جامعة الملك سعود
King Saud University

Pathology
OSPE

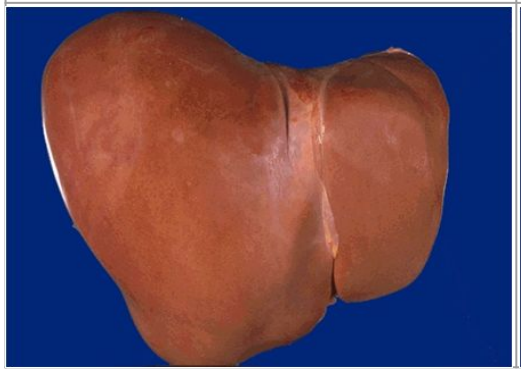
Practical (1)

Cell injury & Inflammation (Part one)

(Cell injury)

CASE (1)

Fatty liver (Steatosis)

Gross appearance	
Normal Liver: The color is brown and the surface is smooth.	Steatosis : 1-slightly enlarged 2-pale yellow appearance 3-greasy(دهني وفيه لمعة)
	

Causes:

The most common cause of fatty change in developed nations is **alcoholism.**

Other causes are:

- **Morbid obesity(السمنة المرضية)**
- **Hepatitis C.(التهاب الكبد)**

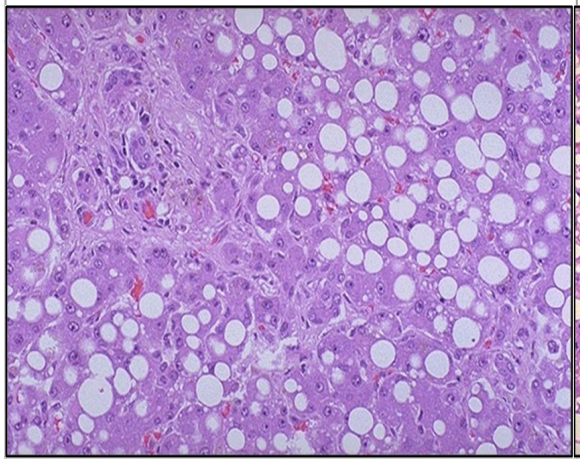
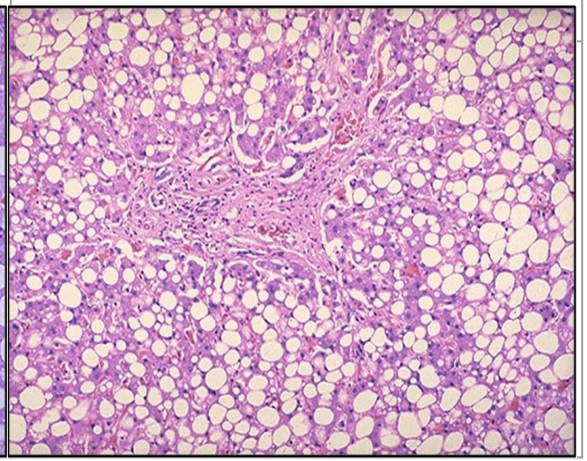
Stain:

By Hematoxylin and Eosin. (H&E)

VIDEO

CASE (1)

Fatty liver (Steatosis)

Microscopic / Histological appearance	
Here : The nuclei displacement to the periphery. (الدهون المتجمعة أزاحت الأنوية للأطراف)	Lipid accumulation as vacuoles in the hepatocytes (Liver cells) **WHY?** The lipid accumulates when lipoprotein transport is disrupted and/or when fatty acids accumulate.
	

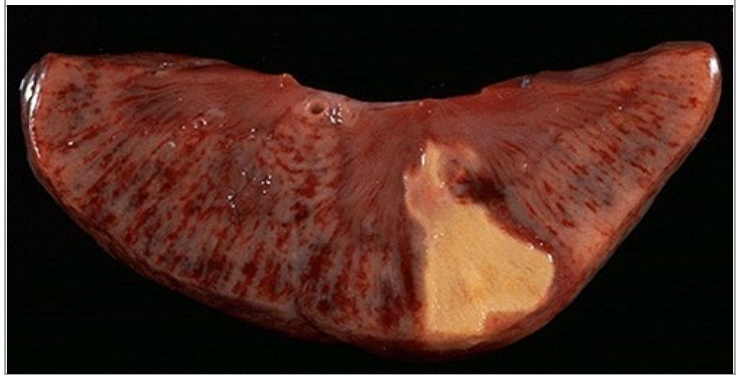
1-Coagulative Necrosis: Kidney

CASE (2)

1- Kidney.
2- Spleen.
3- Heart.

Gross Appearance

Wedge-shaped pale area of coagulative necrosis in the renal cortex.



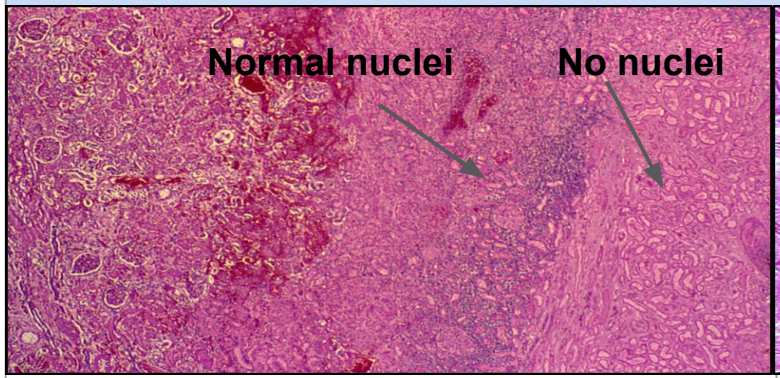
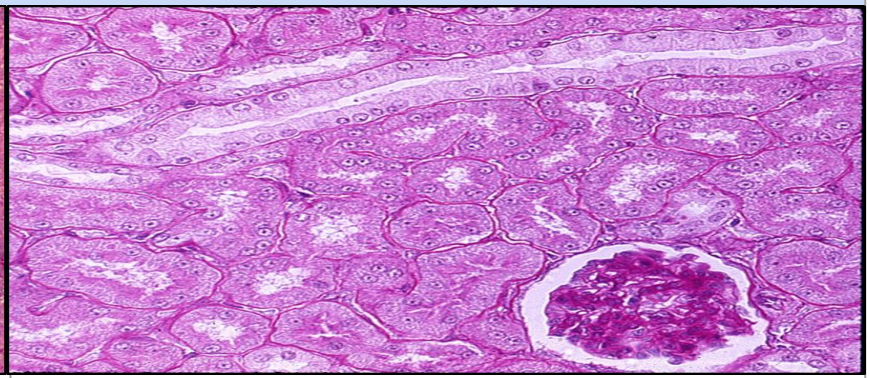
Cause:

Obstruction of the artery will lead to Ischemia.

لمن تنسد الأوعية الدموية يقل وصول الأوكسجين لها بالتالي تدخل مرحلة النيكروسيس وتموت الخلايا بهذه المنطقة

CASE (2)

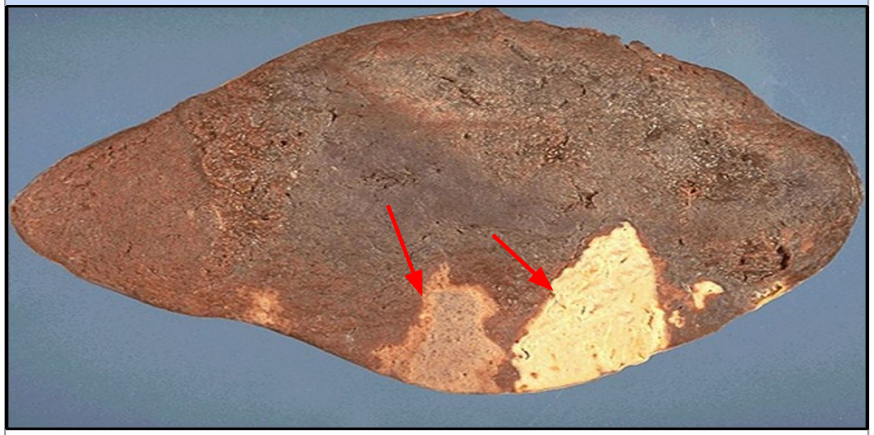
Coagulative Necrosis: Kidney

LPF	Microscopic / Histological Appearance	HPF
		
1- Coagulative necrosis of glomeruli, tubules and interstitial tissue. **2-** **loss of cell nuclei.** **3-** Dilated and congested blood. vessels at the hemorrhagic zone and cellular infiltration by neutrophils, red blood cells and lymphocytes. **4-** inflammatory cells (blue area). Also, Brush border is seen in the right picture.		1- The majority of the tubules seen here are **proximal convoluted tubules.** 2- The **PAS stain** colors the brush border of these structures a deep **pink-lavender**. 3-A **pale-staining** collecting duct stands out in contrast to the abundant proximal tubules.

CASE (2)

2-Coagulative Necrosis: Spleen

Gross Appearance

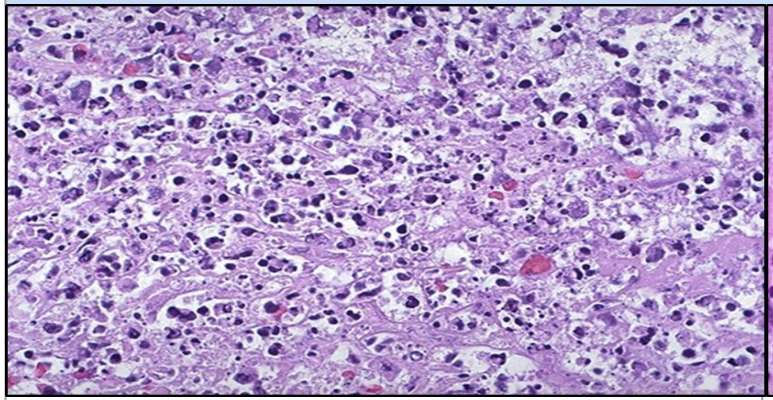


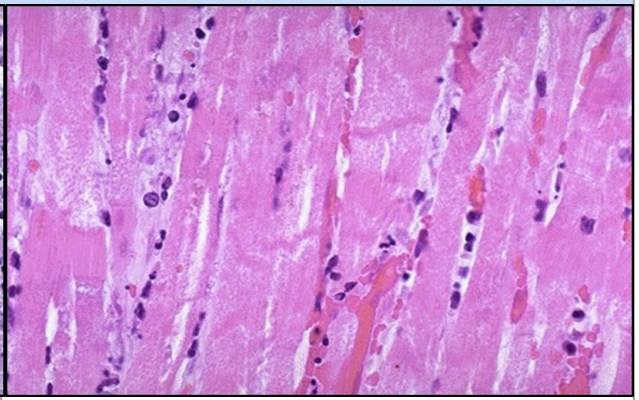
Two large infarctions (areas of coagulative necrosis) are seen in this sectioned spleen.

CASE (2)

3- Coagulative Necrosis: Heart (myocardium)

Microscopic / Histological Appearance





1) Many nuclei undergo:
Pyknosis (shrunken and dark)→ karyorrhexis (fragmentation) →
karyolysis (dissolution)

2) The cytoplasm and cell borders are **not recognizable.**

3) inflammatory cells can be seen (neutrophils).

1- The nuclei of the myocardial fibers are being **lost.**

2) The cytoplasm lost its structure because **no well-defined** cross-striations can be seen.

CASE (3)

Liquefactive Necrosis

A- in the brain

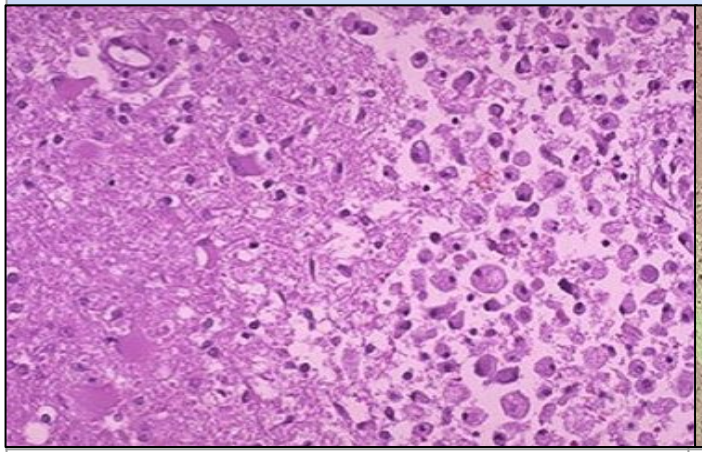
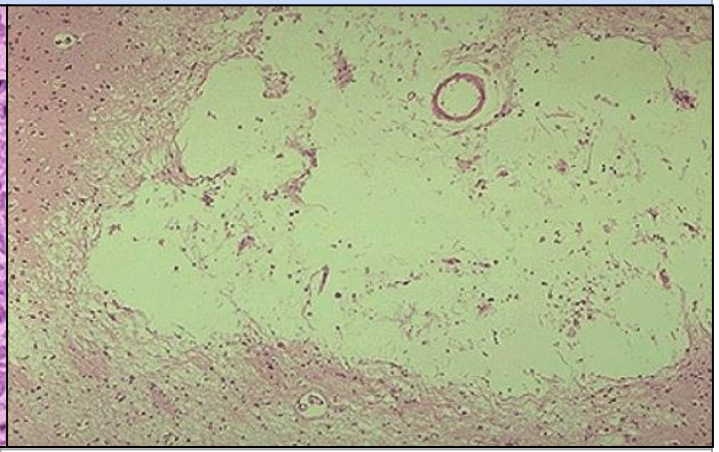
Gross appearance	
	
Grossly, the cerebral infarction at the upper right here demonstrates liquefactive necrosis. Eventually, the removal of the dead tissue leaves behind a cavity.	Liquefactive necrosis in brain leads to resolution with **cystic spaces.** The necrotic area is found in the upper right quadrant of the visual field.

Causes:
irreversible cell injury
Brain infarction caused by **ischemia** is the most common cause of such type of lesions.

CASE (3)

Liquefactive Necrosis

A- in the brain

Microscopic / Histological appearance	
	
1) **Gliosis.** 2) This cerebral infarction demonstrates the presence of many macrophages at the right which are cleaning up the lipid debris from the liquefactive necrosis.	1) lacunar infarct. 2) clear cystic space from resolved liquefactive necrosis. 3) hemosiderin pigment may exist because of hemorrhage.

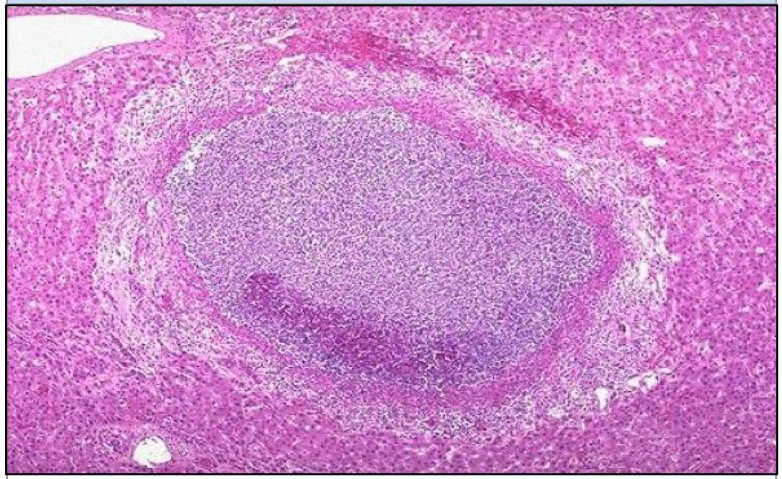
Gliosis: reactive change of glial cells in response to damage to the central nervous system (CNS)
Lacunar infarction: small infarcts in the distal distribution of deep penetrating vessels, they result from occlusion of one of the small penetrating end arteries at the base of the brain.

CASE (3)

Liquefactive Necrosis

B- in the liver

Microscopic / Histological appearance



1) The liver shows a small abscess here filled with many **neutrophils.**
2) This abscess is an example of localized liquefactive necrosis.

Clinical features: (symptoms)

- Abdominal pain, particularly in the right, upper part of the abdomen; pain is intense, continuous or stabbing
- Cough
- Fever and chills
- Diarrhea (in only one-third of patients)
- General discomfort, uneasiness, or ill feeling.
- Loss of appetite
- Sweating
- Weight loss

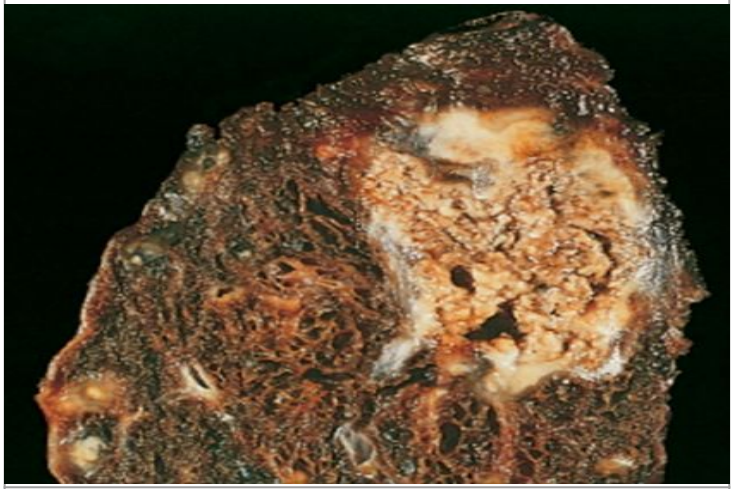
Causes:
Irreversible cell injury

is a type of necrosis which results in transformation of the tissue into a liquid viscous mass.

CASE (4)

Caseous Necrosis
Tuberculosis of the lung

Gross appearance



1-Yellow-white and cheesy debris.
2-Large area of caseous necrosis.

Causes:

Caseous Necrosis is encountered in the foci (center) of tuberculosis infections.
Tuberculosis is caused **by** **Mycobacterium Tuberculosis**.

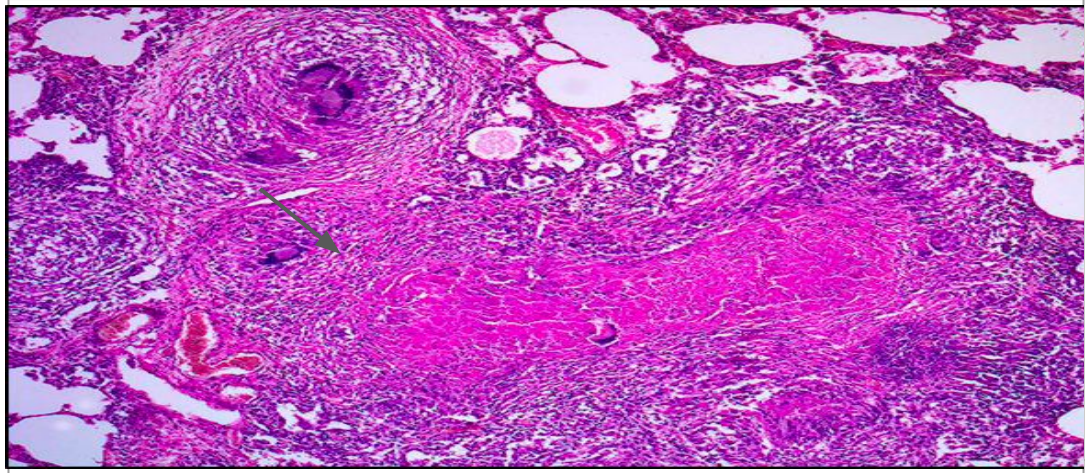
Symptoms :

1.Night sweats.
2.Weight loss.
3.Loss of appetite.
4.Coughing up blood.
5. Fever (mild).

CASE (4)

Caseous Necrosis
Tuberculosis of the lung

Microscopic / Histological appearance



Multiple caseating granulomas.

Granuloma containing of :

1. Epithelioid cells. 2. Giant cells. 3.Lymphocytes and blastocells in the periphery. 4. Caseous necrosis.

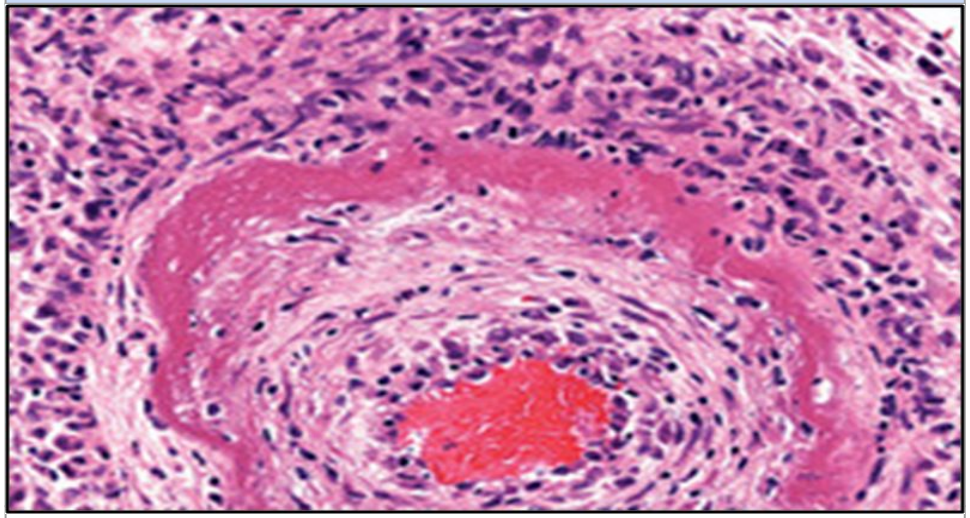
Pink area with no nucleus.

Note preserved alveolar spaces at the margins of the field.

