

Respiratory System

Anatomy 6

Trachea and Lungs:

Lungs and pleura are the most important organs when it comes to diseases of the RS.

Trachea:

Continuation of the larynx.

It's about 5 inches.

Diameter is the diameter of your index (in adults).

But in infants, it's very narrow (diameter of a pencil), that's why tracheostomy is hard in infants.

It begins from the lower border of C6.

Ends at the level of angle of Louis (sternal angle – between T4 and T5), where it bifurcates.

It's composed of 16-20 C-shaped hyaline cartilage that's absent posteriorly, replaced by trachealis muscle (smooth muscle) to allow passage of the bolus in the esophagus behind the trachea.

Relations of Trachea:

Anteriorly:

Arch of aorta.

Remains of thymus gland.

Origin of brachiocephalic artery.

Manubrium sterni.

Left side:

Arch of aorta.

Descending thoracic aorta.

Left subclavian.

Left common carotid.

Left phrenic.

Left vagus.

Left main bronchus.

The phrenic nerve: goes anterior to the hilum.

The vagus nerve: goes posterior to the hilum of the lung.

Right side:
Brachiocephalic artery.
Azygous arch.
Right vagus.
Right phrenic.
Right bronchus.

Posteriorly:
Esophagus.
Left Recurrent laryngeal nerve (between the esophagus and trachea).
Thoracic duct: lies posterior to the trachea and esophagus.

Trachea:

Carina:
the end of trachea and beginning of the division.
The most sensitive part of trachea, especially when foreign bodies enter, causing coughing.

Tracheostomy and Intubation:

Isthmus of thyroid gland: opposite C3-C5.
Intubation → C1 and C2.
Intubation → C5 and C6.

Bronchi:

Right bronchus: wider, vertical, shorter (1 inch).
Left bronchus: narrower, more horizontal, and longer (3 inches).

Foreign bodies → usually go into the right bronchus.

Bronchial Tree:

Right bronchus → divides into ebarterial and hibarterial bronchi at the hilum.
Left bronchus → remains as one bronchus.

Lungs:

Right lung: 3 lobes.
2 fissure: horizontal and oblique.
Upper: 1 secondary bronchus.
Middle: 1 secondary bronchus.
Lower: 1 secondary bronchus.

Left lung: 2 lobes (1 fissure: oblique).
Upper: 1 secondary bronchus.
Lower: 1 secondary bronchus.

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Lingula and cardiac notch: present on the left lung.

Lingula and upper lobe: upper secondary bronchi.

Lower lobe: lower secondary bronchus.

Bronchopulmonary Segments:..

Any unit of the bronchopulmonary segment: bronchus, nerve supply, lymphatics, and blood supply.

Nowadays: the bronchopulmonary segments can be removed in case of diseases.

Bronchioles: smooth muscles increase.

Bronchopulmonary segment;

Surgically very important.

The bronchopulmonary segment are supplied by segmental bronchus accompanied by pulmonary vessels.

Bronchopulmonary segment: pyramidal in shape.

Apex: bronchus enters here.

Base:

The CT is present on both sides of the pyramid.

The pulmonary veins are present in the CT, and they allow the surgeon to determine the boundaries of the bronchopulmonary segment.

Bronchopulmonary Segment:

Right lobe:

Upper lobe: 3 segments.

Apical.

Posterior.

Anterior.

Middle lobe: 2 segments.

Medial.

Lateral.

Basal lobe: 5 segments.

Apico-Basal.

Anterior.

Posterior.

Medial.

Lateral.

Note before birth, the left lung:
Apico-Posterior.
Anterio-medial.

Left Lung:
Upper lobe:
Apical.
Posterior.
Anterior.
Superior lingual.
Inferior lingual.

Basal Lobe:
Apicobasal.
Anterior.
Medial.
Lateral.
Posterior.

If the kid swallowed a foreign body → right bronchus → bronchopulmonary segments.

Standing position: basal lobe, the posterior BPS.

Supine position: basal lobe, the apico-basal BPS.

Clinical Importance of Pulmonary Segments:

Infections.

No barrier.

Surgery.

Postural drainage.

Bronchoscope.

Lungs:

Apex: it lies at the root of the neck, 1 inch above the medial third of the clavicle.

Base: lies on the cupula of diaphragm, and it takes the dome shape of the cupula.

Note: you must take care when putting a cannula in the subclavian vein not to injure the apex of the lung.

It has 2 surfaces:

costal surface: related to the costal cartilage and ribs.

Mediastinal surface: related to the middle mediastinum that contains the pericardium and heart, and it contains the hilum of the lung.

There are 3 borders:

Anterior.

Posterior.

Inferior: above the diaphragm.

Hilum:

Bronchus.

2 Pulmonary veins: carries oxygenated blood.

Pulmonary arteries: carries deoxygenated blood.

Nerves from vagus.

Lymph nodes and lymphatic vessels: dark in smokers.

Right lung: hilarterial and ebarterial bronchus.

Left lung: only one bronchus.

Right lung:

Mainly related to the veins.

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Left lung:

Mainly related to the arteries.

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Inferior border:

Costodiphragmatic surface and recess.

Inflation of the lung: downwards in the recess.

Pleura:

Parietal: covers the thoracic wall.

Visceral: adherent on the lung tissue.

Potential space in between contains fluid for lubrication.

Surface Anatomy of the Lung:

Apex:

No difference between left and right.

1 inch above the medial end of the clavicle.

Covered by suprapleural membrane that seals the chest.

Anterior border: apex → sternoclavicular joint → sternal angle → xiphosternal joint.

Semi-circle on the right side:

Can be used for pericardial aspiration.

Inferior border:

6th rib and Midclavicular.

Midaxillary and 8th rib.

10th rib + posterior ...

Sorry the doctor khabbas.

Importance:

Pneumothorax (air in the pleura): the pleura will be filled, and the lungs will collapse.

Pleural Effusion (fluid in the pleura):

Empyema (pus in the pleura):

Hemothorax (blood in the pleura):

They need aspiration:

Maxillary: we use the ninth intercostal space.

The needle is inserted in the lower part of the intercostal space, or upper border of the rib to avoid injuring the intercostal VAN.

Hilum of the Lung: