

Practical pathology for renal system

pathology faculty of medicine

Merit University

Merit University

pathology faculty of medicine

ILOs

- Define pyelonephritis and describe the risk factors.
- Describe the forms of pyelonephritis and illustrate the morphological features of acute and chronic forms.
- Describe renal cell carcinoma, the presenting features and morphological appearances.
- Describe the difference between microscopic pictures of renal cell carcinoma
- Describe nephroblastoma, the presenting features and morphological appearances.
- Describe the incidence and risk factors of the urinary bladder carcinoma.
- Describe microscopic picture of Bilharziasis

Pyelonephritis

Definition:

Bacterial inflammation of the interstitial tissues of the renal pelvis, medulla and cortex.

Pyelonephritis is a very common kidney disease.

Etiology:

Organisms

as E.coli is the commonest causative organism.

Other causative bacteria are streptococcus faecalis, staphylococcus aureus.

Mixed infection is common

Risk Factors:

1) Urinary tract obstruction

Obstruction is caused by

- urinary bilharziasis
- Stones
- Tumors
- enlarged prostate and congenital malformations.

(2) Diabetes mellitus.

(3) Instrumentation of the urinary tract.

(4) Pyelonephritis

is more common in females due to

(a) The short wide urethra. (b) Pressure of the enlarged pregnant uterus on the ureters at the pelvic brim.

Main two forms:

(1) Acute Pyelonephritis:

Gross picture:

- Commonly the lesion is **bilateral**.
- The kidney is **enlarged** and congested.
- The capsule **strips easily**.
- The outer surface shows **multiple abscesses**.
- The cut surface shows tiny abscesses in the cortex and medulla.

(2) Chronic Pyelonephritis:

May follow acute pyelonephritis, but commonly starts as chronic inflammation.

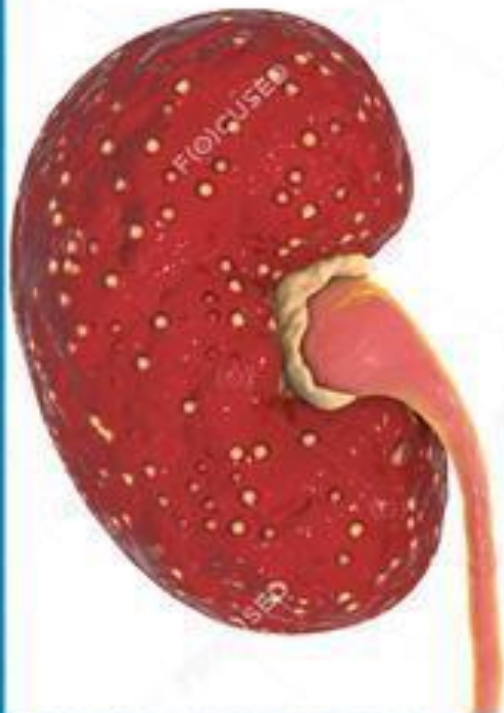
Gross picture:

- The kidney is **reduced in size**
 - the capsule is **thick** and **adherent**.
- The surface shows **irregular depressions** due to cortical scarring.

Pathology of urinary tract diseases

PYELONEPHRITIS

Acute



Chronic



Chronic pyelonephritis



Chronic pyelonephritis, Kidney

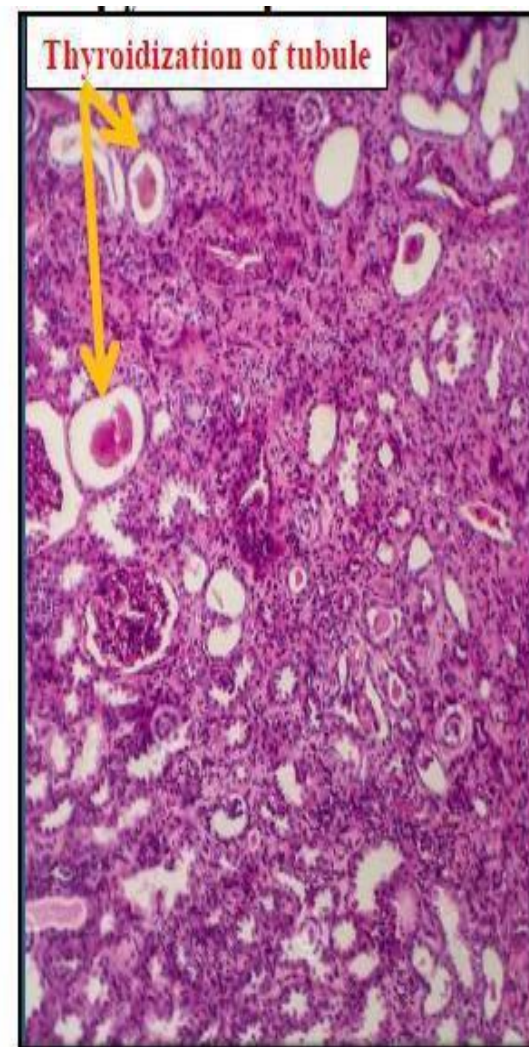
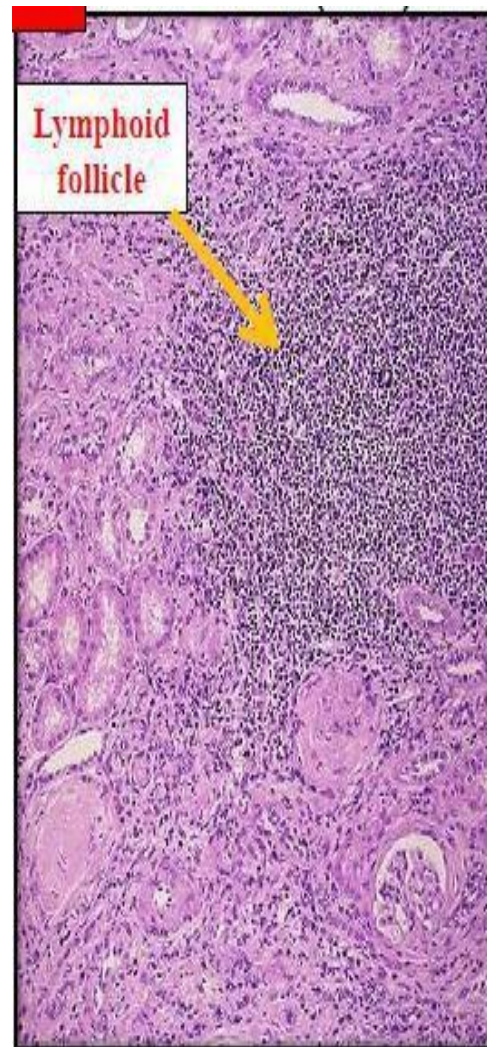
Microscopic picture:

1) A section from a kidney.

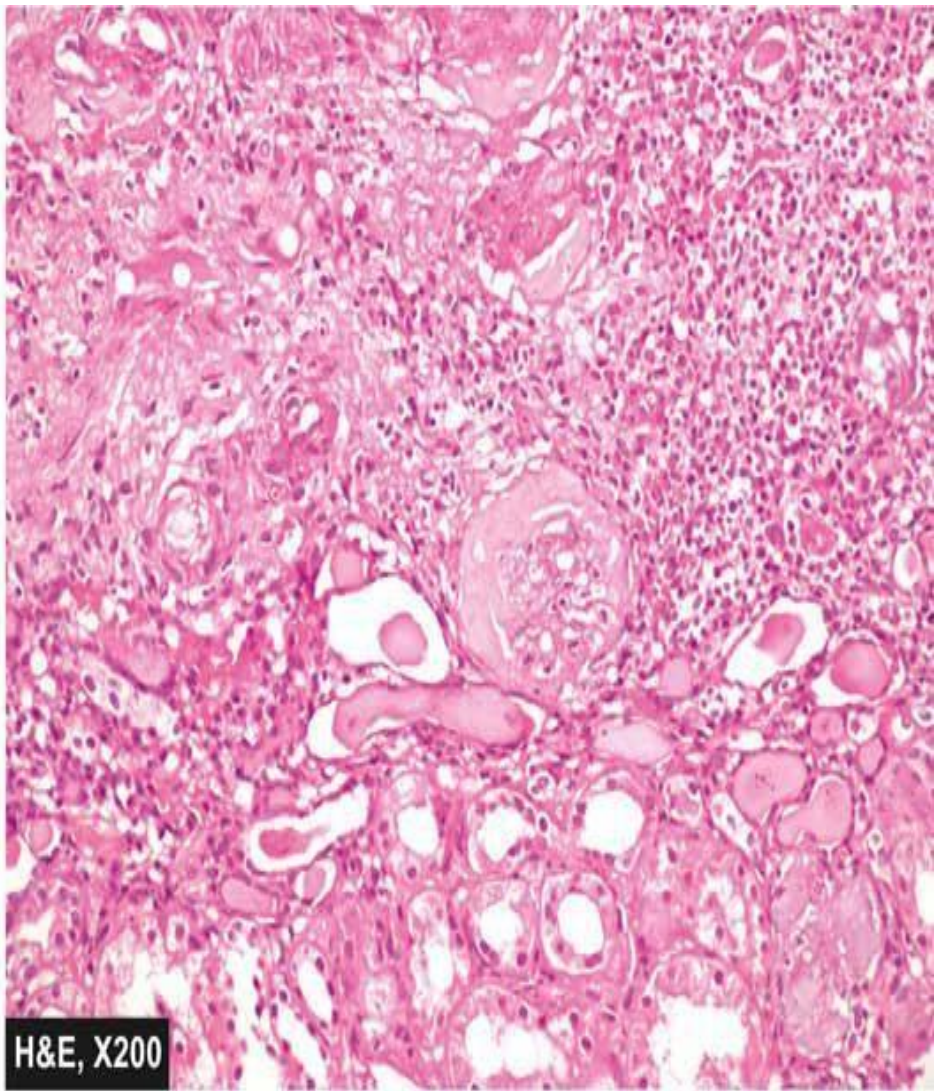
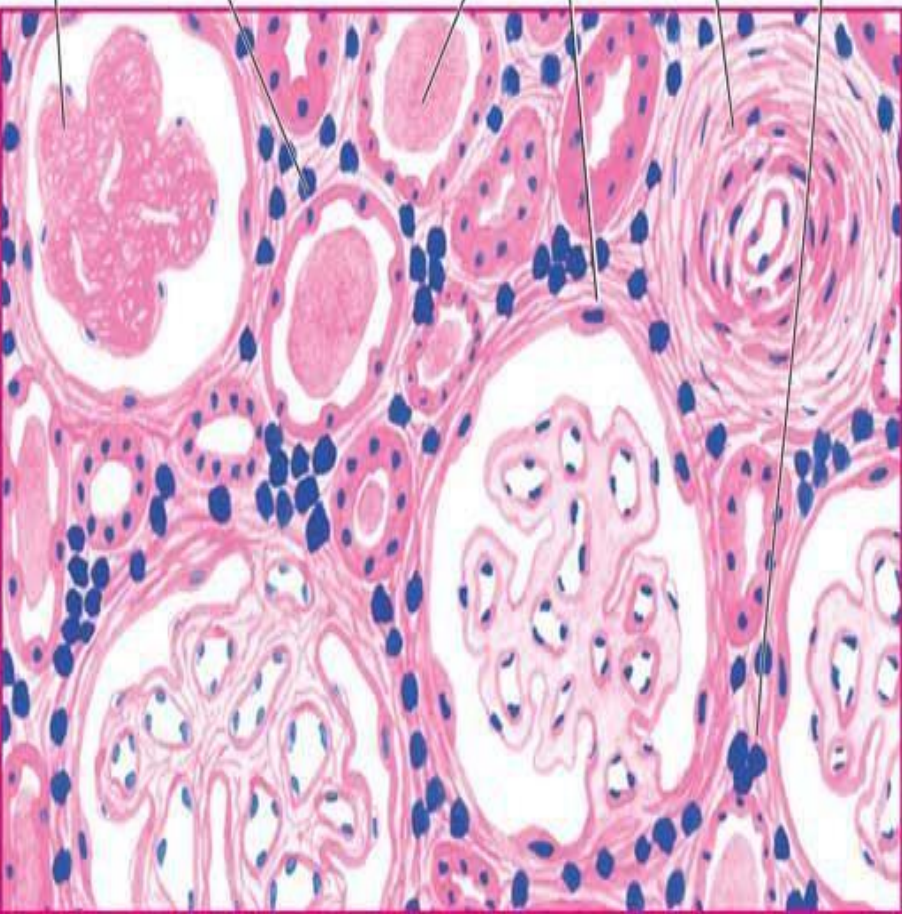
The interstitial tissue is infiltrated by a large number of chronic inflammatory cells mainly lymphocytes that form lymphoid follicles.

2) **Some renal tubules** are atrophic while others showed deep pink, homogenous material in their lamina (**hyaline casts**) that look like thyroid follicles (**thyroidization**).

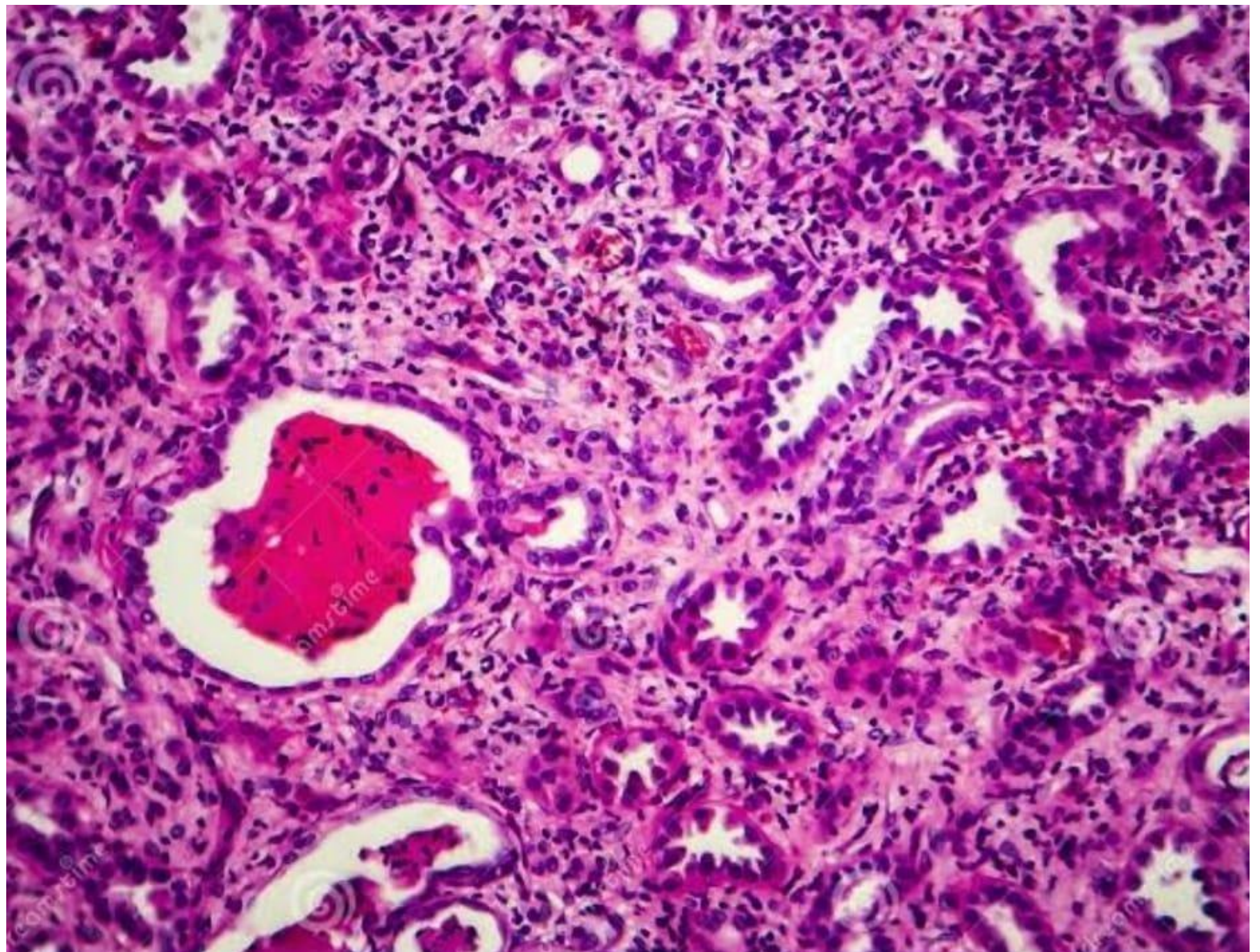
3) **The blood vessels** showed end arteritis obliterans (thickened wall and narrowed lumen).



Hyalinised glomerulus Periglomerular fibrosis Hyalinised vessel
Chronic inflammatory cells Colloid cast (Thyroidisation) Interstitial fibrosis



H&E, X200



Renal cell carcinoma (hypernephroma)

□ Definition

- Renal cell carcinoma (RCC) is an adenocarcinoma arising from tubular epithelium of the kidney and here they are located in the cortex.
- It occurs most commonly from 6th to 7th decades.
- There is male predominance (2:1).

□ Etiology:

❖ Risk factors:

1. Tobacco.
2. Exposure to asbestos & cadmium.
3. Hypertension.
4. Hereditary and acquired cystic diseases of the kidney.
5. Obesity and estrogen therapy.
6. Hereditary: about 5% cases are inherited,

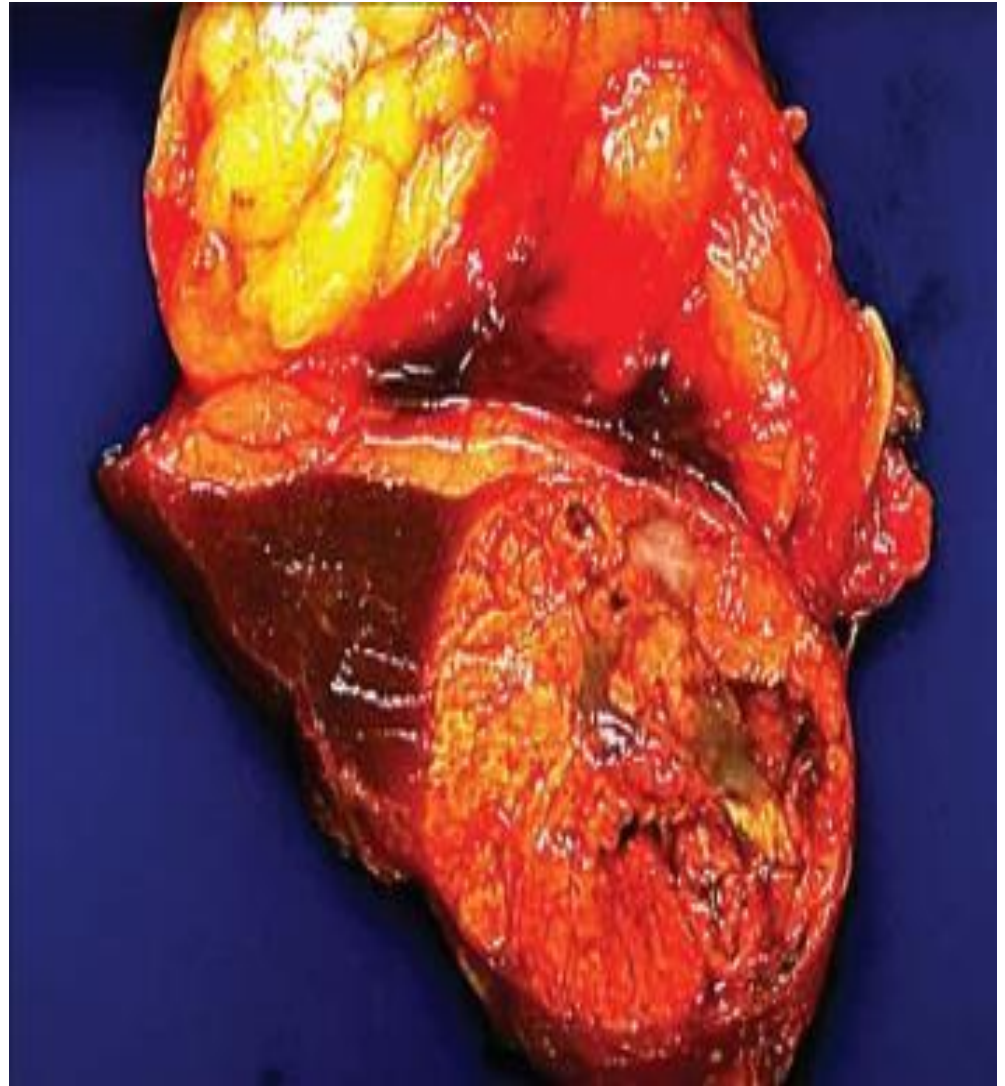
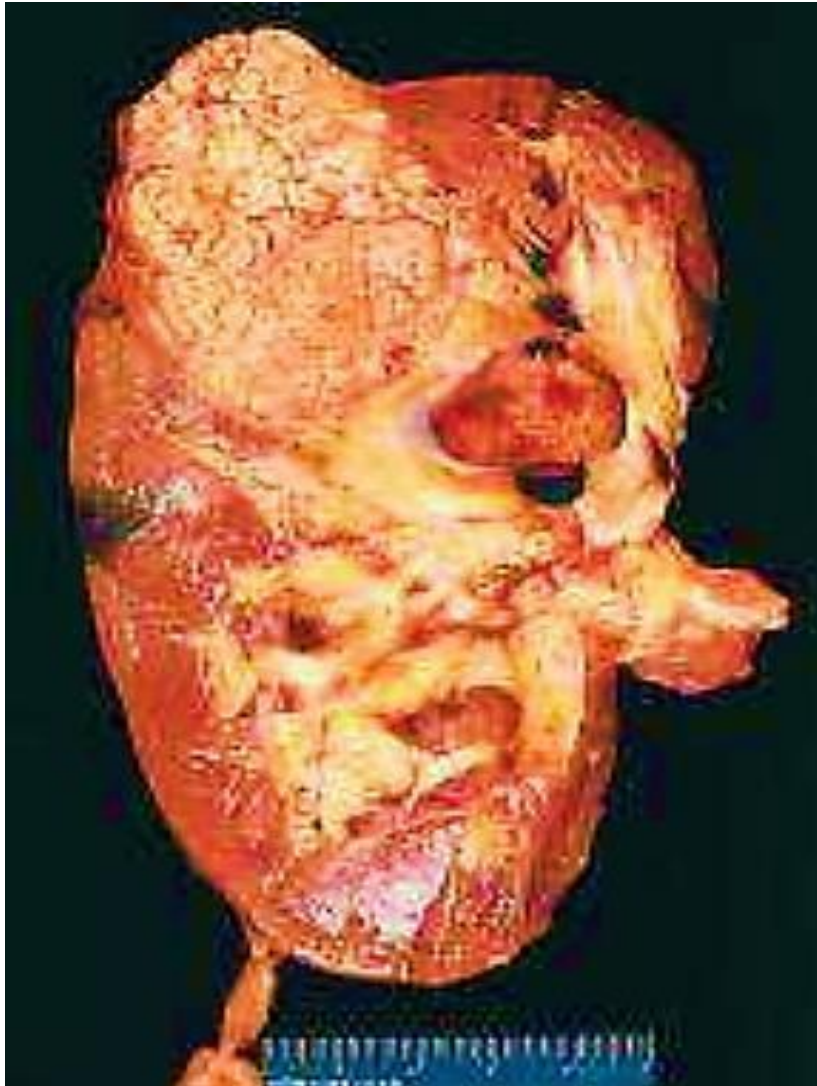
Renal cell carcinoma (hypernephroma), kidney

Gross picture

RCC commonly arises from the poles of the kidney as a solitary and unilateral tumor, more often in the upper pole.

