MEDICAL EDUCATION RESOURCE

Clinical Anatomy of Lungs & Mnemonics

Clinical Anatomy — Lungs

1. Bronchopulmonary Segments and Surgical Importance

- Each lung consists of **ten bronchopulmonary segments**, functionally independent and supplied by its **own segmental bronchus and artery**.
- These segments are **separated by connective tissue septa**, allowing **segmental resection** in cases like localized tuberculosis, abscess, or carcinoma without affecting other regions

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2. Aspiration of Foreign Bodies

- The **right principal bronchus** is **shorter, wider, and more vertical**; hence, inhaled objects (like a coin, peanut, or seed) most often enter the **right bronchial tree**, especially the **posterior basal segment** of the **lower lobe**

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- Clinical effects include **segmental collapse**, **obstructive pneumonia**, or **bronchiectasis**.

3. Bronchogenic Carcinoma

- **Smoking** is the leading cause. The **common sites** are the **hilum** and **upper lobes**.
- Metastasis occurs via **bronchomediastinal lymph nodes** to the **supraclavicular (sentinel) nodes**, and through the **bloodstream** to **brain, bones, and liver**.
- **Compression of the left recurrent laryngeal nerve** by enlarged mediastinal nodes causes **hoarseness of voice**

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4. Pulmonary Collapse (Atelectasis)

- Caused by **bronchial obstruction** from mucus plugs or tumors.
- Leads to **loss of air** in alveoli, **mediastinal shift** toward the affected side, and **reduced breath sounds**.

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5. Lung Abscess

- Usually secondary to **aspiration pneumonia**, especially in the **posterior segment of upper lobe** or **superior segment of lower lobe**.
- Presents with **fever, cough with foul sputum**, and **radiographic cavity formation**.

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6. Emphysema and Chronic Obstructive Pulmonary Disease (COPD)

- **Loss of alveolar elasticity** and **enlarged air spaces** lead to poor ventilation.
- Commonly associated with **smoking and air pollution**.

- Results in **barrel-shaped chest**, **pursed-lip breathing**, and **cyanosis**.

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7. Tuberculosis

- The **apex of the lung** (especially right) is the most common site for **primary infection**, due to **high oxygen tension** favoring Mycobacterium tuberculosis growth.
- May lead to **fibrosis**, **cavitation**, and **spread to lymph nodes**.
- Complete anti-tubercular treatment is essential to prevent **drug-resistant TB**

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8. Pneumothorax and Tension Pneumothorax

- **Air in the pleural cavity** causes **collapse of the lung**.
- If air entry continues without exit, it becomes **tension pneumothorax**, displacing the **mediastinum to the opposite side**.
- Immediate **needle decompression** followed by **chest tube drainage** is lifesaving.

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9. Pulmonary Embolism

- **Thrombus from deep veins of legs** may travel to pulmonary arteries, blocking blood flow.
- Causes **sudden chest pain**, **dyspnea**, and **death** if large.
- **CT pulmonary angiography** confirms diagnosis.

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10. Carina and Cough Reflex

- The **carina** (ridge at tracheal bifurcation) is extremely **sensitive**.
- Irritation triggers **violent cough reflex** via **vagus nerve**.
- **Widening or distortion of carina** on bronchoscopy suggests **subcarinal lymphadenopathy or carcinoma**.

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11. Pleural Effusion Secondary to Lung Disease

- Lung infections or carcinoma may cause **reactive pleural effusion**.
- Fluid collects in **costodiaphragmatic recess**, compressing the lung.
- Aspiration is done **above the upper border of a rib** to avoid the neurovascular bundle.

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12. Postural Drainage

- Technique used to **drain bronchopulmonary segments** by positioning the patient so gravity assists mucus drainage.
- Each lobe/segment has a specific position for effective drainage — crucial in **bronchiectasis and cystic fibrosis**.

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13. Sentinel (Virchow's) Node

- **Left supraclavicular lymph node** enlargement may indicate **intra-thoracic or abdominal malignancy**, often **bronchogenic carcinoma**.

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14. Accessory Lobes and Fissures

- Occasionally, **accessory fissures** or **azygos lobe** may be seen — significant during surgery or radiographic interpretation to avoid misdiagnosis.

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15. Neonatal Respiratory Distress Syndrome (Hyaline Membrane Disease)

- Occurs in **premature infants** due to **deficiency of surfactant**.
- Leads to **alveolar collapse**, **hypoxia**, and **respiratory failure**.
- Treatment: **Surfactant replacement** and **oxygen therapy**.

Summary

The **lungs are clinically significant** not only in respiration but also in numerous systemic diseases — from **infection and cancer** to **vascular and developmental disorders**. Understanding their **segmental anatomy, vascular pattern, and pleural relations** is essential for **diagnosis, bronchoscopy, and thoracic surgery**