

Investigation of pleural and lung diseases (Syndromes of lung and pleural diseases)

Dr. Szathmári Miklós
Semmelweis University
First Department of Medicine
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Syndromes of lung and pleural diseases

Syndrome: A set of physical condition, which occur together, and show you have a particular disease or medical problem.

- Pulmonary infiltration syndrome
- Atelectasis syndrome
- Pleural effusion syndrome
- Pneumothorax syndrome
- Mediastinal „tumour” syndrome

Pulmonary infiltration syndrome I.

The normally air-filled lung contains an area where:

- alveoli are filled by fluid
 - exsudate (pneumonia)
 - transudate (congestive heart failure)
 - blood (pulmonary embolism)
- normal tissue is replaced by solid tumour
- alveoli are compressed (around a tumour)
 - air is reabsorbed from the alveoli, thus they collapse (atelectasis syndrome)

Pulmonary infiltration syndrome II.

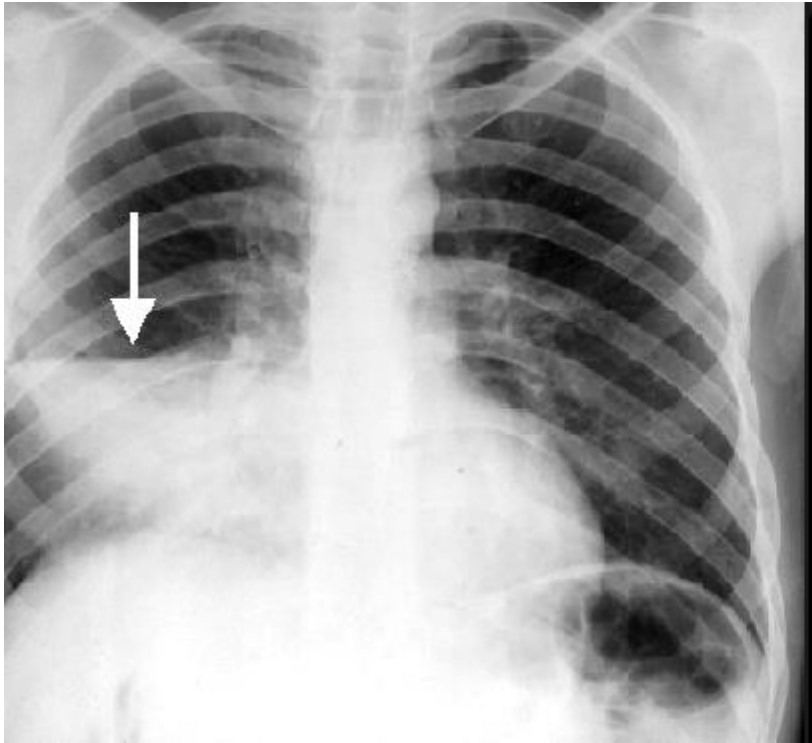
The infiltration **may respect** the borders of

- lung lobes (lobar pneumonia)
- lung segments (embolism, atelectasis)