- The tumor is generally large, golden yellow and circumscribed.
- Cut section of the tumor may show areas of ischemic necrosis, cystic change and foci of hemorrhages.

RCC



❑ Microscopic picture of RCC:

1) Clear cell type RCC (70 %):

- This is the most common pattern, the clear cytoplasm of tumor cells is due to removal of glycogen and lipid from the cytoplasm during processing of tissues.
- Majority of clear cell tumors are well differentiated.

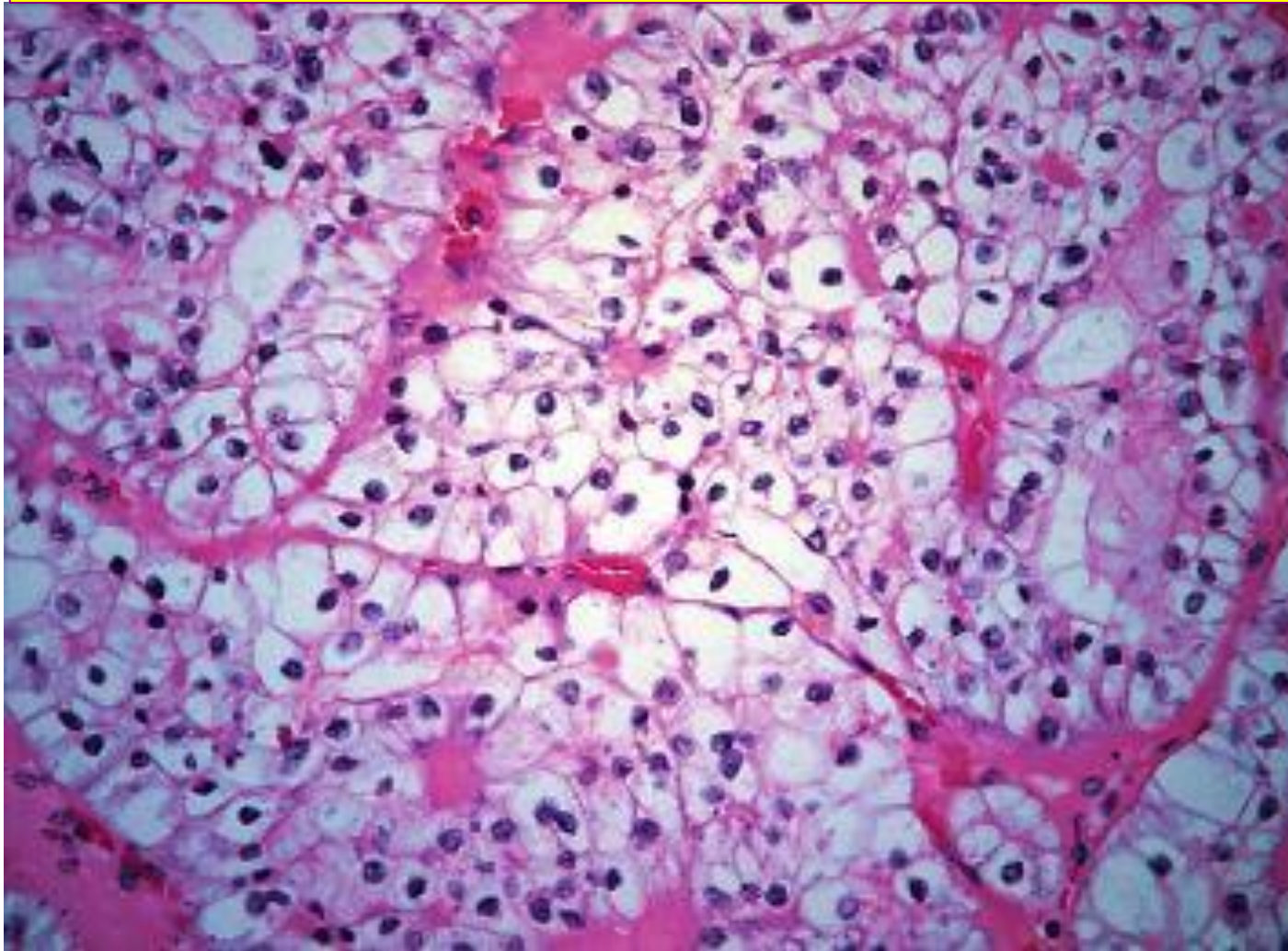
2) Papillary type RCC (15%):

- The tumor cells are arranged in papillary pattern

3) Chromophobe type RCC (5%):

- This type shows admixture of pale clear cells with perinuclear halo and acidophilic granular cells.

Clear cell RCC

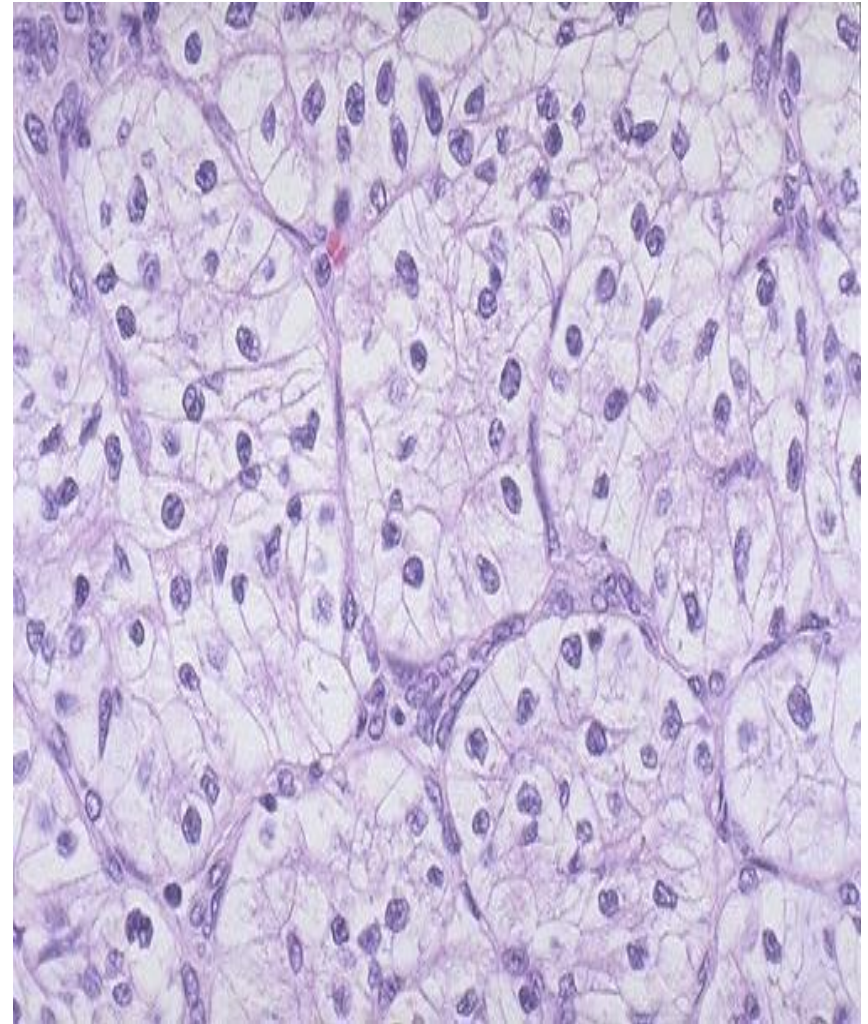


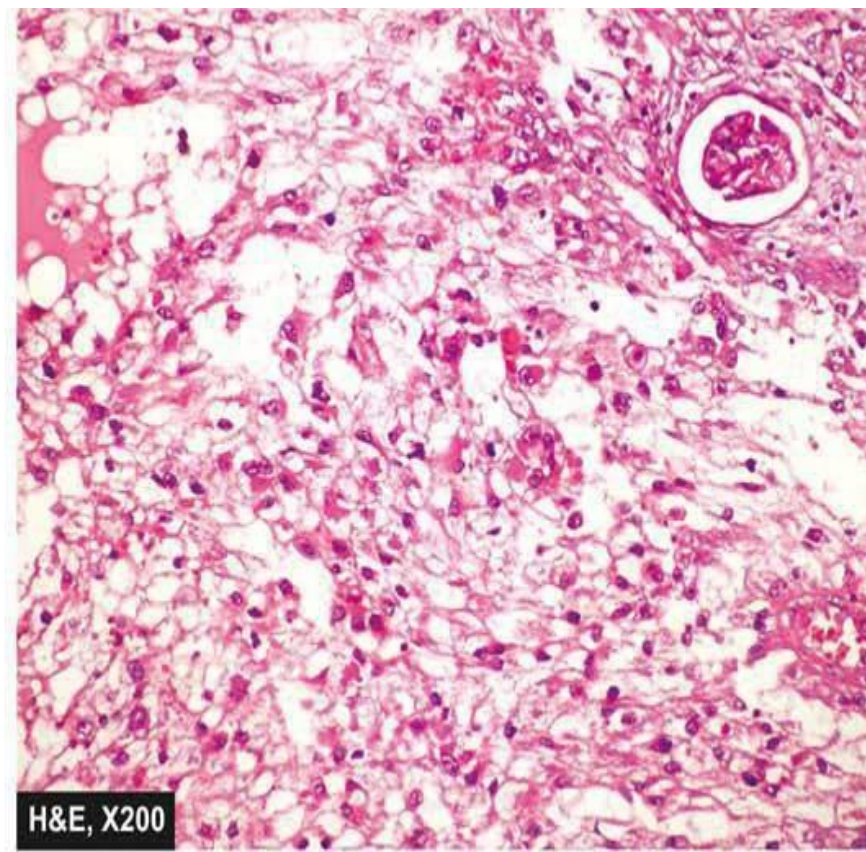
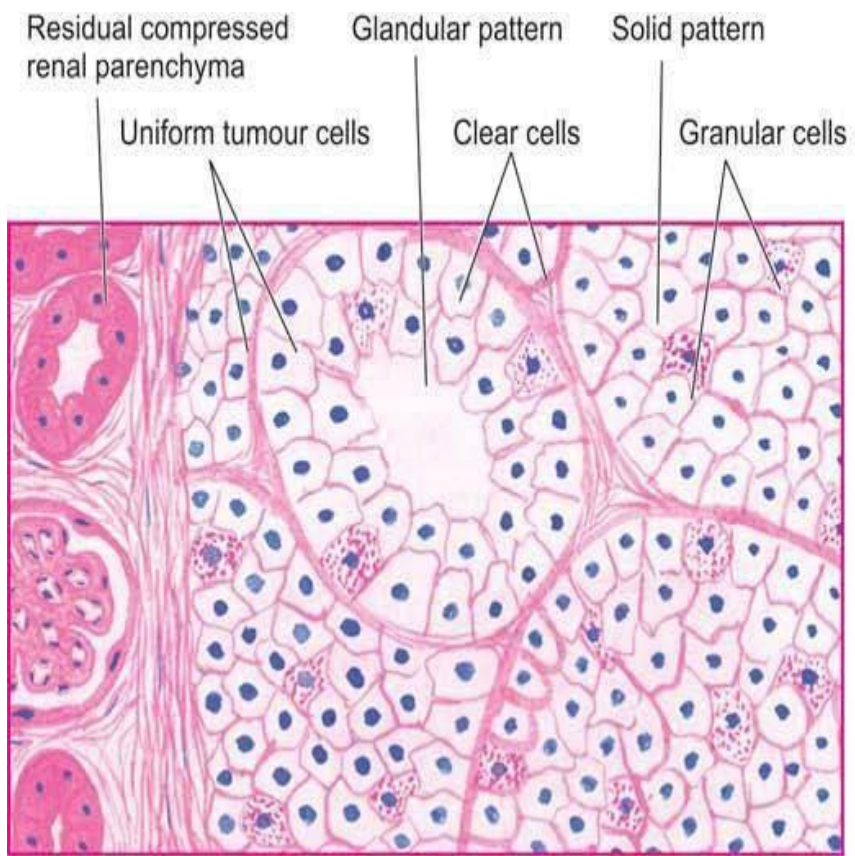
Renal cell carcinoma (hypernephroma), kidney

