Cardiovascular System - Pathology Lab

3rd year medical students

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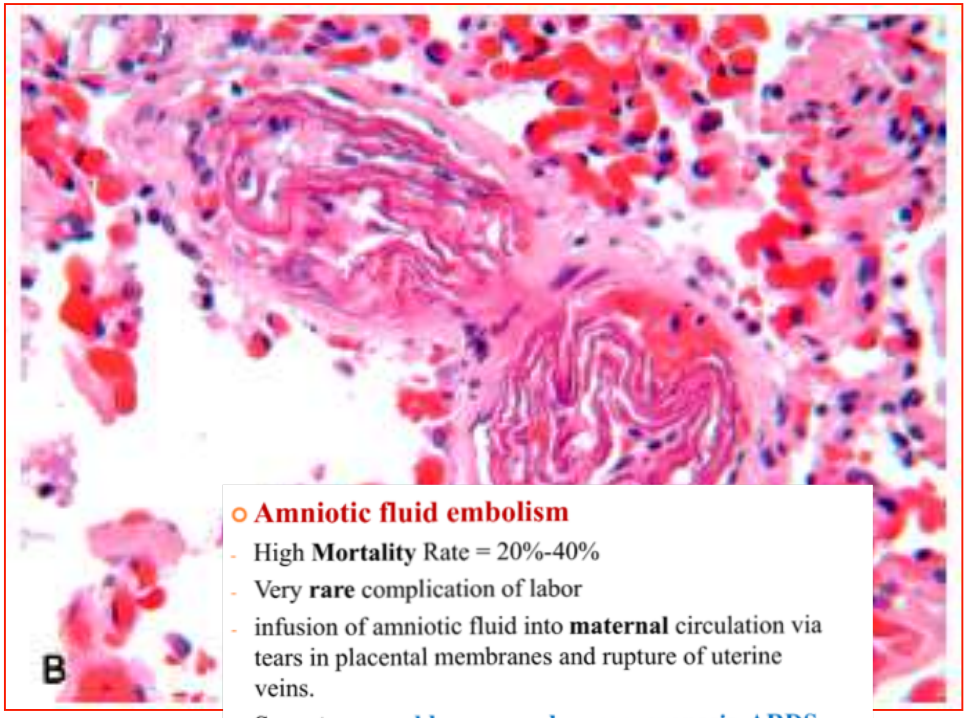
Answered file- Ayat Mohsen & Noor Momani

A 26 years old pregnant woman had a complicated C/S. 12 hours post her C/S, she started to develop shortness of breath, decreased consciousness, And seizures before she died. This is a microscopic section from her lung.

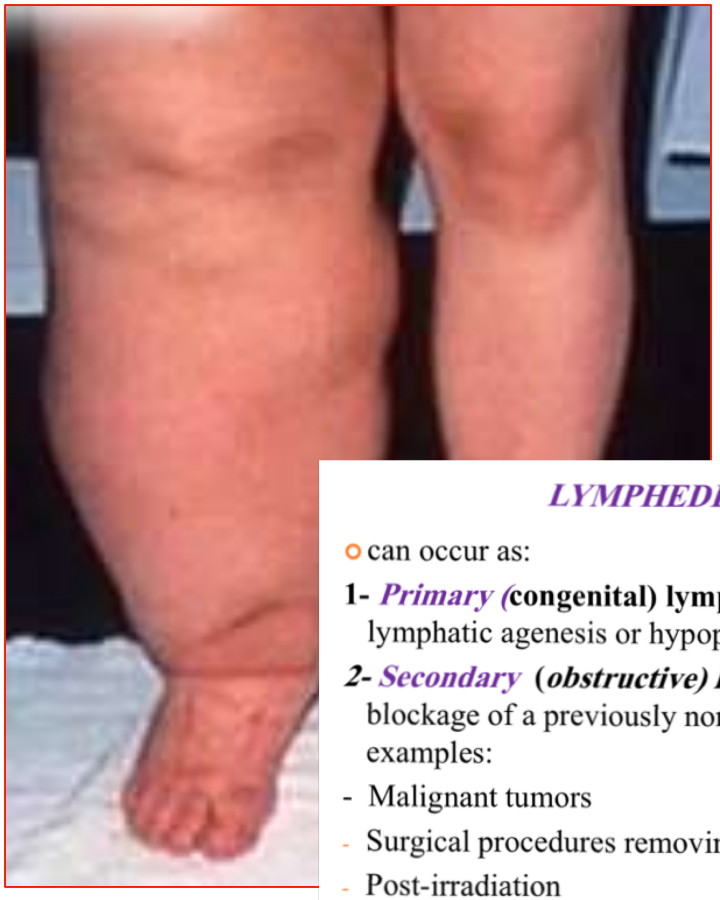
Amniotic fluid embolus: keratin and fetal squamous cells in pulmonary arterioles



- **Amniotic fluid embolism**
  - High **Mortality** Rate = 20%-40%
  - Very **rare** complication of labor
  - infusion of amniotic fluid into **maternal** circulation via tears in placental membranes and rupture of uterine veins.
  - **Symptoms**: **sudden severe dyspnea, cyanosis, ARDS, and hypotensive shock, followed by seizures, DIC and coma**
  - **Microscopic** Findings upon autopsy:
    fetal squamous cells, lanugo hair, fat, mucin …..etc within the maternal pulmonary microcirculation

Lymphedema

- Name major types.
- Give examples on causes



LYMPHEDEMA

- can occur as:

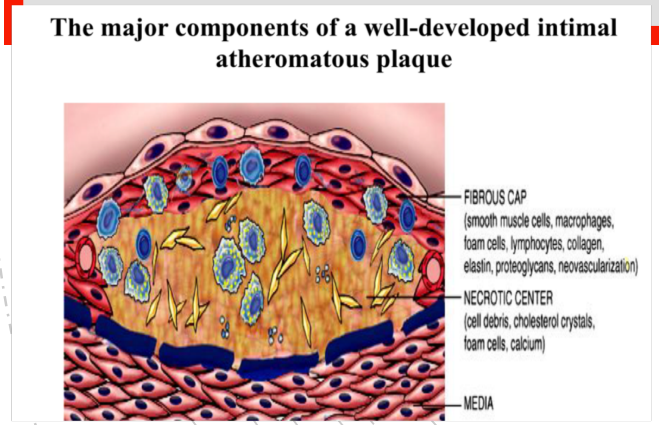
1- *Primary* (congenital) lymphedema → lymphatic agenesis or hypoplasia.

***2- Secondary* (obstructive) lymphedema →** blockage of a previously normal lymphatic examples:

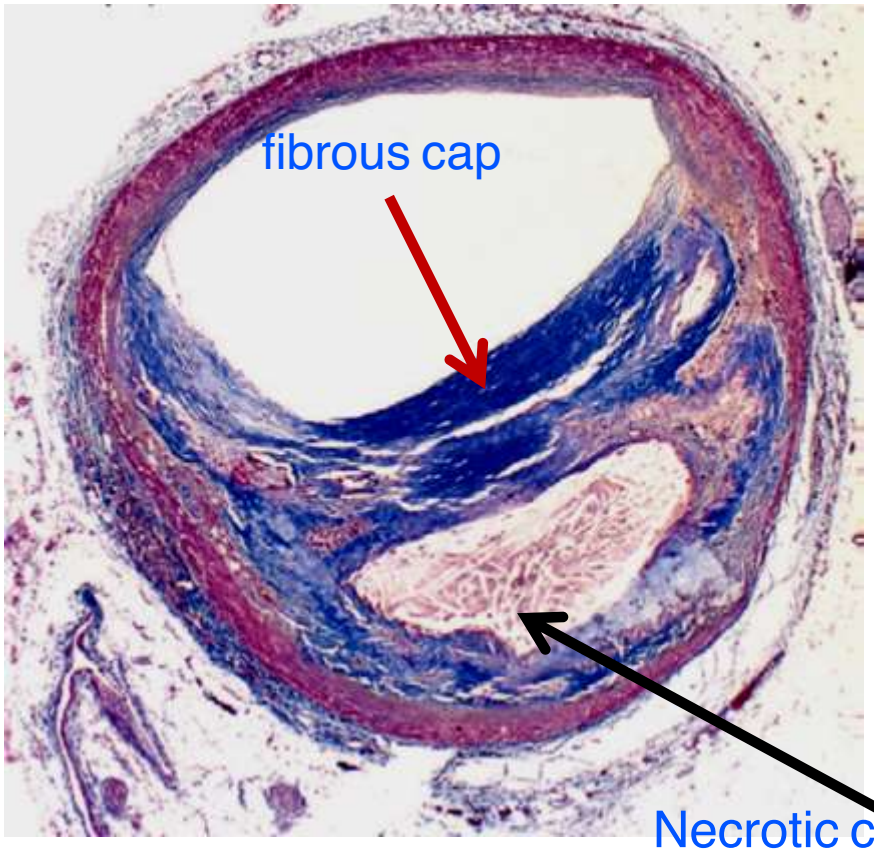
- Malignant tumors
- Surgical procedures removing lymph nodes
- Post-irradiation
- Fibrosis
- Filariasis
- Postinflammatory thrombosis and scarring

Atherosclerosis

- Name parts of this lesion (red and **black** arrows)
- Describe the composition of each part



It's an atheroma



The dye used here is: Masson Trichome, stains collagen with blue (fibrous cap), and necrotic core with red.

