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Respiratory Tract

Function: Enable body to absorb oxygen and excrete carbon dioxide. Ventilation and perfusion of lungs are central to normal function.
Overview of respiratory system:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/respiratory-system/respiratory-function/

Approach to Respiratory tract pathology
Anatomical:
Upper respiratory tract (nose, pharynx, paranasal sinuses, larynx, some include trachea).
- Can subdivide the conditions according to aetiology e.g. inflammatory/infectious, neoplastic, etc.
- Important conditions covered in lecture notes.

Airways (trachea, bronchi, bronchioles, down to respiratory bronchioles).
- Conditions vary according to aetiology, eg. inflammatory, neoplastic, infectious etc. and abnormalities can lead to obstruction of air flow.
- Different conditions affect airways of different sizes, eg. bronchiectasis and chronic bronchitis (larger airways); emphysema and bronchiolitis (smaller airways) etc.

Lung parenchyma (Alveoli, capillaries, interstitium)
- In terms of function, the above form the gas exchange surface which is very important for the **main function** of the lung: absorbing oxygen and secreting carbon dioxide
- **Specific components of alveolar septa** (in the direction of blood to air):
1. Capillary endothelium
2. Basement membranes of:
- capillary and alveolar wall - Interstitial tissue (if present)
- collagen, elastic, fibroblasts, smooth muscle, few chronic inflammatory cells
3. Alveolar epithelium (pulmonary surfactant lies on the luminal surface of this)
4. Alveolar macrophages (within alveolar spaces)

Pleura
- Diseases of the pleura can affect lung function as well, eg. pleural fibrosis decreasing lung expansion
- Some notable conditions: Pleural fibrosis, calcifications and plaques (eg. TB, pneumoconiosis); infections (eg. empyema); malignancy (mesothelioma – related to asbestos exposure)

Blood vessels
- Large to small; arteries (eg. pulmonary embolism) ; veins (eg. chronic venous congestion)
- Conditions can be haemodynamic (eg. pulmonary embolism, pulmonary hypertension) or inflammatory (eg. vasculitis)

Aetiological
VITAMIN C (eg. Vascular, Infectious, Toxic, etc.)

Functional
- This applies mostly to chronic lung diseases of a non-infectious and non-neoplastic nature
- Lung disease can be classified into two main functional abnormalities: obstructive and restrictive
- With a living patient, lung function tests are used to determine the pattern. Eg. total lung capacity and expiratory flow rate (measured by forced expiratory volume at 1 second).
- These two main patterns are caused by different conditions, with some overlaps.

Mindmaps of **approach to respiratory pathology**
https://medicine.nus.edu.sg/pathweb/pathology-demystified/respiratory-system/approach-to-respiratory-pathology/

Mindmap of **Obstructive Vs Restrictive lung disease**:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/respiratory-system/approach-to-respiratory-pathology/

Clinical Manifestations
– Nasal symptoms
- Obstruction
- Leakage – rhinitis, epistaxis (*epistaxis may be one of the signs of Nasopharyngeal carcinoma – there may also be associated tinnitus or 'blocked ear')*
- Snoring (eg. obstructive sleep apnoea)

– Cough
- Dry or Productive (nature of sputum is helpful eg. purulent – think infection; bloody – think neoplasm; frothy – think heart failure etc.)

– Dyspnoea (shortness of breath)
- Many different conditions can cause this, eg. infections (pneumonia – inflammatory exudates filling alveolar spaces rather than air); respiratory distress syndrome COPD; asthma; interstitial lung disease; pneumothorax; respiratory failure; heart failure etc.

– Chest wall symptoms
- Pain – eg. pneumothorax; trauma; costochondritis; advanced tumours infiltrating parietal pleura (pain receptors present)

– Systemic symptoms
- General malaise, loss of appetite and loss of weight (tuberculosis; malignancy)
- Cyanosis (symptom or clinical sign) – Type 2 respiratory failure

Talking Pots and slides
https://medicine.nus.edu.sg/pathweb/pathology-demystified/respiratory-system/media-library/
Look up inflammation chapter for lung abscess!

Quiz
https://medicine.nus.edu.sg/pathweb/pathology-demystified/respiratory-system/respiratory-quiz/