FINAL

Lecture 10

بسم الله الرحمن الرحيم

Pathology Mind Maps

Vascular Lung Diseases

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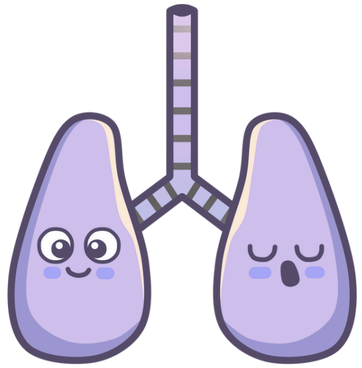


This file contains the lecture material presented through mind maps to make the information clearer, more organized, and easier to follow. It is designed to simplify studying and make revision more effective.

We truly hope you find it beneficial.
If it helps you in any way, please remember us in your prayers.

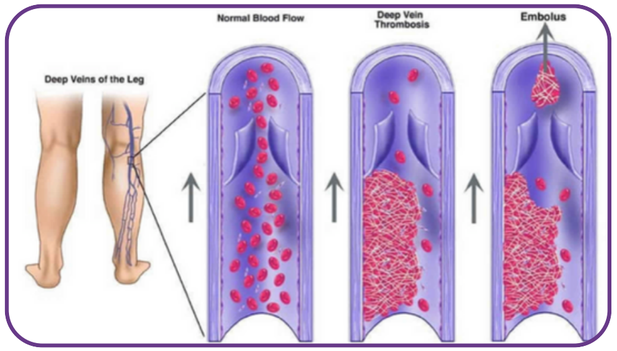
Best of luck in your studies💜!

PULMONARY EMBOLISM

رَبِّ اشْرَحْ لِي صَدْرِي وَيَسِّرْ لِي أَمْرِي وَاحْلُلْ عُقْدَةً مِّن لِّسَانِي يَفْقَهُوا قَوْلِي

Thromboembolism: -Almost all large pulmonary artery thrombi are embolic in Origin.

->95% of PE arise from thrombi within **the large deep veins of the legs**, most often **popliteal vein** and larger veins above it.



Risk factors:

1.prolonged bed rest (immobilization of the legs)
2.Surgery (orthopedic surgery on the knee or hip)
3.severe trauma (burns or multiple fractures)
4.congestive heart failure
5.in women, the period around parturition or the use of OCPs (high estrogen content)
6.disseminated cancer
7.primary disorders of hypercoagulability (factor V Leiden)

Consequences:

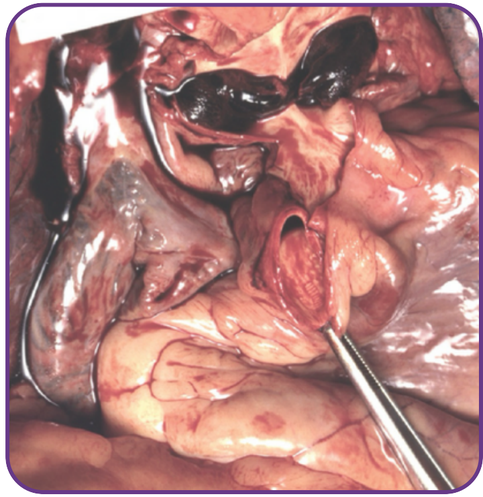
1.increase in pulmonary artery pressure and vasospasm
2.ischemia of the downstream pulmonary parenchyma

depend mainly on:

1.size of the embolus:

• large embolus may embed in the main pulmonary artery or its major branches or lodge at the bifurcation as a saddle embolus
• Smaller emboli become impacted in medium-sized and small-sized pulmonary arteries.

2.the cardiopulmonary status of the patient.



Morphology: -No morphologic alternations: **Large emboli**

-alveolar hemorrhage: **Smaller emboli**

• infarction :

-compromised cardiovascular status (congestive heart failure)

-The more peripheral the embolic occlusion[1], the higher the risk for infarction.

-¾ lower lobes & >50% multiple.