CASE (5)

Fibrinoid necrosis : Artery

Microscopic / Histological appearance



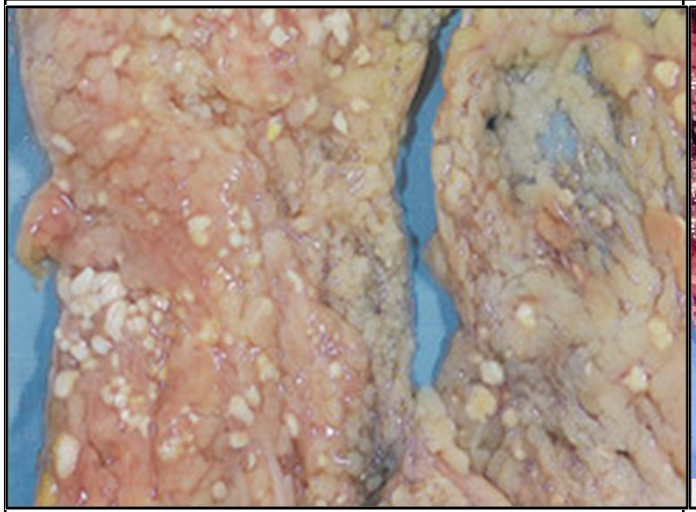
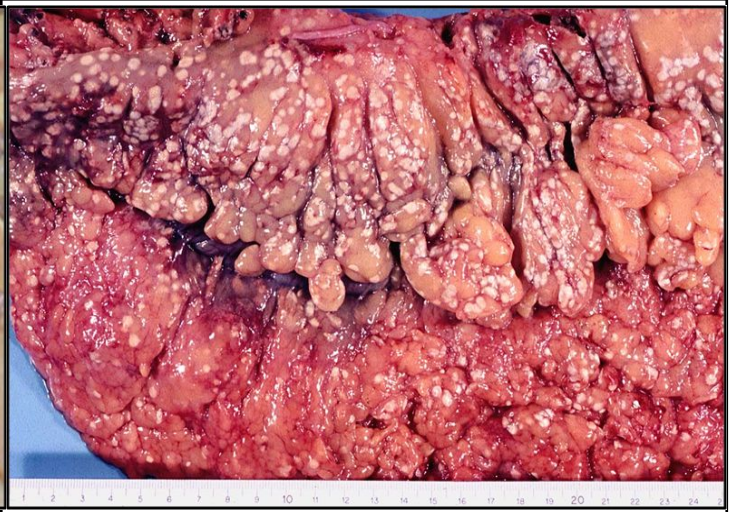
1) Pink area of necrosis at the wall of the artery.
2)The wall of the artery shows a circumferential bright pink area of necrosis with inflammation (neutrophils with dark nuclei).
which appears smudgy and acidophilic/eosinophilic.

Causes:

Immune mediated diseases (autoimmune diseases) and also seen in malignant hypertension.

CASE (6)

Fat necrosis in the mesentery

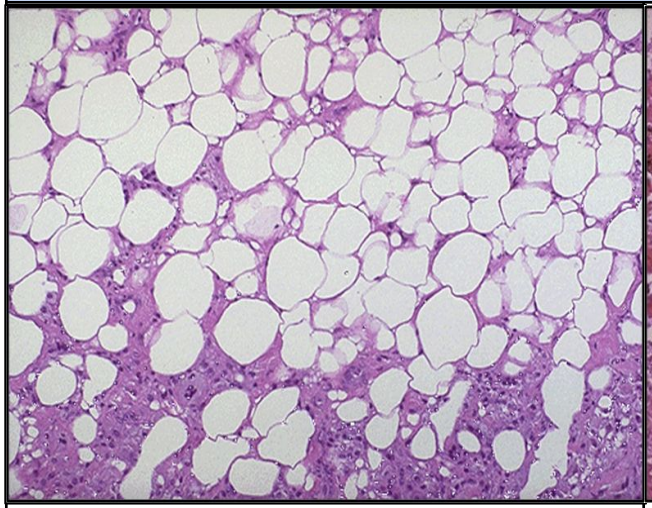
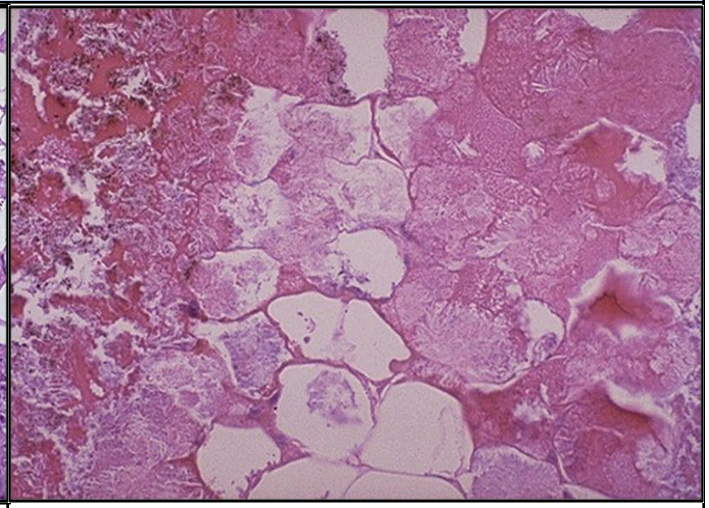
Gross appearance	
	
The areas of white chalky deposits represent foci of fat necrosis **with calcium soap formation (saponification)** at sites of lipid breakdown in the mesentery. (المساريقا في الجهاز الهضمي)	Fat necrosis of the mesentery, Numerous round white fat necrosis.

Causes:
seen in acute pancreatitis.
can also be seen in breast fat and other fatty areas due to traumatic injury.

CASE (6)

Fat necrosis in the mesentery

Fat necrosis adjacent to pancreas is seen here.

Microscopic / Histological appearance	
	
1) Vague (not clear) cellular outlines. **2)** Lost their peripheral nuclei. **3)** cytoplasm has become a pink amorphous mass of necrotic material.	**Left:** There are some remaining steatocytes which are not necrotic. **Right:** The necrotic fat cells at the right have vague cellular outlines, have lost their peripheral nuclei, and their cytoplasm has become a pink amorphous mass of necrotic material

Dystrophic calcification

CASE (7)

1- Aortic valve.
2- Stomach.
3- Skin.

A) In the Aortic valve

Gross appearance

1) View looking down onto the unopened aortic valve in a heart with calcific aortic stenosis.
2) It is markedly narrowed (stenosis).
3) The semilunar cusps are thickened and fibrotic, and behind each cusp are irregular masses of piled-up dystrophic calcification.

Dystrophic calcification:

Seen in areas of necrosis or damage when serum calcium levels are normal and calcium metabolism is normal.**e.g.**

™**Blood vessels:** in the atheromas of advanced atherosclerosis.

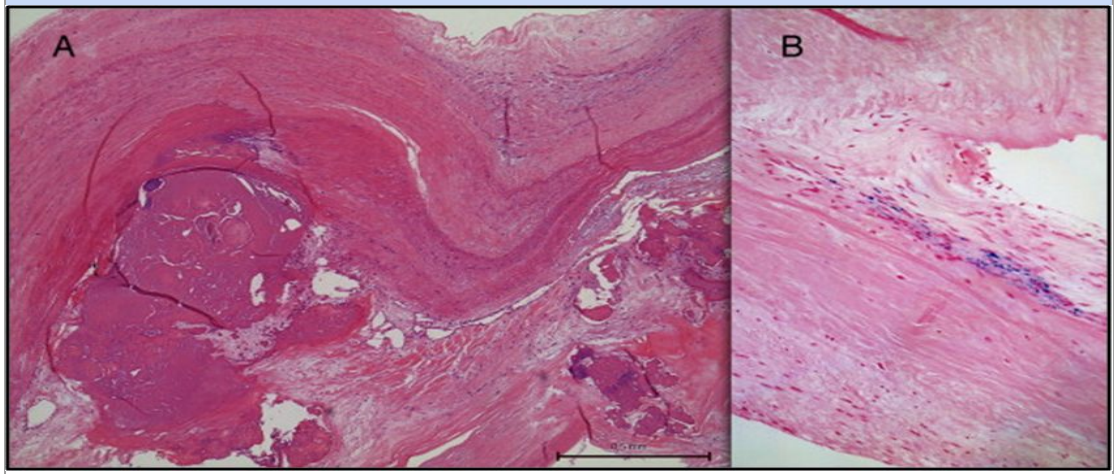
™**Heart:** in aging or damaged/scarred heart valves.

CASE (7)

Dystrophic calcification

A) In the Aortic valve

Microscopic / Histological appearance



It's pink waves at the top and big dark pink circle at the bottom and include some white lines. Fibrosis with some lymphocytes and dystrophic calcification

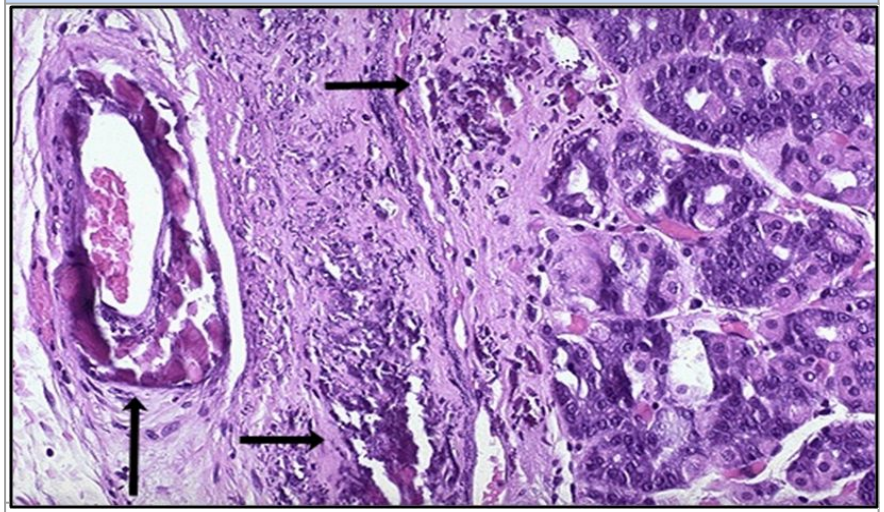
(A) hematoxylin and eosin; 1.25× objective magnification; and siderosis
(B) Berlin blue 40× objective magnification.

CASE (7)

Dystrophic calcification

B) In the stomach

Microscopic / Histological appearance



1) A calcification in the artery wall in the left .
2) There are also irregular bluish-purple deposits of calcium in the submucosa.

CASE (7)

Dystrophic calcification

C) In the skin

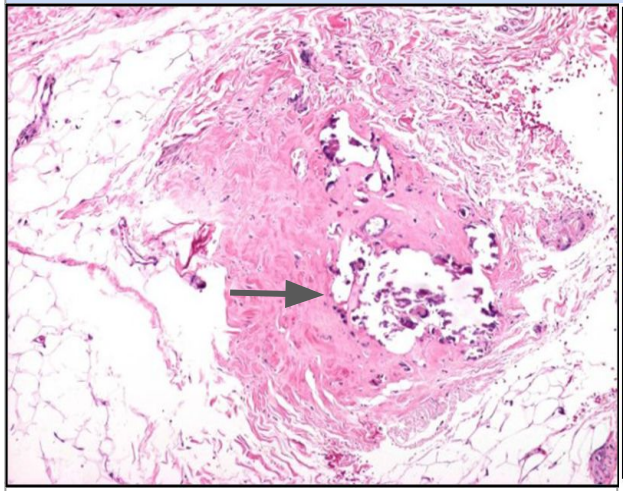
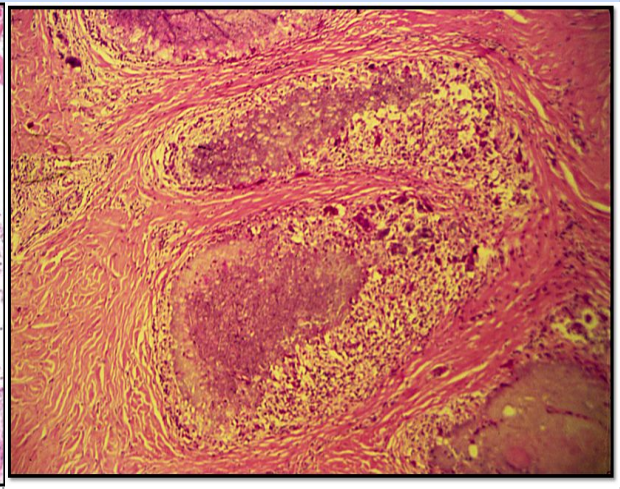
Gross appearance

1) Multiple erythematous hard papules in linear configuration on the extensor aspect of the arm. **2)** Within the lesion there were several 2-5 mm **white calcifications.**

CASE (7)

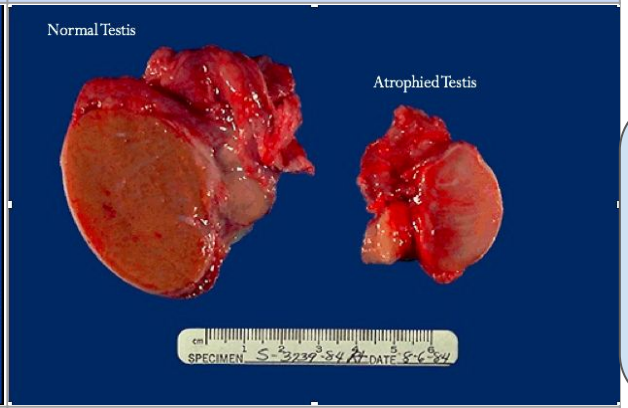
Dystrophic calcification

C) In the skin

Microscopic / Histological appearance	
	
1) Calcifying panniculitis with fibrosis of the subcutaneous connective tissue septae. **2)** Adjacent inflammation containing plasmocytes and lymphocytes, and a deposit of calcification (arrow).	**1)** Irregular blue granular deposits of calcium in the dermis. **2)** The calcium surrounded by fibrous tissue and for foreign body giant cell reaction.

CASE (8)

Atrophy of the Organ (Brain – Testis)

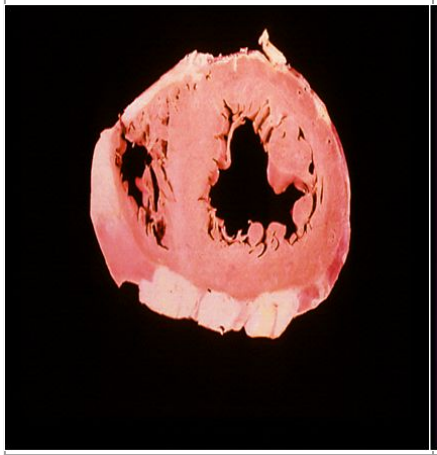
Gross appearance The atrophy of the brain	Gross appearance The atrophy of the testis
	
The gyri : are narrowed. **The intervening sulci :** are widened. **Particularly pronounced toward the frontal lobe region.**(الفص الجبهي)	**The Right :** Normal testis. **The Left :** the testis has undergone atrophy and is much smaller than the normal testis.

Causes: in the brain the most common cause is **Alzheimer disease.**

Causes: in the testis the people who take **steroids.**

CASE (9)

Left Ventricle Hypertrophy

Gross appearance	
	
Normal ventricles	**Left ventricular hypertrophy:** The number of myocardial fibers does not increase , but their size increased in response to an increased workload.

Causes:

- Patients with severe **hypertension.**
- **Hypertrophic** cardiomyopathy.
- **Athlete training.**

Clinical features (symptoms):

- Chest pain

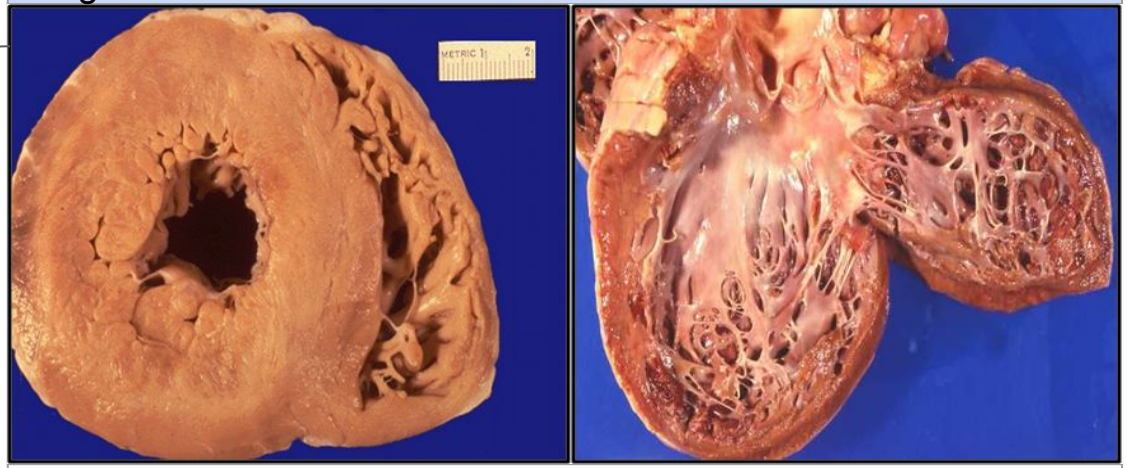
CASE (9)

Left Ventricle Hypertrophy

This cross section view of the heart shows the left ventricle in the right of the picture.

Gross appearance

Right



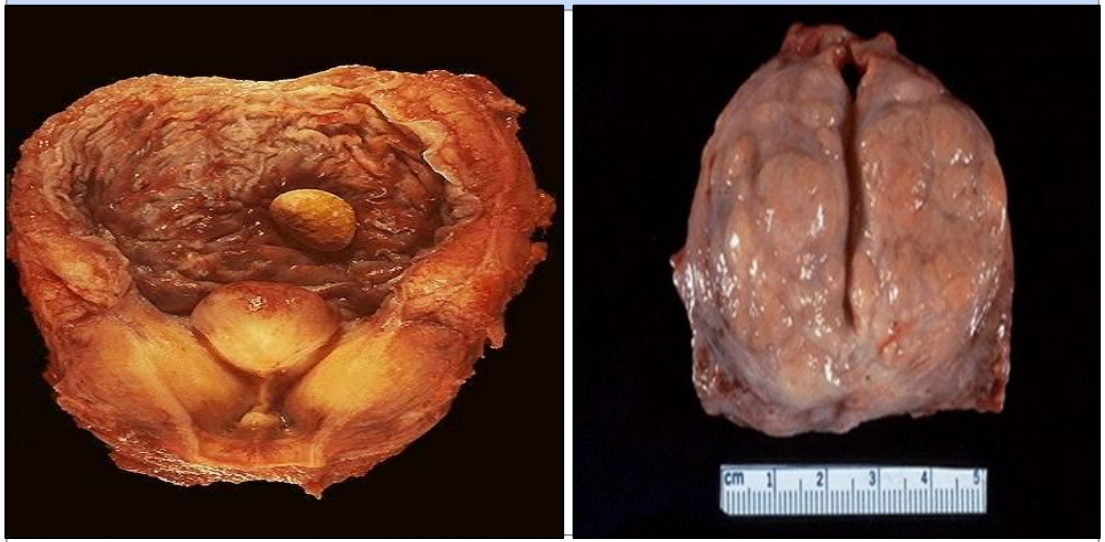
Left

1) people with hypertensive → increase the workload on the left ventricle of the heart → The myocardial fibers undergoes Hypertrophy (which is increse in size NOT in number)
2) **Hypertrophy (Enlargement) of the left ventricular.**
3) The left ventricle is **grossly thickened.**
4) The myocardial fibers have undergone **hypertrophy.**

CASE (10)

Prostatic Hyperplasia

Gross appearance



1) The **normal adult** male prostate is about 3 to 4 cm in diameter.
2) The number of prostatic glands, as well as the stroma, has increased in this **enlarged prostate.**

Causes: caused by changes in hormone balance and in cell growth.

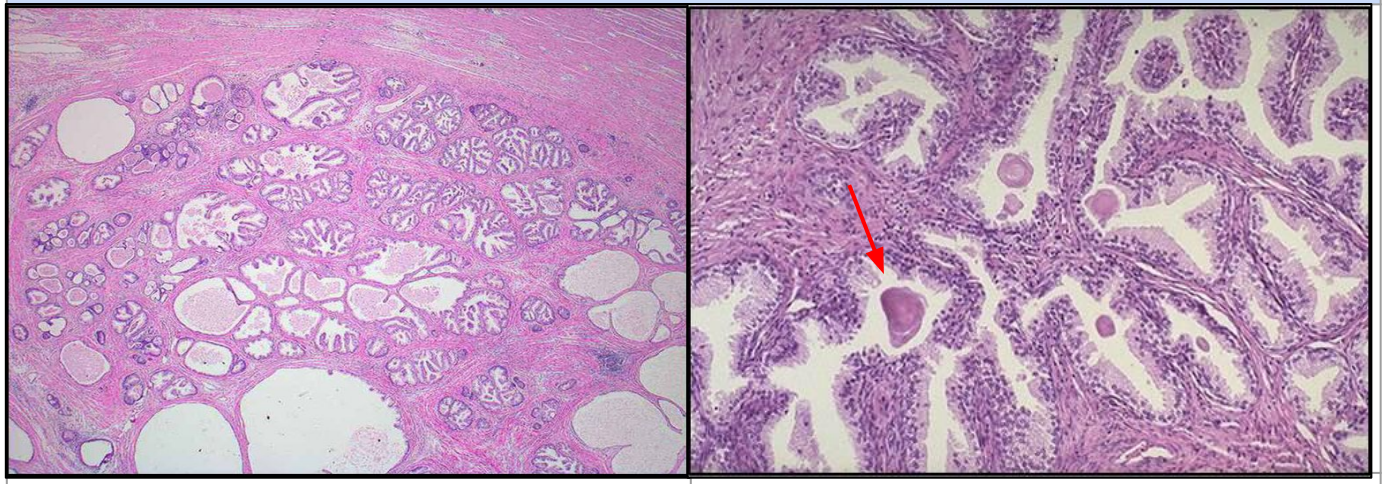
Clinical features:

The number of prostatic glands, as well as the stroma(CT),has increased in this enlarged prostate → Prostatic Hyperplasia (increased in number)

CASE (10)

Prostatic Hyperplasia

Microscopic / Histological appearance

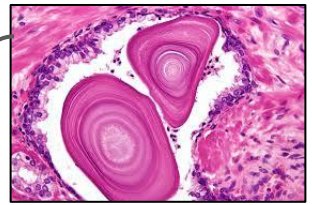


1) **Nodular hyperplasia of glandular** and **fibromuscular stromal tissue.**
2) Each nodule shows large number of glands of variable sizes lined by tall columnar epithelium and some are cystically dilated.