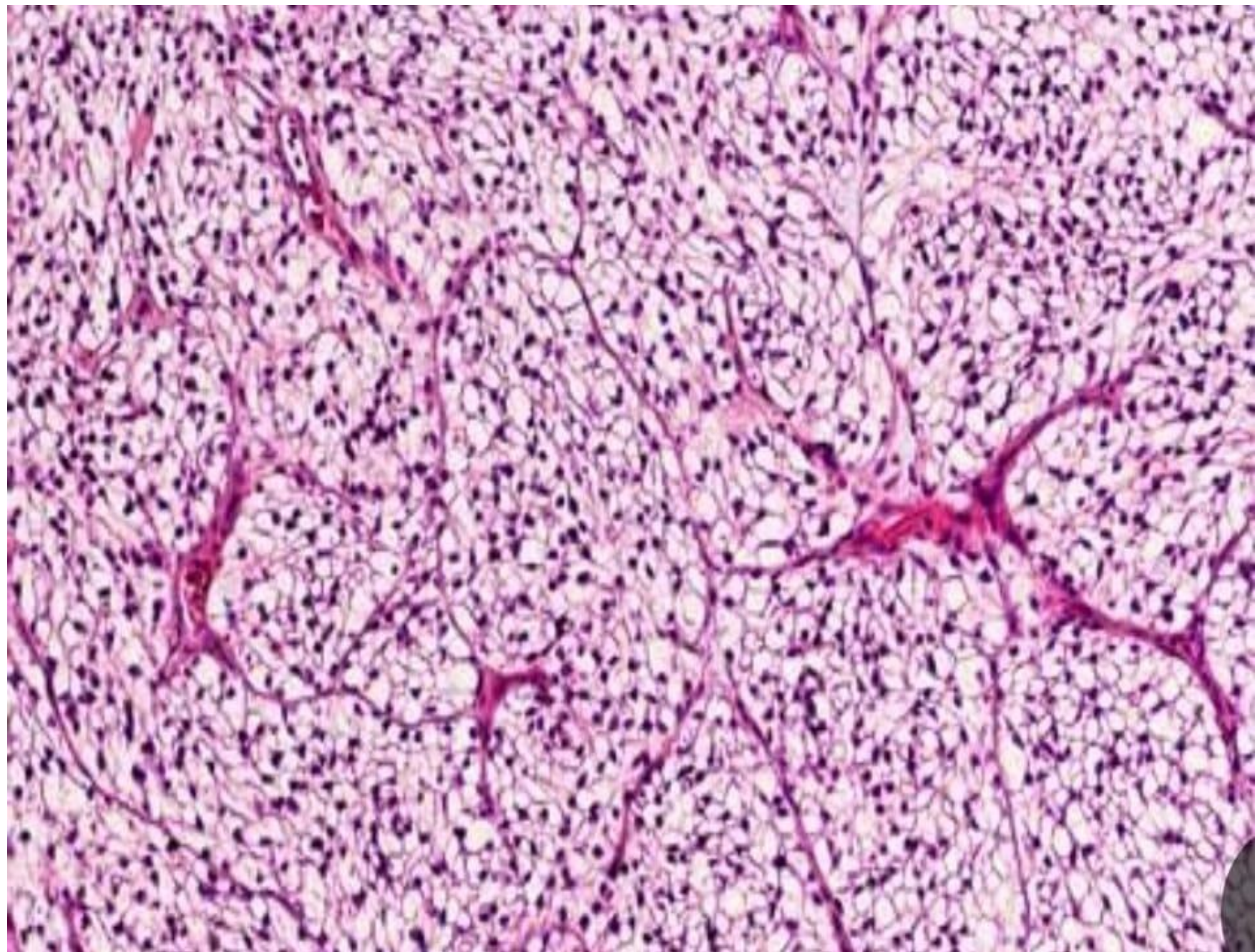
Clear cell type

This is a section from **a renal tumor**.

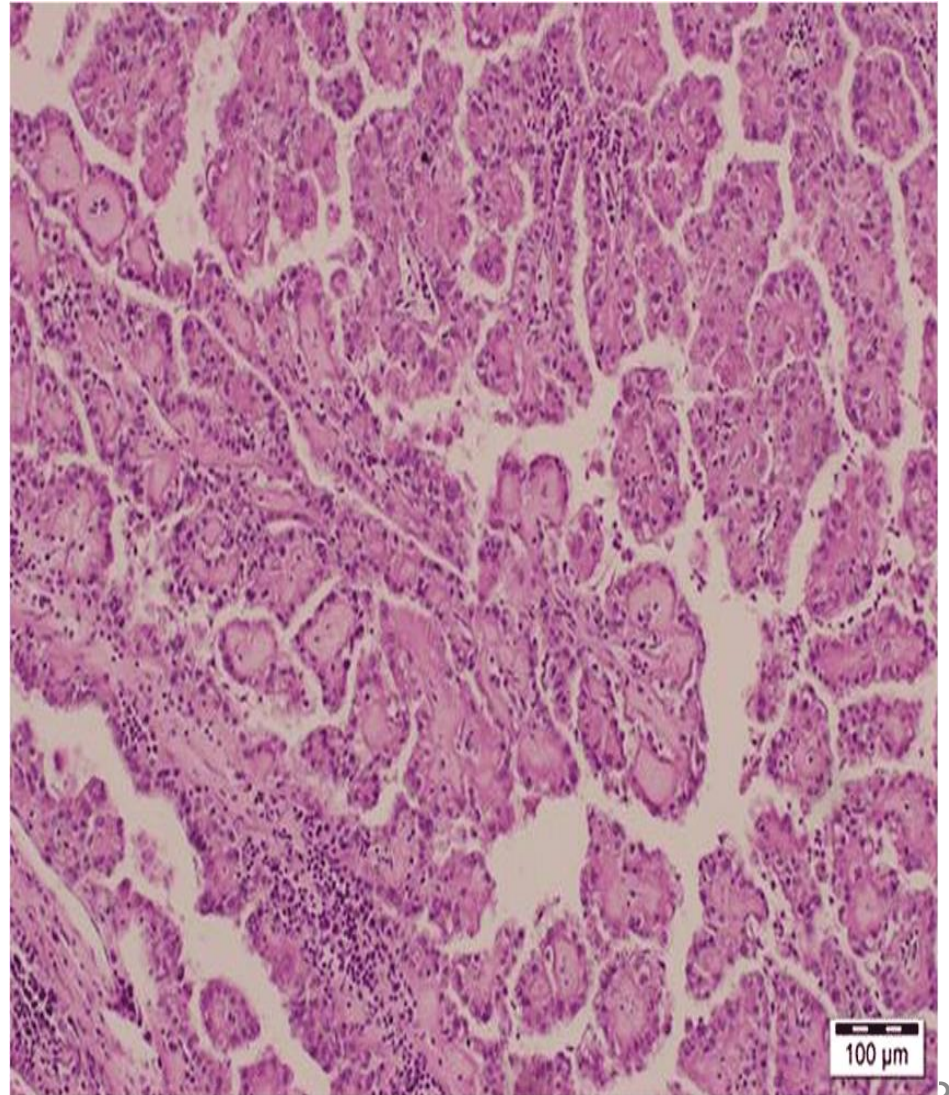
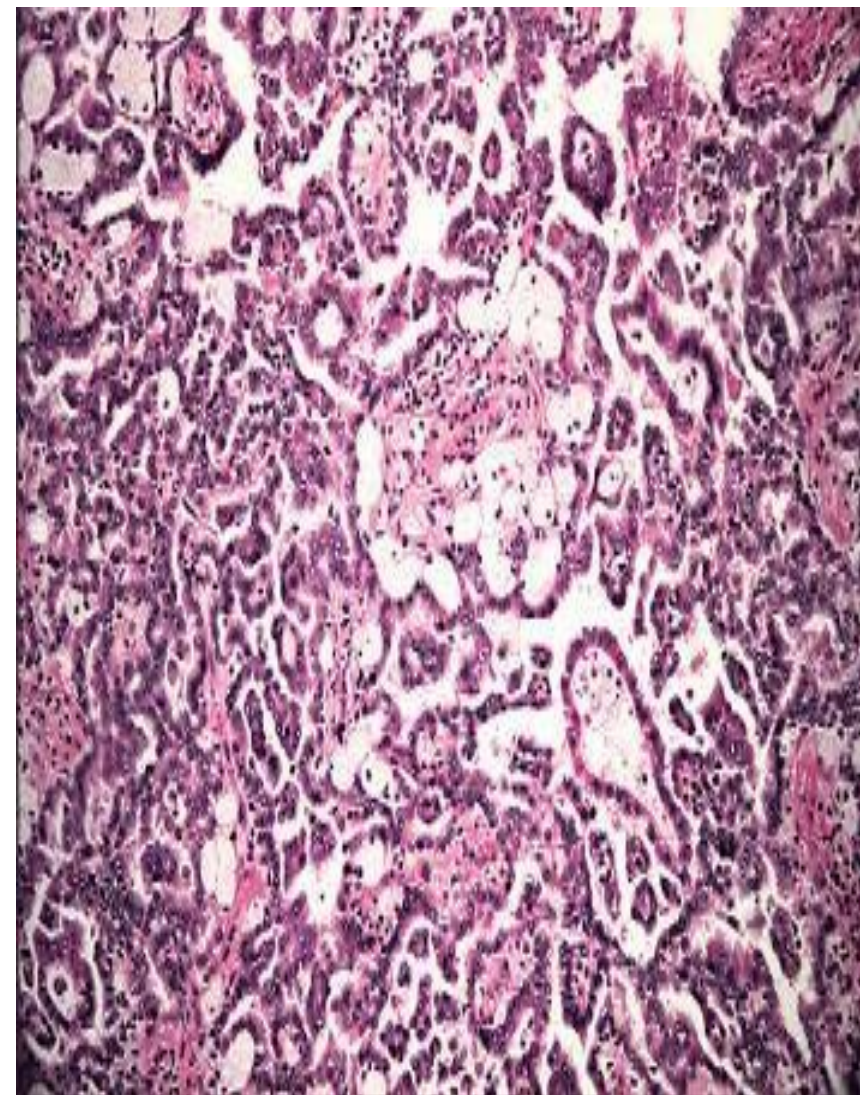
- It is formed of **large polyhedral tumor cells** with pale eosinophilic or clear cytoplasm and small, central, round, dark nuclei.
- **The cells** are arranged in **nests and small sheets**, within a delicate fibro-vascular tissue stroma that is infiltrated by lymphocytes. The tumor cells showed rare mitosis, areas of necrosis and hemorrhage.