Infarction

- **lung (A), and spleen (B)**

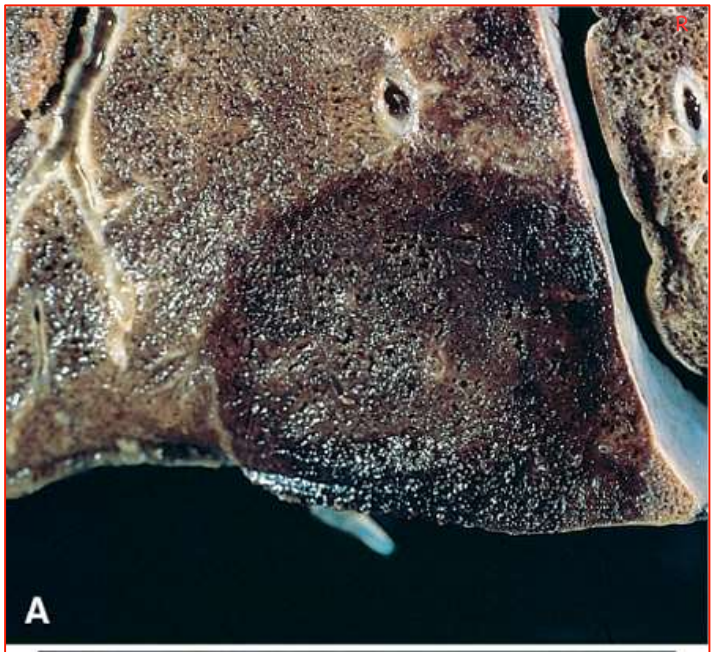
Solid organ

1- what type of infarct do you see in A & B?

A: Red

B: White

2- microscopic features you expect to see in A & B?



- infarct = an area of **ischemic necrosis** caused by occlusion of arterial supply or venous drainage in a tissue
- 99% of infarcts result from thromboi/emboli
- other mechanisms:

Vasospasm

extrinsic compression (e.g., by tumor)

vessel **twisting** (e.g.testicular torsion, volvulus)

traumatic vessel **rupture**

MORPHOLOGY OF INFARCTS

- infarcts may be either **red** (**hemorrhagic**) or **white** (**anemic**) and may be either septic or bland
- tend to be wedge shaped (occluded vessel at the apex and the periphery of the organ forming the base)
- margins of infarcts tend to become better defined with time
- histologic hallmark of infarction is **ischemic coagulative necrosis**
- note: <u>The brain is an **exception**</u> (liquefactive necrosis)
- most infarcts are ultimately replaced by scar

RED INFARCTS:

- **occur in any of the following scenarios:**

(1) **venous** occlusions (e.g. ovarian torsion)

(2) **loose** tissues (e.g. lung) that allow blood to collect in the infarcted zone

(3) tissues with **dual** circulations (e.g. lung and small intestine)

(4) previously congested tissues because of **sluggish venous** outflow

(5) when flow is **re-established** to a site of previous arterial occlusion and necrosis

WHITE INFARCTS

- occur with:

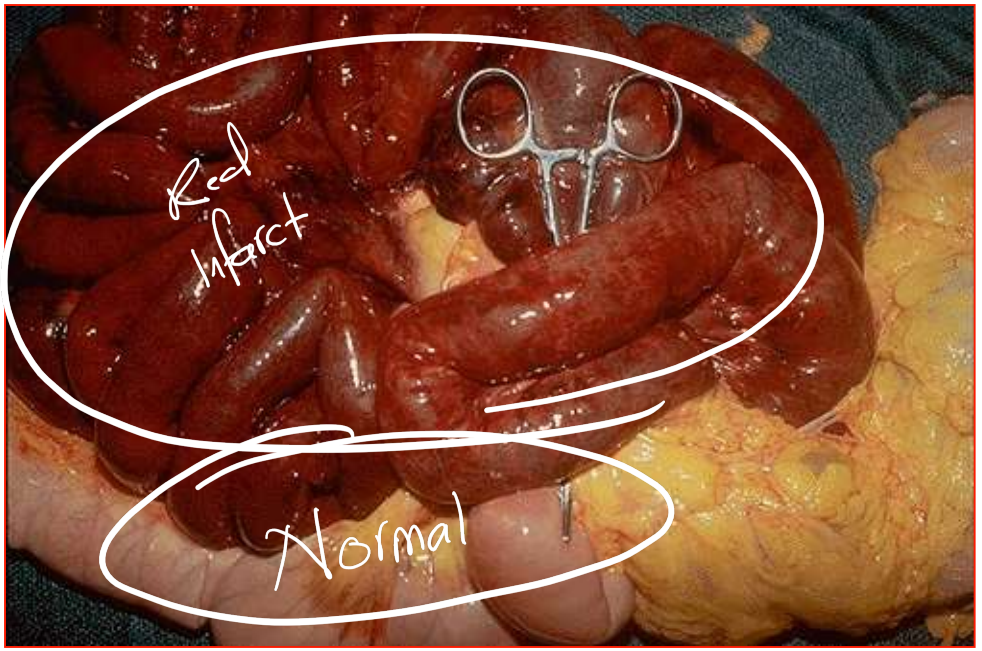
1) **arterial** occlusions
2) **solid** organs (such as heart, spleen, and kidney).

A 74 years old man was brought to ER with severe abdominal pain and rectal bleeding. Laparotomy was performed. This is a picture of His small intestines.

