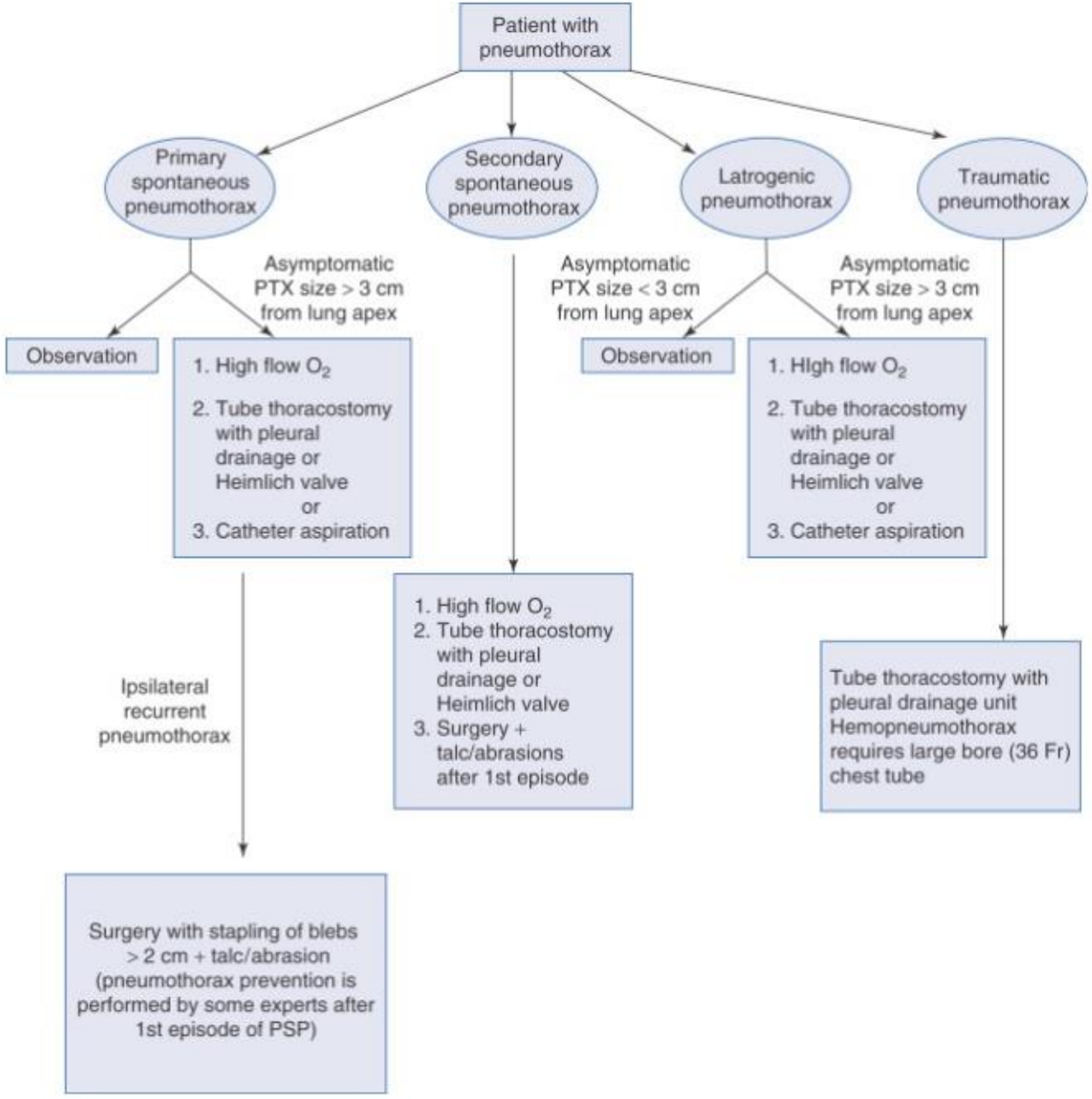
Needle aspiration

Tube thoracostomy

Surgery

- VATS
- thoracotomy
- pleurodesis

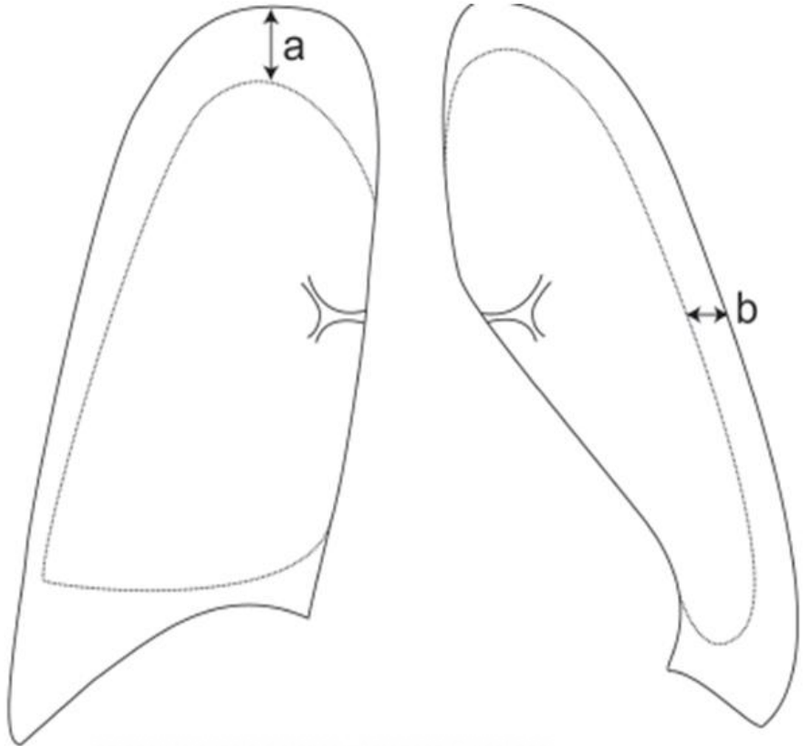
Pneumothorax : Treatment



Ref:. Medical Management of the Thoracic Surgery Patient

Pneumothorax : Treatment

Size of pneumothorax



- a = apex to cupola distance – American Guidelines
- b = interpleural distance at level of the hilum – British Guidelines

a :

- The *American College of Chest Physicians*
  apex-cupola distance > 3 cm

b :

- The *British Thoracic Society*
  interpleural distance at the hilum >2 cm

- *Belgian guidelines*
  dehiscence over the entire length of the lateral chest wall
- *Light's index (see image below)*
  calculative approach that involves the diameter of the collapsed lung (L) and the diameter of the inner hemithorax at the hilum (H) with estimated pneumothorax size = (1 – L3/H3) x 100 of ≥20% defined as large

Indication for tube thoracostomy

01 Patients with tension pneumothorax (rare in PSP)

02 Patients with severe dyspnea

03 Patients who are clinically stable and fail observation or aspiration or in whom aspiration cannot be performed due to lack of expertise

04 Patients with bilateral pneumothorax

05 Patients with complex loculated pneumothorax (unusual in PSP)

06 Patients with concurrent hemothorax

07 Patients with a pleural effusion necessitating drainage

Pneumothorax : Treatment

Indications for Surgery in Primary Spontaneous Pneumothorax

First episode

- Prolonged air leak
- Non–re-expansion of the lung
- Bilateral pneumothorax
- **Hemothorax**
- Tension pneumothorax
- Complete pneumothorax
- Occupational hazard
- Absence of medical facilities in isolated areas
- **Associated single large bulla**
- Psychological

Second episode

- Ipsilateral recurrence
- **Contralateral recurrence**

Emergent Thoracostomy ?