HERE : of the nodules of hyperplastic prostate.

1) There are many glands along with some intervening stroma.
1) Eosinophilic hyaline corpora amylacea is present in some glands.

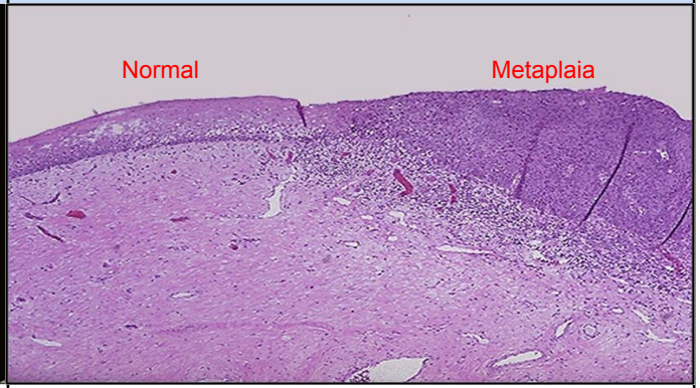
corpora amylacea
أجسام نشوية



EXTRA

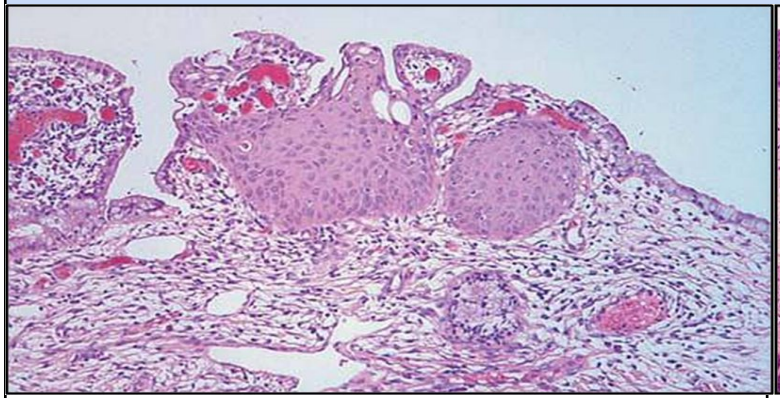
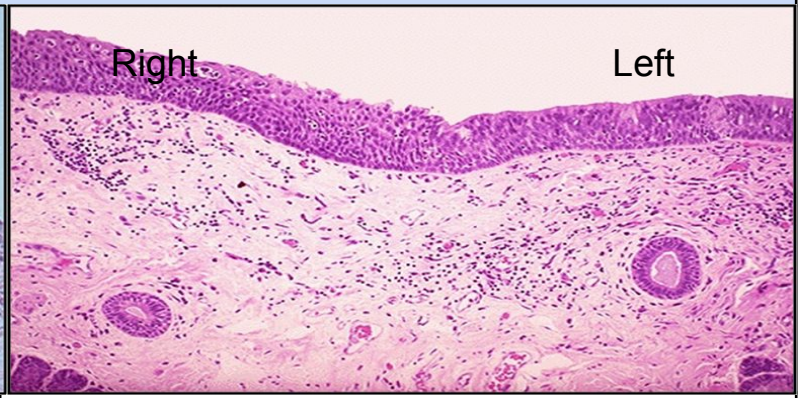
CASE (11)

Squamous Metaplasia And Dysplasia: Uterine Cervix

Gross appearance	Microscopic / Histological appearance
	
Normal Uterine Cervix	**Normal and Dysplastic Cervical Squamous Epithelium**
• **smooth** • **glistening mucosal surface**, with small rim of vaginal cuff from this hysterectomy specimen. • The cervical is small and round, typical for a nulliparous woman. • The is will have a fish-mouth shape after one or more pregnancies.	**The normal** cervical squamous epithelium at the right transforms to dysplastic changes on the left with underlying chronic inflammation.

CASE (11)

Squamous Metaplasia And Dysplasia: Uterine Cervix

Microscopic / Histological appearance	
	
Endocervical Squamous Metaplasia	**Laryngeal Squamous Metaplasia**
A section of endocervix shows the normal columnar epithelium at both margins and a focus of squamous metaplasia in the center.	• Metaplasia of laryngeal respiratory epithelium has occurred here in a smoker. • The chronic irritation has led to an exchanging of one type of epithelium (the normal respiratory epithelium at the left) for another (the more resilient squamous epithelium at the right)

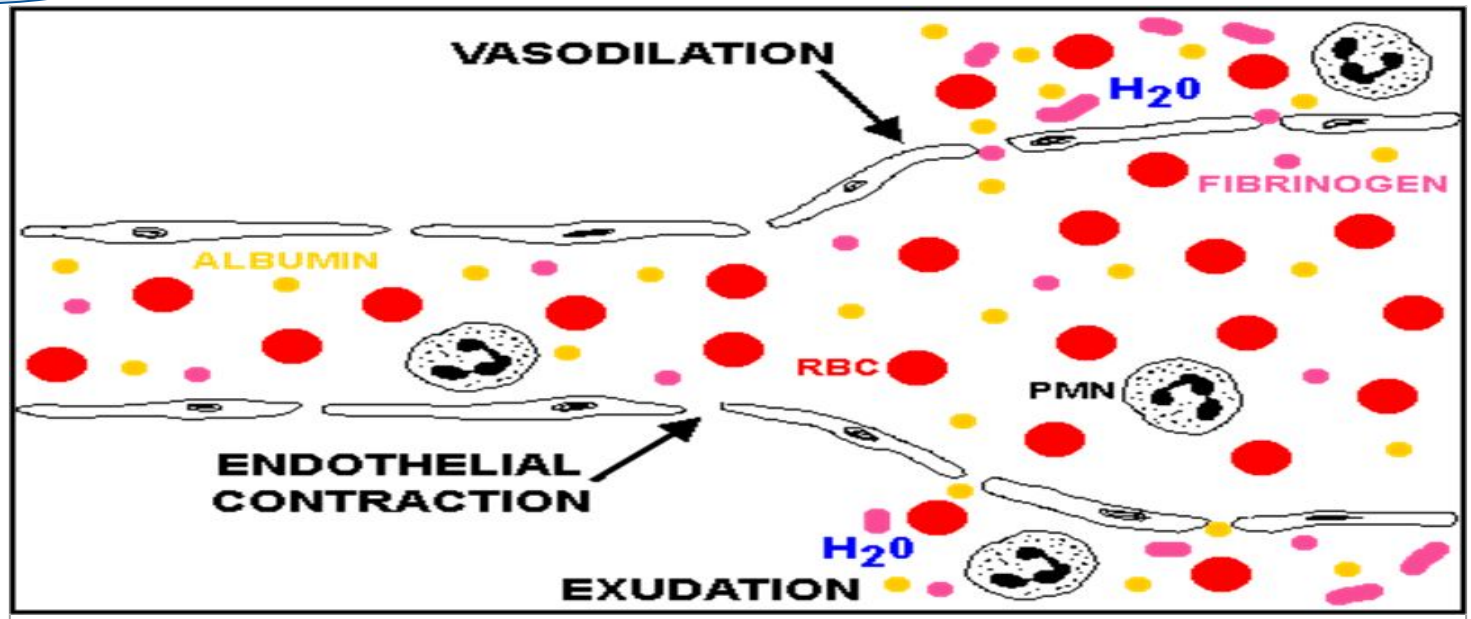
Practical (2)

Cell injury & Inflammation (Part two)

(Acute inflammation)

EXPLAIN

Pathogenesis of Exudation

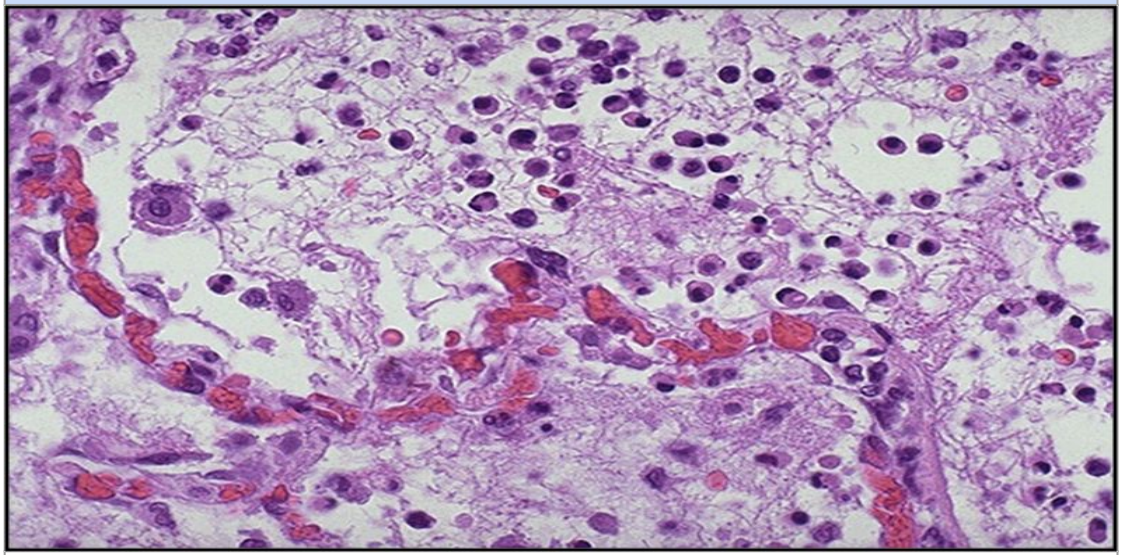


The diagram shown here illustrates the process of exudation, aided by endothelial cell contraction and vasodilation, which typically is most pronounced in venules.
Collection of fluid in a space is a transudate. If this fluid is protein-rich or has many cells then it becomes an exudate.

CASE (12)

1- Exudation in the Alveolar Space

Microscopic / Histological appearance

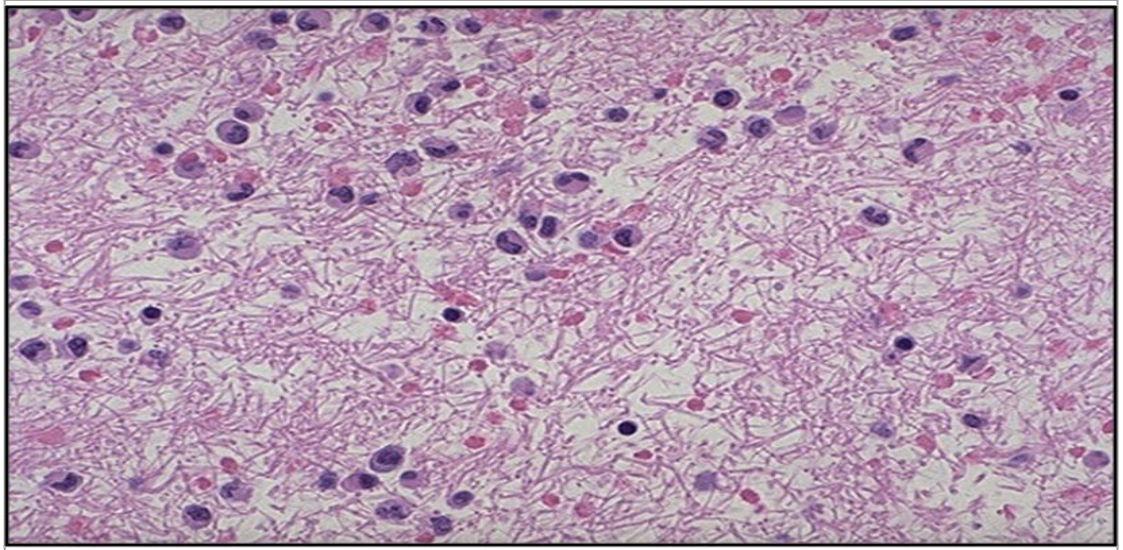


Here is vasodilation with exudation that has led to an outpouring of fluid with fibrin into the alveolar spaces along **with PMN's indicative of an acute bronchopneumonia of the lung.**

CASE (12)

2- Exudation of Fibrin in Acute Inflammation

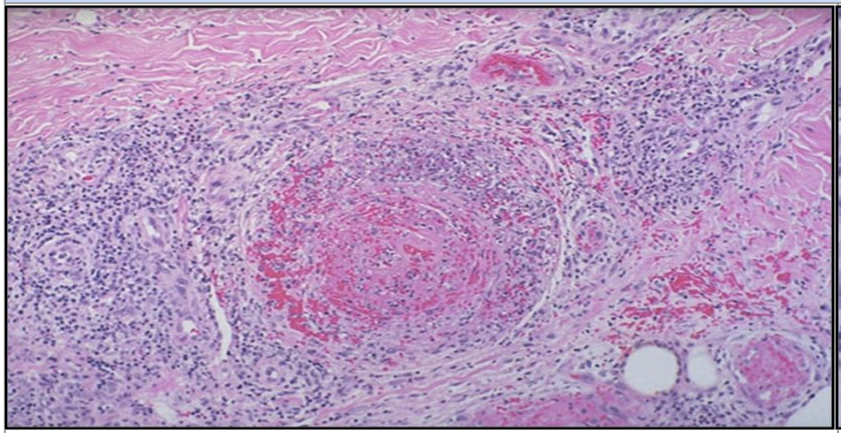
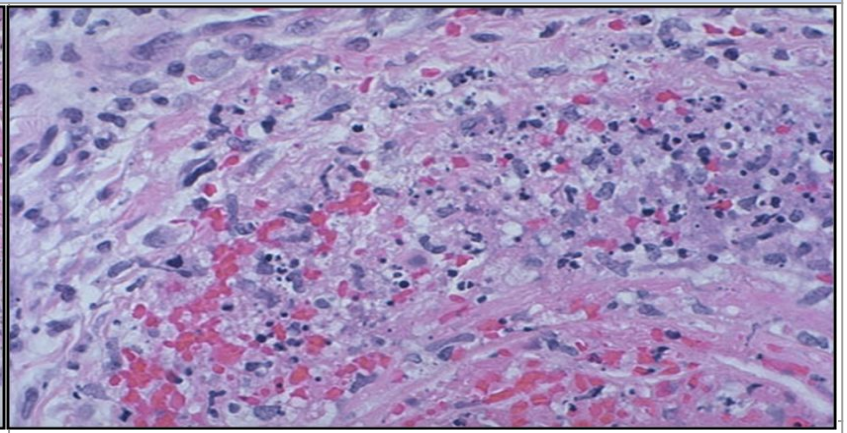
Microscopic / Histological appearance



Here is an example of the fibrin mesh in fluid with PMN's that has formed in the area of acute inflammation. **It is this fluid collection that produces the "tumor" or swelling aspect of acute inflammation.**

CASE (13)

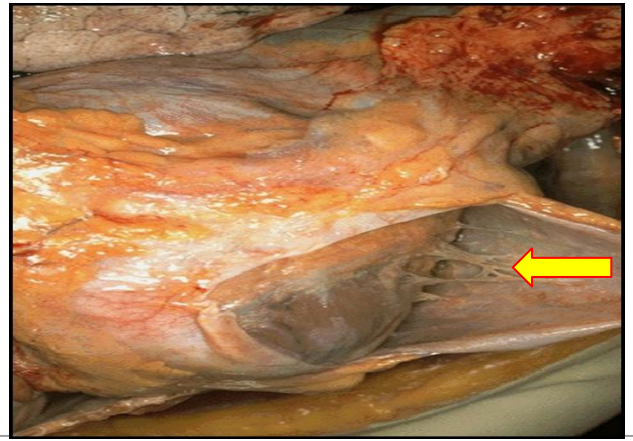
Inflammation with Necrosis

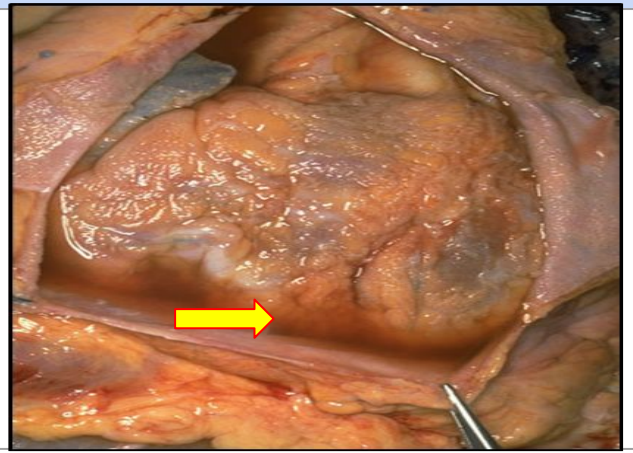
LPF	Microscopic / Histological appearance	HPF
		
The vasculitis shown here demonstrates the destruction that can accompany **the acute inflammatory** process and the interplay with the coagulation mechanism. The arterial wall is undergoing necrosis, and there is thrombus formation in the lumen.		At higher magnification, vasculitis with arterial wall necrosis is seen. **Note** the fragmented remains of neutrophilic nuclei (karyorrhexis). **Acute inflammation** is a non-selective process that can lead to tissue destruction.

CASE (14)

Acute Fibrinous Pericarditis

Gross Appearance





The pericardial cavity has been opened to reveal a fibrinous pericarditis with strands of stringy pale fibrin between visceral and parietal pericardium.

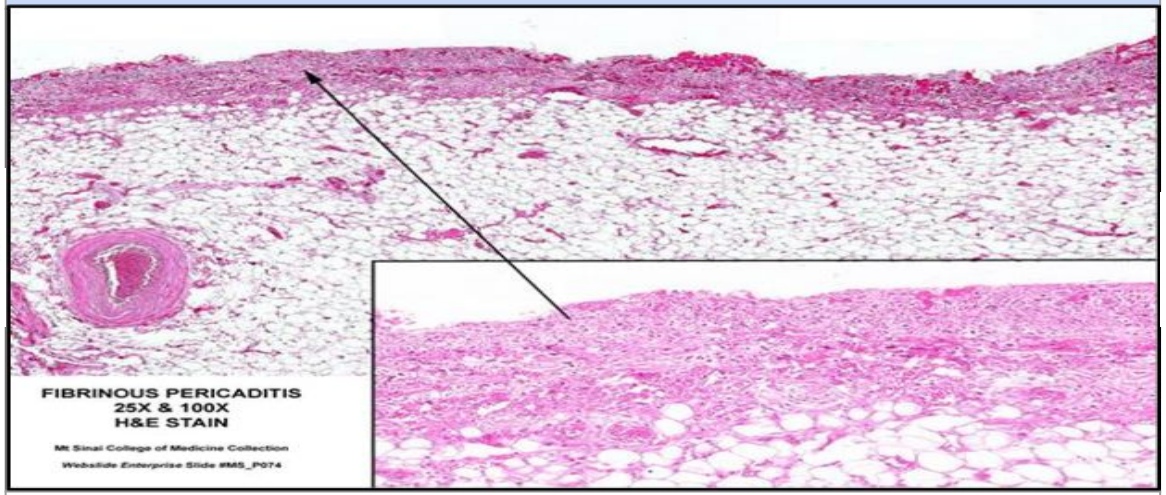
Fibrinous : serous fluid at the bottom of the pericardial cavity. the epicardial (the outer layer of the heart) appears rough due the strands of pink-tan fibrin that have formed pale fibrin in the pericardium.

تجمع سائل اسفل التجويف, شكله خشن بسبب تكون فايبرن عليه

CASE (14)

Acute Fibrinous Pericarditis

Microscopic / Histological Appearance



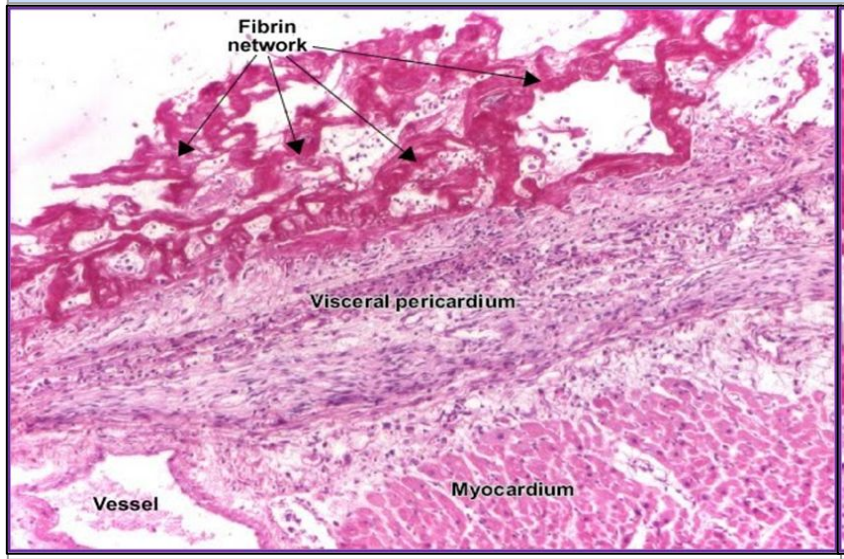
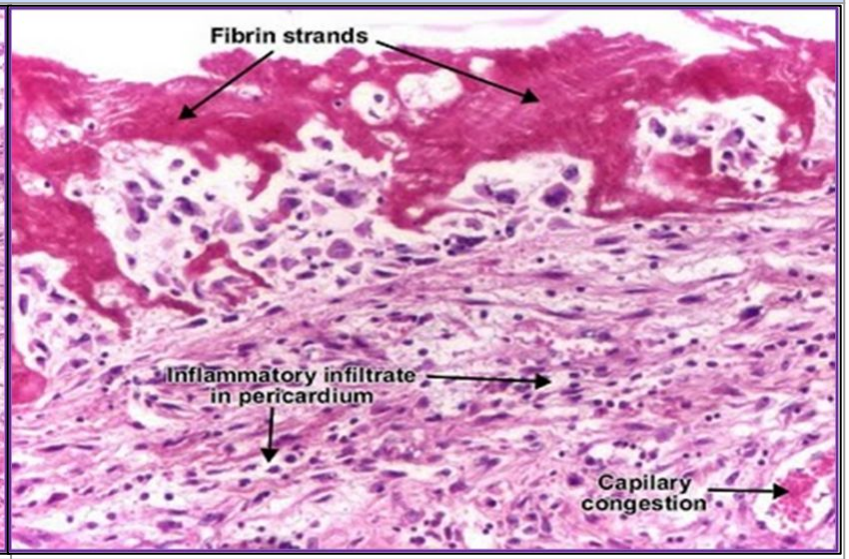
The fibrinous exudate is seen to consist of pink strands of fibrin gutting from the pericardial surface at the upper right.

