

Renal tumors of adults

Urinary Tract Tumors

- **2%-3% of all cancers in adults.**
- The **most common** malignant tumor of the kidney is **renal cell carcinoma**.
- *Tumors of the lower urinary tract are twice as common as renal cell carcinomas.*

Renal Cell Carcinoma (RCC)

- Origin: renal tubular epithelium.
- in cortex.
- 2%-3% of all cancers in adults.
- 6th-7th decades.
- M:F 2:1

Predisposing factors

- **smoking**
- **hypertension**
- **obesity**
- **occupational exposure to cadmium**
(nickel-cadmium batteries, etc).
- **chronic dialysis & acquired polycystic disease**

New classification based on the molecular origins of these tumors

- 1-Clear Cell Carcinomas
- 2-Papillary Renal Cell Carcinomas
- 3-Chromophobe Renal Carcinomas

1-Clear Cell Carcinomas

- most common type (70%- 80% of RCC).
- cells with **clear** or **granular** cytoplasm.
- may be:
 - 1-Sporadic
 - 2-Familial (including von Hippel-Lindau (VHL) disease)
- The *VHL* gene is involved in familial and also sporadic clear cell carcinomas (60%).

VHL disease

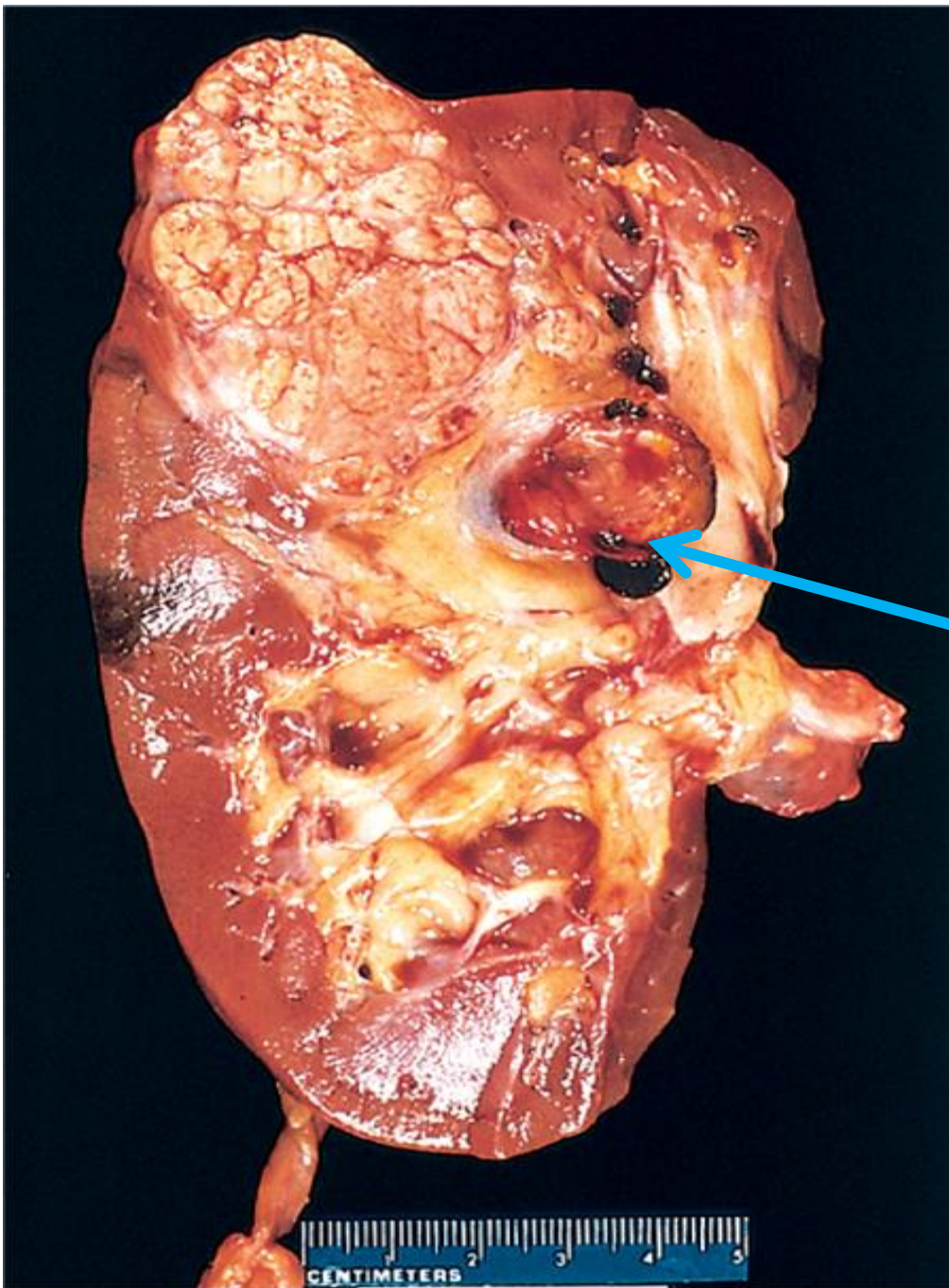
- **VHL gene on chromosome 3p25** is a tumor suppressor gene involved in limiting the angiogenesis in response to hypoxia
- autosomal dominant
- predisposition to a variety of neoplasms:
 - 1- hemangioblastomas of cerebellum
 - 2- bilateral renal cysts
 - 3- bilateral & multiple renal clear cell carcinomas (40%-60%).
 - 4- Pheochromocytoma

