ANATOMY TEAM

Lecture (4)

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Objectives

By the end of the lecture, the student should be able to :

- **Describe the anatomy of the pleura:**

subdivisions into parietal & visceral pleurae, nerve supply of each of them.

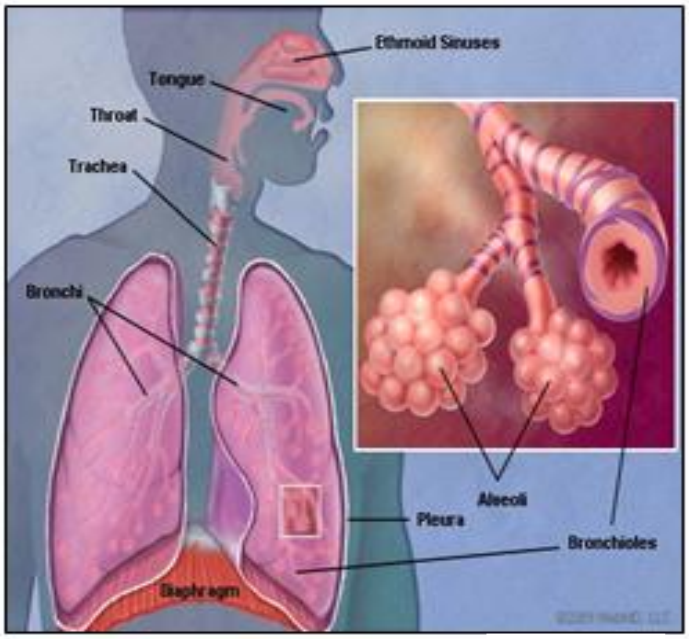
- **List the parts of parietal pleura and its recesses.**
- **Describe the surface anatomy of both pleurae and lungs.**
- **Describe the anatomy of lungs : shape, relations, nerve supply, blood supply.**
- **Describe the difference between right & left lungs.**
- **Describe the formation of bronchopulmonary segments and the main characteristics of these segment in the lung.**

تنويه: هذا العمل لا يعتبر مصدر اساسي للمذاكره وهو للمراجعه فقط ، ولا يوجد أي اختلاف بين سلايد الاولاد والبنات

تنبيه للأولاد: السلايدز رقم 3 ، 8 ، 12 ، يوجد تحتها صور لا تستطيع مشاهدتها إلا بوضع (عرض الشرائح) والسلايد رقم 10 تحته سلايد كامل مهم لا تستطيع مشاهدته إلا(بعرض الشرائح

أولاد

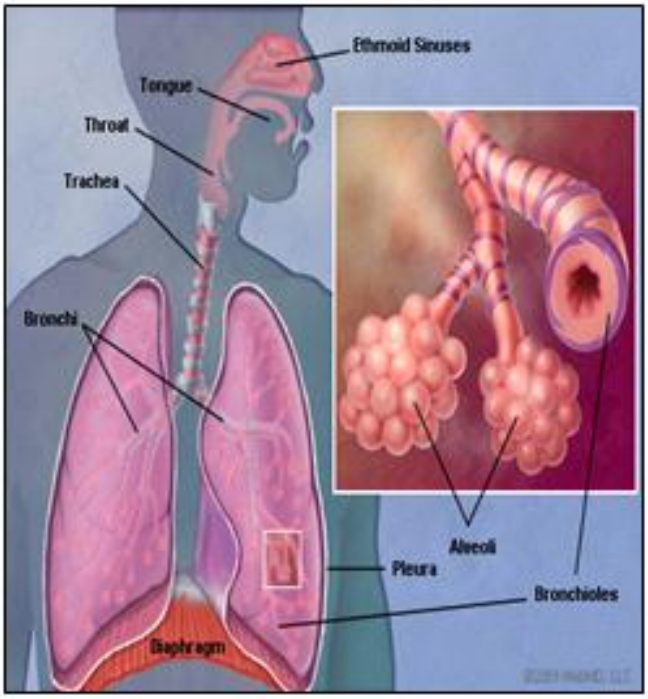
Bronchopulmonary segments



- **The main characteristics of a bronchopulmonary segment:**
- It is a subdivision of a lung lobe.
- It is pyramidal shaped, its apex toward the lung root.
- It is surrounded by connective tissue septa.
- It has a segmental bronchus, a segmental artery, lymph vessels, and autonomic nerves.
- The segmental vein lies in the inter- segmental C.T. septa between the segments.
- A diseased segment can be removed surgically, because it is a structural unit.