The exudate on the surface is shown enlarged in the inset.

Note a considerable number of erythrocytes trapped in the mesh of fibrin threads.

CASE (14)

Acute Fibrinous Pericarditis

LPF	Microscopic / Histological appearance	HPF
		
The pericardium is distorted by **thick irregular layer of pinkish fibrinous** exudate with some **red cells** and **inflammatory cells.**		The subepicardial layer is thickened **by edema and shows dilated blood vessels, chronic inflammatory cells** and areas of calcification.

CASE (15)

Acute Appendicitis

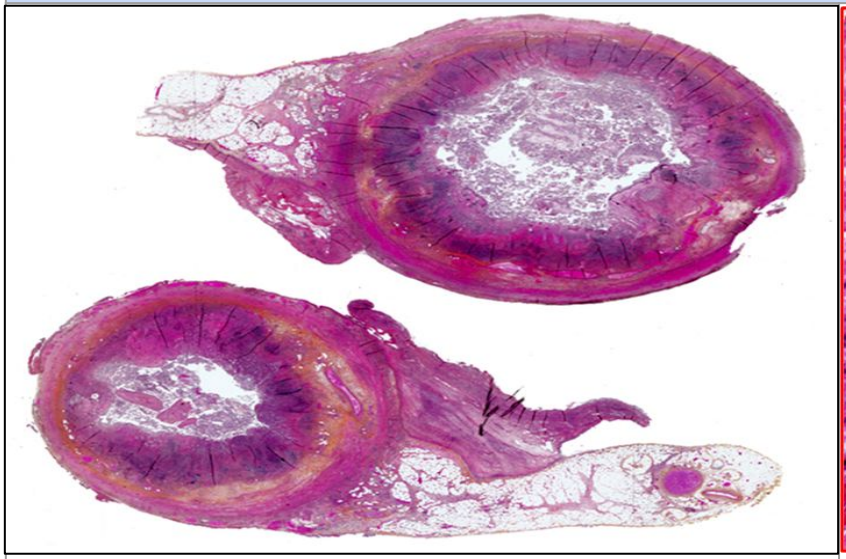
Gross appearance

normal appendicitis	acute appendicitis	
		longitudinal section (LS) 
Normal appearance : of the appendix against the background of the caecum.	• **Yellow to tan exudate.** • **Hyperemia**(احتقان), including the periappendiceal fat superiorly(دهون حول الزائدة الدودوية) • And **Smooth.** • **Glistening pale** tan serosal surface.(بسبب الدهون يلمع)	• **Enlarged and sausage-like** (botuliform).(تشبه النقانق) • **Red inflamed mucosa** with its irregular luminal surface. • This appendix **does not show late complications,** like transmural necrosis, perforation, and abscess formation.(مالها اعراض)

CASE (15)

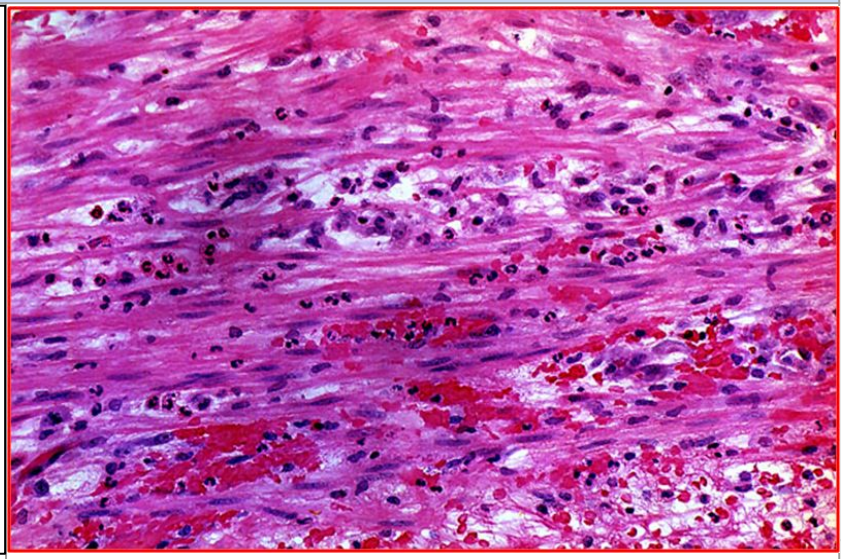
Acute Appendicitis

Microscopic / Histological appearance



LPF of the cut section

(الزائدة مقطوعة بالعرض هنا)

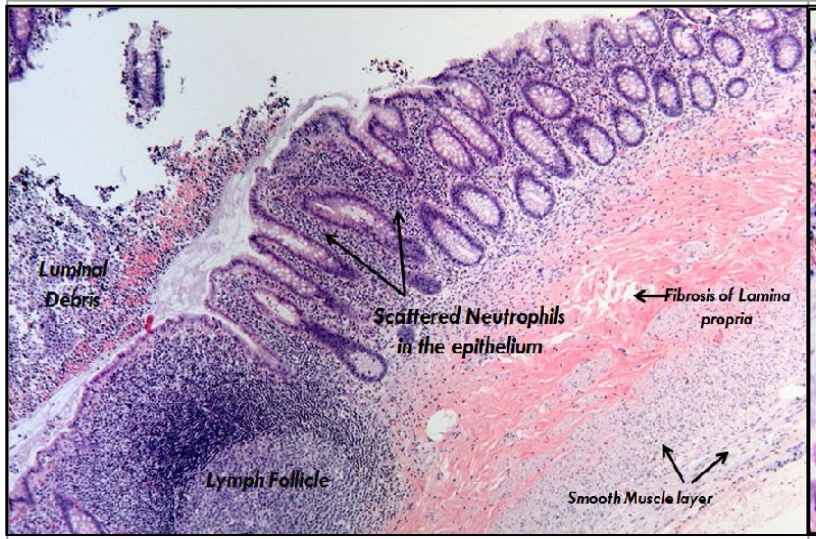


This slide shows the muscle layer of the appendix which is permeated with **numerous polymorphonuclear leukocytes.**(فيه أنوية كثيرة من خلايا الدم البيضاء)

CASE (15)

Acute Appendicitis

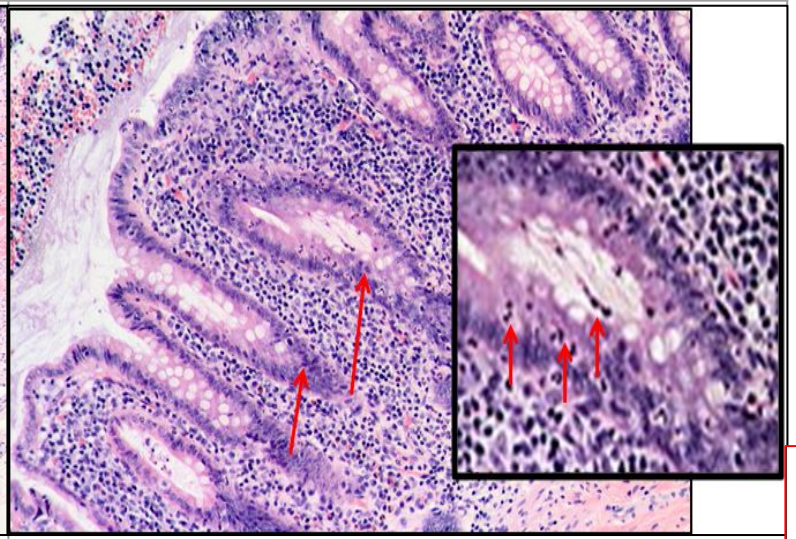
Microscopic / Histological appearance



Acute Appendicitis – LPF

(LPF = Low Power Field)

(Low magnification)



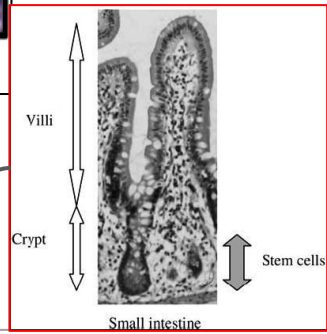
Acute Appendicitis – HPF

(HPF = High Power Field)

(High magnification)

Scattered Neutrophils in **the crypt epithelium.**

(للتوضيح)



CASE (15)

Acute Appendicitis

EXTRA

Clinical features: (symptoms)

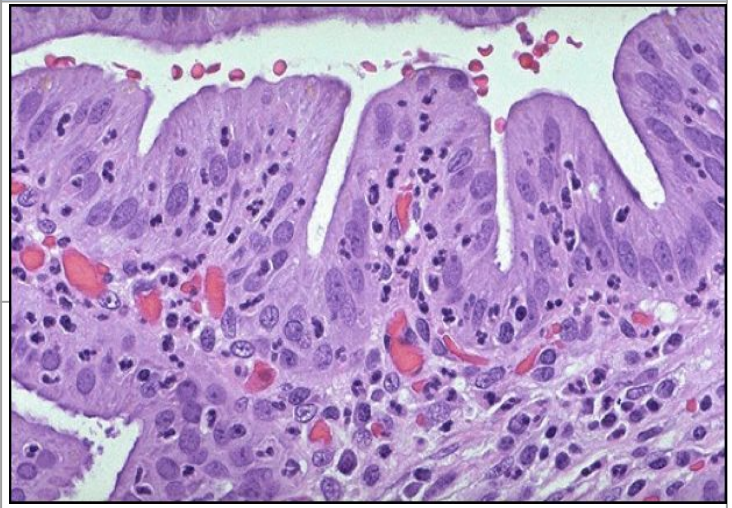
- Lower right side abdominal pain.
- Loss of appetite.
- Nausea (feeling of sickness with an inclination to vomit).
- Vomiting.
- Diarrhea.
- Constipation.
- Abdominal swelling.
- Low grade fever.

Treatment: Surgery.

CASE (16)

Acute Cholecystitis

Inflammation of the Gall bladder (التهاب المرارة الحاد)

Gross Appearance	Microscopic / Histological Appearance
	
• **Mucocele.** • Stone obstructed the neck. • **Distended**(منتفخ).	**The neutrophils** are seen infiltrating the mucosa and submucosa of the gallbladder.(النيوتروفيل هنا تخترق الطبقات)

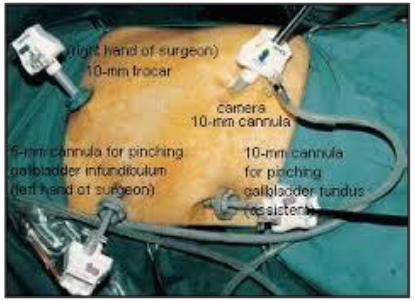
Clinical features: (symptoms)

- Right upper quadrant abdominal pain with tenderness on palpation (tough)

Treatment:

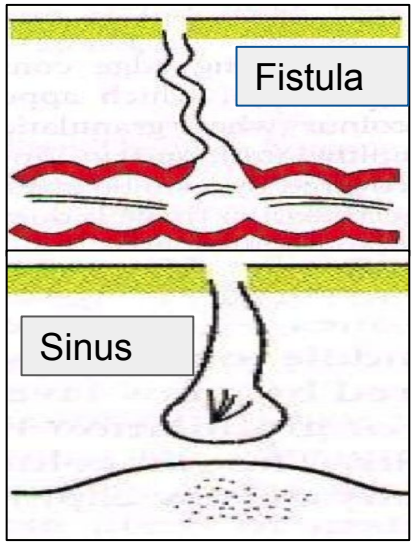
- Laparoscopic cholecystectomy.
(استئصال المرارة بالمنظار)

(Aspiration done and removed by lap chol)

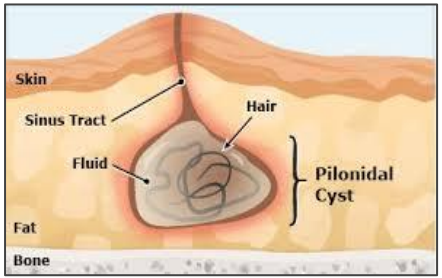


CASE (17)

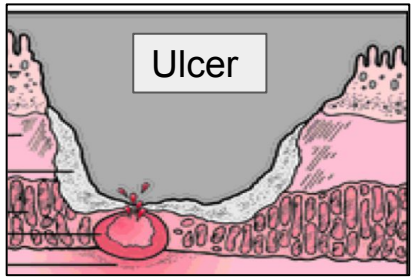
Skin Pilonidal Sinus

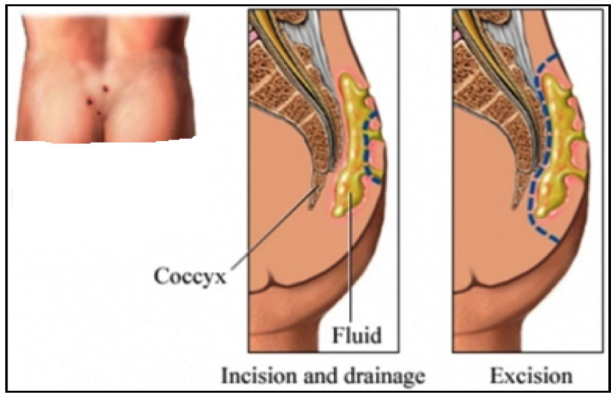


لتوضيح الفرق بينهم فقط



EXTRA





Foreign Body Reaction (Pilonidal Sinus)
Gross Appearance

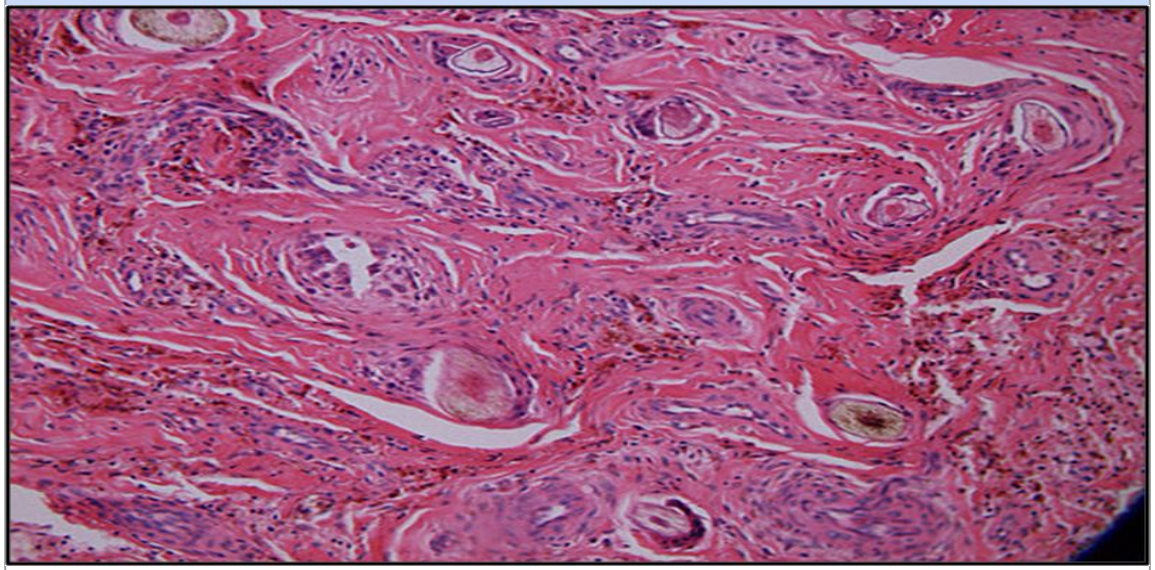
- A pilonidal sinus is a sinus tract which commonly contains hairs. (أحياناً يسمونه كيس الشعر)
- It occurs under the skin between the buttocks (the natal cleft) a short distance above the anus.
- Usually runs vertically between the buttocks and rarely occurs outside the coccygeal region.

CASE (17)

Skin Pilonidal Sinus

Surgically excised pilonidal sinus tracts.

Microscopic / Histological Appearance LPF



The lumen of the sinus and wall contain large number of hair shafts with foreign body giant cells, lymphocytes , macrophages & neutrophils.

Practical (2)

Cell injury & Inflammation (Part two)

(Chronic inflammation)

CASE (18)

Chronic cholecystitis with stones

Gross appearance (sectioning longitudinally) (LS)

- **Thickness of gallbladder wall.**
- **Abundant polyhedral stones.**
- **Small papillary tumor in the cystic duct.**

EXTRA

Causes:

Excessive and inappropriate activation of the immune system.

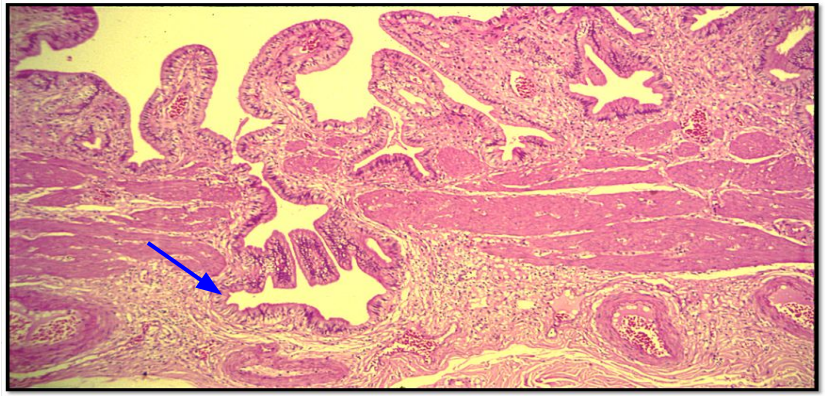
Other causes:

Immune responses against common environmental substances that cause allergic diseases.

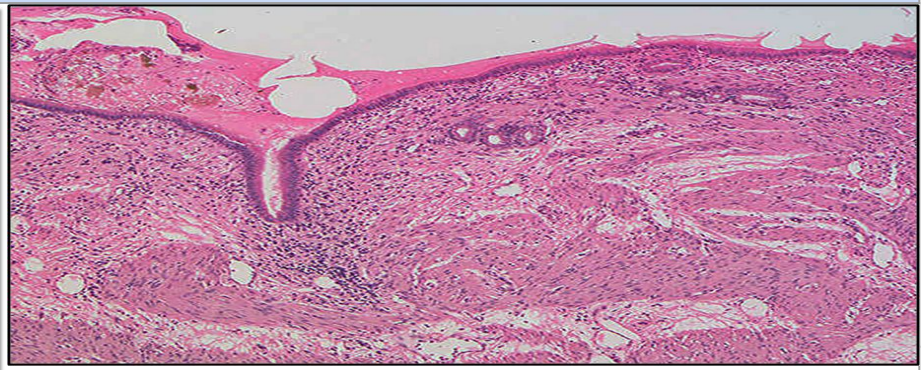
CASE (18)

Chronic cholecystitis with stones

Microscopic / Histological appearance



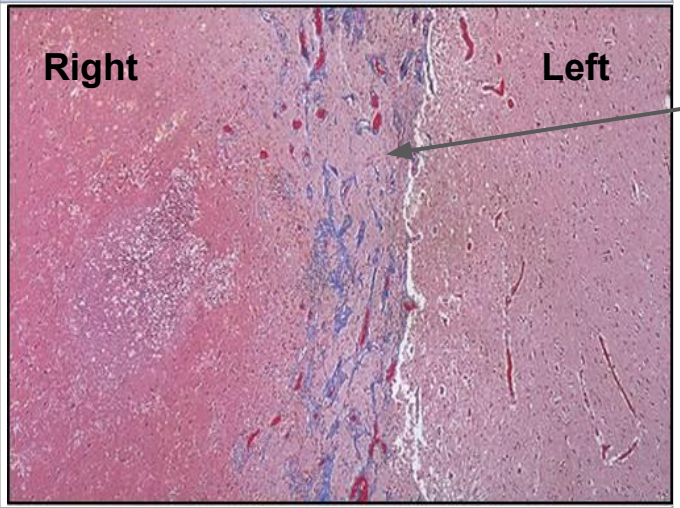
- **Irregular mucosal folds** and foci of ulceration in mucosa.
- **Wall is penetrated by mucosal glands** which are present in muscle coat (Rokitansky- Aschoff sinuses) **(ARROW)**
- All layers show **chronic inflammatory cells** infiltration and **fibrosis.**



- The **mucosa is atrophic**, with a single layer of **flattened epithelium.**
- There is **proteinaceous fluid(السائل البروتيني)** adherent to the mucosal surface, **with some bile stained orange-brown** crystals toward the upper left in the lumen.
- The lamina propria shows fibrosis and contains a mononuclear cell infiltrate **(small dark blue nuclei)**
- **The muscle is hypertrophied compared to normal gallbladder.**

CASE (19)

BRAIN ABSCESS
Liquefactive necrosis

Gross appearance CT of a cerebral abscess.	Microscopic / Histological appearance Brain Abscess - MRI
	
There is a liquefactive center with yellow pus surrounded by a thin wall.	Left: Normal brain is at the left and the center. Right: the abscess

STAIN:

This trichrome stain demonstrates the light blue connective tissue in the wall of an organizing cerebral abscess.