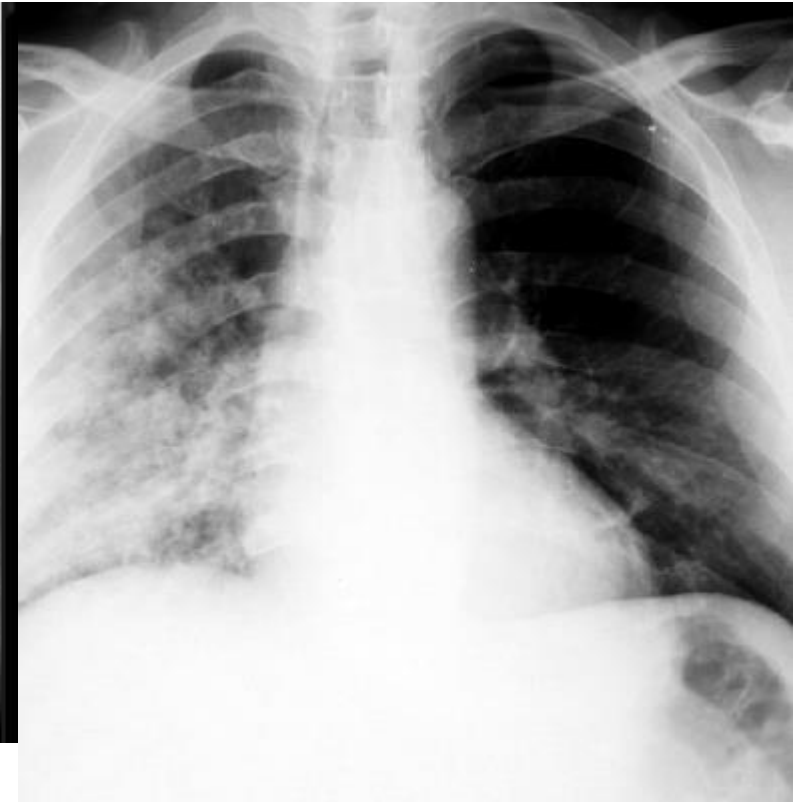
or **may not respect** the borders:

- tumour
- bronchopneumonia
- congestion

Chest X- ray in pulmonary infiltration syndrome



Lobar pneumonia



Bronchopneumonia

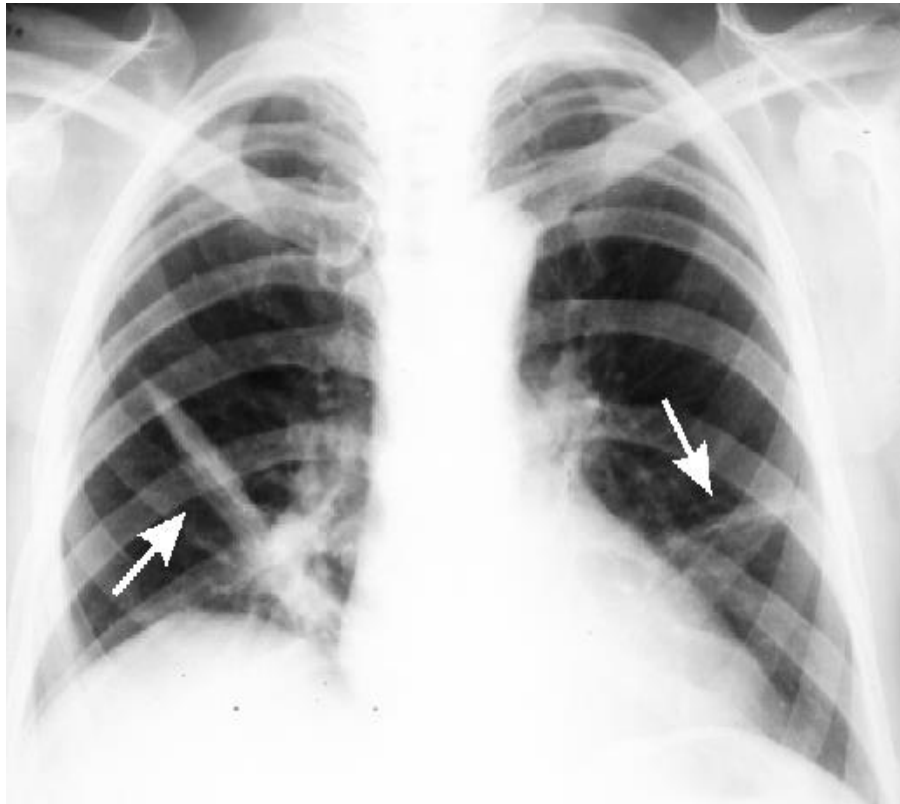
Pulmonary infiltration syndrome II.