Tension pneumothorax

History taking,
Risk of re-expansion edema

immediate needle decompression

chest tube

Pneumothorax for pregnant women

multidisciplinary management,
avoid teratogenic drugs

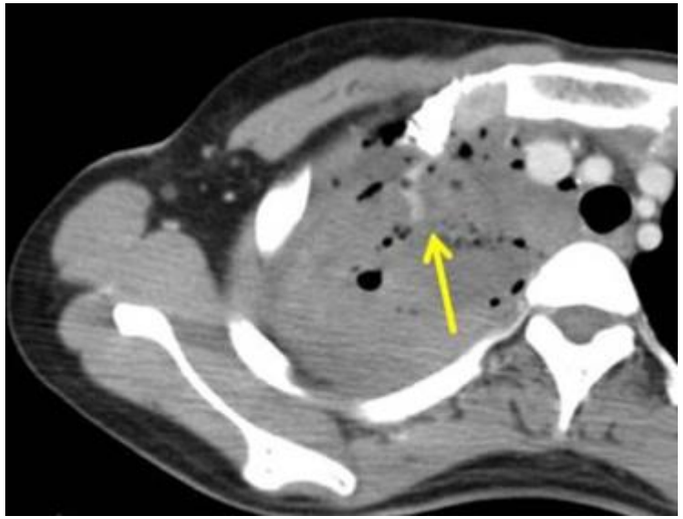
Ventilated patients

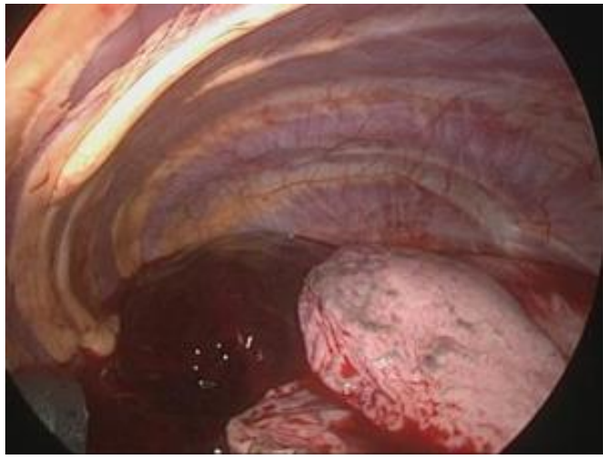
high risk of barotrauma,
need tube thoracostomy