Infarction

- **A case of sudden mesenteric artery occlusion.**
- **What type of infarcts is it? Why?**

Red infarct; dual blood supply

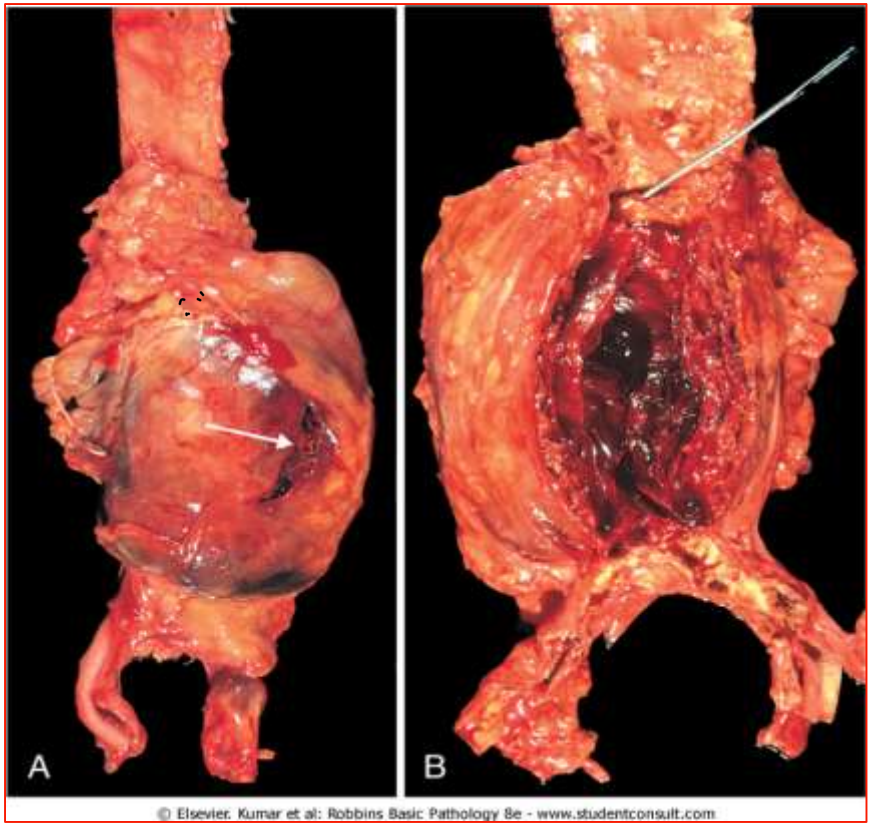


Aortic aneurysm

-What part of the aorta is involved ?
Abdominal, AAA

-Picture A, white arrow? rupture

- picture B? Mural thrombosis



Abdominal Aortic Aneurysm

- (Atherosclerotic aneurysms)occur most frequently in **abdominal** aorta (= AAA)
- common iliacs, arch, and descending parts of thoracic aorta can also be involved
- **Pathogenesis**
- **m/c in men**
- **rarely < age 50**
- **Atherosclerosis is a major cause of AAA**

- other contributors include:

1- Hereditary defects in structural components of the aorta:

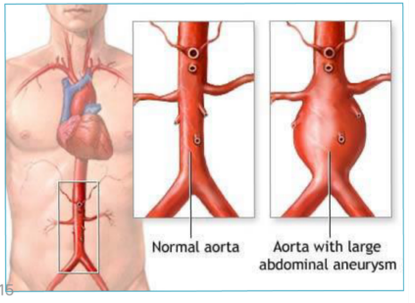
(e.g., **Marfan disease** **by** defective fibrillin production affects elastic tissue synthesis)

2- An altered balance of collagen degradation and synthesis mediated by local inflammatory infiltrates and the destructive proteolytic enzymes

- (e.g. vasculitis)