Papillary RCC



Nephroblastoma (Wilms' Tumour)

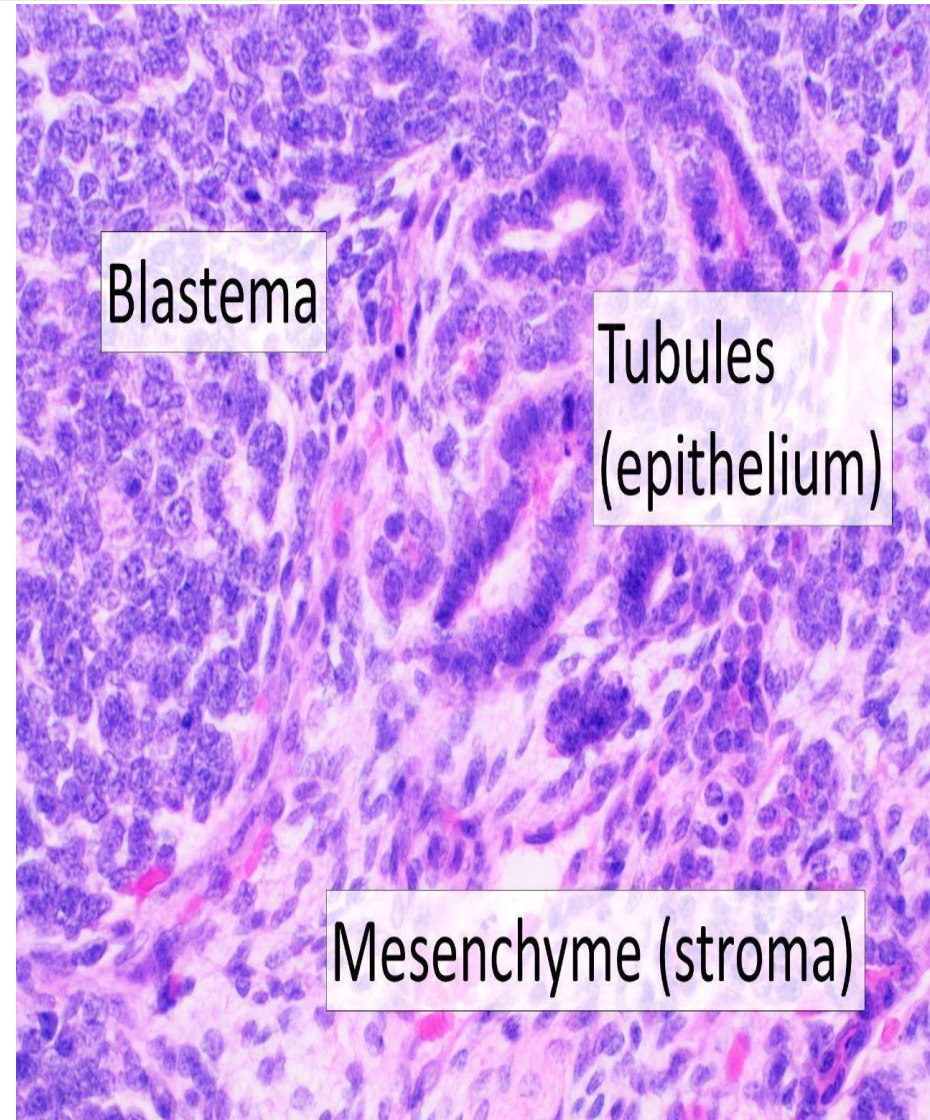
➤ Definition & Epidemiology:

- Nephroblastoma or Wilms' tumor is an **embryonic tumor** derived from primitive renal epithelial and mesenchymal components.
- It is the most common abdominal malignant tumor of **young children**.
- It is seen between **1 to 6 years of age**
- There is **equal sex incidence**.

Wilms tumor (Nephroblastoma)

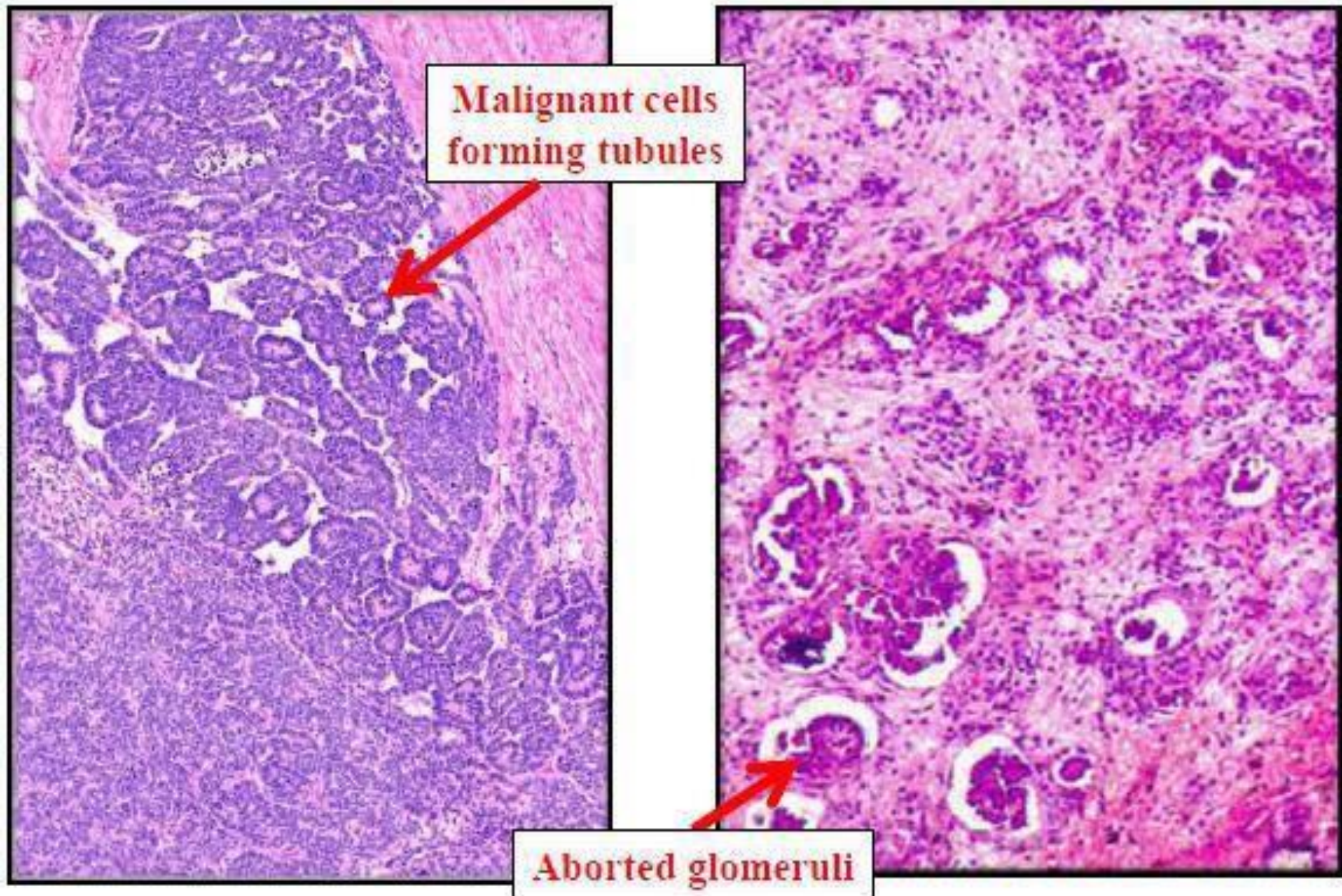
This is a section from a **large renal mass** of a child. The tumor tissue is composed of **three types** of neoplastic cells:

- (1) **Epithelial cells** that look round or cubical and arrange in small tubular structures solid sheets and immature (abortive) glomeruli.
- (2) **Undifferentiated (blastemal) cells** that are small cells with oval or round hyperchromatic nuclei and scanty pale basophilic cytoplasm. They arrange in sheets and nests, with frequent mitosis and necrosis.
- (3) **Spindle-shaped cells** that form the stroma of the tumor. They are usually myxomatous tissue but sometimes they are muscle, cartilage or bone tissue.



**Malignant cells
forming tubules**

Aborted glomeruli



Urinary Bladder Carcinoma

❑ Incidence

- Most cases usually occur **above 40 years**. However in Bilharzial bladder cancer it occurs in age less than 40 years and more commonly seen **in males more than in females**.

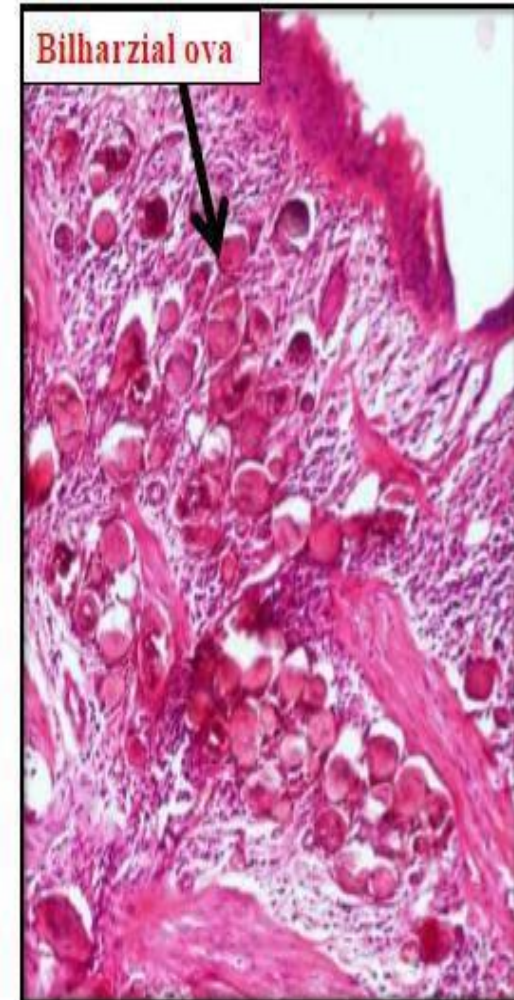
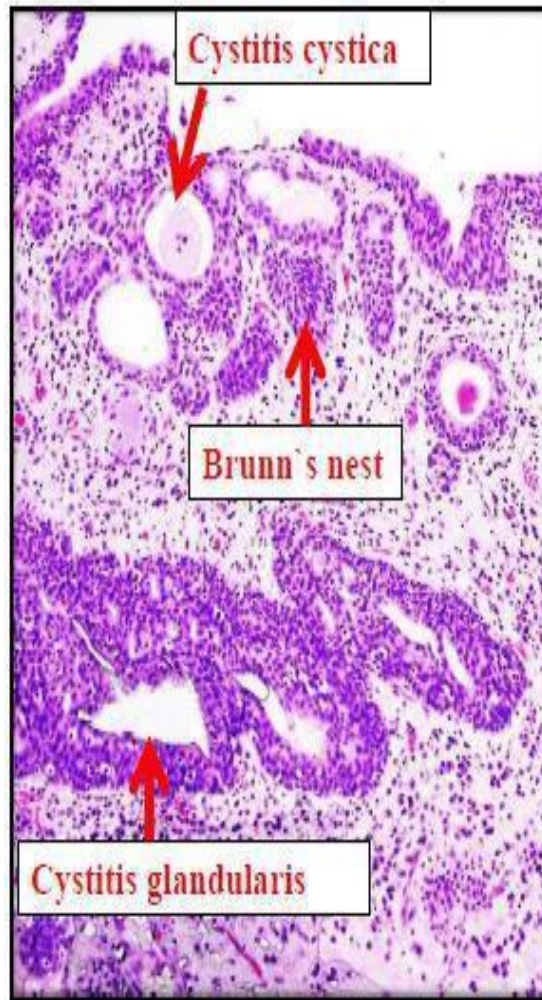
❑ Risk Factors:

➤ Schistosomiasis (Bilharziasis) :

- There is increased risk of bladder cancer in patients having bilharzial infestation (**Schistosoma haematobium**) of the bladder.
- Schistosomiasis is common in Egypt.
- It is thought to induce **local irritant effect** and **initiate Bilharzial urothelial precancerous lesions**.