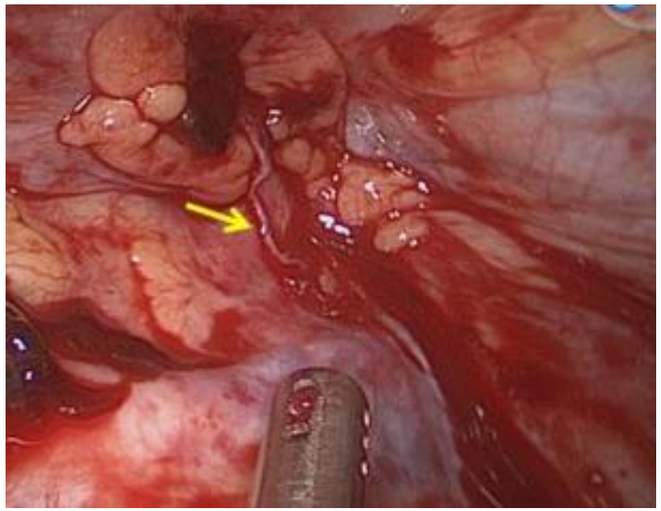
Pediatric patients

Emergency
Vulnerable
Call a pediatrician

Hemopneumothorax







History

no trauma, recurrent pneumothorax

Physical exam

conjunctival pallor

Drainage color

Bloody

Treatment

NPO
Surgery may be required in some cases

Special Situations

Air travel

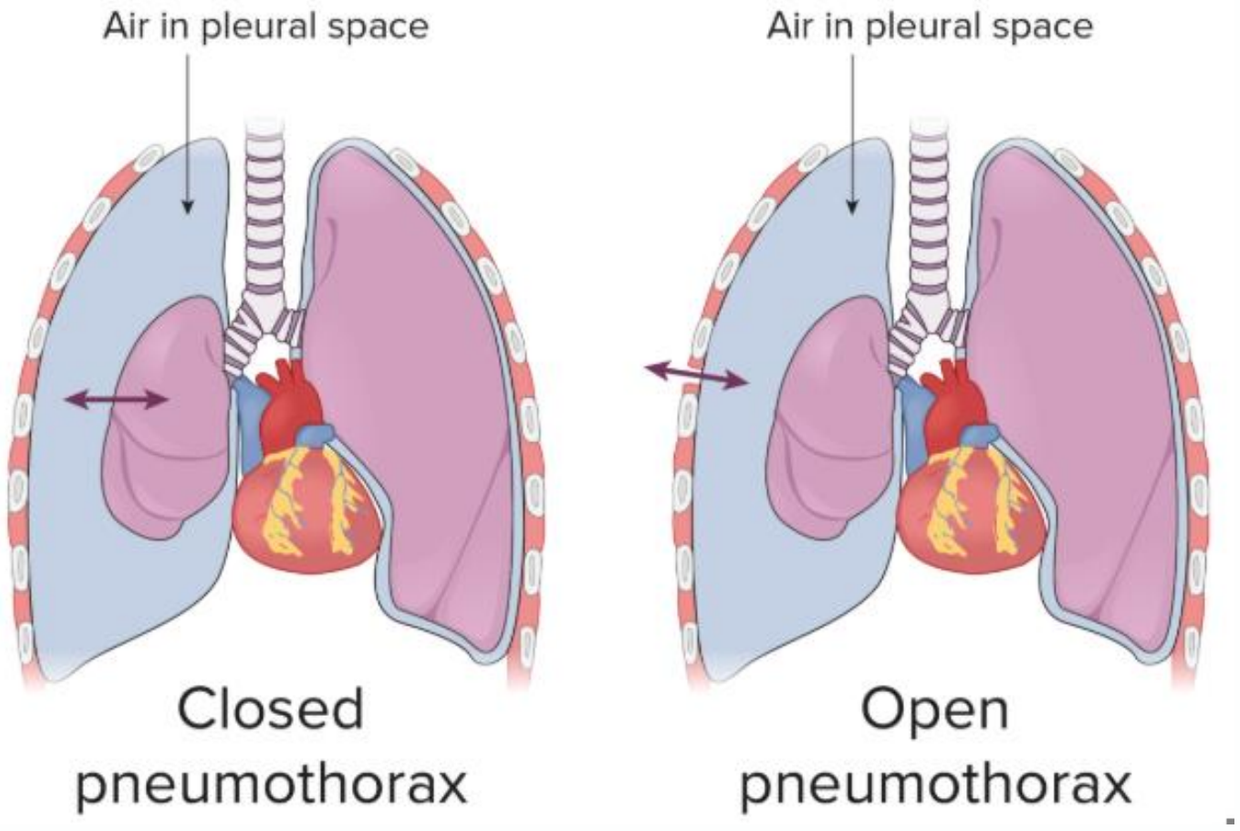
- Air travel poses risks for patients with pneumothorax due to cabin pressure changes.
- Proper timing after treatment is critical to avoid recurrence or complications.

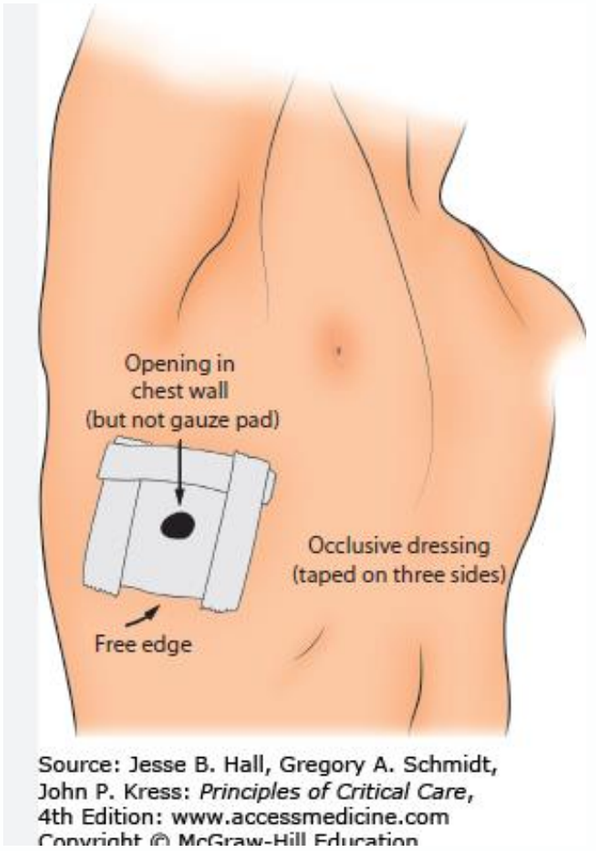
British Thoracic Society (BTS, 2022)

Wait ≥7 days after complete radiographic resolution.

After thoracic surgery, Patients, professionals and their carers should be aware that this may result in a delay of 4 weeks for non-essential air travel and 2 weeks for essential air travel.