-wedge-shaped[2], with their base at the pleural surface and the apex pointing toward the hilus of the lung

Nonthrombotic pulmonary emboli: -Uncommon but **potentially lethal**

such as:

• air, fat, amniotic fluid embolism

• foreign body embolism in intravenous drug abusers

• Bone marrow embolism:

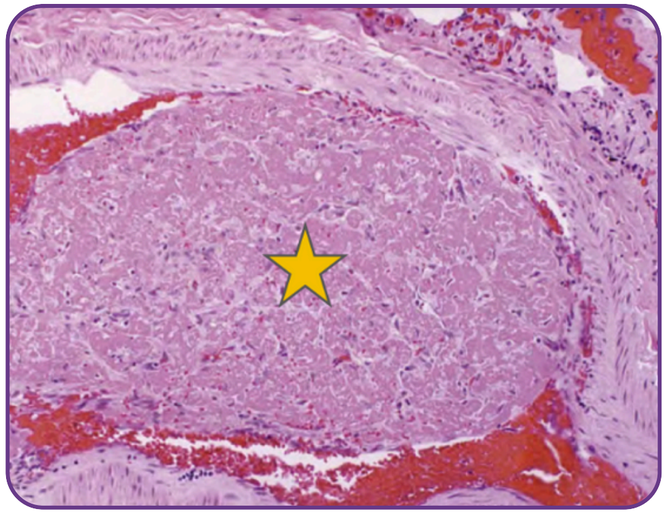
-the presence of hematopoietic and fat elements within a pulmonary artery

-after massive trauma and in patients with bone infarction secondary to sickle cell anemia

PULMONARY INFARCTS

General: -Typically, hemorrhagic with red-blue areas of coagulative necrosis in the early stages
-The adjacent pleura surface is covered by fibrinous exudate
-The occluded vessel is located near the apex of the infarcted area.
-The red cells begin to lyse within 48 hrs → red-brown as hemosiderin is produced
→ fibrous replacement begins at the margins as a gray-white peripheral zone → scar

1



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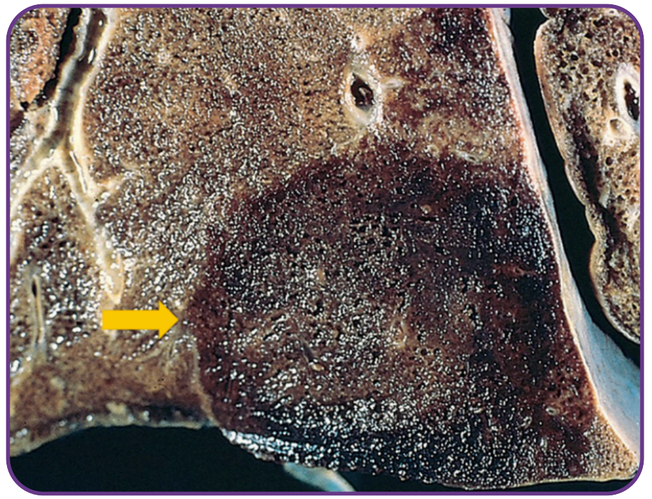


Mangment: **Prophylactic therapy**: anticoagulation, early ambulation, elastic stockings, intermittent pneumatic calf compression, and isometric leg exercises for bedridden patients.
Anti-coagulation therapy for patients who develop pulmonary embolism.
Thrombolytic therapy for hemodynamically unstable patients with massive pulmonary embolism.

Clinical Features:

60% - 80% → clinically silent

• Small emboli

• embolic mass is rapidly removed by fibrinolytic activity

5% → death, acute right-sided heart failure, or cardiovascular collapse

• As in Massive pulmonary embolism: >60% of the total pulmonary vasculature is obstructed by a large embolus or multiple small emboli.

10-15% → dyspnea

• Obstruction of small to medium pulmonary branches → pulmonary infarction

<3% → progressively worsening dyspnea

• recurrent showers of emboli leading to pulmonary hypertension, chronic right-sided heart failure, and pulmonary vascular sclerosis.

"اللّٰهُ لَآ إِلٰهَ إِلَّا هُوَ الْحَيُّ الْقَيُّومُ ۚ لَا تَأْخُذُهُ سِنَةٌ وَلَا نَوْمٌ ۚ لَّهُ مَا فِي السَّمَاوَاتِ وَمَا فِي الْأَرْضِ ۗ مَن
ذَا الَّذِي يَشْفَعُ عِندَهُ إِلَّا بِإِذْنِهِ ۚ يَعْلَمُ مَا بَيْنَ أَيْدِيهِمْ وَمَا خَلْفَهُمْ ۖ وَلَا يُحِيطُونَ بِشَيْءٍ مِّنْ عِلْمِهِ إِلَّا بِمَا
شَاءَ ۚ وَسِعَ كُرْسِيُّهُ السَّمَاوَاتِ وَالْأَرْضَ ۖ وَلَا يَئُودُهُ حِفْظُهُمَا ۚ وَهُوَ الْعَلِيُّ الْعَظِيمُ"

PULMONARY HYPERTENSION

لَا تَدْرِي لَعَلَّ اللَّهَ يُحْدِثُ بَعْدَ ذَٰلِكَ أَمْرًا

Definition: Pressures of **25 mmHg or more** at rest.