2-Papillary Renal Cell Carcinomas

- 10% to 15%.
- papillary growth pattern.
- **multifocal** and **bilateral**
- familial and sporadic forms.
- **MET proto-oncogene** on ch7q31.
- increased gene dosage due to **duplications of chromosome 7** → ↑ growth in proximal tubular epithelial cells

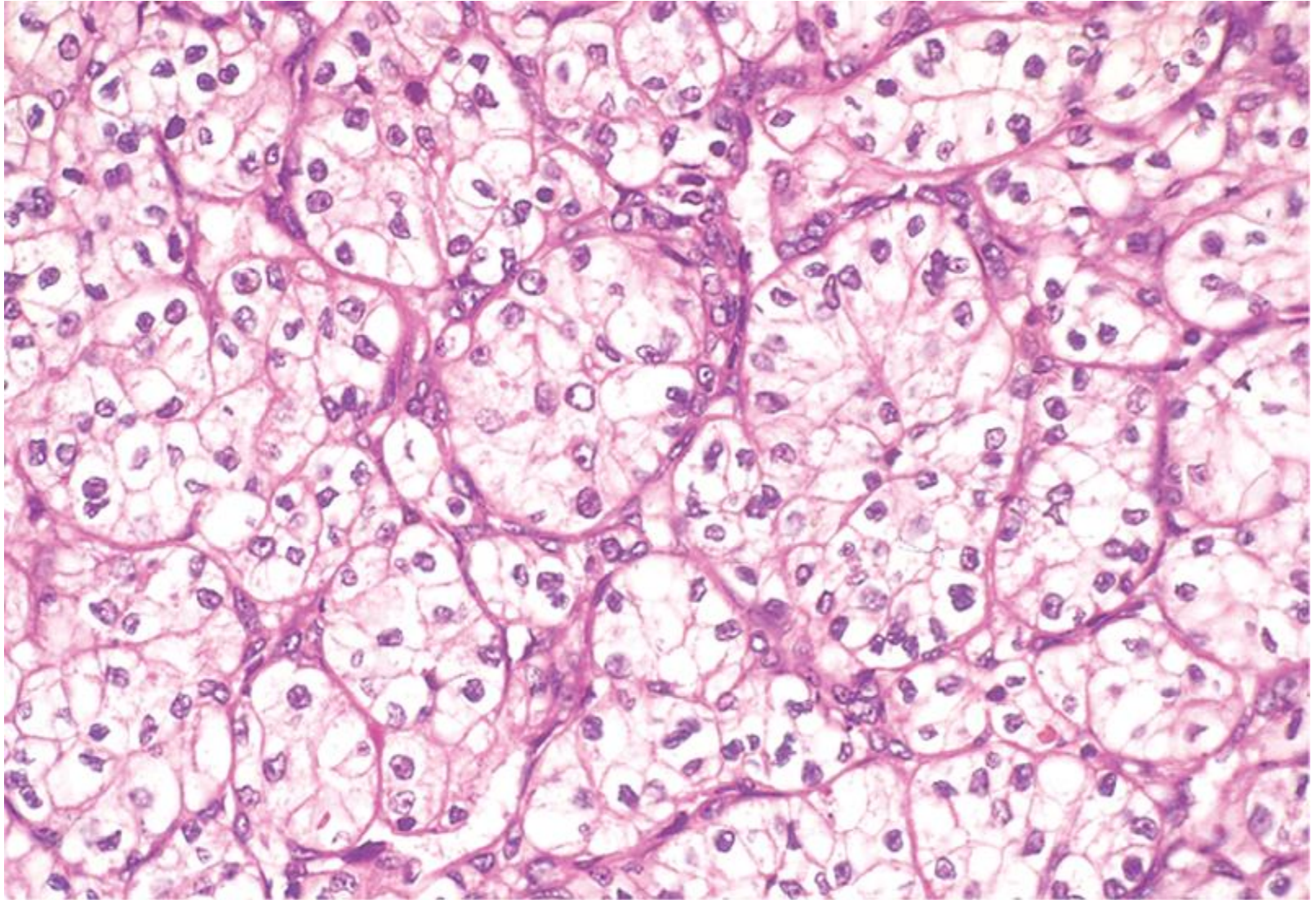
3-Chromophobe Renal Carcinomas

- least common (5%)
- from **intercalated cells** of collecting ducts.
- tumor cells stain more darkly (i.e., they are less clear) than cells in clear cell ca.
- multiple losses of entire chromosomes, including 1, 2, 6, 10, 13, 17, and 21.
- extreme **hypodiploidy**.
- good prognosis.



Renal cell carcinoma:
yellowish, spherical
neoplasm in one pole of
kidney.
Note the tumor in the
dilated, thrombosed renal
vein.

Renal cell carcinoma (clear cell pattern)



Clinical Course of all RCC

The characteristic triad of :

1- painless hematuria (50%)

2- palpable abdominal mass

3- dull flank pain

4-Fever

5-Polycythemia (5% - 10%): elaboration of erythropoietin by tumor.

6- other Paraneoplastic syndromes:

- 1-hypercalcemia
- 2-Hypertension
- 3-Cushing syndrome
- 4-feminization or masculinization

- metastases most commonly to lungs and bones.
- **may invade the renal vein**, sometimes extending to inferior vena cava and even into the right side of the heart.

Urothelial tumors (transitional cell carcinoma)