AAA- Morphology

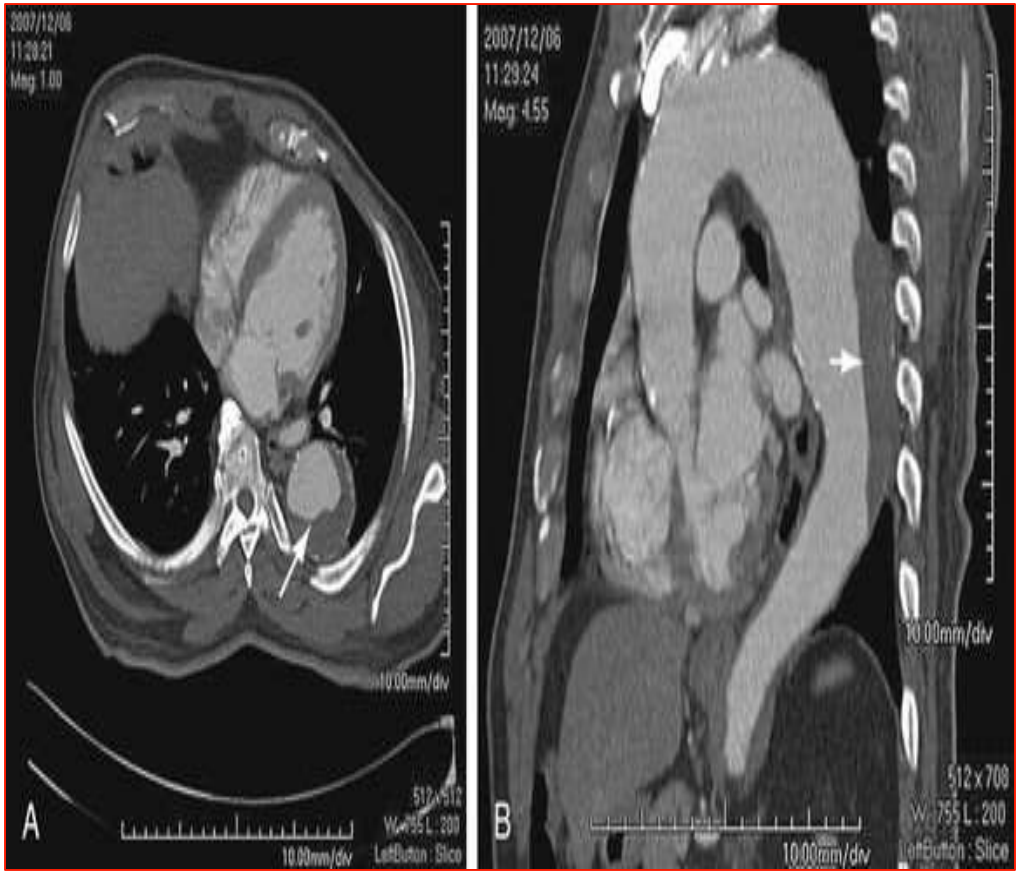
- Usually below renal arteries and above bifurcation of aorta
- can be saccular or fusiform
- may be as large as 15 cm in diameter, and as long as 25 cm
- Microscopically: atherosclerosis; thinning of media
- frequently contains a laminated mural thrombus



Aortic aneurysm

-What part of the aorta is involved ? descending

-white arrows represents? Thrombosis



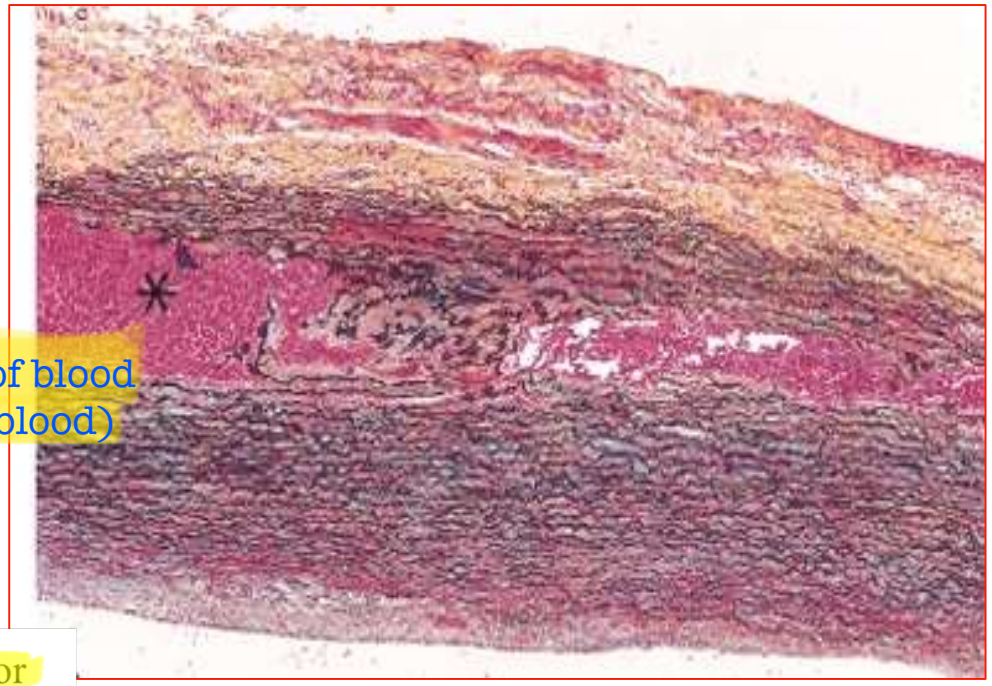
Radiology Key- Thorasic Aortic Aneurysms

Aortic dissection

- The special histochemical stain in this microscopic section of aorta shows elastic fibers in black color. What does the black star represents? Collection of blood (dissected blood)

-Name a major precipitating factor Hypertension

-other causes?