Bilharziasis, urinary bladder

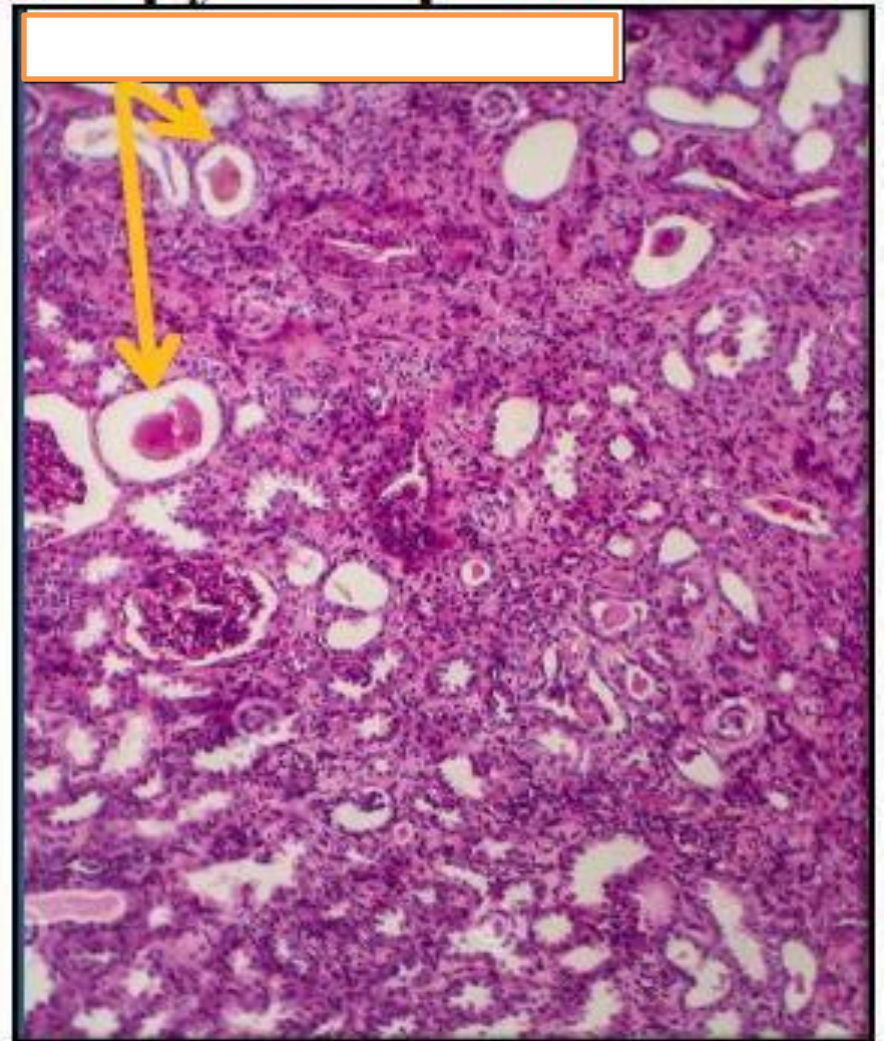
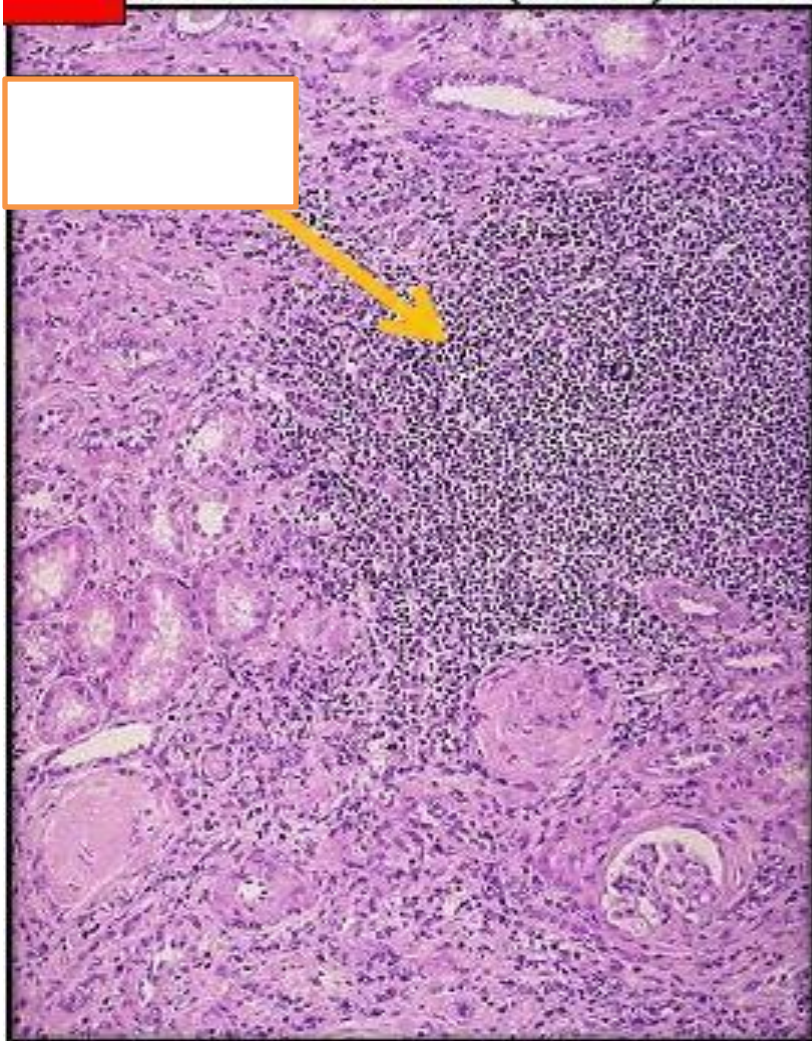
A histological section from the **urinary bladder** that showed (1)hyperplastic, (2)atrophic, or (3)ulcerated **urothelial covering** with or without (4)squamous metaplasia. Other bilharzial epithelial changes such as **Brun's nests**, **cystitis cystica**, and **cystitis glandularis** could be also seen. **The lamina propria** shows many deposited calcified bilharzial ova that are surrounded by **bilharzial granuloma** (eosinophiles, lymphocytes, plasma cells, few foreign body giant cells and fibroblasts or fibrous tissue in old lesions).



Diagnosis :

Organ :

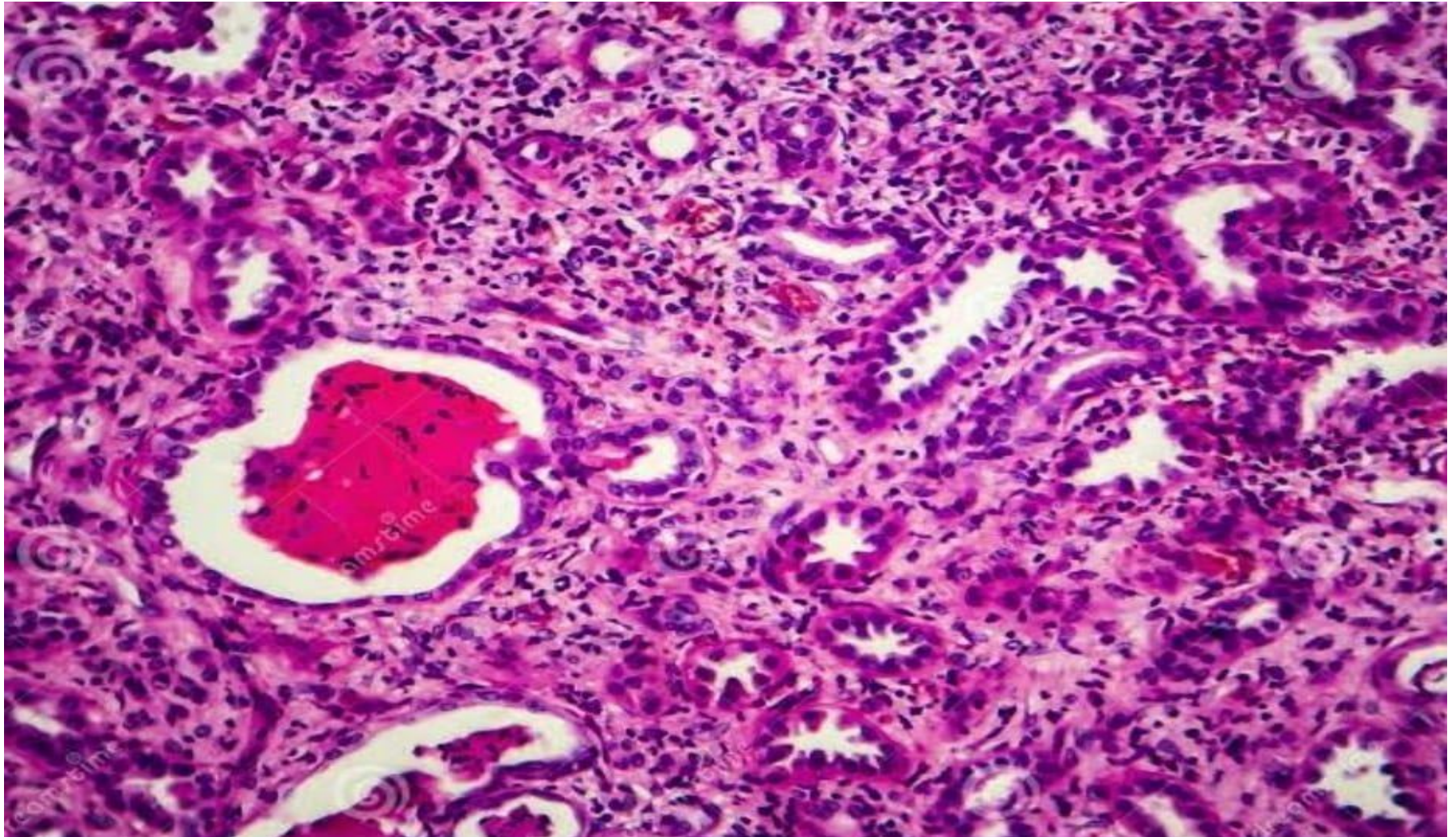
Characteristic features :