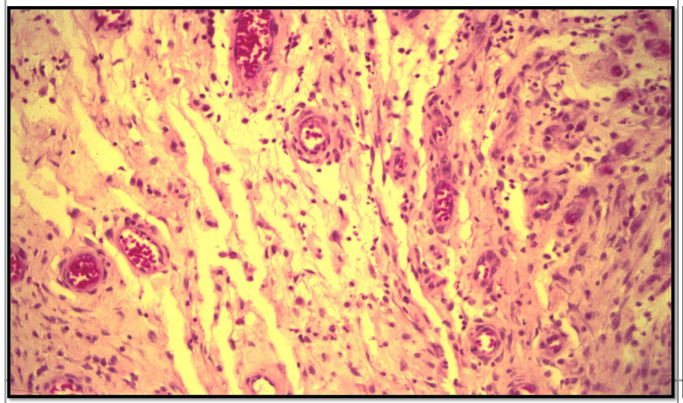
CAUSES:

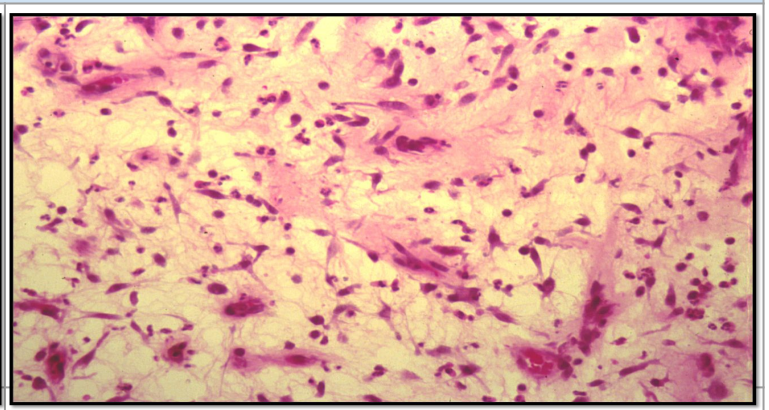
- Abscess usually result from Hematogenous spread of bacterial infection.
- OR, Direct penetrating trauma or extension from adjacent infection in sinuses

CASE (20)

Granulation Tissue

LPF	Microscopic / Histological appearance	HPF





- **Section of fragments of edematous.**
- **Loose connective tissue** shows many small newly formed capillaries lined by plump endothelial cells.
- **Proliferation of fibroblasts is seen.**

- **Inflammatory cells** (including macrophages, lymphocytes, plasma cells and neutrophils) in the oedematous stroma.
- **Pink homogenous collagen fibers** may be identified.

Granulation tissue(scar):

-**New connective tissue** and tiny blood vessels that form on the surfaces of a wound **during the healing process.**

-It grows from the base of a wound and is able to fill wounds of almost any size.

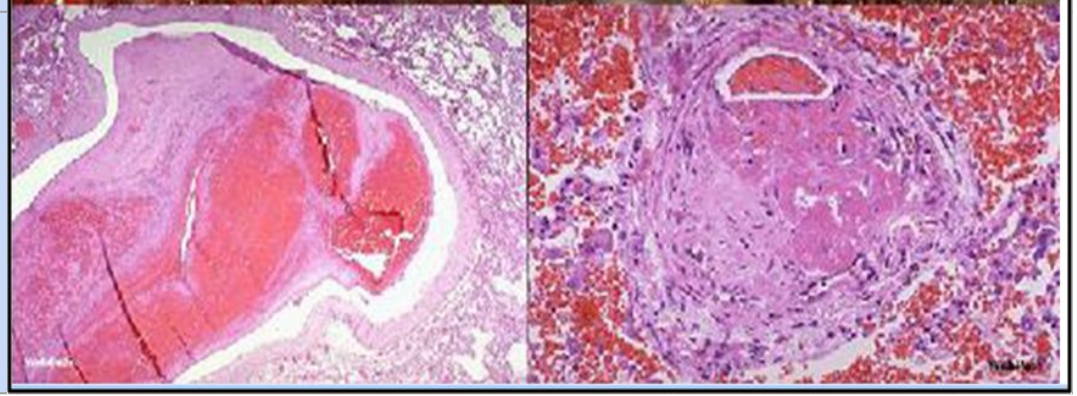
Practical (3)

Thromboembolic disorders

A) Organisation Thrombus

CASE (21)

Organizing thrombus in a case of pulmonary embolism.
جلطة تسبب انسداد في الرئة

Gross appearance	
Microscopic / Histological appearance	

Causes:
by a type of bacterium called **Mycobacterium tuberculosis**.

Name of Thrombus: Pulmonary thromboembolism.

Location: Large pulmonary artery.

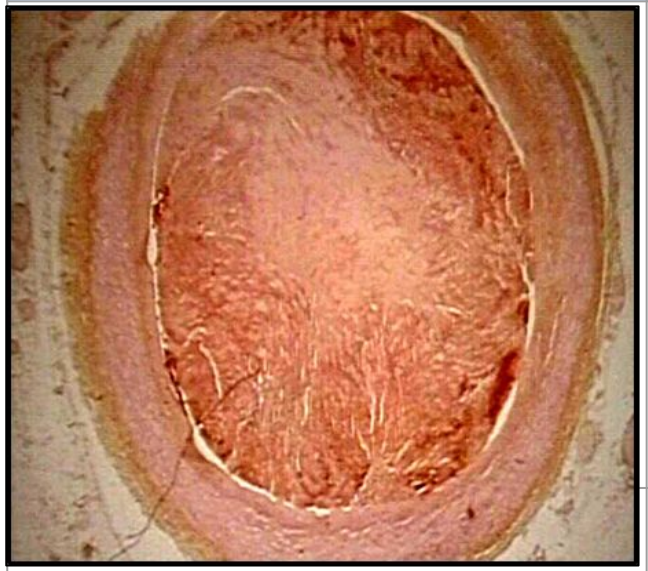
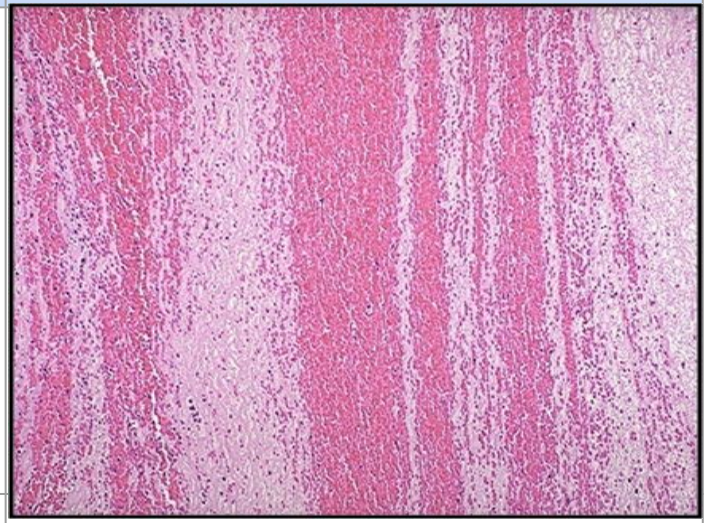
Pulmonary TB –Caseous Necrosis.

- Cheese-like appearance
- Dead tissue appears as a soft and white

B) Lines of Zahn

CASE (21)

تشبه الخطوط بين الجبال هنا اربطوها بالصورة عشان تتذكرون

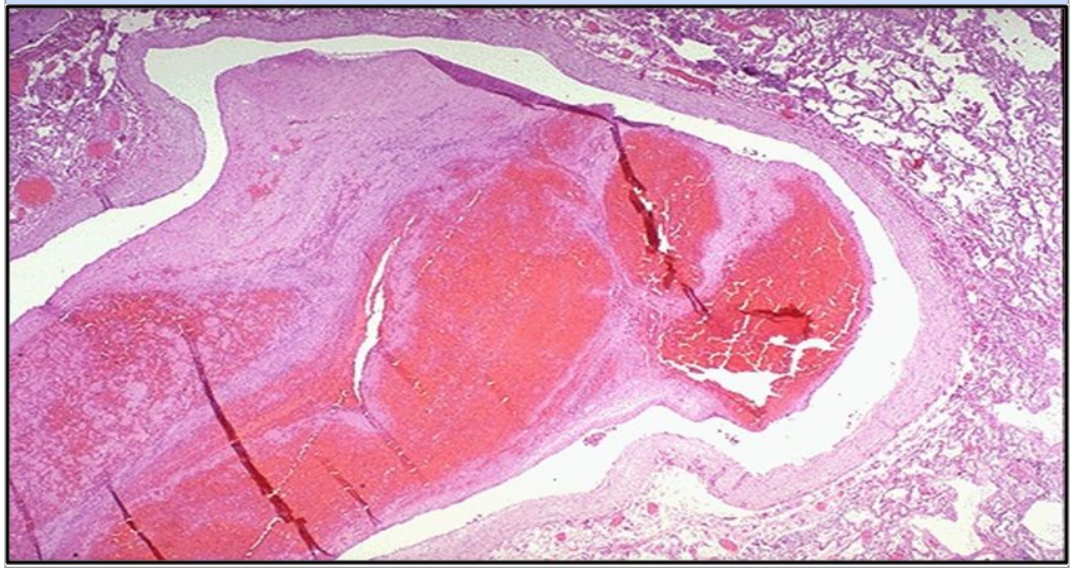
Gross appearance	Microscopic / Histological appearance
	
• **Solid Mass of blood elements** • Upper layer looks like yellow chicken fat, the lower part is filled with red blood cells.	• **Alternating pale layers of platelets mixed with some fibrin and darker layers containing more red cells.** • Contains pale pink and dark red lines (Lines of Zahn). • Appears in Heart and Aorta.

- If Lines of Zahn is present Then it is evidence proves a clot is PRE-mortem. (هذه الخطوط تظهر قبل الوفاة وتدل على أن المريض قد توفي بسبب الجلطة)
- POST-mortem thrombus are not attached to vessel wall. They are firmer, and show vague lines of pale gray fibrin.

CASE (21)

Organizing Thrombus with Lines of Zahn

Microscopic / Histological appearance



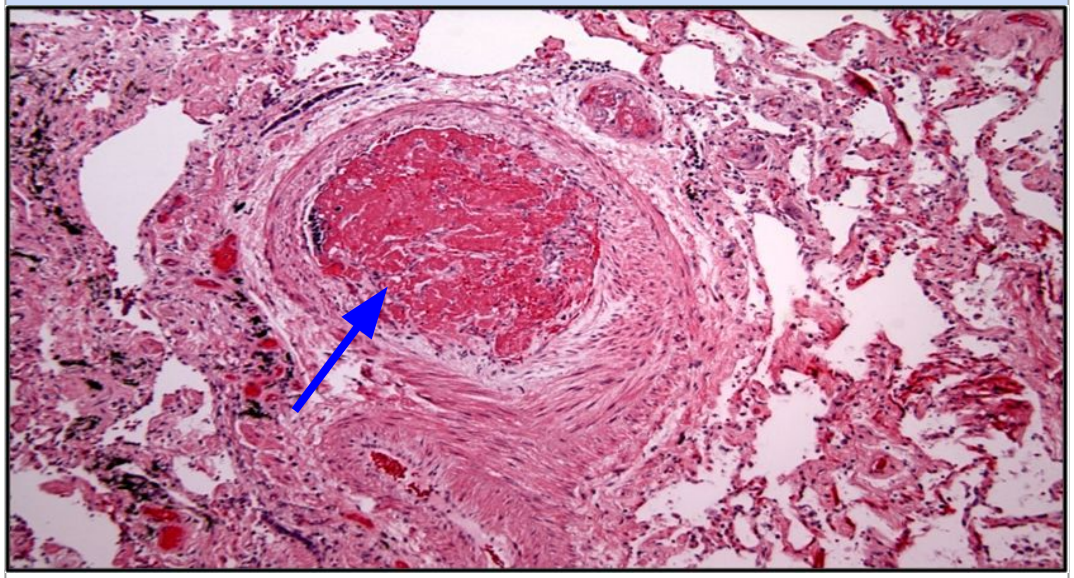
- There are interdigitating areas of pale pink and red that form the "lines of Zahn" characteristic for a thrombus (خثرة)
- These lines represent layers of red cells, platelets, and fibrin which are laid down in the vessel as the thrombus forms.

CASE (21)

Pulmonary thromboembolism in a small pulmonary artery.

نفس الكلام هنا وبالسلايد اللي قبل الفرق ان اللي قبل صورة بالطول و هنا بالعرض.

Microscopic / Histological appearance



- There are interdigitating areas of pale pink and red that form the "lines of Zahn" (arrow)characteristic for a thrombus (خثرة)
- These lines represent layers of red cells, platelets, and fibrin which are laid down in the vessel as the thrombus forms.

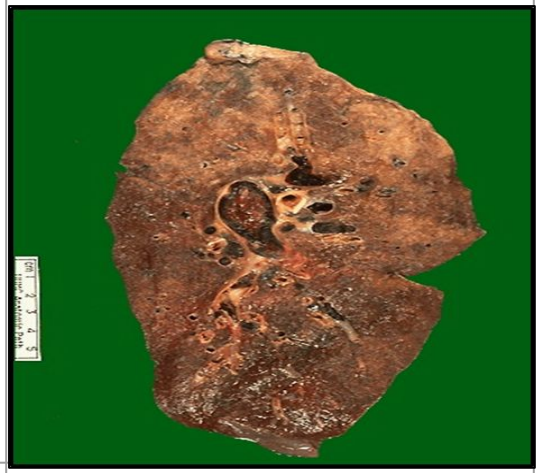
CASE (22)

Pulmonary Embolus with Infarction

Gross appearance

Dark red triangular area of dead lung tissue "infarction"due to blockage of one of the major arteries to the lung by **an embolus ("blood clot")** originating from the deep veins of the leg.

غالباً يصير بالأشخاص اللي بالأماكن الباردة جداً ويتجمدون



A large pulmonary **thromboembolism** is seen in the pulmonary artery of the left lung Such thromboemboli typically originate in the leg veins or pelvic veins **of persons who are immobilized.**

Causes:

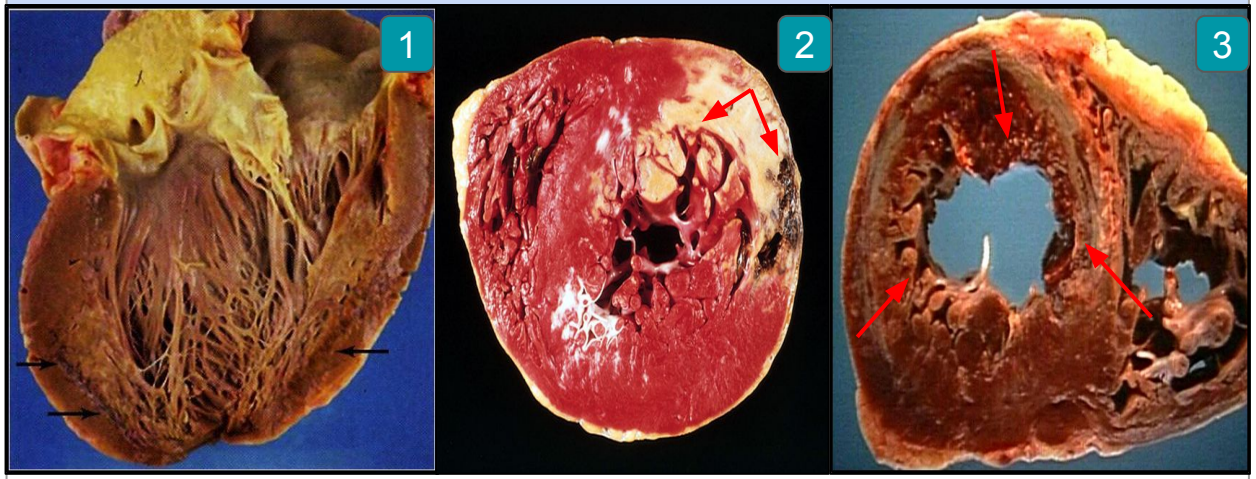
A large pulmonary **thromboembolism** is seen in the pulmonary artery of the left lung due to blockage of one of the major arteries to the lung by an **embolus ("blood clot")** originating from the deep veins of the leg.

عادة ما يحدث عندما تتكون تجلطات في أوردة الساق وتنفصل لتنتقل وتستقر في الشرايين الرئوية مسببة انسداداً كاملاً أو جزئياً لها

CASE (23)

Myocardial Infarction

Gross appearance



2+3 - Cross section of the left and right ventricles shows a pale and irregular focal fibrosis in the left ventricular wall with increased thickness.

Clinical features:

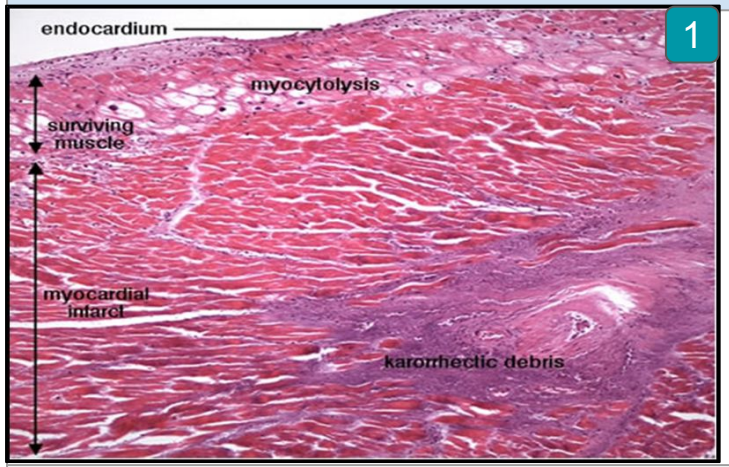
- Arrhythmias (عدم انتظام ضربات القلب)
- ventricular, aneurysm(تمدد الأوعية الدموية)
- Rupture of myocardium (تمزق عضلة القلب)
- Cardiac tamponade (hemorrhage in the pericardium lead to restricted)

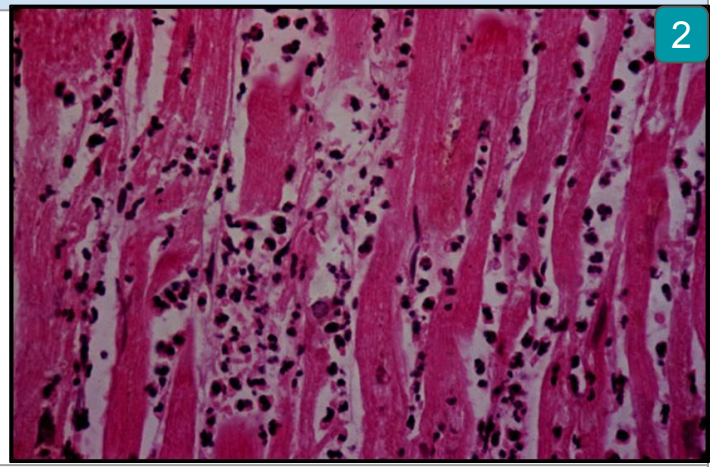
حالة يحدث فيها تجمع للسوائل أو الدم حول القلب)

CASE (23)

Myocardial Infarction

Microscopic / Histological appearance





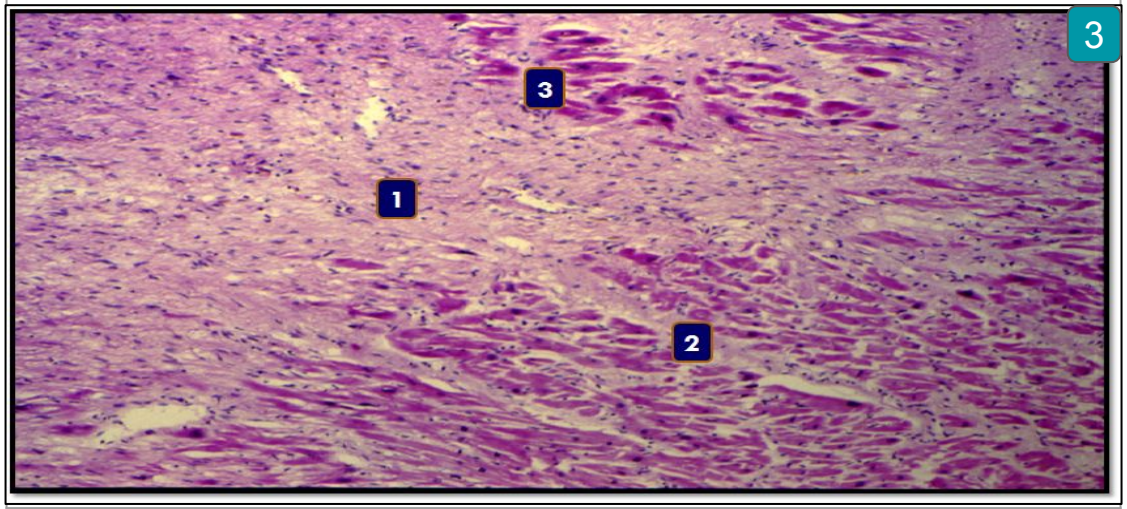
- **Pic (1) : Transmural myocardial infarct at 2 weeks.**
- **Pic (2) : Acute myocardial infarct.** This 3-4 day old infarct shows necrosis of myocardial cells and is infiltrated **with polymorphonuclear (Neutrophil) leukocytes.**
- **Picture 1-2 (early stage and middle stage) :**

- Loss of nucleus and cross saturations.
- Debris of necrotic tissue.(حطام الخلايا الميتة)
- Neutrophil (pic 2).

CASE (23)

Myocardial Infarction

Microscopic / Histological appearance



1- **Patchy coagulative necrosis of myocardial fibers.** The dead muscle fibers are structureless and hyaline with loss of nuclei & striations.

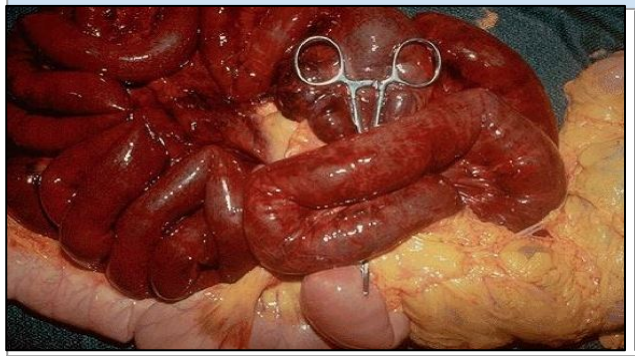
2- **Chronic ischemic fibrous scar replacing dead myocardial fibers .**

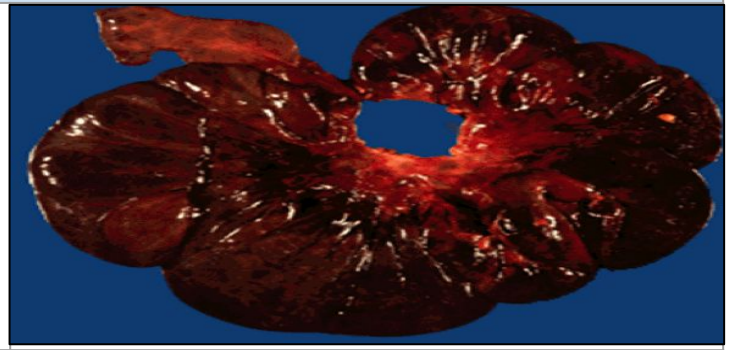
3- **The remaining myocardial fibers show enlarged nuclei due to ventricular hypertrophy.**

CASE (24)

Infarction of the small intestine

Gross appearance





- Dark red infarcted small intestine contrasts with the light pink healthy part.
- Loop of bowel (from hernia) and mesentery (the yellowish part) is clear here.

