Kidney tumors

- **BENIGN**
  - **Papillary Adenoma**
  - **Fibroma/Hamartoma**
  - **Angiomyolipoma**
  - **Oncocytoma**
- **MALIGNANT**
  - **Renal Cell Carcinoma (Clear Cell Carcinoma).**
  - **Papillary renal cell carcinoma**
  - **Chromophobe renal cell carcinoma**
  - **Urothelial (Transitional)cell carcinoma**

Renal cell carcinoma

- **TOBACCO RELATED, STRONGLY**
- **SOME HEREDITARY/FAMILIAL**
- **MOST are “CLEAR CELL”, a few PAPILLARY**
- **YELLOW grossly, “CLEAR” cells microscopically**
- **STRONGLY tend to invade the renal VEIN early, in preference to lymphatics. Does the kidney have lymphatics?**

UROTHELIAL (TRANSITIONAL) RENAL CARCINOMAS

- **In renal pelvis. Why?**
- **1/10 as common as renal cell carcinomas**
- **EXACTLY the same appearance as lower urinary tract carcinomas. Why?**
- **MUCH more likely to obstruct the kidney than renal cell carcinomas. Why?**
- **Associated with ureter and bladder carcinomas. Why?**

Tumors Of The Kidney

- **Benign Tumors :**

  They rarely cause clinical problems.

  - **Renal Papillary Adenoma**
  - **Renal Fibroma or Hamartoma.**

- **Malignant Tumors :**

  On the contrary to benign tumors, malignant tumors are clinically of great importance

Adult Tumors And Tumor-Like Conditions:

1/Renal Cell Carcinoma

- Tumors are derived from the renal tubular epithelium.
- Predominantly in the cortex.
- Represent 80 to 85% of all primary malignant tumors of kidney.
- Age: sixth to seventh decades
- Sex: male: female 2:1
- Only 1% bilateral

- **Epidemiology, there are many risk factors;**

1. Tobacco is the most significant factor.
2. Obesity, particularly in women.
3. Hypertension.
4. Unopposed estrogen therapy.
5. Exposure to, asbestos, petroleum products, and heavy metals.

Conditions that may be complicated by renal cell carcinoma are the followings;

- 1. von-Hippel-Lindau (VHL) disease, renal cell carcinoma occurs in more than 50% of individuals with this syndrome.
(Autosomal dominant syndrome, abnormal vHLgene on chromosome 3.
- Have CNS, retinal, liver & kidney tumors & cysts.)
- 2. Acquired cystic renal disease, about 50% of the patients on long-term dialysis develop renal cysts, 7% of cases are complicated by cancer.
- 3. Adult form of polycystic kidney disease and multicystic nephroma.
- 4. Tuberous sclerosis: (increase risk of angiomyolipoma, & renal cell carcinoma).
- 5. Neuroblastoma (treated nuroblastoma).
- 6. Familial cutaneous leiomyomatosis
- 7. Lymphoma.

Clinical features

- It usually presents with hematuria, flank pain or abdominal mass. However, this diagnostic triad occurs in only 9% of the patients.
- Other manifestations are weight loss, anemia, fever, and symptoms caused by metastatic deposits.
- Rarely paraneoplastic manifestations may occur.

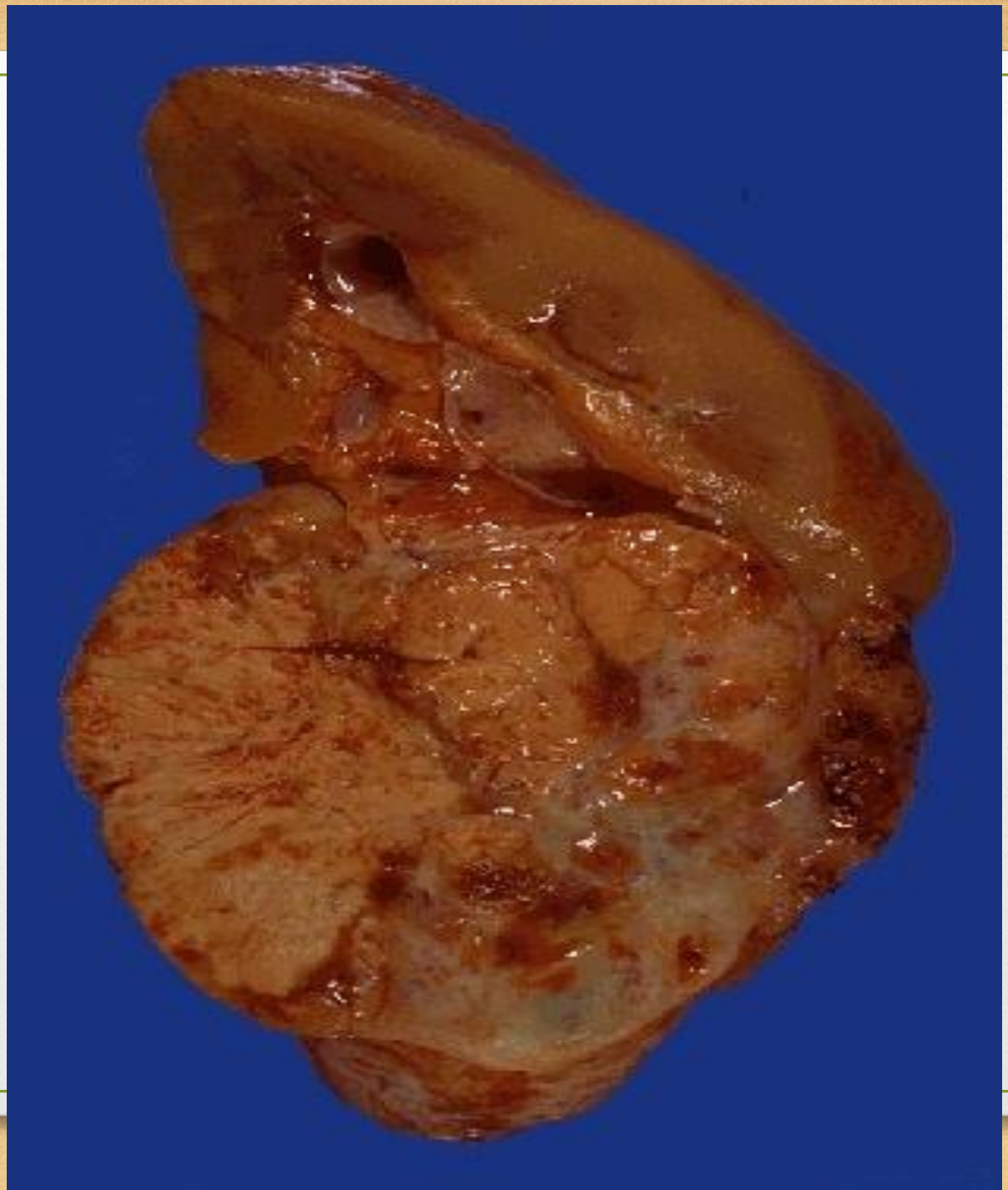
Ectopic secretion of:

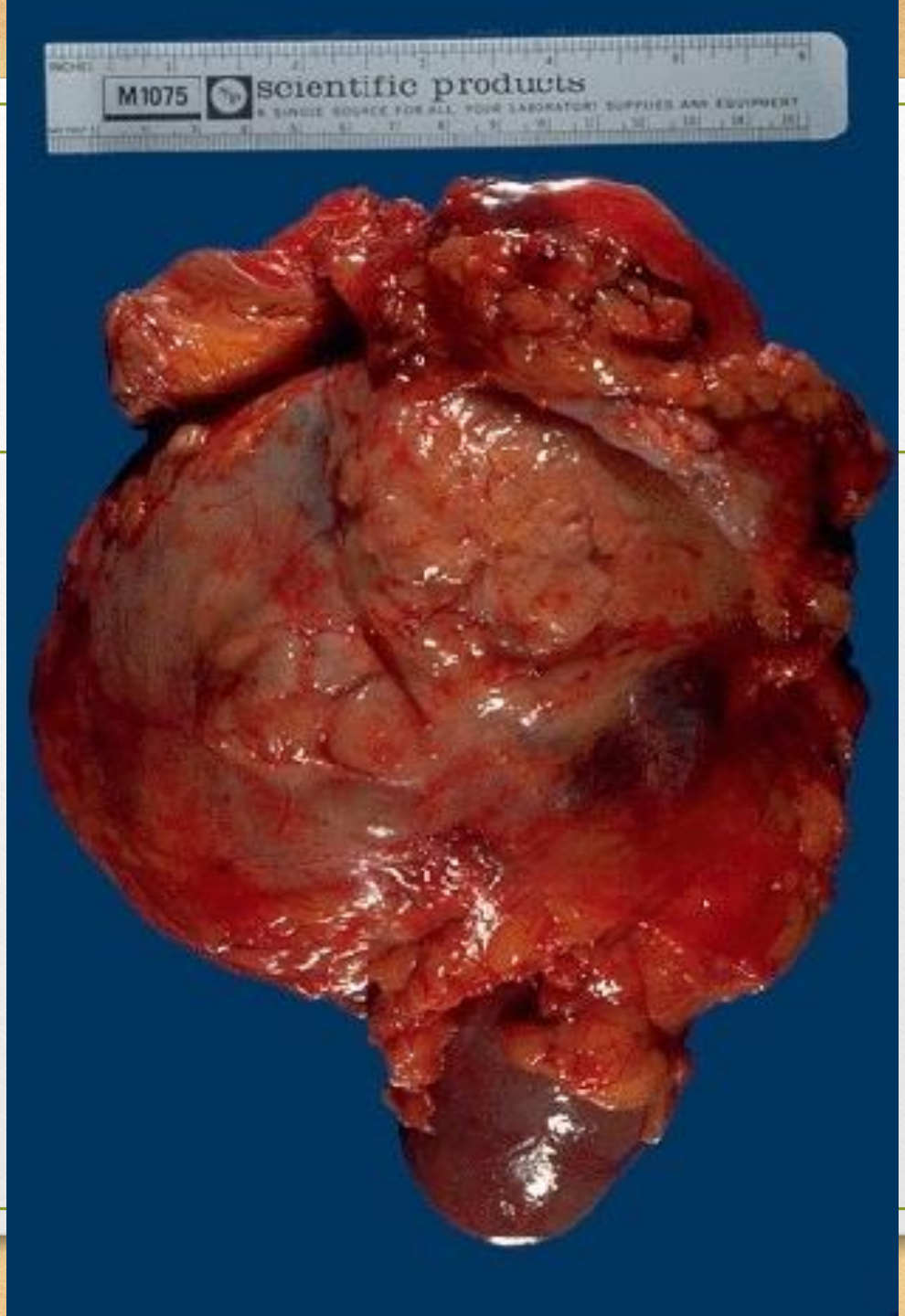
EPO polycythemia

Parathyroid-related peptide hypercalcemia

Morphologic features

- Grossly, most renal cell carcinomas are well delineated and cortical in location. Usually the cut surface is solid golden/yellow in color.
- Areas of hemorrhage, necrosis, calcification, and cystic change are common findings.
- Microscopically,
- Mostly clear cells contain lipid and glycogen , with well demarcated cell membrane, round to oval nuclei.
- Another type of cells is granular cell type with small round nuclei & pink granular cytoplasm