Diagnosis :

Organ :

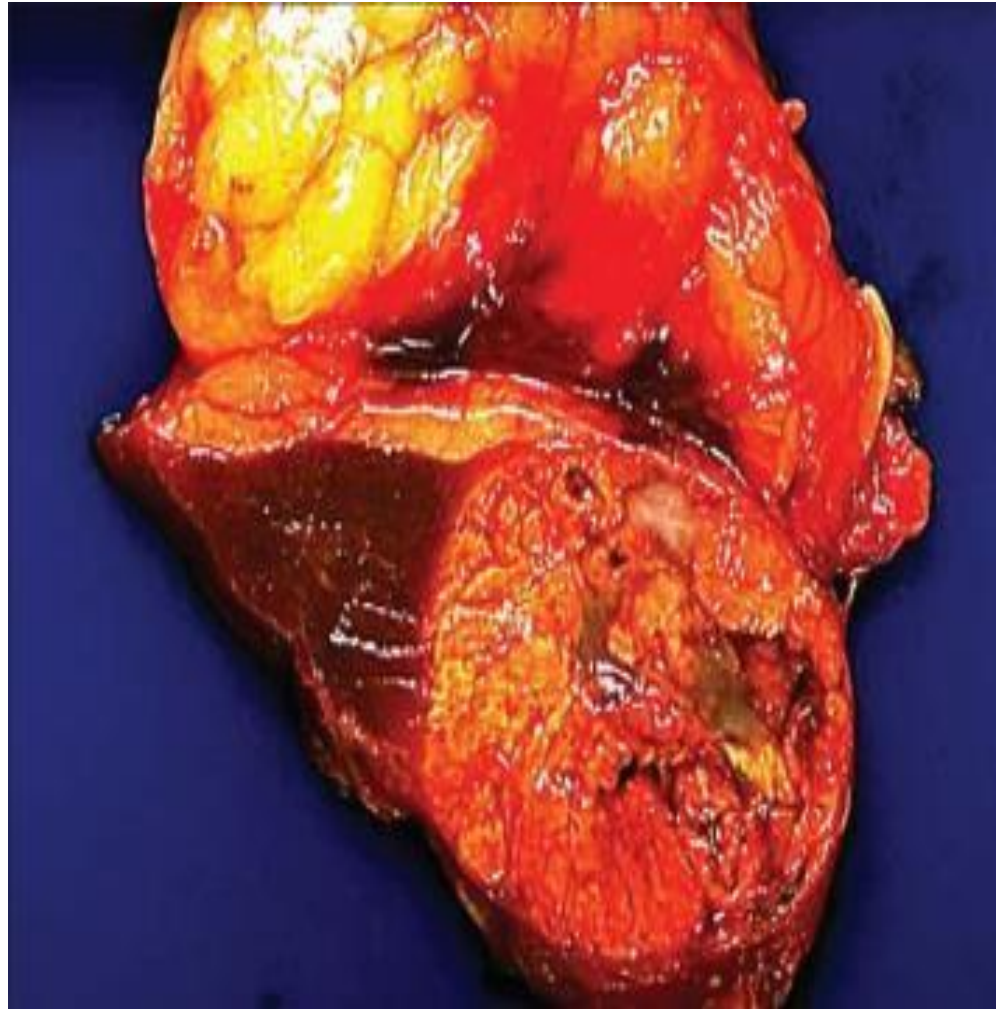
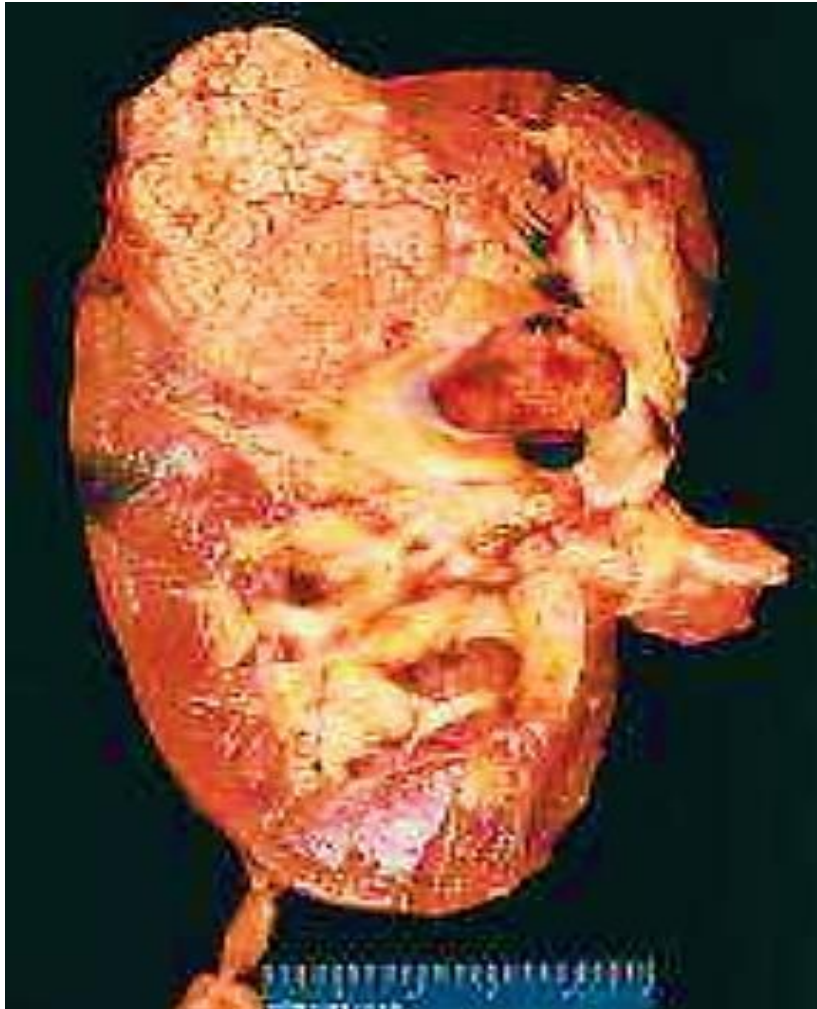
Characteristic features



Diagnosis :

Organ :

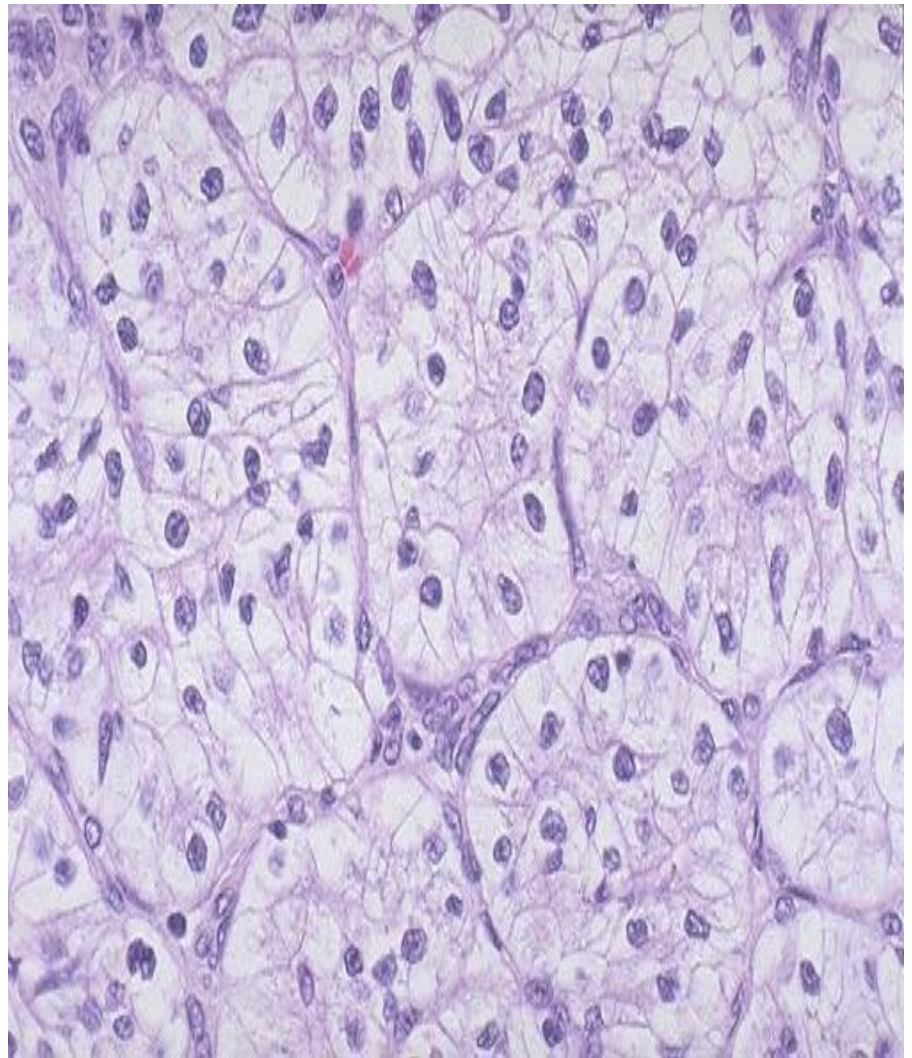
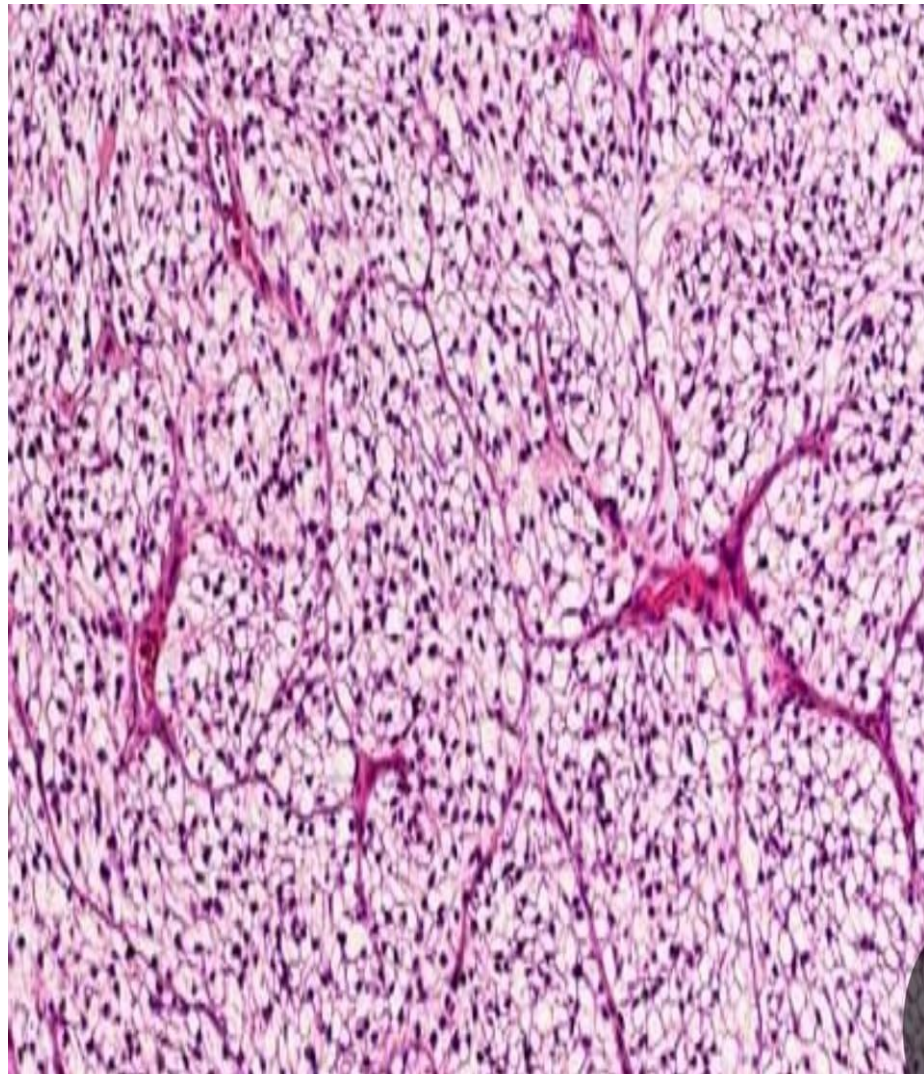
Characteristic features :