- **Respiratory expansion:**
 - **diminished**
- **Palpation:** tactile (pectoral) fremitus
 - **increased**
- **Trachea:**
 - **always in the midline**
- **Percussion:**
 - **dullness** over the affected area (may be absent in deep-sited lesions)
- **Auscultation:**
 - **fine crackles** (crepitation) if alveoli are filled with fluid (pneumonia, embolism, congestion) or partly compressed (tumour), but they are absent if the alveoli are airless (atelectasis)
 - **bronchial breathing** sound

Atelectasis syndrome I.

- When a plug in a mainstream bronchus (as form mucus or a foreign object) obstructs air flow, oxygen in the lobe is absorbed and the affected lung tissue collapses into a airless state
- Causes:
 - Obstruction of the bronchi
 - Impaired surfactant-function (ARDS)
 - Lung compression by pneumothorax or pleural effusion

Chest X-ray in atelectasis syndrome



Small : discoid or streak shape form of atelectasis



Large atelectasis: airless lung

Atelectasis syndrome 2.

- **Respiratory expansion:**
 - **decreased**
- **The trachea:**
 - may be **shifted toward the affected side**
- **The diaphragm:**
 - **High level** on the affected side
- **Palpation:**
 - **decreased pectoral fremitus**
- **Percussion:**
 - **dull** over the airless area
- **Auscultation:**
 - Large atelectasis: Breath sounds are usually **absent**
 - Small atelectasis: **fine crackle, bronchial breathing**

Pleural effusion syndrome I.

Normally, the two (parietal and visceral) sheets of the pleura

- are in close contact (virtual space)
- are moving smoothly over each other

If the surface of the pleural sheets become rough because of apposition of

- fibrin (pleurisy)
- cells (tumour)
- blood clot (injury)
- callous tissue (tbc)

then each breath will cause **pleural rub**

Pleural effusion

- Pleural fluid accumulates when pleural fluid formation exceeds pleural fluid absorption
- Fluid enters the pleural space:
 - from the capillary in the parietal pleura (removed lymphatics of parietal pleura)
 - from the interstitial spaces of the lung via the visceral pleura
 - From the peritoneal cavity via small holes of diaphragm

To determine whether the effusion is transudate or exudate

- Transudative pleural effusion occurs when **systemic factor** that influence the formation and absorption of pleural fluid altered
- Exudative pleural effusion occurs when **local factor** that influence the formation and absorption of pleural fluid altered
- Exudative pleural effusions meet at least one of the following criteria:
 - Pleural fluid/serum protein >0.5
 - Pleural fluid/serum LDH >0.6
 - Pleural fluid LDH more than two-thirds of the normal upper limit for serum