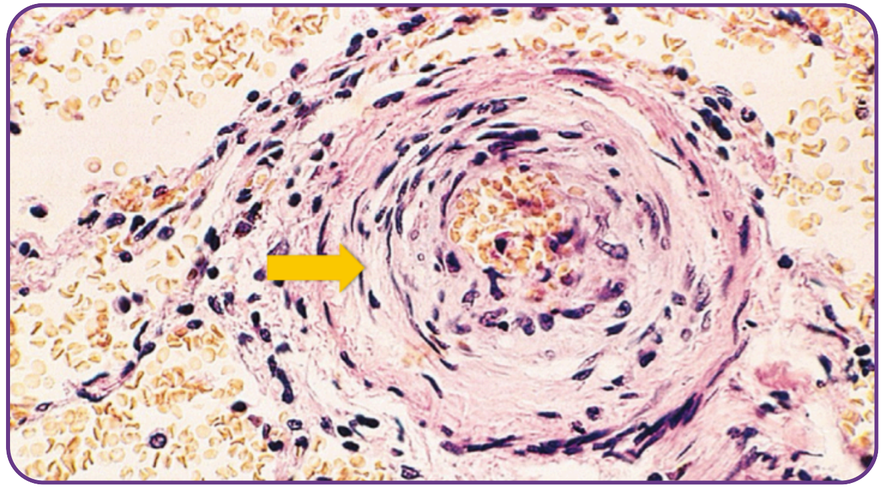
-may be caused by a decrease in the cross-sectional area of the pulmonary vascular bed or by increased pulmonary vascular blood flow.

Classification:

- **Pulmonary arterial hypertension:** heritable forms of pulmonary hypertension
  -affects **small pulmonary muscular arterioles**
  •Examples: connective tissue diseases, human immunodeficiency virus, and congenital heart disease with left to right shunts
- **Pulmonary hypertension due to left-sided heart disease:** including systolic and diastolic dysfunction and valvular disease
- **Pulmonary hypertension due to lung diseases and/or hypoxia:** including COPD and interstitial lung disease
- **Chronic thromboembolic pulmonary hypertension**
- **Pulmonary hypertension with unclear or multifactorial mechanisms**

Morphology: **Medial hypertrophy of the pulmonary muscular and elastic arteries**

- small arteries and arterioles



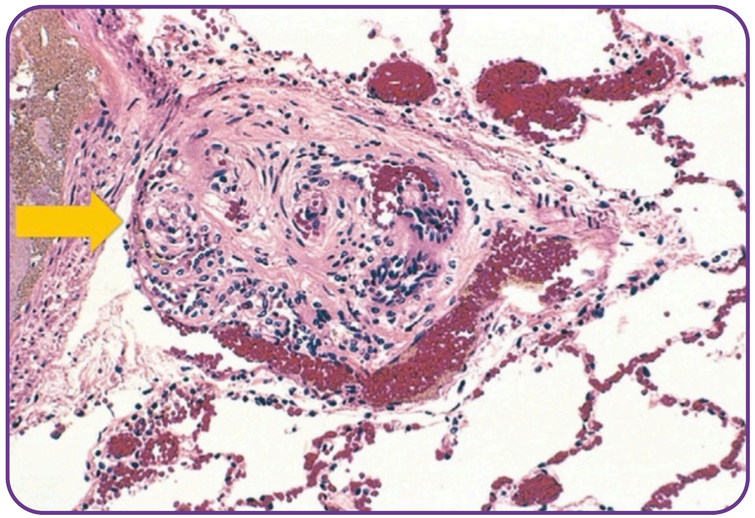
Pulmonary arterial atherosclerosis

- pulmonary artery and its major branches

Right ventricular hypertrophy

Plexiform lesion:

- uncommon
- a tuft of capillary formations producing a network, or web, that spans the lumens of dilated thin-walled, small arteries and may extend outside the vessel



DIFFUSE ALVEOLAR HEMORRHAGE SYNDROMES

فَإِنَّ مَعَ الْعُسْرِ يُسْرًا

Complication of some interstitial lung disorders.