Diagnosis :

Organ :

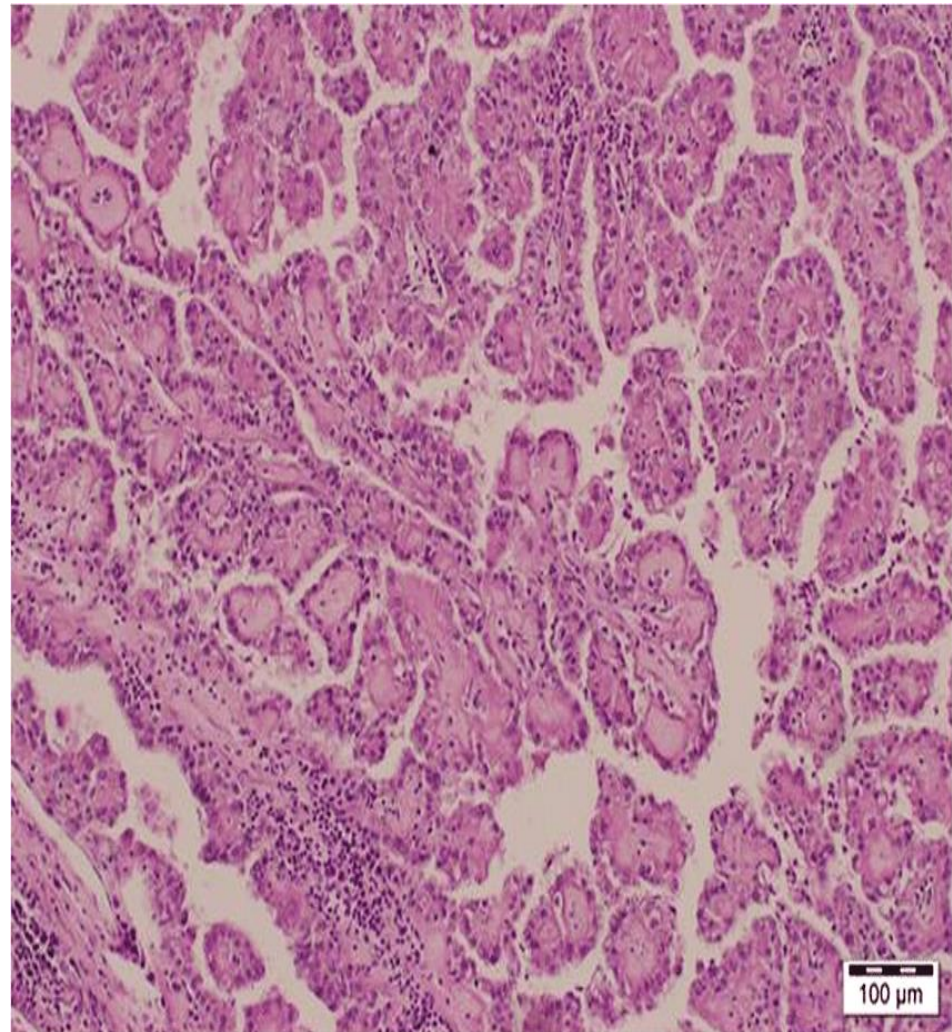
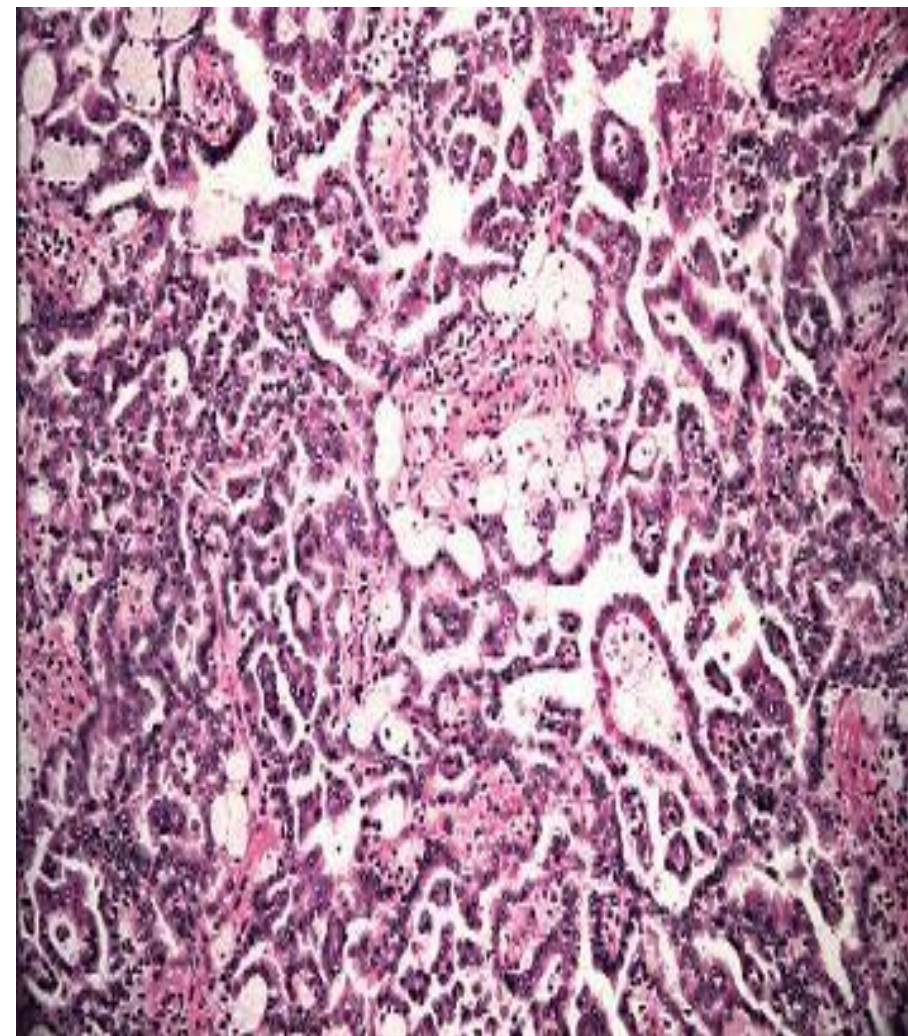
Characteristic features :



Diagnosis :

Organ :

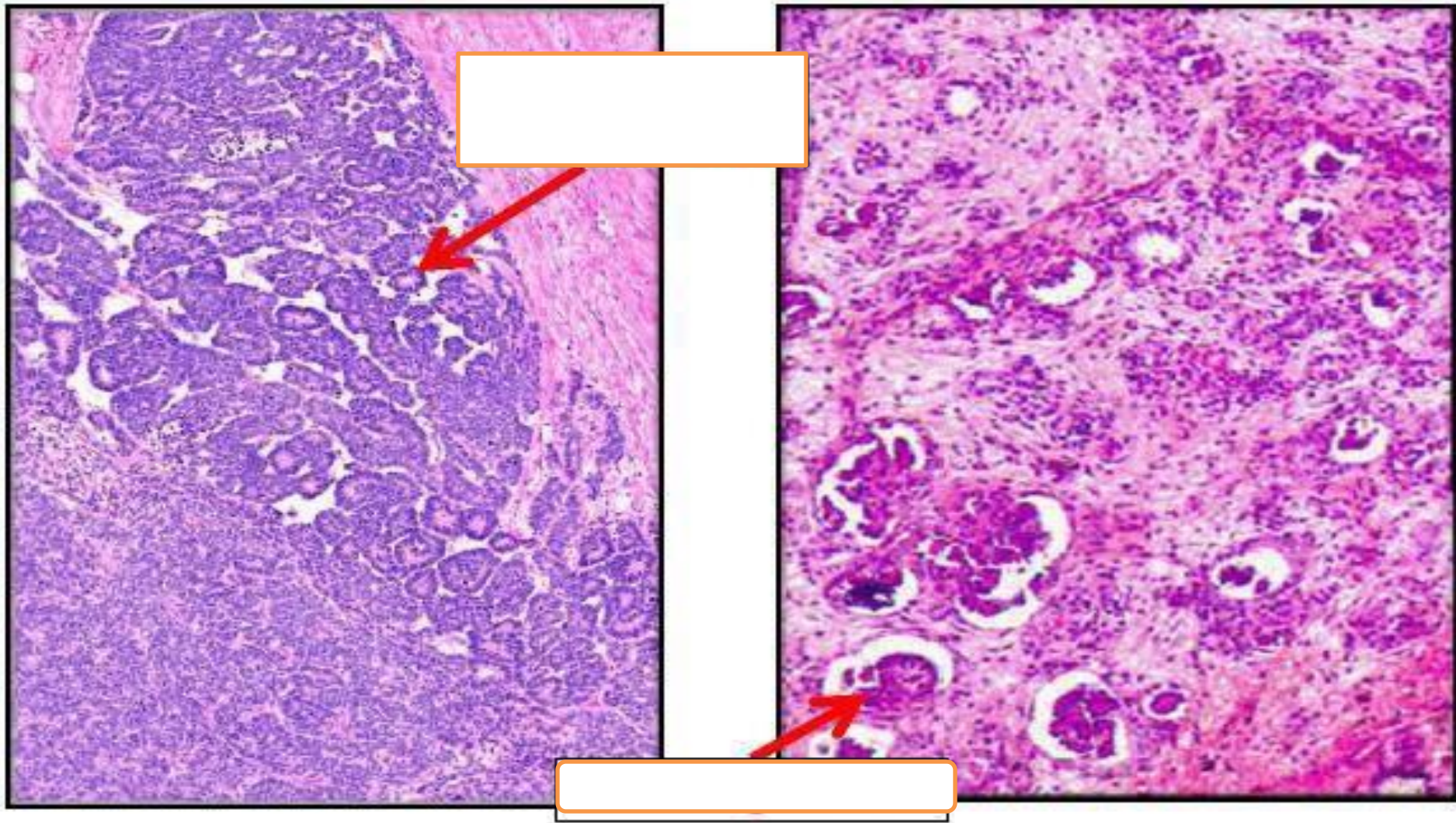
Characteristic features :



Diagnosis :

Organ :

Characteristic features :



Diagnosis :

Organ :

Characteristic features :