Open pneumothorax



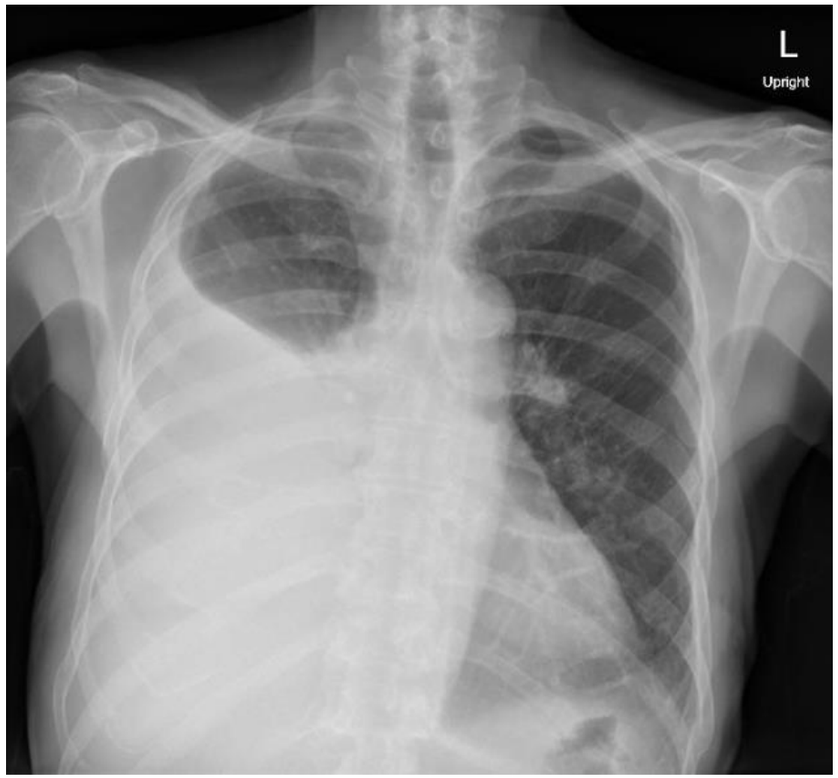


Source: Jesse B. Hall, Gregory A. Schmidt, John P. Kress: *Principles of Critical Care*, 4th Edition: www.accessmedicine.com