- **classified into :**

- 1 -benign papilloma.**

- 2-papillary urothelial neoplasms of low grade**

- 3-papillary urothelial carcinoma of high grade**

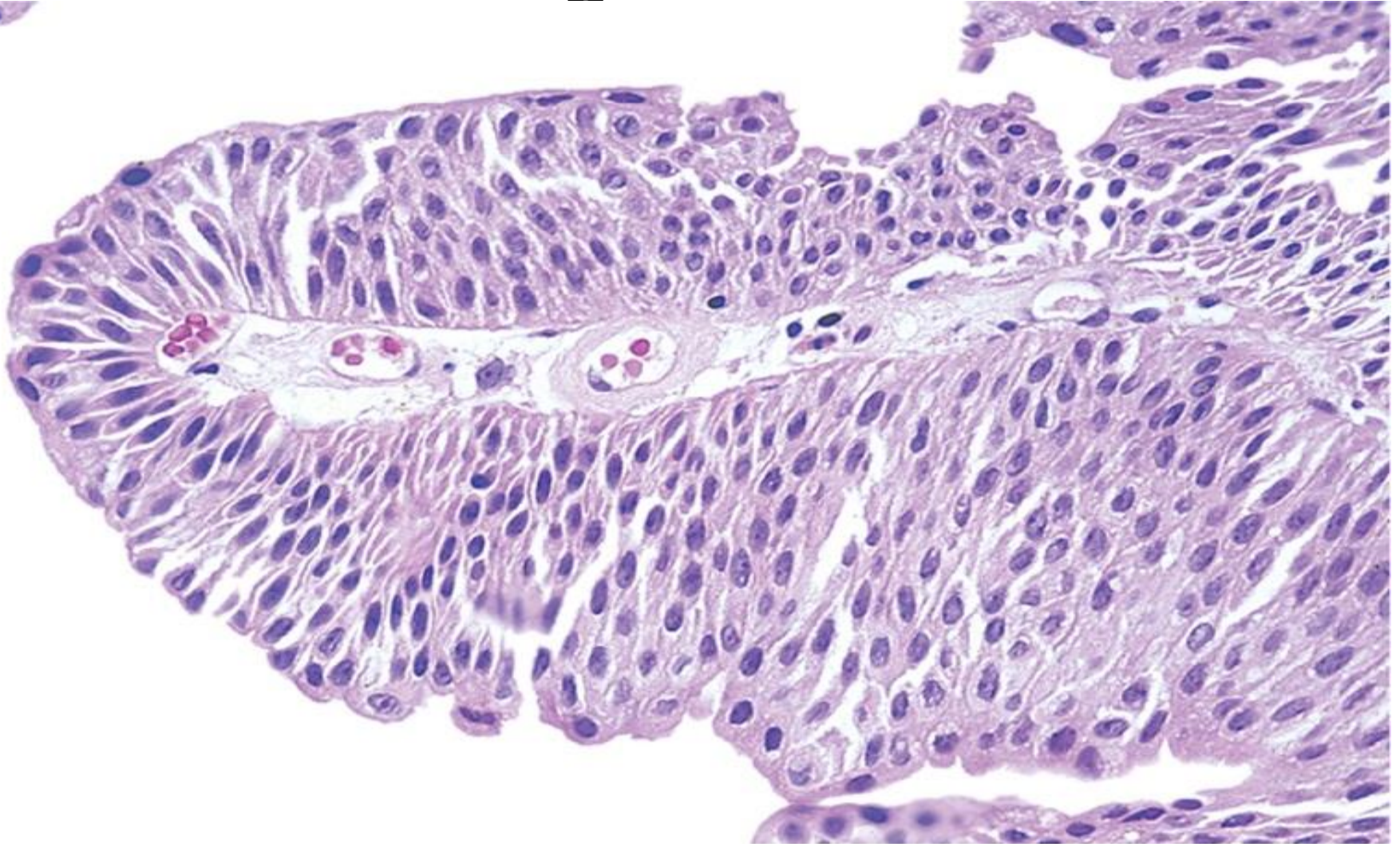
Transitional cell carcinoma of bladder



Urothelial (transitional) cell carcinomas

- **Low-grade carcinomas are rarely invasive.**
- **may recur after removal.**
- **staging at the time of initial diagnosis is the most important prognostic factor**

Papillary Urothelial (transitional) carcinoma-low grade



squamous cell carcinomas

- only 5% of bladder cancers
- Associated with:
- **Schistosomiasis** infection
- **chronic inflammation**
- **stone** formation

Clinical Course of bladder cancers

- ***Painless hematuria.***
- **M:F 3:1**
- **50 to 70 years.**
- **Prognosis**
- low-grade shallow → good prognosis.
- High grade lesions + deep → bad

- Predisposing factors of bladder cancers :
- not familial.
- 1- β -naphthylamine (paints; cigarettes)
- 2- Cigarette smoking.
- 3- Chronic cystitis.
- 4- Schistosomiasis.
- 5- drugs as cyclophosphamide.

- **Treatment:**
- transurethral **resection**
- (**BCG**) injections → granulomatous reaction (immune response against cancer)
- Follow-up for recurrence with **cystoscopy** and urine cytologic studies for the rest of life.
- Radical **cystectomy** and **chemotherapy** for advanced cases

Papillary urothelial carcinoma of ureter & renal pelvis

- **rarest tumors of the collecting system (5%).**
- **Painless hematuria**
- **pain in costovertebral angle; hydronephrosis**
- **5-year survival rate is less than 10%.**