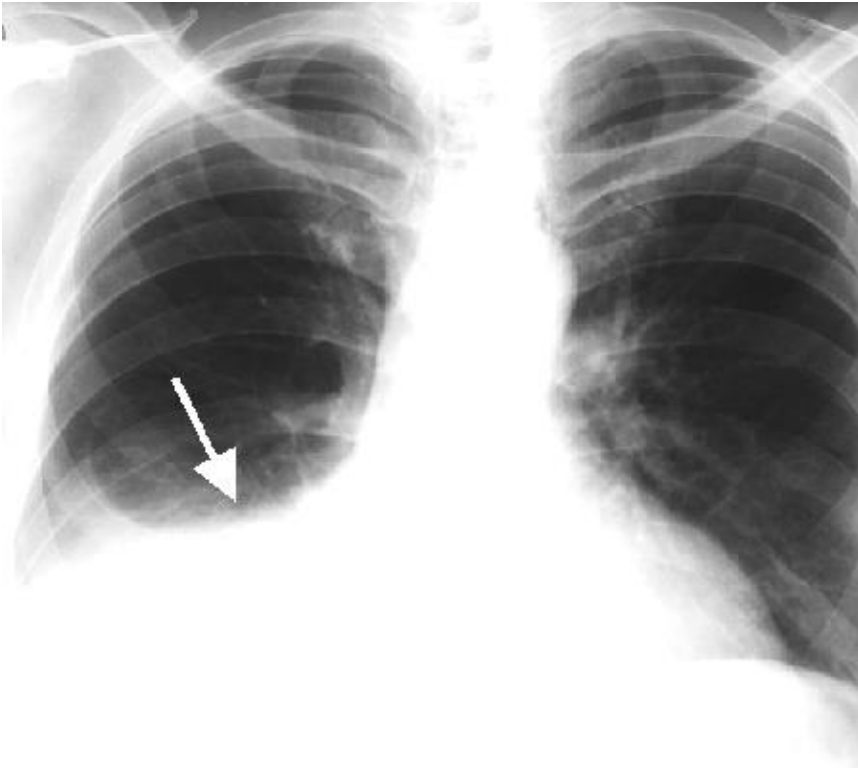
Causes of pleural effusion

Transudate	Exudate
Congestive heart failure	Infections
Liver cirrhosis	Tumours (lung, breast, lymphoma)
Nephrotic syndrome	Pulmonary embolism
Peritoneal dialysis	Vasculitis – autoimmune disorders
Myxoedema	Empyema thoracis
Meigs's syndrome (benign ovarian tumours can cause ascites and a pleural effusion)	Tuberculous pleuritis
	After irradiation
	Gastrointestinal disorders (pancreatitis)
	Hemothorax (iatrogenic or traumatic)

Pleural effusion syndrome II.

- **Respiratory expansion:**
 - **decreased**
- **Palpation:**
 - pectoral fremitus is **decreased**
- **Percussion:**
 - **Dullness.** Ellis-Damoiseau's line, Korányi-Grocco-Rauchfuss triangle. Borders are different if:
 - air gets over the fluid (pleuro-ptx)
 - fluid is trapped by callus
- **Auscultation:**
 - breathing sounds are **decreased** . However: compression of adjacent lung tissue causes atelectasis → fine crackles and bronchial breathing

X-ray in pleural effusion syndrome



Small amount of pleural effusion



Large amount of pleural effusion

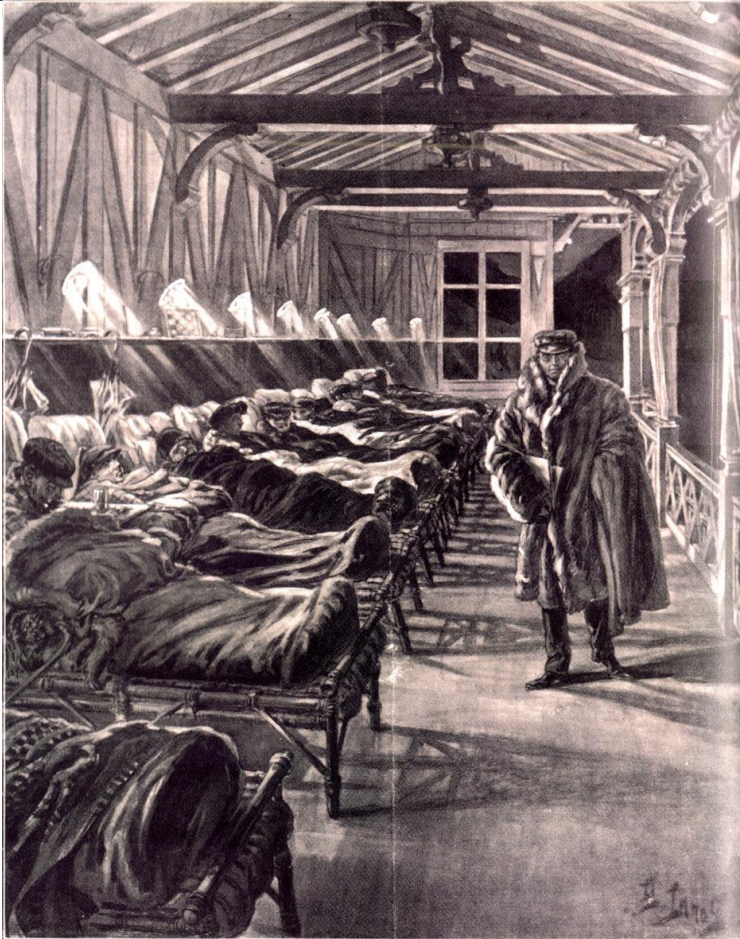
Pneumothorax syndrome I.