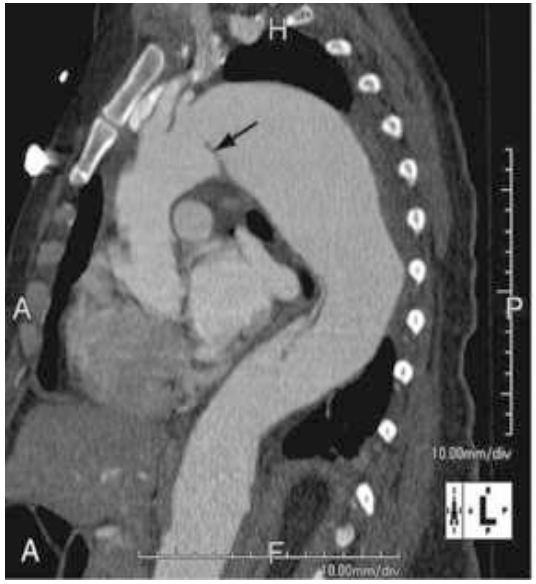


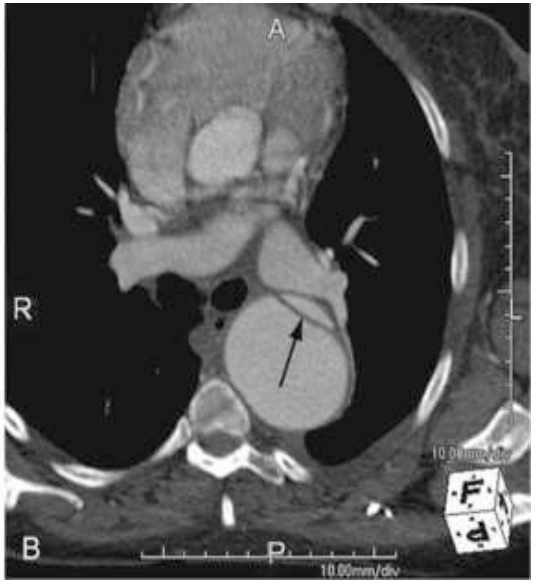
- 1- Hypertension is *the* major risk factor
- pressure-related mechanical injury and/or ischemic injury.
- 2- inherited or acquired connective tissue disorders causing abnormal vascular ECM
- (e.g., Marfan syndrome, Ehlers-Danlos syndrome, vitamin C deficiency, copper metabolic defects)

Aortic dissection

-black arrows represents?

Aneurysm with dissection





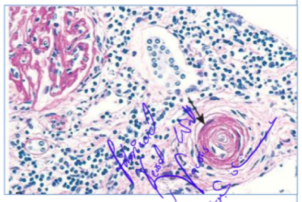
Radiology Key- Thorasic Aortic Aneurysms

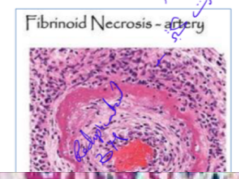
Arteriolosclerosis

- types? A, B
- causes?

- Ass. with benign hypertension
- homogeneous pink hyaline thickening of arteriolar walls
- luminal narrowing
- leakage of plasma components across injured endothelial cells into vessel walls
- increased ECM production by smooth muscle cells in response to chronic hemodynamic stress

2- Hyperplastic arteriolosclerosis





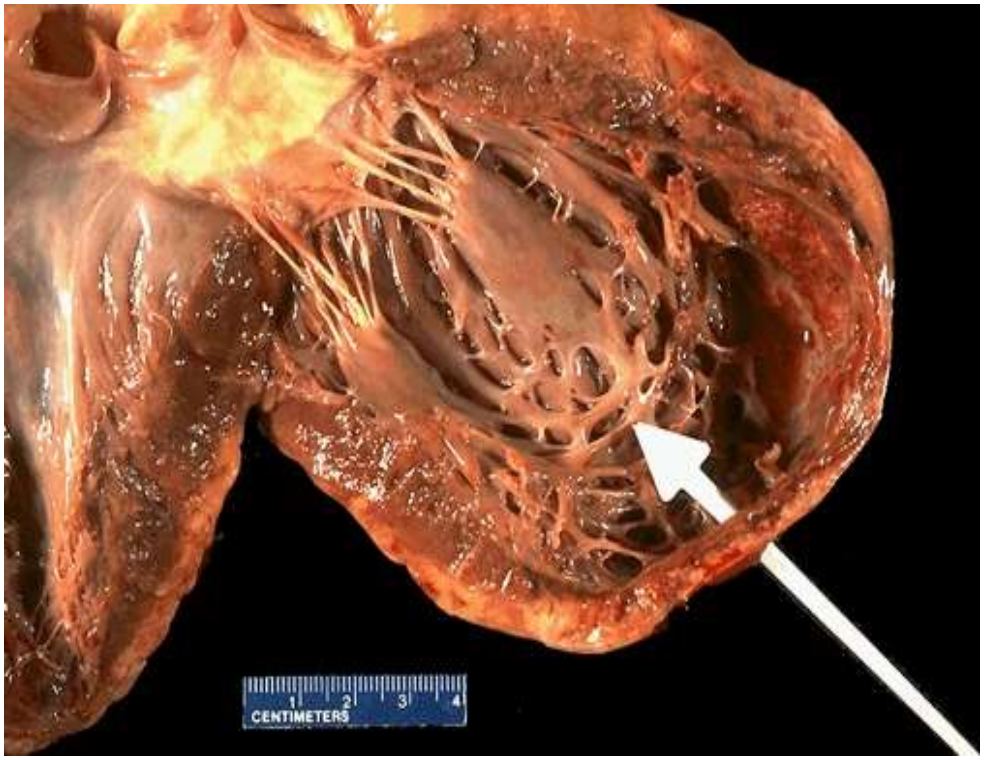
- With severe (malignant) hypertension
- "onionskin" concentric laminated thickening of arteriolar walls
- luminal narrowing
- reduplicated basement membrane
- fibrinoid vessel wall necrosis (necrotizing arteriolitis)

Complications of MI

-what complication is seen in this picture (white arrow)?