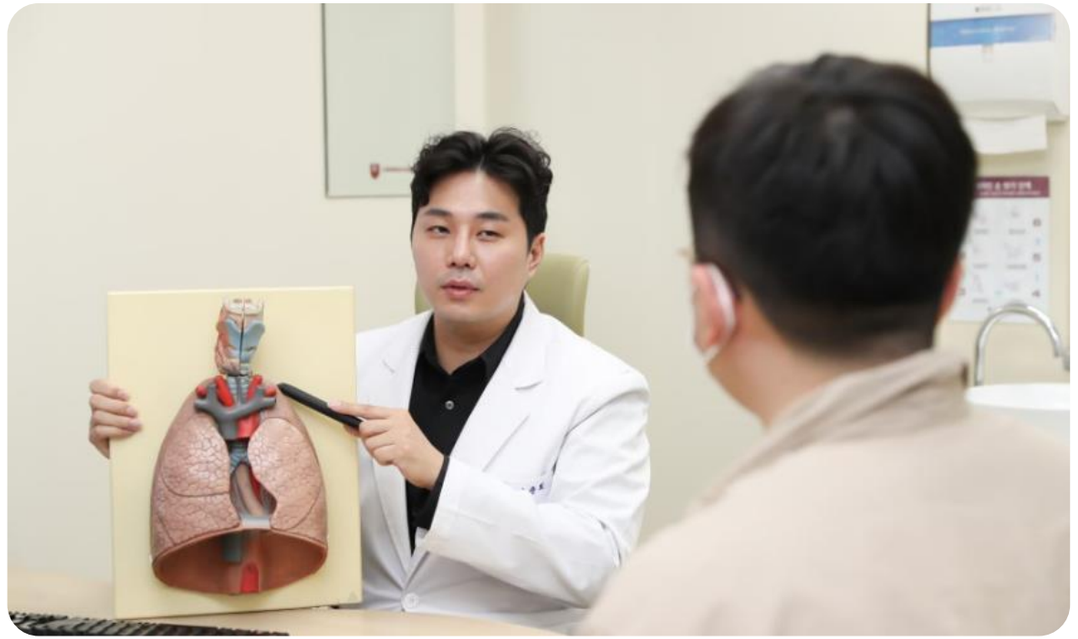
Pleural effusion : Introduction

흉수 Pleural effusion

폐름 감싸는 흉막 공간에 체액이
비정상적으로 고이게 되는 질환



고려대학교구로병원
KOREA UNIVERSITY GURO HOSPITAL



Pleural effusion : Pleural fluid analysis

Lights criteria

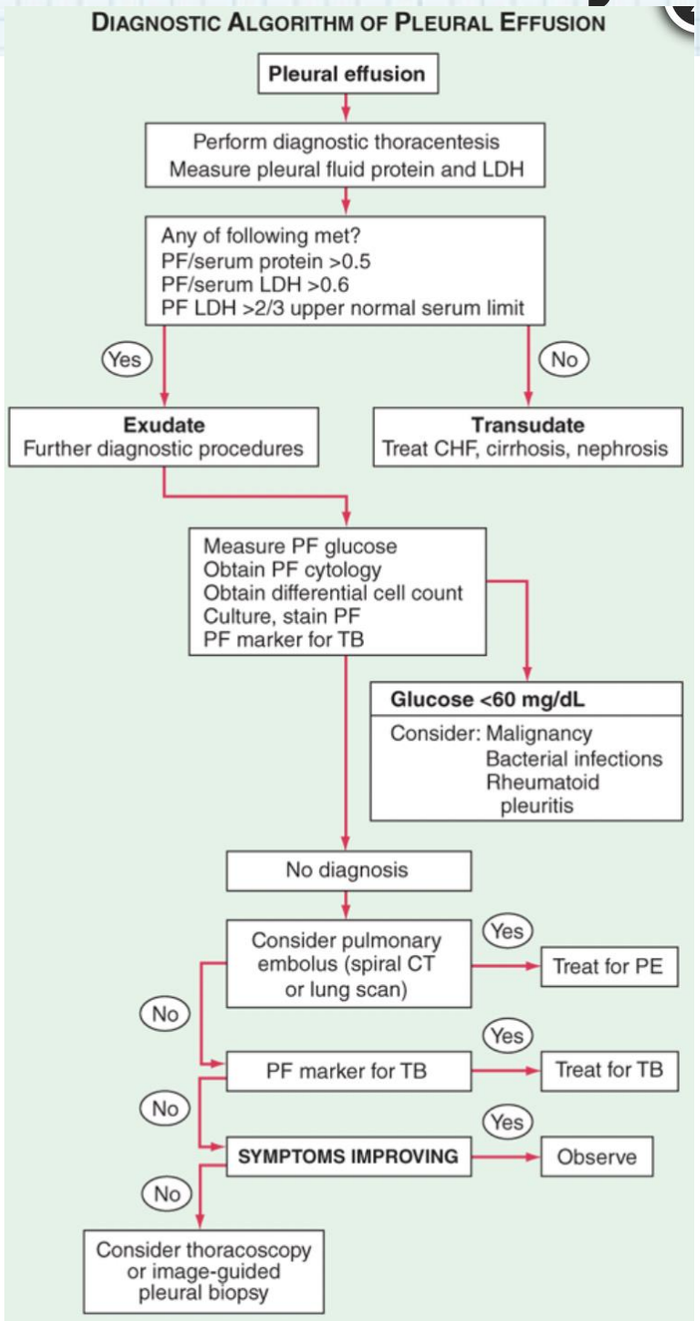
	TRANSUDATE	EXUDATE
Pleural : Serum protein	< 0.5	> 0.5
Pleural : Serum LDH	< 0.6	> 0.6
Pleural fluid LDH	< 2/3 ULN serum LDH	> 2/3 ULN serum LDH

Pleural effusion : Pleural fluid analysis

Transudates	Exudates
Common	**Common**
• Congestive cardiac failure	• Malignancy
• Liver cirrhosis	• Pleural infection
• Hypoalbuminaemia	• Pulmonary embolism
• Nephrotic syndrome	• Autoimmune pleuritis
Less common	**Less common**
• Nephrotic syndrome	• Drugs
• Mitral stenosis	• Lymphatic disorders
• Peritoneal dialysis	• Meigs syndrome
• Chronic hypothyroidism	• Post-coronary artery bypass graft
• Constrictive pericarditis	• Benign asbestos related pleural effusion