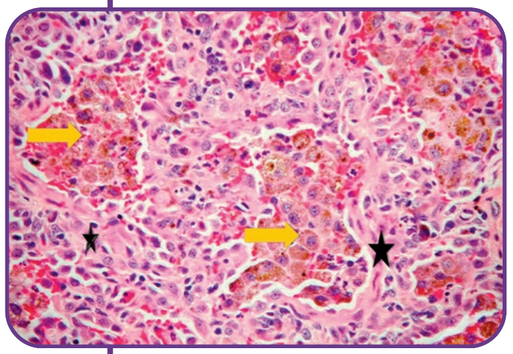
Goodpasture syndrome:

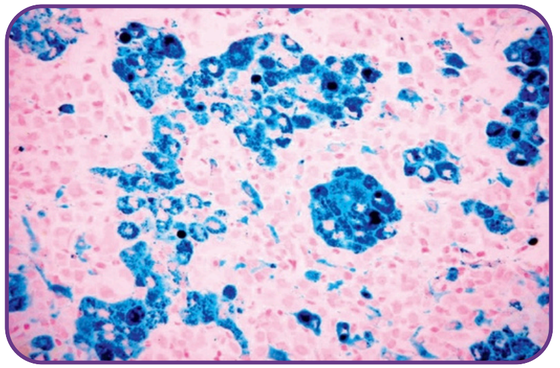
Definition: Is an uncommon autoimmune disease in which lung and kidney injury are caused by circulating autoantibodies against certain domains of type IV collagen.

type IV collagen is intrinsic to the basement membranes of renal glomeruli and pulmonary alveoli

Results in: necrotizing hemorrhagic interstitial pneumonitis and rapidly progressive glomerulonephritis

Morphology: Grossly, red-brown consolidation due to diffuse alveolar hemorrhage





- **Microscopically**:

Focal necrosis of alveolar wall with intraalveolar hemorrhage,
Fibrous thickening of septa
Hypertrophic type II pneumocytes.
Abundant hemosiderin
Linear pattern of immunoglobulin deposition (IgG, sometimes IgA or IgM) seen along the alveolar septa

Clinical Features:

- Teens and twenties
- Males > females
- Active smokers
- Plasmapheresis and immunosuppressive therapy, renal transplantation

Granulomatosis with polyangiitis:

Formerly called **Wegener granulomatosis**

>80% of patients develop upper-respiratory or pulmonary manifestations

Characteristic: The lung lesions are characterized by a combination of necrotizing vasculitis (“angiitis”) and parenchymal necrotizing granulomatous inflammation

Signs and symptoms:

- The signs and symptoms of the upper-respiratory tract involvement (chronic sinusitis, epistaxis, nasal perforation) and the lungs (cough, hemoptysis, chest pain).
- Focal necrotizing, often crescentic, glomerulonephritis.
- Anti-neutrophil cytoplasmic antibodies (PR3- ANCAs) are present in close to 95% of cases

Idiopathic pulmonary hemosiderosis

اللهم لک الحمد کما ینبغي بجلال وجهک وعظیم سلطانک

اللهم اجعل أجر هذا العمل صدقة جارية عن روح **عمر عطيه عوده المرابي**

- اللَّهُمَّ اغْفِرْ له وَارْحَمْهُ، وَاعْفُ عنْه وَعَافِهِ، وَأَكْرِمْ نُزُلَهُ، وَوَسِّعْ مُدْخَلَهُ، وَ اغْسِلْهُ بمَاءٍ وَثَلْجٍ وَبَرَدٍ، وَنَقِهِ مِنَ الخَطَايَا كما يُنَقّى الثَّوْبُ الأبْيَضُ مِنَ الدَّنَسِ.
- اللَّهُمَّ أبدله داراً خيراً من داره، وأهلاً خيراً من أهله، وأدخله الجنّة، وأعذه من عذاب القبر ومن عذاب النّار.
- اللهمّ يمّن كتابه، ويسّر حسابه، وثقل بالحسنات ميزانه، وثبّت على الصراط أقدامه، وأسكنه في أعلى الجنات، بجوار حبيبك محمد صلّى الله عليه وسلم.
- اللهم اغفر لحينا وميتنا وشاهدنا وغائبنا وصغيرنا وكبيرنا وذكرِنا وأنثانا اللهم من أحييته منا فأحيِه على الإسلام ومن توفيته منا فتوفه على الإيمان اللهم لا تحرمنا أجره ولا تضلنا بعده.
- اللهم اغفر له وارفع درجته في المهديين، واخلفه في عقبه في الغابرين، واغفر لنا وله يا رب العالمين، وافسح له في قبره، ونوّر له فيه.
- اللَّهُمَّ أنزل على أهله الصّبر والسلوان وارضهم بقضائك.

اللهم لا تفجعنا بأنفسنا ولا أهلنا ولا أحبتنا، اللهم أعوذ بك من فواجع الأقدار ومن مصائب الدنيا وتقلب حوادثها، اللهم إنا نخاف الفقد فلا تحملنا ما لا طاقة لنا به.