بنات

Bronchopulmonary segments



- The respiratory bronchioles end by branching into alveolar ducts, which lead into alveolar sacs.
- The alveolar sacs consist of several alveoli, each alveolus is surrounded by a network of blood capillaries for gas exchange.

NOTE

- The lung not inside pleura, it is enclosing it.
- Hilum is a depression at the **mediastinal surface** of lung contains many structures these structures called the root
- The two layers continue with each other around the **root (vessels,bronchi)**of **the lung**
- the **pulmonary ligament:** located below the root as loose cuff hanging down.
- The space between the **Parietal layer** and **Visceral layer called ,** the pleural cavity, contains a thin film of **pleural fluid (5-10 ml.).**
- Cervical Pleura above the medial1/^{3rd} of clavicle.
- suprapleural membrane: extended from c7 to first rib
- Costodiaphragmatic in the inferior border**.(imp)**
- Costomediastinal in the anterior border**.(imp)**
- **Right pleura:** one inch above the medial 1/3 of the clavicle → sternoclavicular joint → **6th** costal cartilage → **8th** rib in midclavicular line → **10th** rib in mid-axillary line → last thoracic spine. **.(imp)**
- **Left pleura:** one inch above the medial 1/3 of the clavicle → sternoclavicular joint → **4th** costal cartilage → deviates for about 1 inch to left at **6th costal**cartilage → **8th** rib in midclavicular line → **10th**rib in mid-axillary line → last thoracic spine. **.(imp)**
- **lung:**Half inch above the medial 1/3 of the clavicle → sternoclavicular **joint** → **6th** costal cartilage → **6th** rib in midclavicular line → **8th** rib in mid-axillary line → **10th** thoracic spine.
- Inferior border of the lung, upper by 2 space from inferior border of the pleura.
- Suprapleural membrane triangular shape.
- Costodiaphragmatic in the inferior border**.(imp)**
- Costomediastinal in the anterior border**.(imp)**
- **Pleural Effusion** occure in ***Costodiaphragmatic pleural*** *recess*
- **Mediastinal**supplied by Phrenic nerve.
- Right lung 3 lobes, Left Lung 2 lobes.
- Right lung wider & shorter, Left Lung longer & narrower
- Anterior part called **mediastinal**, Posterior part called **vertebral**.
- ***Pulmonary artery***: carries**non-oxygenated blood**.
- ***2 pulmonary veins :*** **carry oxygenated blood**
- ***Blood supply for lung: Bronchial arteries, Bronchial veins.***
- ***Nerve supply for lung : Sympathetic Fibers, 2- Parasympathetic Fibers***
- **Phrenic nerve**anterior to the root of the lung.
- **Vagus nerve**posterior to the root of the lung.
- **Azygos vein** only enter the superior vena cava.
- ***Bronchial arteries***supply oxygenated blood the **lung**.
- When a person has asthma given drug stop the Parasympathetic like atropine.
- Each lung has **10** bronchopulmonary segments.
- **Bronchopulmonary** is surrounded by connective tissue.
- **Bronchopulmonary** between them vessels.

	Cervical Pleura	Costal pleura	Mediastinal pleura	Diaphragmatic pleura
description	Projects about one inch above the medial1/3rd of clavicle lines the under surface of the suprapleural membrane	lines, the back of the: Sternum, Ribs & costal cartilages, Intercostal spaces & Sides of vertebral bodies	covers the mediastinum	covers the thoracic (upper) surface of the diaphragm.
The nerve	----------	the intercostal nerves	phrenic nerves	phrenic nerves, around the periphery by lower 6 intercostal nerves

To remember the nerve :

The doctor said that the phrenic nerve pass in the middle so, it supply the Mediastinal pleura

the intercostal nerves ---------- Costal pleura

because Diaphragmatic pleura pass in each side (middle, costal) so, it will be supplied by the two nerve :

- **Phrenic nerve**
- **Intercostal nerve**

	Costal surface of lung	Medial surface of lung
description	Convex. Covered by costal pleura which separates lung from: ribs, costal cartilages & intercostal muscles	Medial surface: It is divided into 2 parts: Anterior (mediastinal) part: Contains a hilum in the middle (it is a depression in which bronchi, vessels, & nerves forming the root of lung). Posterior (vertebral) part: It is related to: Bodies of thoracic vertebrae, Intervertebral discs, Posterior intercostal vessels Sympathetic trunk.