Renal tumors of childhood

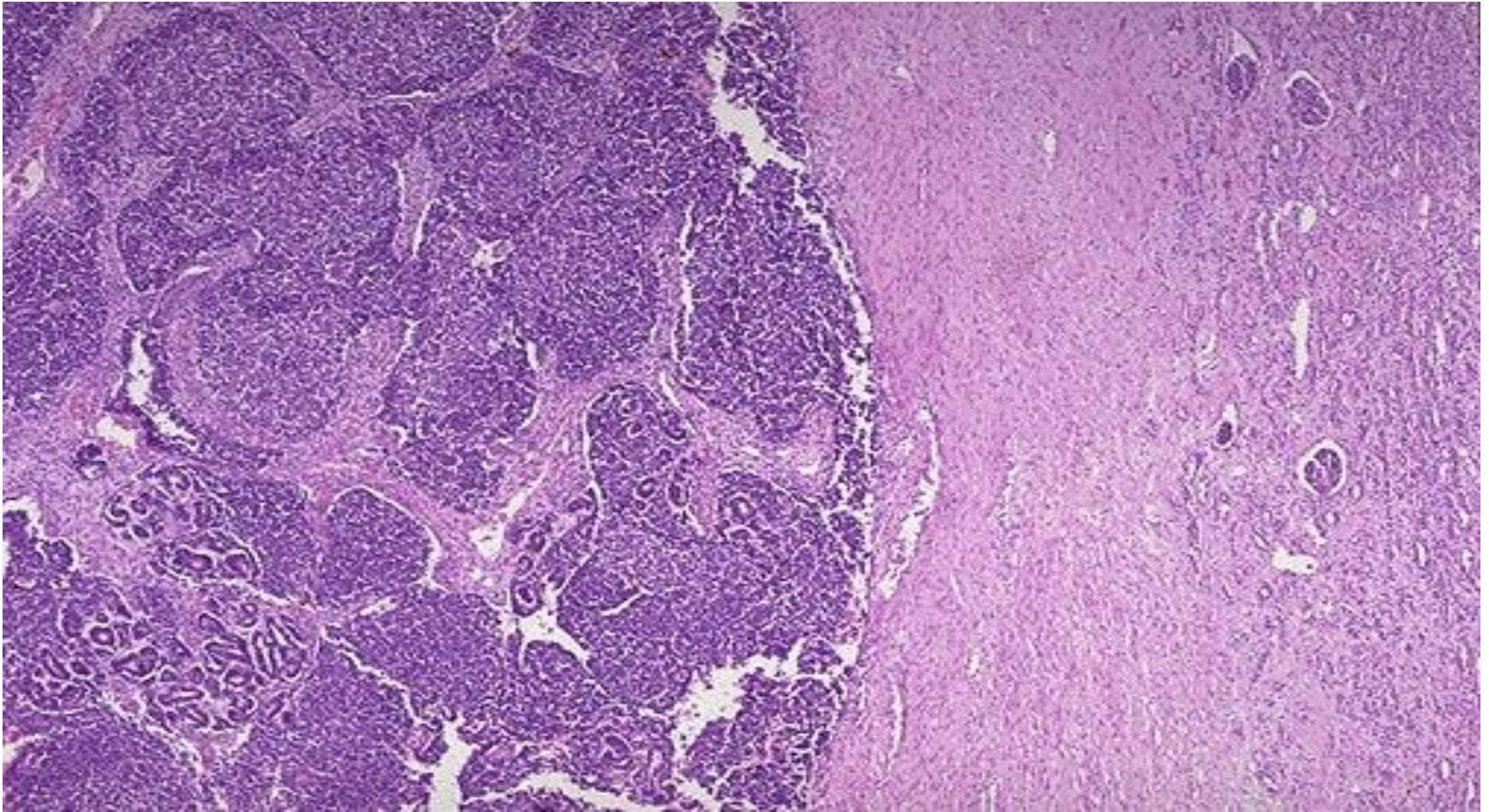
Wilms Tumor

- 3rd most common solid cancer < 10 years.
- derived from the mesoderm.
- sporadic or familial (**autosomal dominant**).
- Mutations: **WT-1 and 2** genes.
- primitive glomerular and tubular structures
- Treatment: surgery & chemotherapy

Wilm's tumor of the kidney



Wilm's tumor nests and sheets of dark blue cells at the left with compressed normal renal parenchyma at the right.



The tumor shows attempts to form primitive glomerular and tubular structures