- When air leaks into the pleural space.
 - **Primary spontaneous ptx:** usually due to rupture of apical pleural bulla. Almost exclusively in smokers
 - **Secondary ptx:** due to chronic obstructive lung disease.
 - **Traumatic ptx:** penetrating or nonpenetrating, iatrogenic (insertion of central intravenous catheters)
 - **Tensile ptx:** usually occurs during mechanical ventilation or resuscitative efforts. The positive pleural pressure is life-threatening:
 - Severely compromised ventilation
 - Decreased venous return to the heart and reduced cardiac output

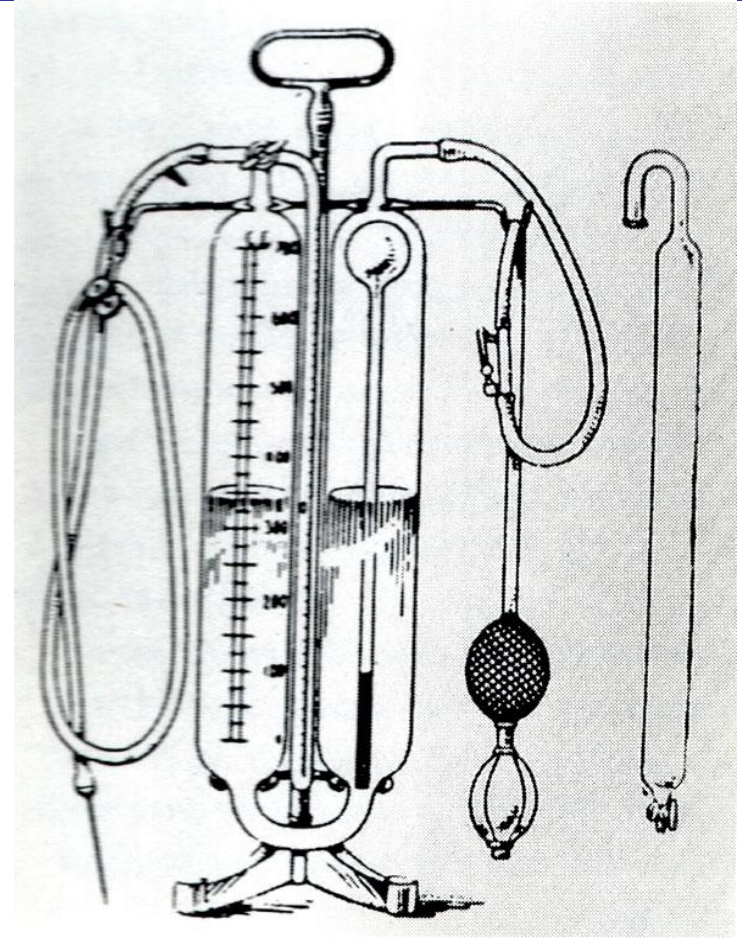
Pneumothorax syndrome II.