Borders

Anterior border of lung : sharp and thine

Anterior border of left lung presents a cardiac notch has a thin projection called the lingula below the cardiac notch.

Posterior border : **is rounded, thick and lies beside the vertebral column.**

Base

(inferior or diaphragmatic surface) is concave and rests on the diaphragm

	Right lung	Left lung
Root	2 bronchi (tow because it divide befor entering the lung)------ posterior. Pulmonary artery-------- superior Pulmonary veins-------- inferior and anterior.	One brounchs------ posterior Pulmonary artery-------- superior Pulmonary veins-------- inferior and anterior.
Size	Larger & shorter than left lung.	----------
Lobes	Divided by 2 fissures (oblique & horisontal) into 3 lobes (upper, middle and lower lobes).	Divided by one oblique fissure into -2 lobes, Upper and lower.
Mediastinal surface	Posterior ------ Azygos vein and its arch , Vagus nerve, Esophagus (s) Anterior ------ Phrenic nerve (n) Cardiac impression: related to right atrium. Below hilum and in front of pulmonary ligament : groove for I.V.C.(inferior vena cava)	Posterior------ Descending aorta,Vagus nerve, Groove for left common carotid and left subclavian arteries(to avoid confusing there is no artery in the right) Anterior------ Phrenic nerve Cardiac impression: related to left ventricle

For more understanding the bronchopulmonary segments and lung lobules see this animation:

http://www.getbodysmart.com/ap/respiratorysystem/lungs/segments/tutorial.html (click tutorial to see the explanation and reviw to see the animation)

Review:

1- which layer of the pleura lines the thoracic walls ?

Parietal layer

2- name the divisions of the parietal pleura.

1- Cervical 2- Costal

3- Mediastinal 4- Diaphragmatic

3- what does the costal pleura line ?

- **the back of the Sternum,**
- **Ribs & costal cartilages,**
- **Intercostal spaces &**
- **Sides of vertebral bodies**

4-what covers the thoracic surface of the diaphragm?

Diaphragmatic pleura

5-what is Parietal pleura sensitive to?

pain, pressure, temperature, and touch

6- Describe the anterior margin of the left pleura؟

It extends from sternoclavicular joint to the 4^{th} costal cartilage, then deviates for about 1 inch to left at 6^{th} costal cartilage to form cardiac notch.

7- name some causes of the Pleural Effusion ؟

Inflammation, TB, congestive heart disease and malignancy.

8- describe the base of the lung؟

Inferior or (diaphragmatic surface) is concave and rests on the diaphragm

9- describe the Costal surface of the lung :

- **Convex and Covered by costal pleura which separates lung from: ribs, costal cartilages & intercostal muscles.**

10- How many bronchi enter the left lung?

Only one , while the right lung have two.

11- where do we find the Azygos vein?

On the Mediastinal surface of right lung.

12-the artery that supplies the lung with oxygenated blood is ?

Bronchial arteries.

13 describe the action of the sympathetic fibers of the lungs .

broncho-dilatation/and vasoconstriction

14- where do Parasympathetic Fibers originate from ?

Vagus nerve.

15- what are the Bronchopulmonary segments

These are the anatomical, functional, and surgical units of the lungs.

Secondry bronchus >(segmental) tertiary bronchus > bronchioles > terminal bronchioles > alveolar ducts > alveolar sacs > alveoli.

Quiz:

1- Which of the following structures line under the suprapleural membrane?

A- Apex of the lung.
B- Cervical pleura.
C- Costal pleura.
D- Mediastinal pleura.

2- One of the following structures continuous with visceral pleural:

A- Diaphragmatic pleura.
B- Cervical pleura.
C- Mediastinal pleura.
D- Thoracic pleura.

3- Which of the following is true for visceral pleura:

A- has 3 parts.
B- supplied by phrenic nerve.
C- Sensitive to pain.
D- Sensitive to stretch.

4- All of the following supplied by phrenic nerve except:

A- Diaphragm
B- Mediastinal pleura.
C- Visceral pleura.
D- Diaphragmatic.

5- What is the most common site in the lung for pleural effusion?

A- Costodiaphragmatic pleural recess .
B- Costomediastinal pleural recess .
C- Both

6- The sternoclavicular joint is the starting point for which margin of the pleura?