- Diffuse violaceous red appearance is a sign of transmural (entire wall) hemorrhagic intestinal infarction.

cause:
Ischemia (losing the blood supply)

Clinical features: (symptoms)
- abdominal pain.
- Vomiting
- diarrhea.
- in some cases, fever, are also
- seen in :**Hernia (الفتق)**

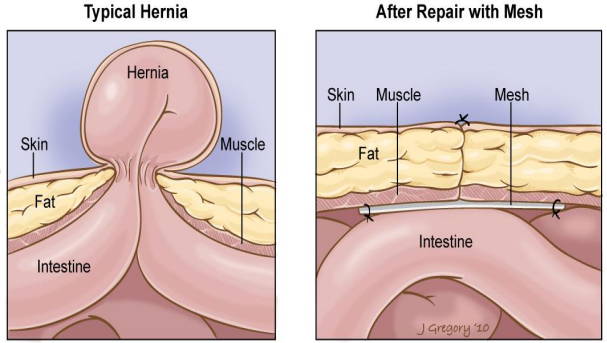
Complicated adhesions: because of past surgery.

CASE (24)

Infarction of the small intestine

EXTRA

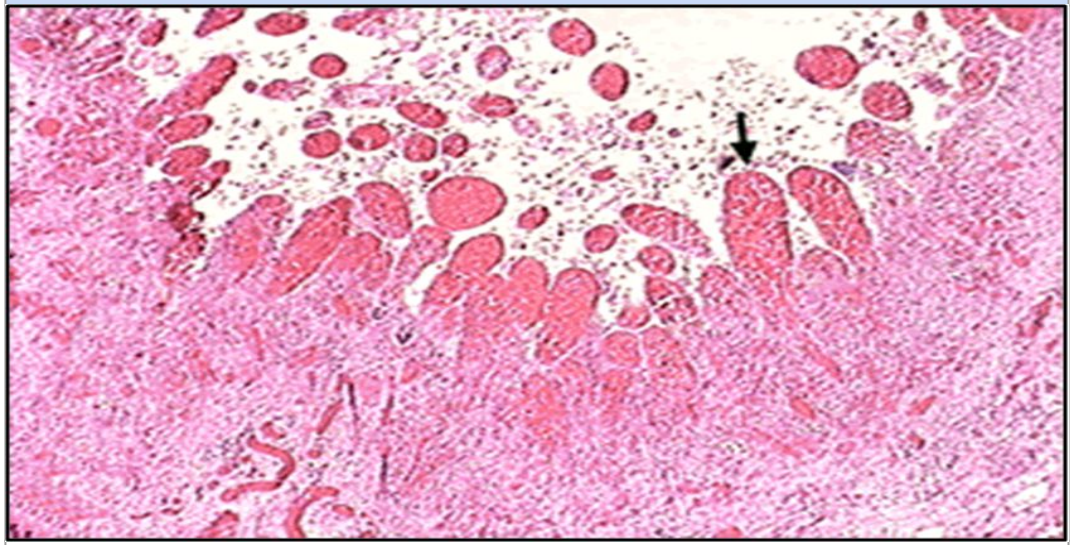
- **Loop of bowel:** intestine twists on itself.
- **Hernia:** internal part of the body pushes through a weakness in the muscle or surrounding tissue wall.
- **Mesentery:** it attaches organs to the posterior wall of the abdomen.
- **Adhesions:** fibrous bands that form between tissues and organs, often as a result of injury during surgery.



CASE (24)

Infarction of the small intestine

Microscopic / Histological appearance



- Intestinal infarction typically begins in the villi, which are end vasculature without anastomoses.
- There is complete loss of the mucosal epithelium.
- Broad areas of hemorrhage with moderate inflammatory infiltrate is present.

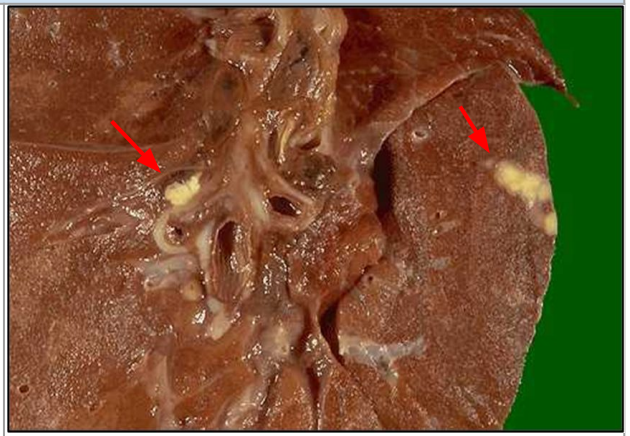
Practical (4)

Granulomatous Diseases

(specific chronic inflammation)

CASE (25)

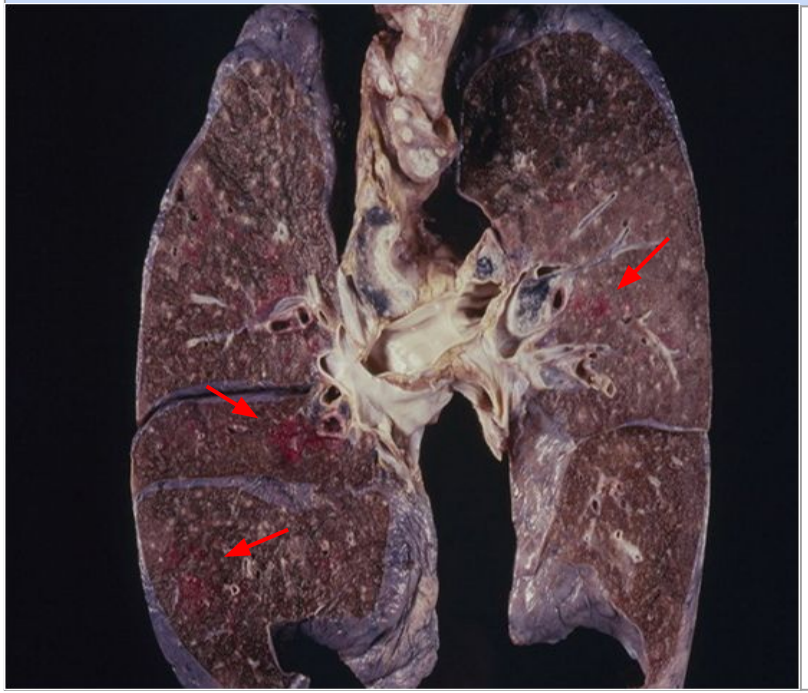
Pulmonary TB – Caseous Necrosis – Gross

Gross appearance		
		
• The granulomas have areas of **caseous necrosis.** • **Is most characteristic of secondary T.B.** • **Cheese-like appearance** • **dead tissue appears as a soft and white dead cell mass.**	Initial (primary) infection with T.B. producing a sub-pleural lesion **called a Ghon's focus.** **Early Ghon's focus + lymph node lesion = Ghon's complex**	**The Ghon's complex is seen here at closer range.**

Miliary TB of the Lungs

CASE (25)

Gross appearance



Cause: when TB lung lesions erode pulmonary veins or when extrapulmonary TB lesions erode systemic veins.

- **This results** in hematogenous dissemination of tubercle bacilli.
- **Miliary** spread limited to the lungs can occur following erosion of pulmonary arteries by TB lung lesions.
- (الدوائر الحمراء في الصورة)

CASE (25)

Pulmonary TB – Caseous Necrosis – Gross

EXTRA

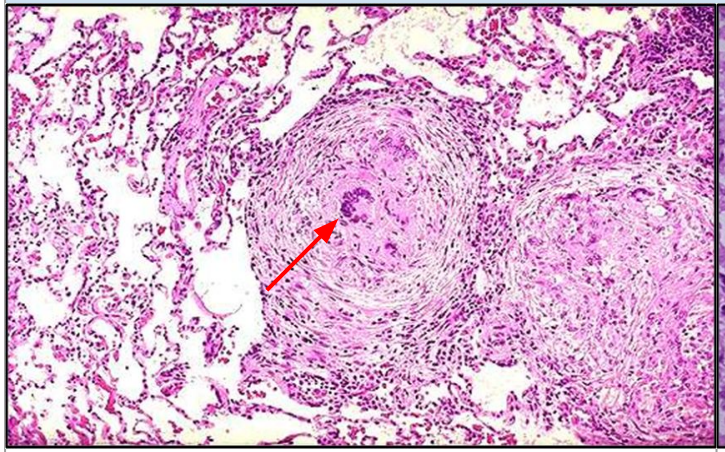
- **Primary tuberculosis** is the pattern seen with initial infection with tuberculosis in children.
- **Reactivation, or secondary tuberculosis,** is more typically seen in adults.

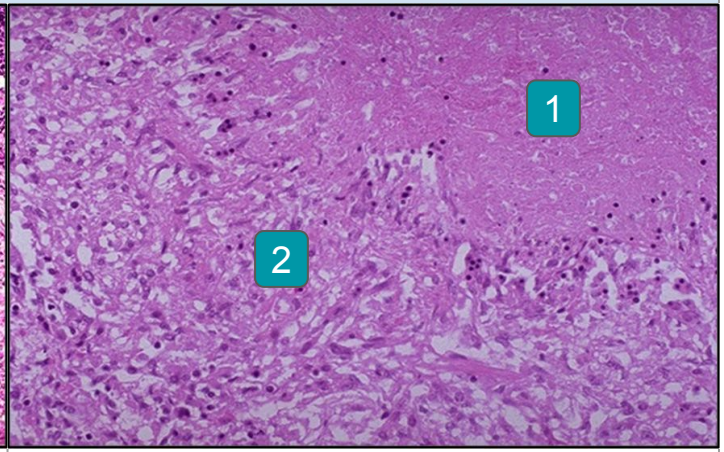
- **Granulomas** are composed of transformed macrophages called epithelioid cells along with lymphocytes, occasional PMN's, plasma cells, and fibroblasts.

CASE (25)

Tuberculous Granulomas

Microscopic / Histological appearance





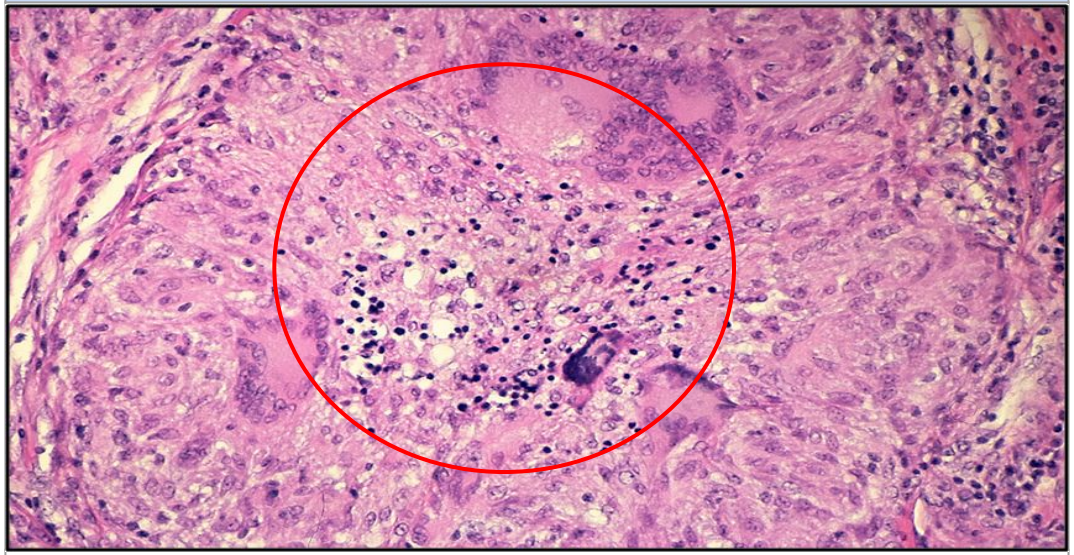
- Well-defined **granulomas** are seen here.
- They have **rounded outlines**.
- The one toward the center of the photograph contains **several Langhans giant cells.**

[1] composed of **the necrotic elements of the granuloma** as well as the infectious organisms.
[2] **inflammatory component** with **epithelioid cells**, lymphocytes, and fibroblasts.

CASE (25)

Pulmonary TB - Granuloma with central early necrosis

Microscopic / Histological appearance

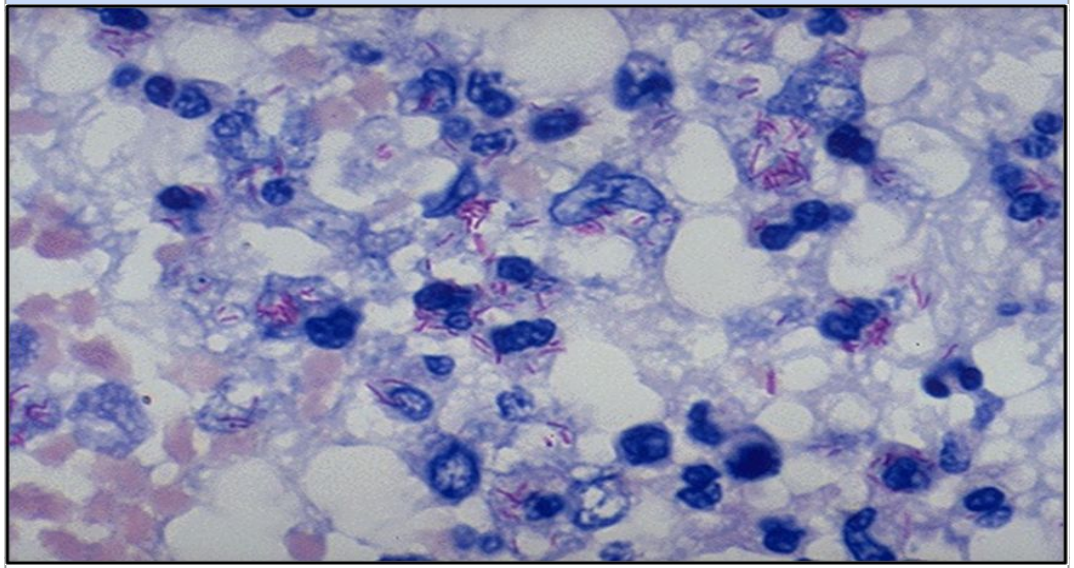


The pyknotic nuclei of epithelioid cells in the center of the granuloma (apoptotic bodies) are a precursor of necrosis.

CASE (25)

Acid Fast bacilli of Mycobacterium TB in the Lung

Microscopic / Histological appearance



- A stain for Acid Fast Bacilli is done (AFB stain) to find the mycobacteria .

CASE (26)

Tuberculous Lymphadenitis

Gross appearance

- **Enlarged lymph node**
- **Yellowish area of caseous necrosis**
- **Pic (2) :** Section of a lymph node with connective tissue capsule and lymphoid tissue.

Cause:

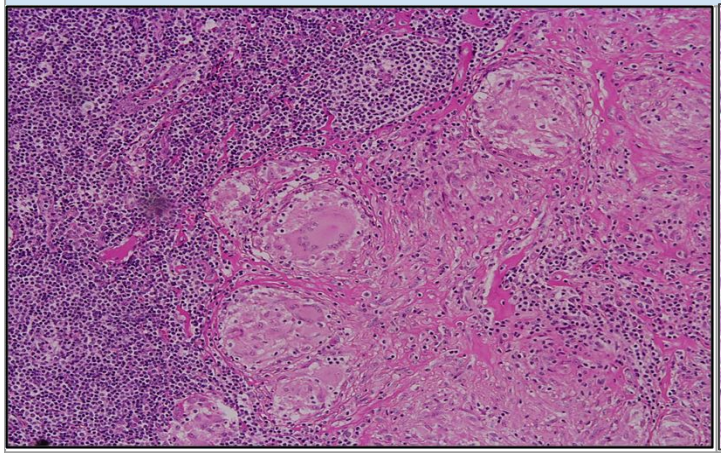
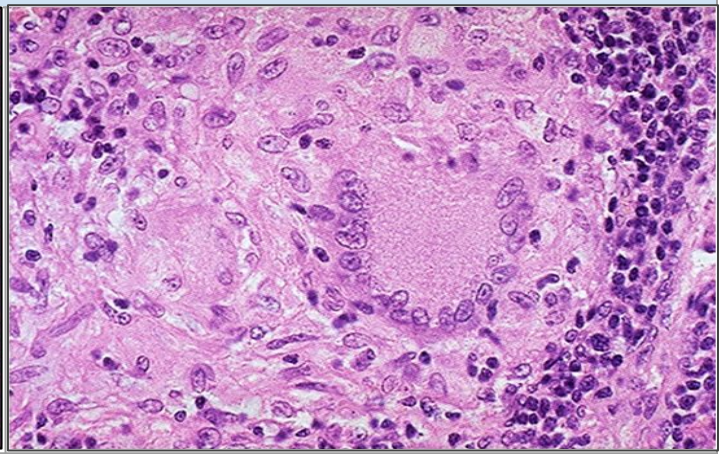
Infection in the lymph nodes by TB mycobacteria

Signs and symptoms:

Appearance of a chronic, painless mass in the neck.

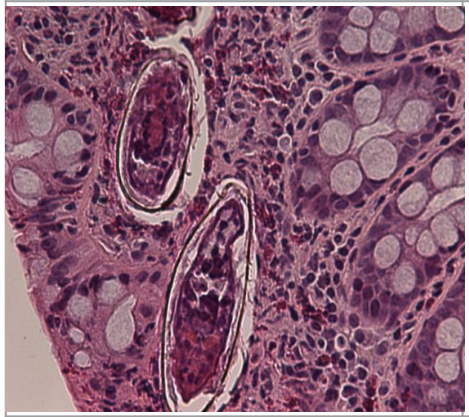
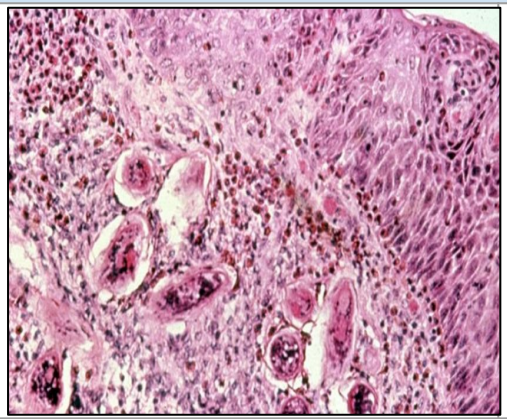
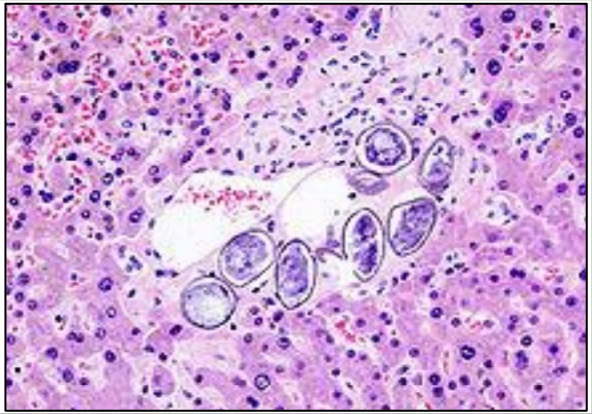
CASE (26)

Tuberculous Lymphadenitis

Microscopic / Histological appearance	
	
• Many **round and oval tubercles/ granulomas.** • **homogenous and pink in colour.**	**The granulomas consists of:** • **epithelioid cells.** • **few langhan's giant cells.** • **peripheral rim of lymphocytes**

CASE (27)

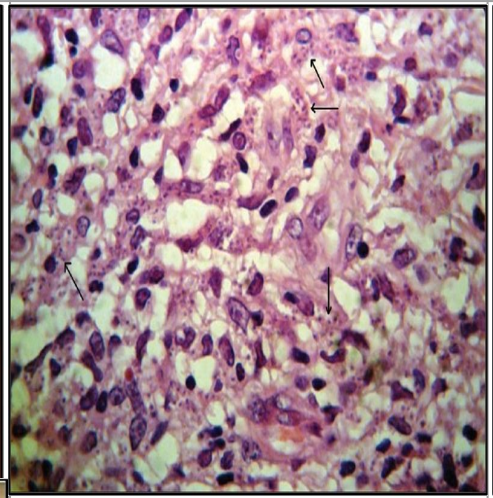
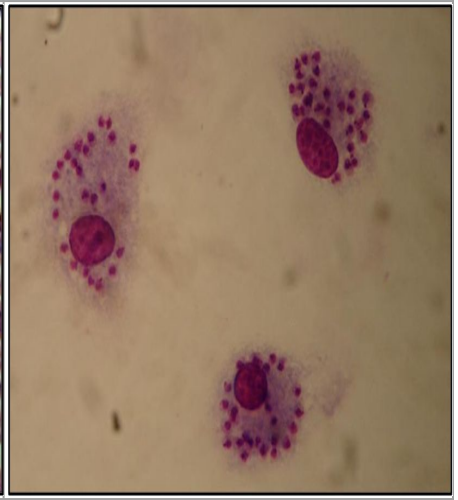
Bilharzial Granulomas

Microscopic / Histological appearance		
		
Colonic Bilharziasis - HPF	**Bilharziasis of the Urinary Bladder**	**Hepatic portal tract**
• **Colon biopsy of bilharziasis.**	• **Schistosoma haematobium.** • Urinary Bladder biopsy showing bilharziasis eggs	• **S. japonicum in the Hepatic portal tract.**

Cause:
A parasitic infection by trematode worms acquired from infested water. Known as schistosoma

CASE (28)

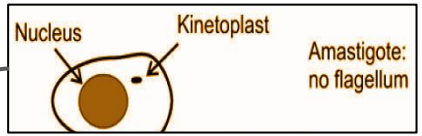
Cutaneous (Leishmaniasis)

Gross appearance	Microscopic / Histological appearance	
 		
Shows marked cellular infiltration and parasites) Leishman bodies) within macrophages.	**The blood film shows macrophages containing Leishmania amastigotes each with a prominent kinetoplast.**(البقعة الغامقة).	