1. Decreased chest expansion
2. Heart and mediastinum is dislocated toward the opposite side
3. Hyperresonant or tympanitic percussion sound
4. Decreased or absent breathing sounds
5. Decreased or absent tactile fremitus
6. Sudden pain, dyspnoea, cyanosis

Treatment of tuberculosis in the end of 19. century

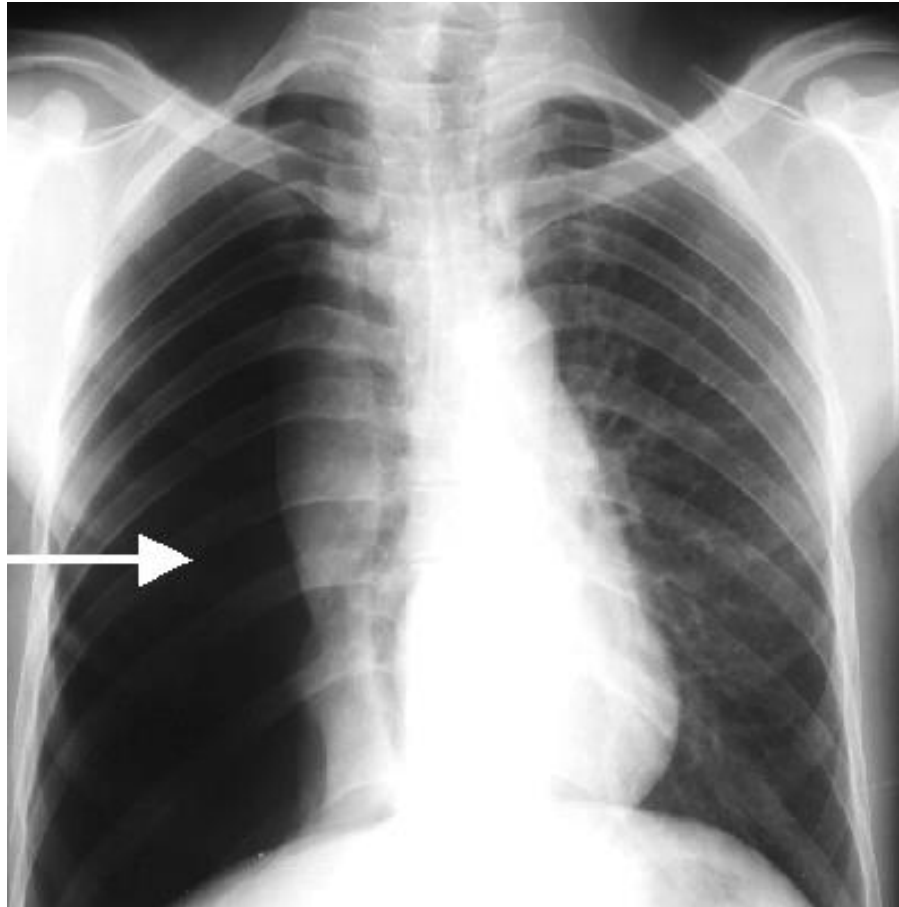


Rest cure on high altitude



Artificial pneumothorax to close gaping cavities in the lung

X-ray picture of pneumothorax



Mediastinal „tumour” syndrome

- Enlargement of mediastinal organs: lymph nodes, aortic aneurysm, substernal goitre, extreme dilatation of left atria, pericardial fluid
- The symptoms depend on size, localization and origin of the enlarged organ (terime)
 - **Compression of vena cava superior**
 - The most common cause is the bronchogenic carcinoma with metastasis in the mediastinal space
 - Cyanosis and oedema of the head and neck. Distension of jugular veins.
 - **Compression of trachea**
 - Dry coughing, characteristically in supine position
 - Stridor
 - Distal from the narrowed bronchus is atelectasis
 - **Compression of recurrent laryngeal nerve**
 - Aneurysm of the aortic arch, an enlarged left atrium, and tumours of the mediastinum and bronchi are the most frequent causes of an isolated vocal cord palsy
 - **Compression of nerv. phrenicus**
 - Paralysis of the diaphragm