Rupture in the free wall of the Ventricle.

-Mention the consequences that may follow this. Hemopericardium and Cardiac Tamponade (fatal)



What type of aneurysm is this?

FALSE ANEURYSM

Complications of MI

-**A recent or old MI? (red arrow)** Old (scar).

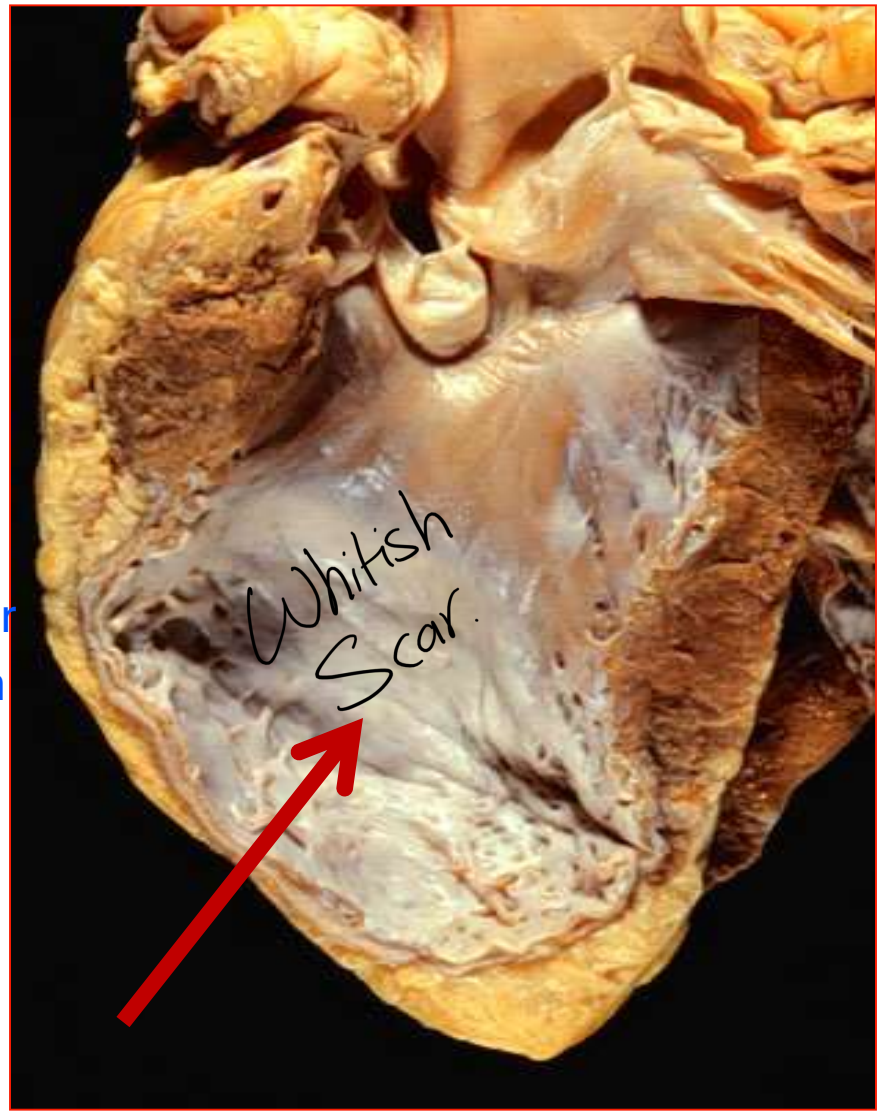
-**What post-MI complication is seen?** Ventricular Aneurysm

-**potential clinical consequences?** Ventricular dilation.

Slides

- **Complications of ventricular aneurysms include:**

1-mural thrombus
2-arrhythmias
3-heart failure



Type of aneurysm?