Causes:

Parasitic infection from the genus Leishmania.

It is spread by the bite of an insect called a **sandfly.**



Practical (5)

Neoplasia

(Benign tumors)

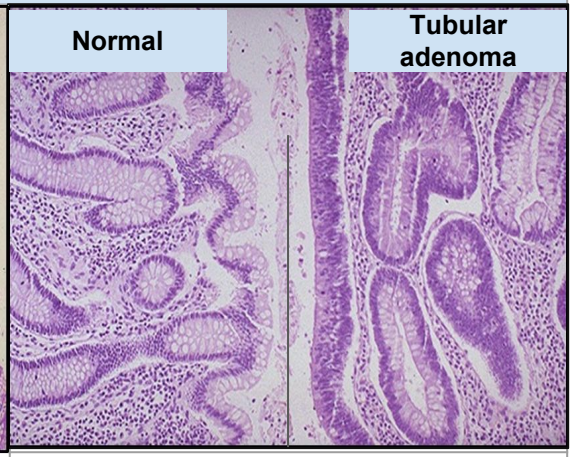
CASE (29)

Adenomatous polyp of the colon

Gross appearance

- **Polypoid gross mass.**
- **Arising from the intestinal mucosa.**
- **Hemorrhagic surface** (detected with stool occult blood screening).
- **Long narrow stalk.**
- **Size:** Polyp is above 2cm making it a possibility for malignant tumor, but this polyp was proved to be **benign.**

Microscopic / Histological appearance

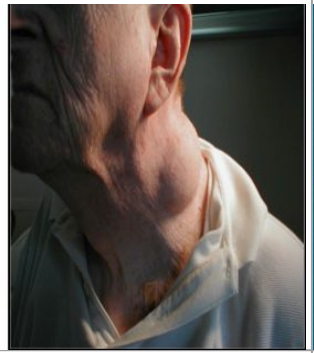
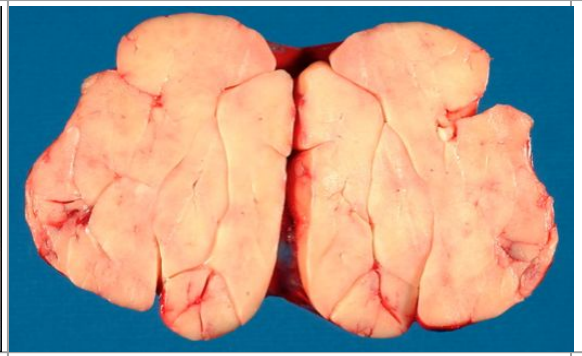
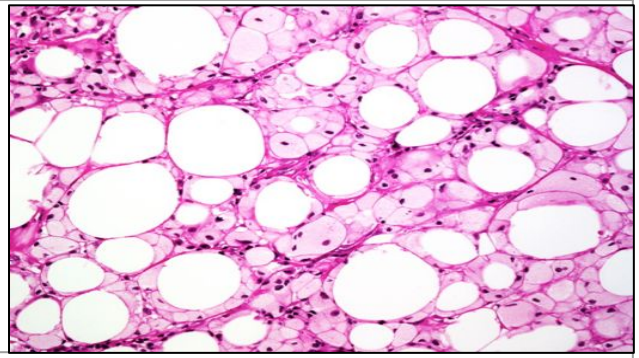


-Crowded.
-Disorganized glands.
-Goblet cells are less numerous.
-The cells lining the glands of the polyp have **hyperchromatic nuclei. (more blue)**

In Tubular adenoma :
The neoplastic glands are more irregular with **darker (hyperchromatic)** and **more crowded nuclei.**

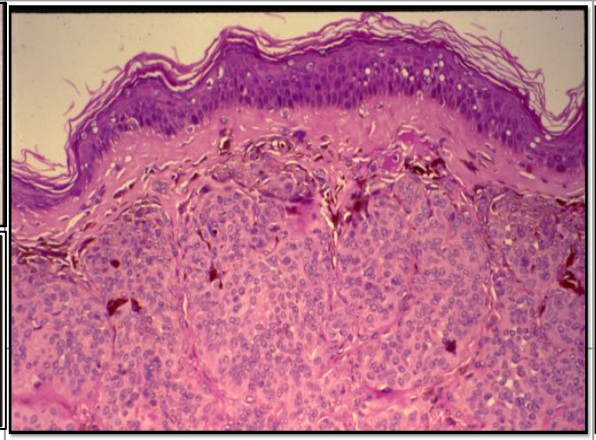
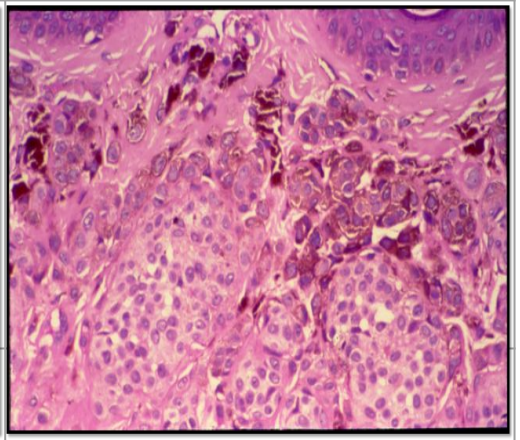
CASE (30)

Lipoma

Gross appearance			Microscopic / Histological appearance
			
Lipoma of the Neck • **Benign, slow growing, subcutaneous skin growth.** • In this case, the lipoma is rather **large and located in the neck region.** • On palpation, **these are soft, non tender, and mobile if it is small size.**		**Cut section** • **Benign tumor composed of mature adipose tissue.** • **Grossly, they appear bright yellow and lobulated.**	**Lipoma with fat necrosis** • **Area of fat necrosis within a lipoma.** • The masses are **comprised primarily of mature adipocytes.** • **Histiocytes present** within these areas should not be mistaken for lipoblasts.

CASE (31)

Intradermal Nevus

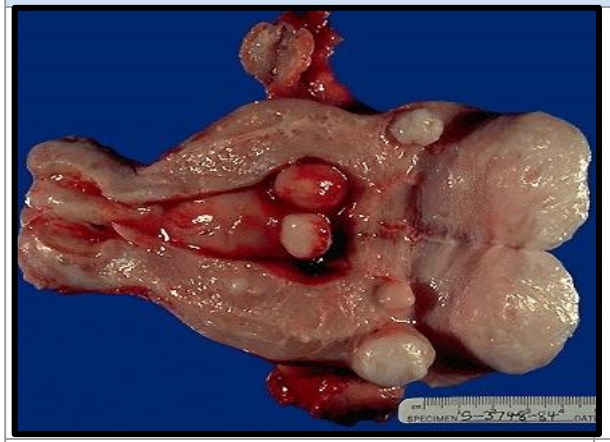
Gross appearance	Microscopic / Histological appearance	
Intradermal Nevus	**Intradermal Nevus - LPF**	**Intradermal Nevus - HPF**
		
• The lesion is small, symmetrical(pigmented) • And uniformly has different colors (Pink – Tan – Brown-Black,etc).	• Nests and clusters of small round or spindle shaped nevus cells. • Few melanophages in the upper dermis.	• Contains varying amount of brown melanin pigment. • No junctional activity.

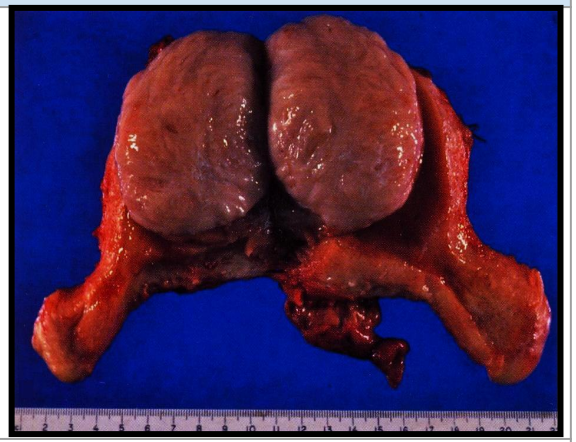
Cause: they cannot be classed as a pathological entity rather, a normal variant.

CASE (32)

Multiple Uterine Leiomyomata

Gross appearance





- **Smooth muscle tumors of the uterus are often multiple.**
- **Seen here are**: **submucosal, intramural,** and **subserosal leiomyomata of the uterus.**

- **A well demarcated tumour mass in the muscle coat of uterus without a definite capsule. (ورم حميد بدون غلاف)**

Cause:

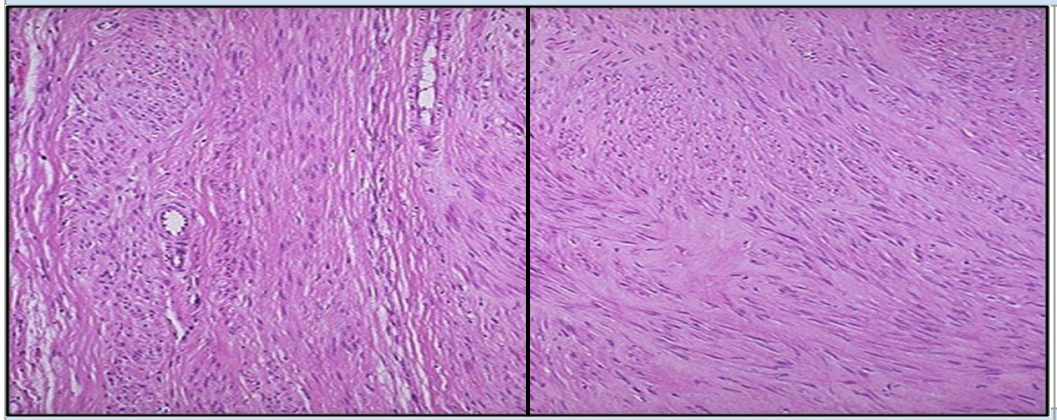
Unknown cause, however research and clinical experience point to the following factors:

- Genetic changes.
- Hormones.
- Some growth factors.

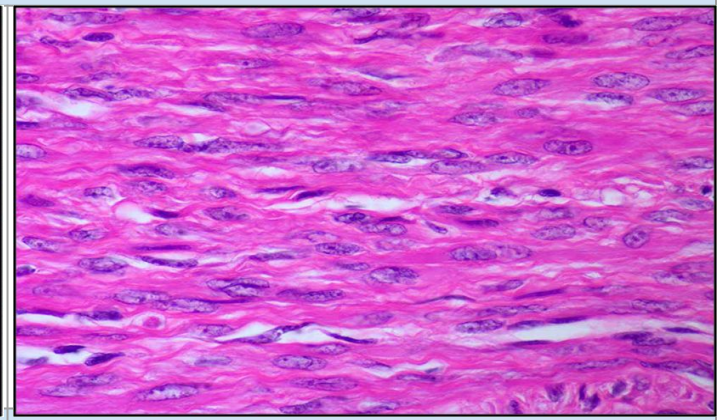
CASE (32)

Multiple Uterine Leiomyomata

Microscopic / Histological appearance



Uterine Leiomyoma – LPF



Uterine Leiomyoma – HPF

- **The neoplasm is well-differentiated.**
- **Bundles of smooth muscle are interlacing in the tumor mass.**

Normal myometrium.

The muscle cells are spindle shaped with elongated nuclei and eosinophilic cytoplasm.

CASE (33)

Chondroma
Enchondroma of the fibula

Gross appearance

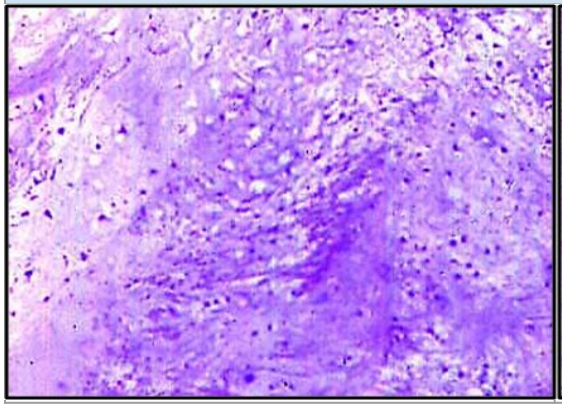
The picture shows:

- Intramedullary bone expansion.
- Chondromyxoid material.
- Thin bone cortex.

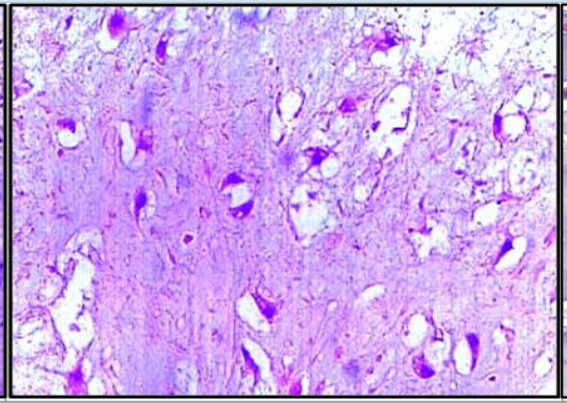
CASE (33)

Chondroma
Enchondroma of the fibula

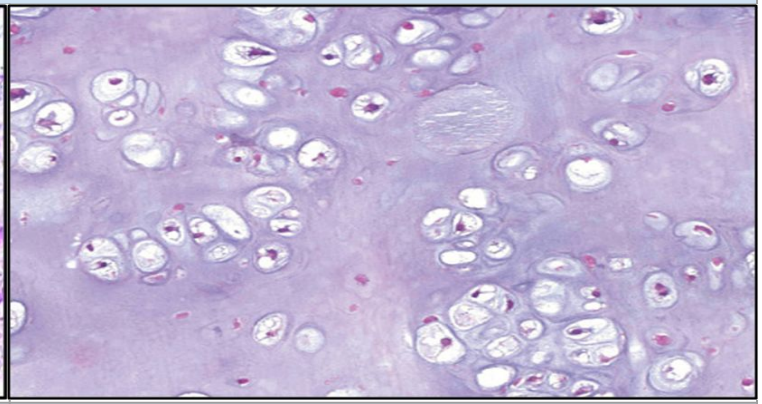
Microscopic / Histological appearance



Enchondroma of the Fibula - LPF



Enchondroma of the Fibula - HPF



Enchondroma of the Fibula - HPF

- Lobules consist of mature cartilage cells irregularly distributed through pale blue homogenous matrix.
- The cells contained within the lacunar spaces singly, in pairs or in tetrads.

  Few bony trabeculae are included in the tumour.

- Cartilage shows hypo to moderate cellularity.
- Contains chondrocytes of variable sizes.
- Chondrocyte nuclei tend to be small, round and hyperchromatic.
- Scattered binucleated cells may be found.
- Irregular purple granules within the matrix represent calcifications.

CASE (34)

(Hemangioma)
Hemangioma of the Skin

Gross appearance

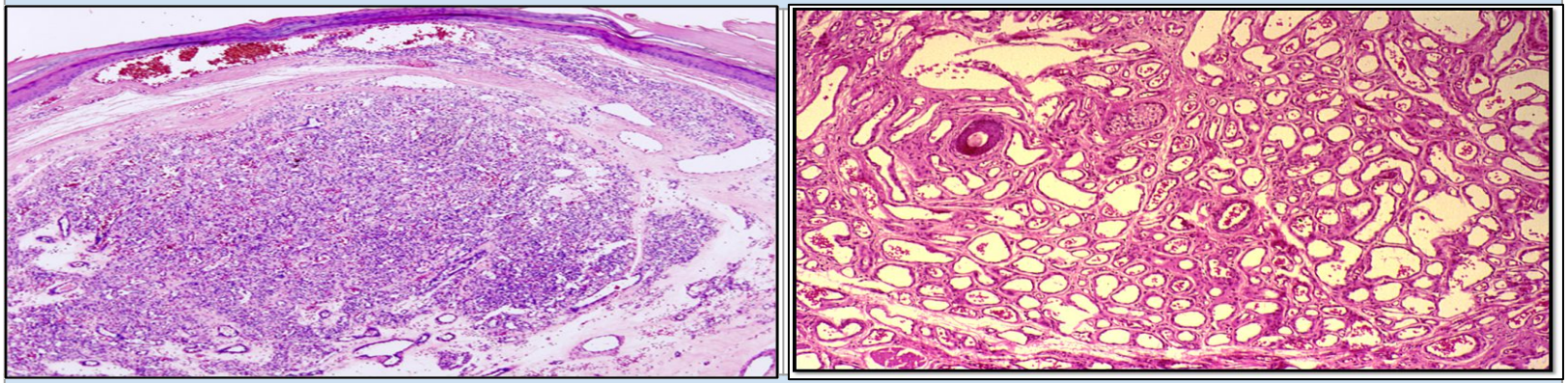
A tumour mass in the dermis. (ورم وعائي)

Which consists of large number of vascular spaces of varying shapes and sizes separated by connective tissue stroma.

CASE (34)

(Hemangioma)
Hemangioma of the Skin

Microscopic / Histological appearance



Capillary Hemangioma of the skin – LPF

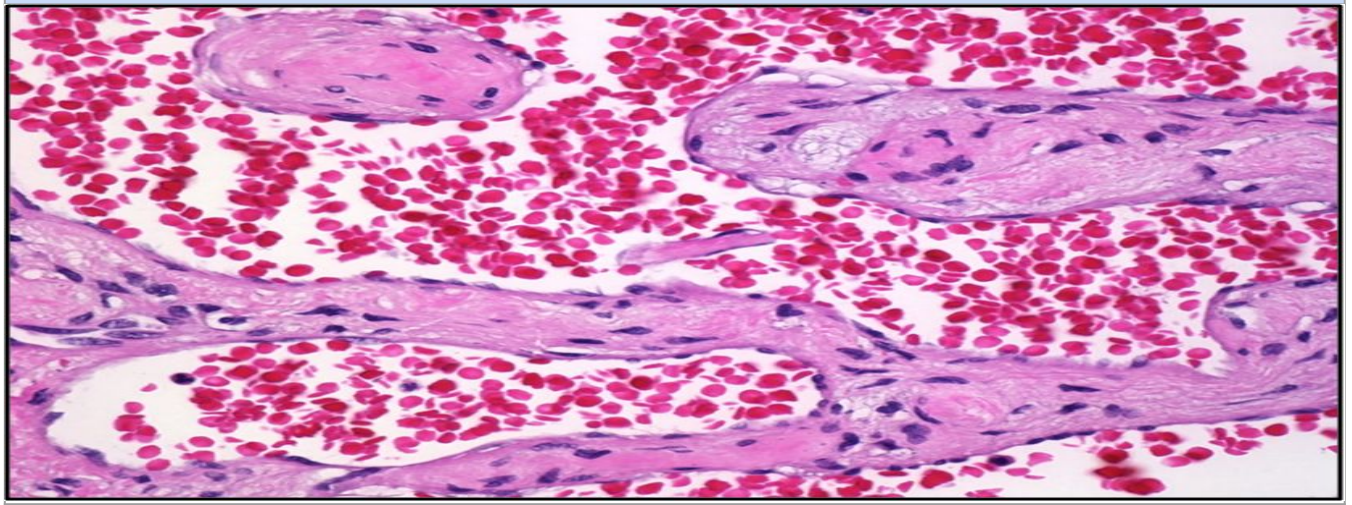
- **Histopathology of cutaneous capillary hemangioma.**
- **Skin biopsy: By Hematoxylin and Eosin. (H&E)**

- **Vascular spaces are lined by the flattened endothelial cells and some contain blood.**
- **Connective tissue stroma separated the capillary vascular spaces.**

CASE (34)

(Hemangioma) Cavernous Hemangioma of Skin – HPF

Microscopic / Histological appearance

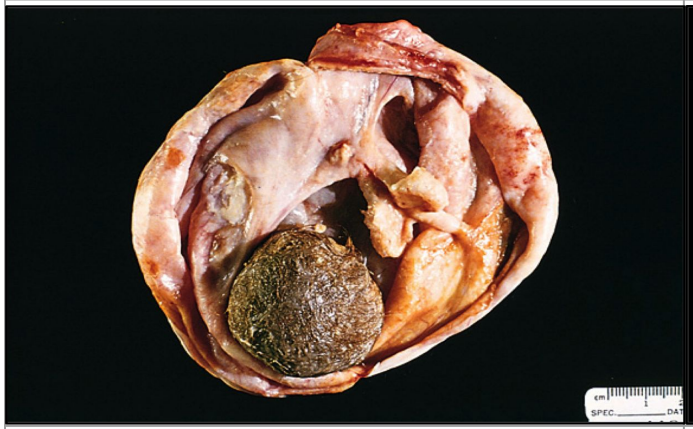


- **Large cavernous hemangioma complicated by thrombocytopenic purpura. (بسبب نقص الصفائح الدموية)**
- **Blue rubber bleb nevus syndrome: cavernous hemangiomas of the skin and gastrointestinal tract.** (أورام وعائية الغائرة في الجلد و الجهاز الهضمي)

CASE (35)

Teratoma (Dermoid Cyst) of the Ovary
Ovary: Mature Cystic Teratoma

Gross appearance



- **Opened mature cystic teratoma (dermoid cyst) (كيس جلدي) shows hair (bottom) and a mixture of tissues .**

- **This 4.0 cm dermoid cyst is filled with greasy material (keratin and sebaceous secretions).**
- **Shows tufts of hair.**
- **The rounded solid area at the bottom is called (Rokitansky's protuberance)**

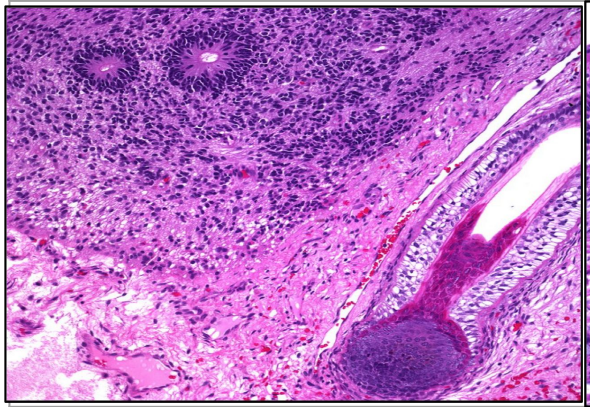
Teratoma contains:

Structures from other germ layers such as bone and cartilage, lymphoid tissue, smooth muscle and brain tissue containing neurons and glial cells.