Ref. BTS guideline 2023

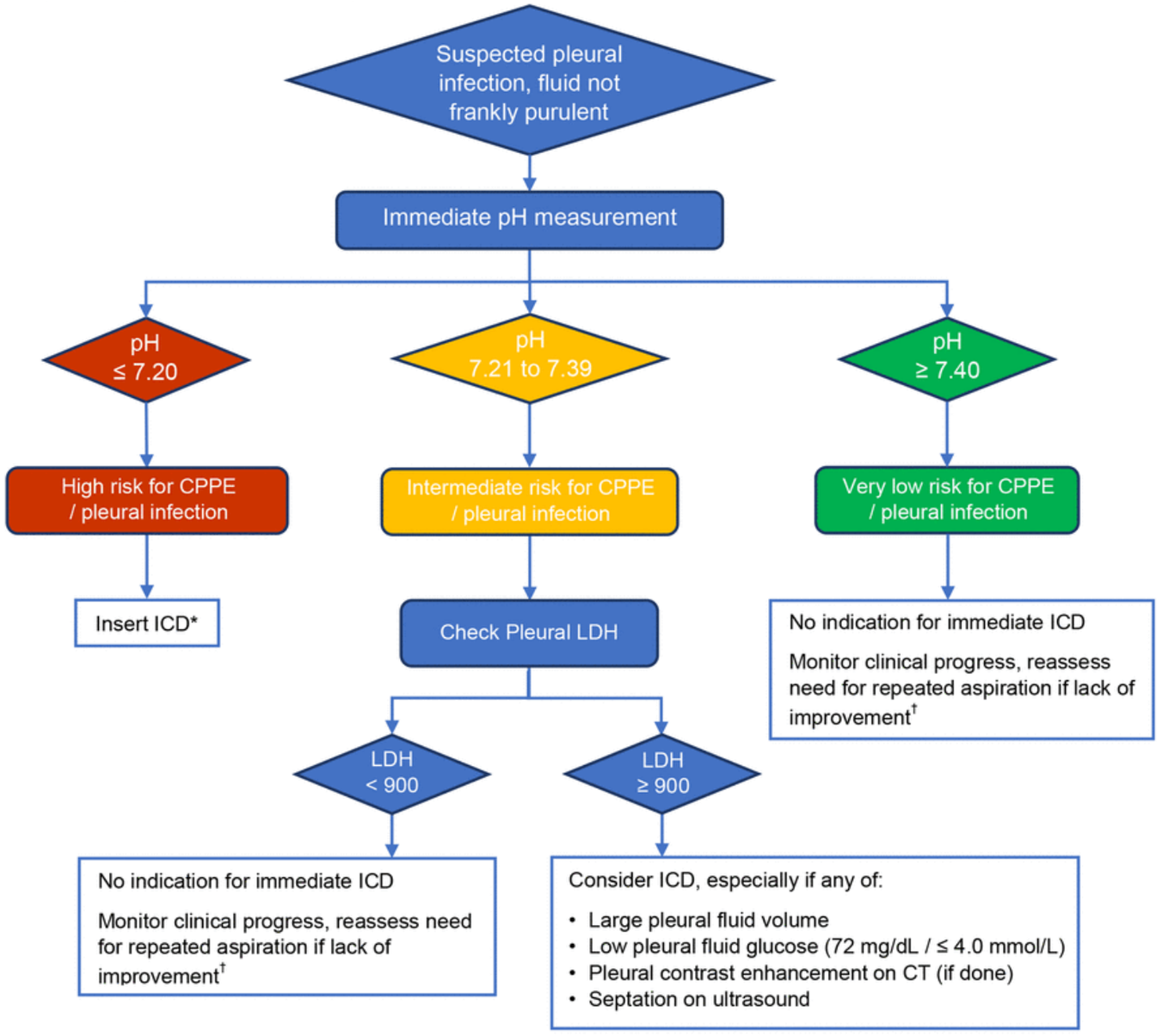
Pleural effusion : Pleural fluid analysis