TRUE ANEURYSM

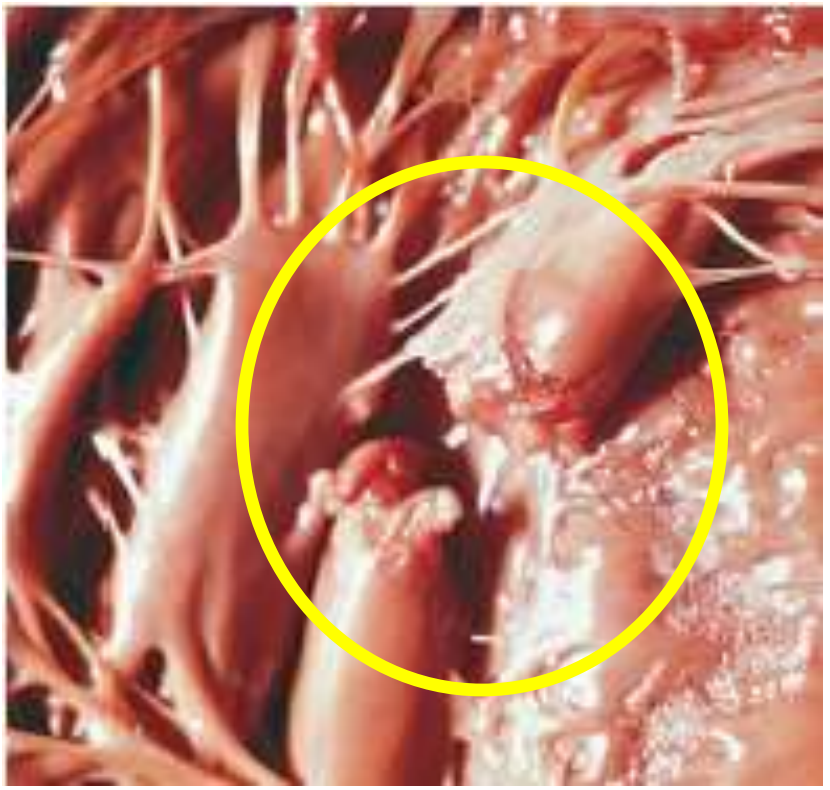
Complications of MI

- what complication of acute MI do you see?

rupture of papillary muscle.

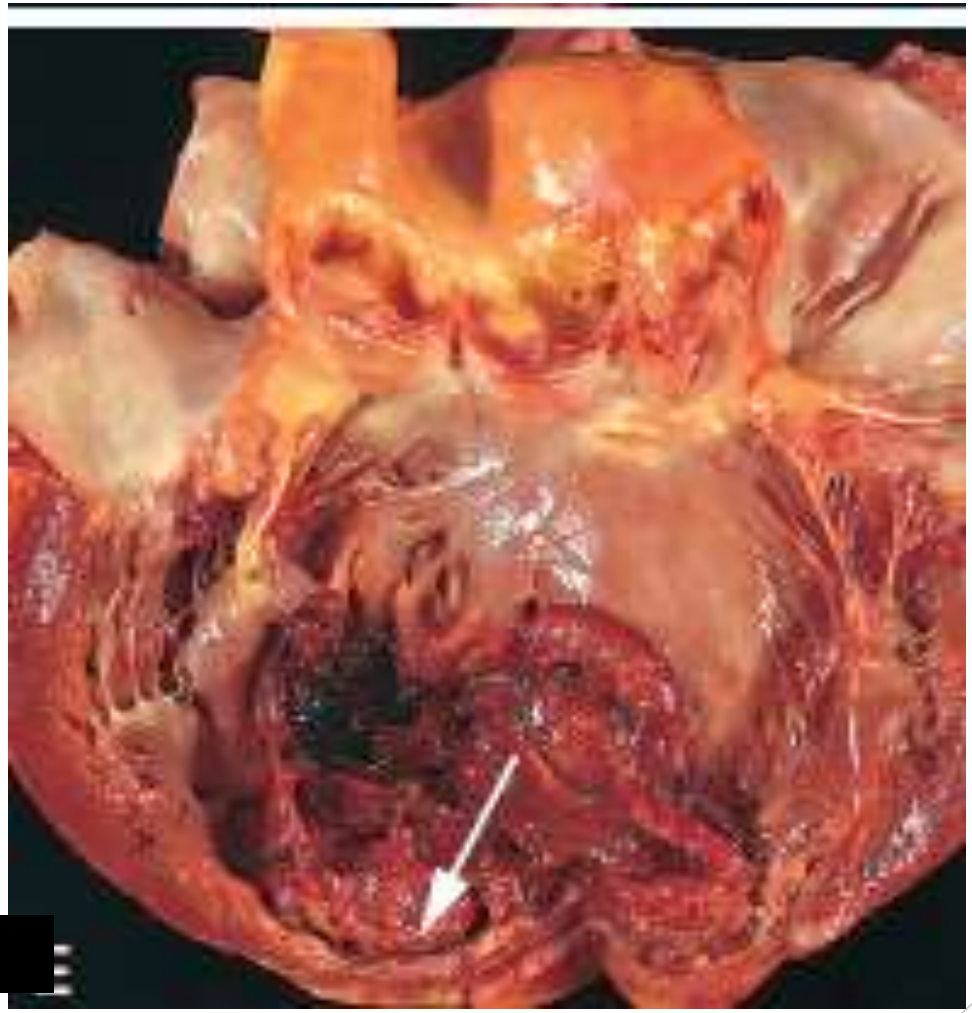
- potential adverse effects ?

Regurgitation if it happens in Mitral valve



Complications of MI

-what significant complication of acute MI do you see? Mural Thrombosis



Acute rheumatic heart disease

- **Aschoff bodies are *pathognomonic* for rheumatic fever**
- **Composition? Collections of T-lymphocytes, plasma cells, and macrophages**

Seen in acute phase of rheumatic fever