A- Inferior margin.
B- Posterior margin.
C- Anterior margin.
D- Superior margin.

7- The inferior margin of the pleura will terminate at:

A- Spinous of T12
B- Spinous of L1
C- Spinous of T10
D- Spinous of T9

8- Costomediastinal in the:

A- Superior.
B- Inferior.
C- Anterior.
D- Posterior.

9- Oblique fissure extends from:

A- Body of T4
B- Body of T3
C- Spinous of T4
D- Spinous of T5

10- The transverse fissure found in……and extends from…….

A- Right lung, 5th costal cartilage.
B- Left lung, 3th costal cartilage.
C- Left lung, 4^{th} costal cartilage.
D- Right lung, 4^{th} costal cartilage.

11- Which of the following is related to mediastinum:

A- Apex of the lung
B- Diaphragmatic surface of the lung
C- Medial surface of the lung
D- Costal surface of the lung

12- The apex of the lung is covered by:

A- Visceral pleura
B- Cervical pleura.
C- Costal pleura.
D- Mediastinal pleura.

13- The lingula found below:

A- The cardiac notch of right lung
B- The posterior border of left lung
C- The cardiac notch of left lung
D- The posterior border of right lung

14- the costal surface is:

A- Convex and covered by costal pleura.
B- Concave and covered by costal pleura.
C- Convex and covered by mediastinal pleura.
D- Concave and covered by cervical pleura.

15- One of the following is related to sympathetic trunk:

A- Anterior part of mediastinal surface.
B- Vertebral part of costal surface.
C- Posterior Vertebral part.
D- Posterior part of lateral surface.

16- One of the following is true for left lung:

A- Has 2 fissure.
B- Has 2 lobes.
C- Larger and shorter
D- Has 3 bronchi in its root.

17- Azygos vein related to:

A- Mediastinal surface of left lung.
B- Mediastinal surface of both lungs.
C- Costal surface of right lung.
D- Mediastinal surface of right lung.

18- Groove of inferior vena cava found in:

A- Right lung, below the hilum, behind the pulmonary ligament
B- Right lung, above the hilum, in front of pulmonary ligament.
C- Right lung, below the hilum, in front of pulmonary ligament.
D- Left lung, below the hilum, in front of pulmonary ligament.

19- Which part of heart related to cardiac impression of left lung:

A- Left ventricle.
B- Right atrium.
C- Left atrium.
D- Right ventricle.

20- Vagus nerve related to:

A- Anterior to the root of right lung.
B- Anterior to the root of both lungs.
C- Posterior to the root of left lung.
D- Posterior to the root of both lungs

21- The blood supply of lungs:

A- Pulmonary nerve.
B- Bronchial arteries.
C- Subclavian artery.
D- Aorta artery.

22- Which of the following structure carries oxygenated blood:

A- Pulmonary artery.
B- Superior vena cava.
C- Brachiocephalic vein.
D- Pulmonary vein.

23- The nerve which supplies the lung is:

A- Pulmonary plexus which is formed of somatic N.S.
B- Pulmonary plexus which is formed of autonomic N.S.
C- Brachial plexus.
D- Phrenic nerve

24- parasympathetic fibers of pulmonary plexus come from:

A- Phrenic nerve.
B- Sympathetic trunk.
C- Vagus nerve.
D- Intercostal nerve.

25- One of the following is true for action of sympathetic fibers of pulmonary plexus:

A- Broncho-dilatation.
B- vasoconstriction.
C- vasodilatation.
D- A and B.

26- The right main bronchus when entering hilum, divides into:

A- Superior lobar bronchus.
B- Middle lobar bronchus.
C- Inferior lobar bronchus.
D- B and C.

27- Which of the following structure has blood capillaries for gas exchange:

A- Segmental bronchioles.
B- alveolus.
C- Bronchi.
D- Alveolar duct.

28- Which of the following structure found between bronchopulmonary segments:

A- Segmental artery.
B- Segmental vein.
C- Segmental bronchus.
D- Autonomic nerves.

Answers

1	B
2	C
3	D
4	C
5	A
6	C
7	A
8	C
9	A
10	D
11	C
12	B
13	C
14	A
15	C
16	B
17	D
18	C
19	A
20	D
21	B
22	D
23	B
24	C
25	D
26	D
27	B
28	B