CASE (35)

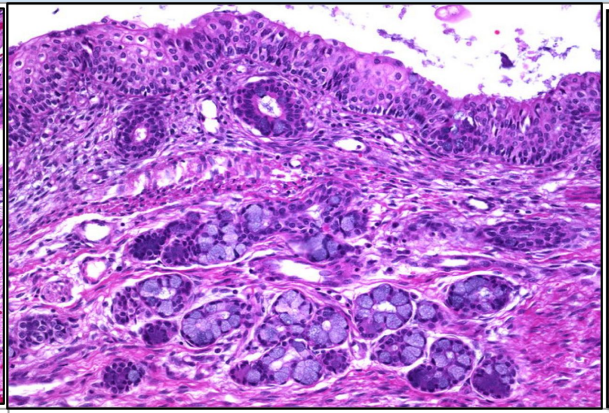
Teratoma (Dermoid Cyst) of the Ovary
Ovary: Mature Cystic Teratoma

Microscopic / Histological appearance

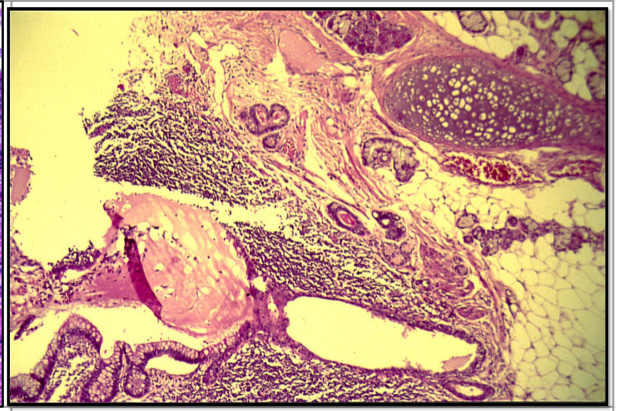


Ovarian teratoma showing neuroepithelial tubules and rosettes (immature component) adjacent to a hair follicle (mature component).

- They consist of epidermis, hair follicles, sweat and sebaceous glands and neuroectodermal derivatives



- **This image shows skin and mucinous glands in a mature solid teratoma of the ovary.**



- **Stratified Squamous epithelium with underlying sweat glands.**
- **Sebaceous glands.**
- **Hair follicles**
- **columnar ciliated epithelium.**
- **mucous and serous glands.**
- **Structures from other germ layers.**

Practical (6)

Neoplasia

(Malignant tumors)

CASE (36)

Squamous Cell Carcinoma (SCC)

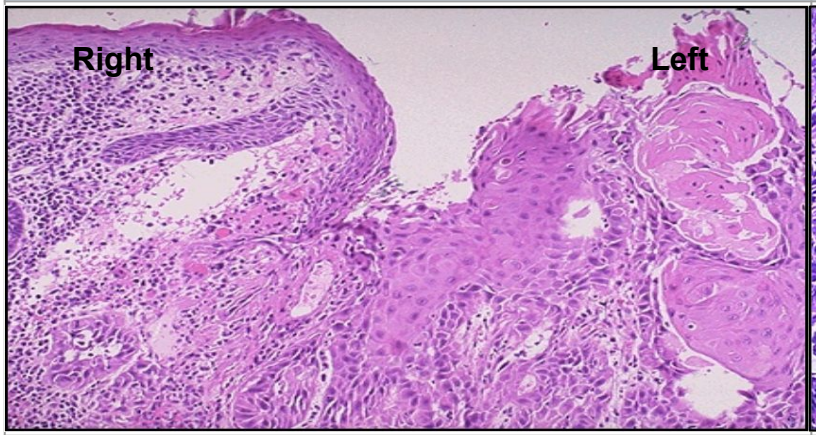
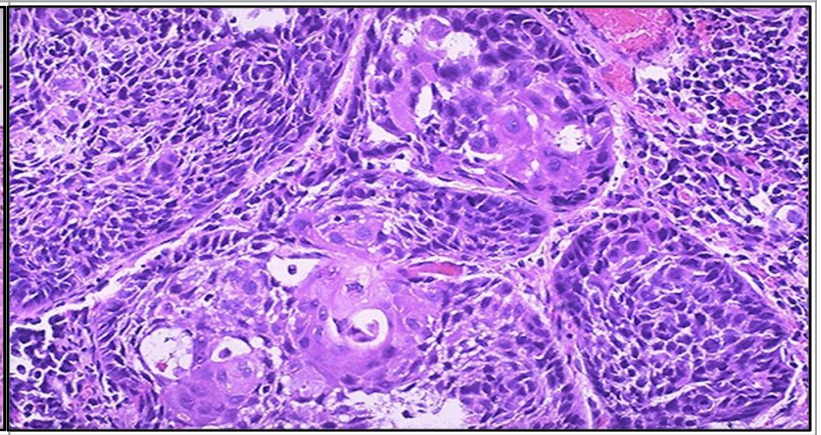
Gross appearance



- Squamous cell carcinoma (SCC) is the second most common cancer of the skin.
- A sore that does not heal or any change in an existing mole, wart.(الثآليل)
- There may be an ulcer or reddish skin plaque that grows very slowly, may bleed occasionally (especially in lips).
- may have an ulcerated center with raised, hard edges, may have a pearly quality with tiny blood vessels, is commonly present on sun-exposed areas (back of hands, lip)
- Usually a small ulcer which will not heal and bleeds sporadically, ears and the scalp. (نزيف مستمر متقطع)

CASE (36)

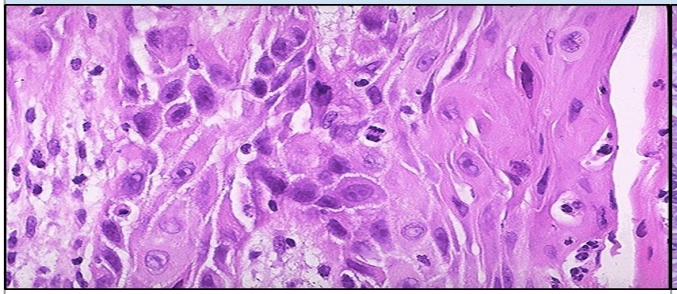
Squamous Cell Carcinoma (SCC)

Microscopic / Histological appearance	
	
• **Right :** The normal squamous epithelium. • **Left :** Squamous cell carcinoma. • **The neoplastic squamous cells are still similar to the normal squamous cells, but are less orderly.**	**Here :** A moderately differentiated squamous cell carcinoma in which some, **but not all,** of the neoplastic cells in nests have **pink cytoplasmic keratin.**

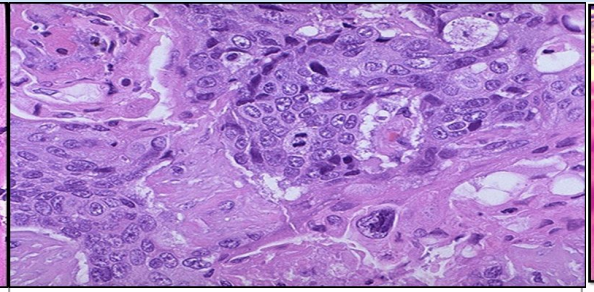
CASE (36)

Squamous Cell Carcinoma (SCC)

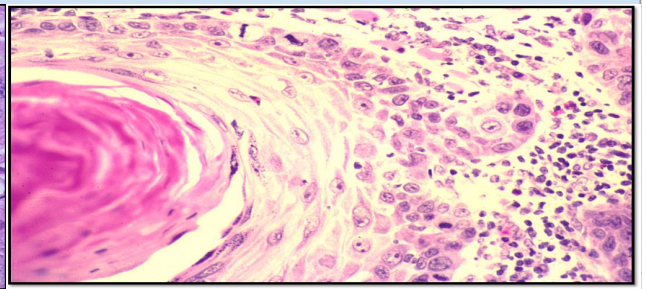
Histopathology (HPF) High Power Field (تكبير عالي)



- This squamous cell carcinoma shows enough ***differentiation*** to tell that the cells are of ***squamous origin***.
- The cells are **pink and polygonal** in shape with **intercellular bridges.**
- The neoplastic cells show **pleomorphism, with hyperchromatic nuclei.**
- A mitotic figure is present near the center.



- A mitotic figure is seen here in the center.
- Surrounded by cells of a **poorly differentiated** squamous cell carcinoma, with **pleomorphic cells .**
- **That have minimal pink keratinization** in their cytoplasm.
- In general, **mitoses** are more likely to be seen in malignant neoplasms.



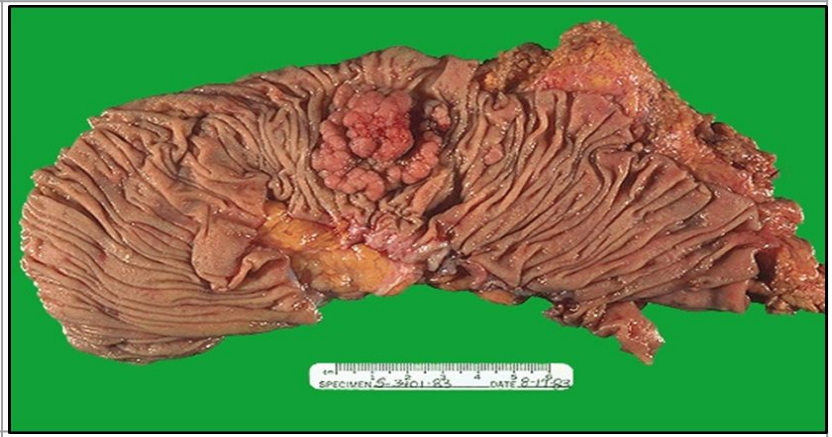
- The **dermis** is infiltrated by masses of **well differentiated** neoplastic squamous cells
- Separated by **fibrous tissue stroma with chronic inflammatory cells.**
- Tumour cells show pleomorphism, hyperchromatism and many mitotic figures.
- **Pinkish laminated keratin pearls** (epithelial cell nests) are present in the center of some cell masses

CASE (37)

Adenocarcinoma of large intestine

Gross appearance

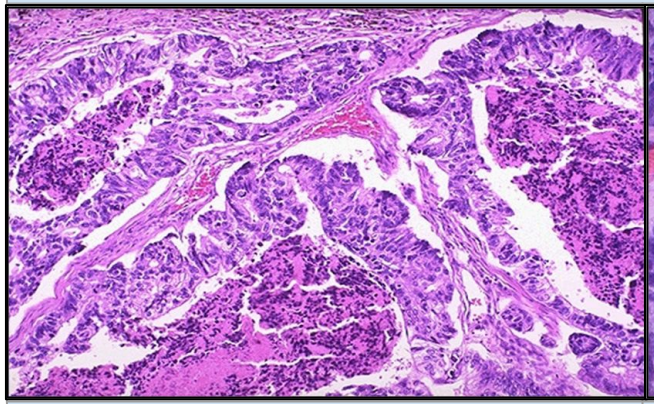
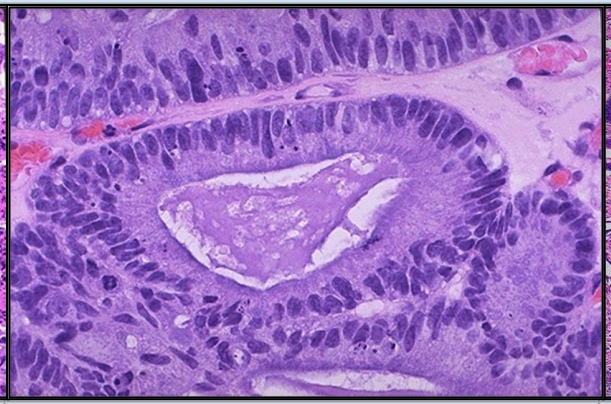
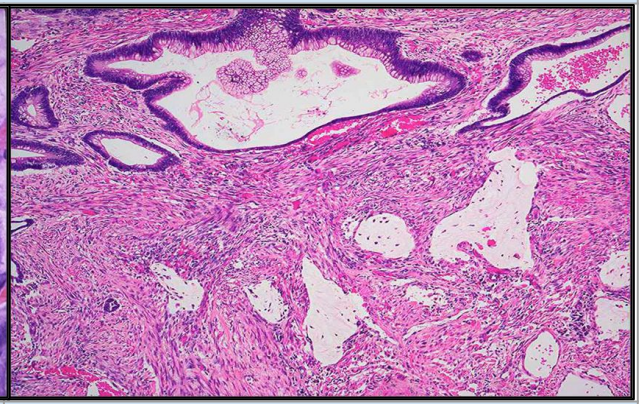
- This cancer is more exophytic in its growth pattern.
- One of the complications of a carcinoma is obstruction (usually partial).
- **Signs and sympotoms:** 1- abdominal pain
  2- intestinal obstruction (constipation)(إمساك)
  3- bleeding through the rectum.



- This is an adenocarcinoma arising in a villous adenoma. (was in the sigmoid colon)
- The surface of the neoplasm is polypoid and reddish pink.
- Hemorrhage from the surface of the tumor creates a guaiac positive stool.

CASE (37)

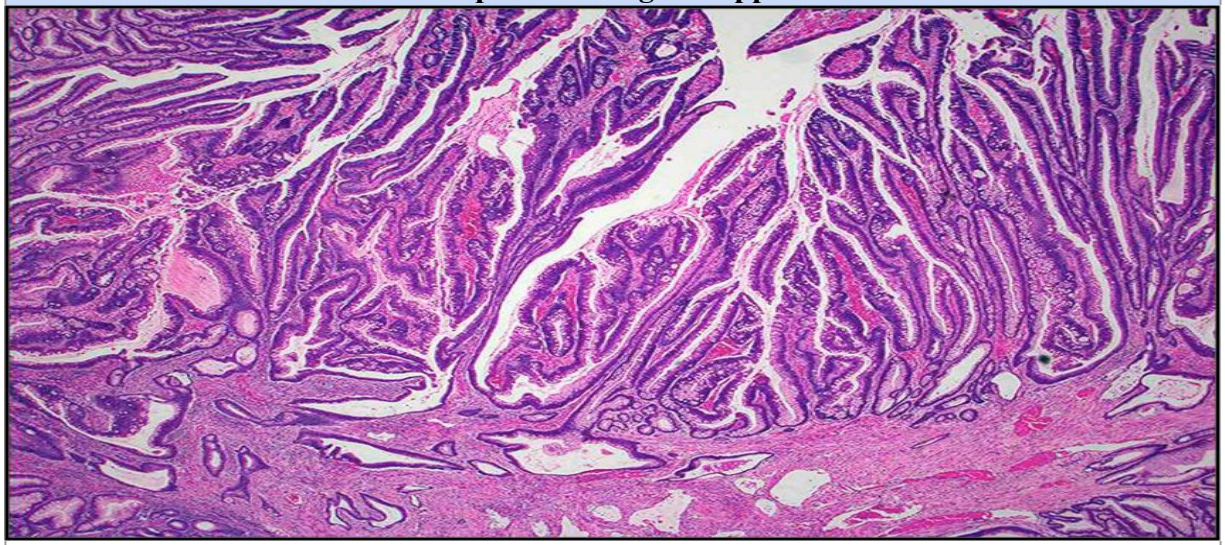
Adenocarcinoma of large intestine

Microscopic / Histological appearance		
		
Adenocarcinoma of the Colon-LPF	Adenocarcinoma of the Colon-LPF	Adenocarcinoma of the Colon-HPF
Here: is an adenocarcinoma in which the glands are much larger and filled with necrotic debris.	The acini are lined by one or several layers of neoplastic cells with papillary projection showing pleomorphism, hyperchromatism and few mitoses.	At high magnification. The neoplastic glands of adenocarcinoma have crowded nuclei with hyperchromatism and pleomorphism. No normal goblet cells are seen.

CASE (37)

Adenocarcinoma of large intestine

Microscopic / Histological appearance



- A moderately differentiated colonic adenocarcinoma.
- Tumour consists of crowded irregular malignant acini.
- Separated by thin fibrovascular stroma.

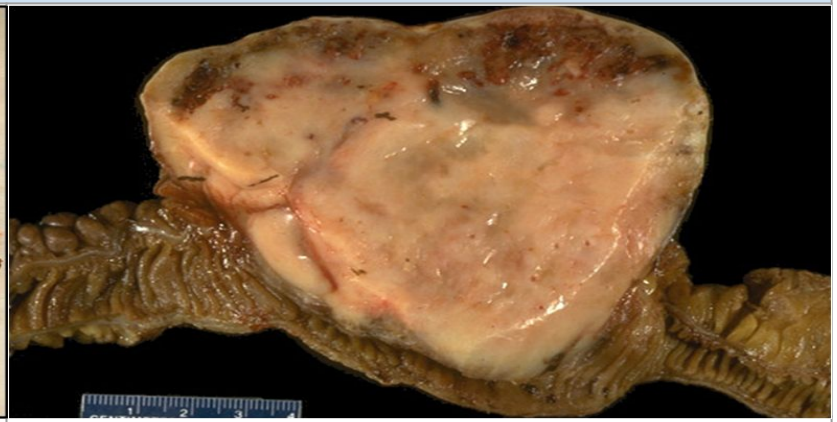
CASE (38)

Leiomyosarcoma of Small Intestine

Gross appearance

Cut surface of this leiomyosarcoma.

- Showing ill defined pale and soft large fleshy mass with hemorrhage and necrosis.

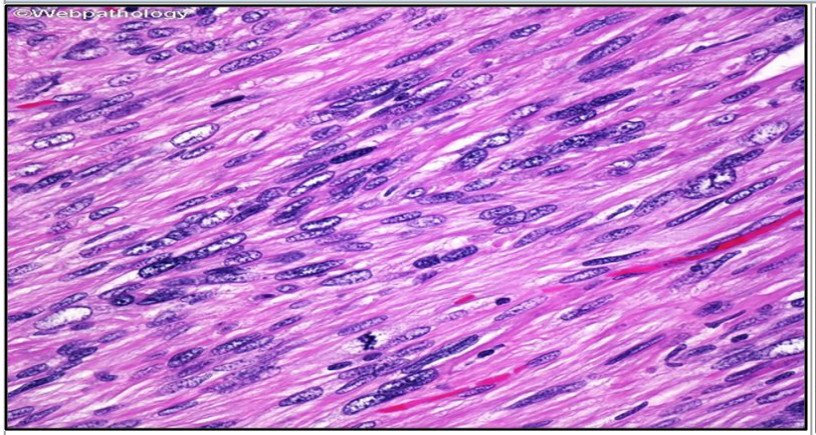
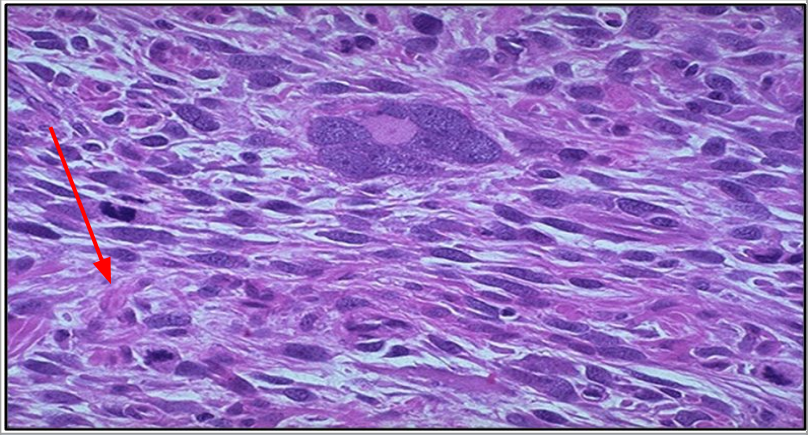


This is a leiomyosarcoma of the small bowel.

- As with sarcomas in general, this one is big and bad.
- Sarcomas are uncommon at this site, but must be distinguished from other types of neoplasms.

CASE (38)

Leiomyosarcoma

Microscopic / Histological appearance	
	
Leiomyosarcoma – HPF	**Leiomyosarcoma of the Uterus - HPF**
• **Marked atypia and cellularity with multiple mitoses present.** • **Classic features of leiomyosarcoma including: cigar shaped nuclei and arrangement of cells in fascicles are seen.**	• **Sarcomas, including leiomyosarcomas, often have very large bizarre giant cells along with the spindle cells.** • **A couple of mitotic figures appear at the right and lower right (Arrow)**

THE END

اقتراح بسيط لتسهيل الدراسة للصور أو السلايدات تحت المايكروسكوب

حاولوا تخترعون من راسكم اي رسمه غريبة تشبه رسمات الصورة تذكركم بعدين بالسلايد , أو حاولوا تربطون المظهر الطبيعي للعضو بصورته تحت المايكروسكوب عشان إذا تذكرتوا العضو بتذكرون اللي تحت المايكروسكوب إن شاء الله بالتوفيق للجميع ...

The struggle you're in today
is developing strength you need for tomorrow.

BOYS LEADER:

- Wael Al Oud

GIRLS LEADER

- Samar AlOtaibi

GIRLS TEAM:

- Latifah AlSukait
- Ghaida Aljamili
- Asrar Batarfi
- Farrah Mendoza
- Raghad Alnafesa
- Monirah Alsalouly
- Nouf AlAbdulkarim
- Nurah AlQahtani
- Reem Albahlal
- Demaah Alrajhi
- Ola Alnuhayl