Ref.: Harrison's mannual

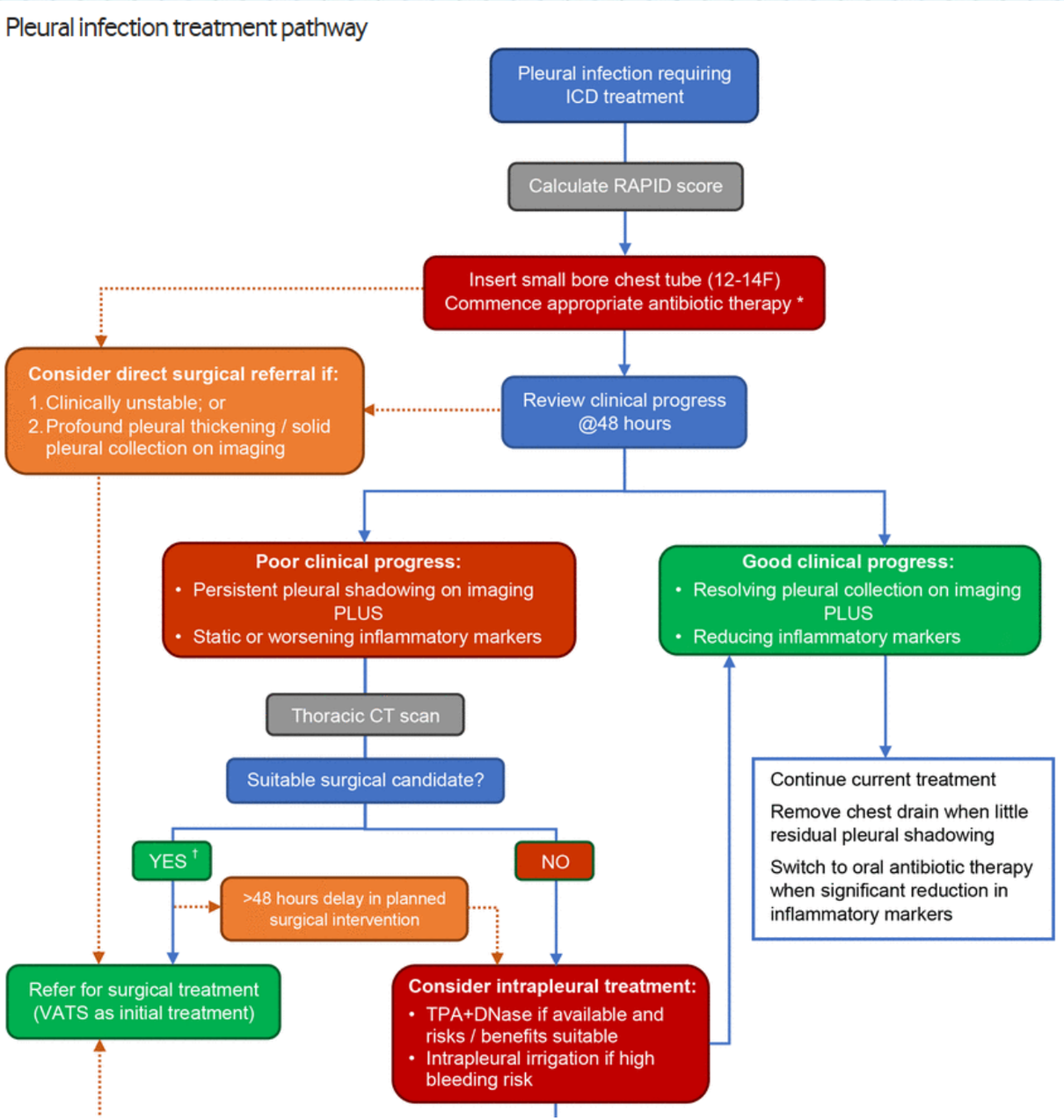
Pleural effusion : Treatment

Suspected pleural infection, non-purulent fluid – initial decision tree



Ref. BTS guideline 2023

Pleural effusion : Treatment



Ref. BTS guideline 2023

Esophageal perforation

Patients who receive treatment within 24 hours have a lower mortality rate (around 10% to 25%), while those treated after 24 hours see the rate more than double, reaching 40% to 60%.

HD 0

Chest pain, CAG: normal

HD 1

Dyspnea

History

Chest pain

Physical exam

Decreased sound

Drainage color

foul-smelling fluid

Treatment

NPO, Antiniotics
Endoscopic stent insertion

Effusion vs. Atelectasis

Feature	Pleural Effusion	Atelectasis
Opacity pattern	Homogeneous increased opacity, typically showing a **meniscus sign** (curved upper margin)	Triangular-shaped opacity converging toward the **hilum**
Location	Usually starts in the lower zones (costophrenic angle blunting), **gravity-dependent**	Confined to a specific **lobe or segment**
Volume change	No or minimal volume loss	**Marked volume loss** (narrowing of intercostal spaces, reduced hemithorax size)
Mediastinal shift	In massive effusion, shift of mediastinum/heart **to the opposite side** (push)	Shift of mediastinum/heart **toward the affected side** (pull)
Other signs	Free fluid layering seen on **decubitus film**	Fissure displacement, **air bronchogram** (especially in segmental atelectasis)

Effusion vs. Atelectasis