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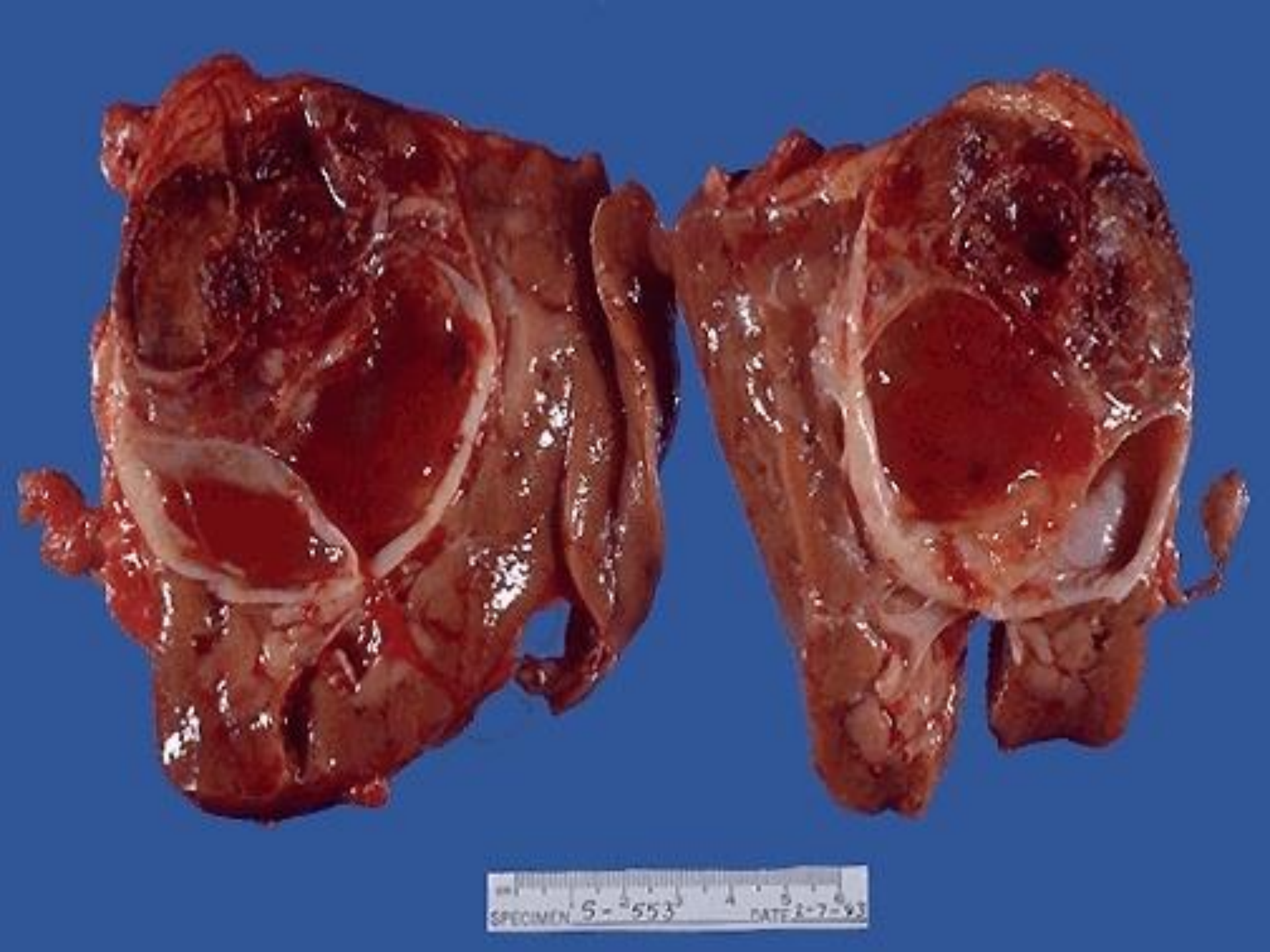
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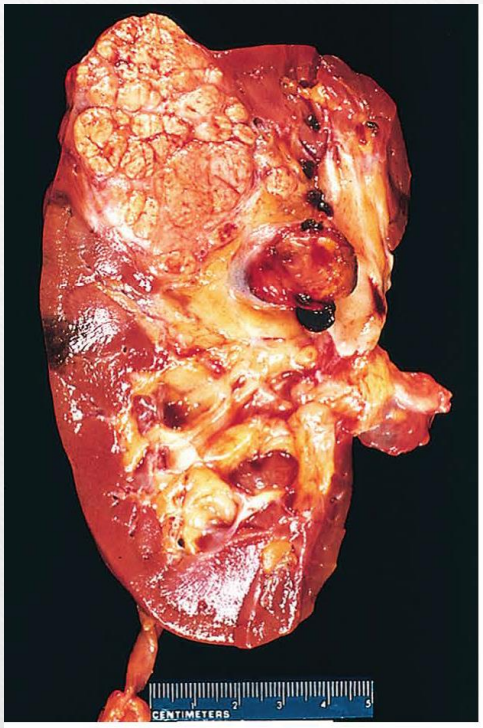
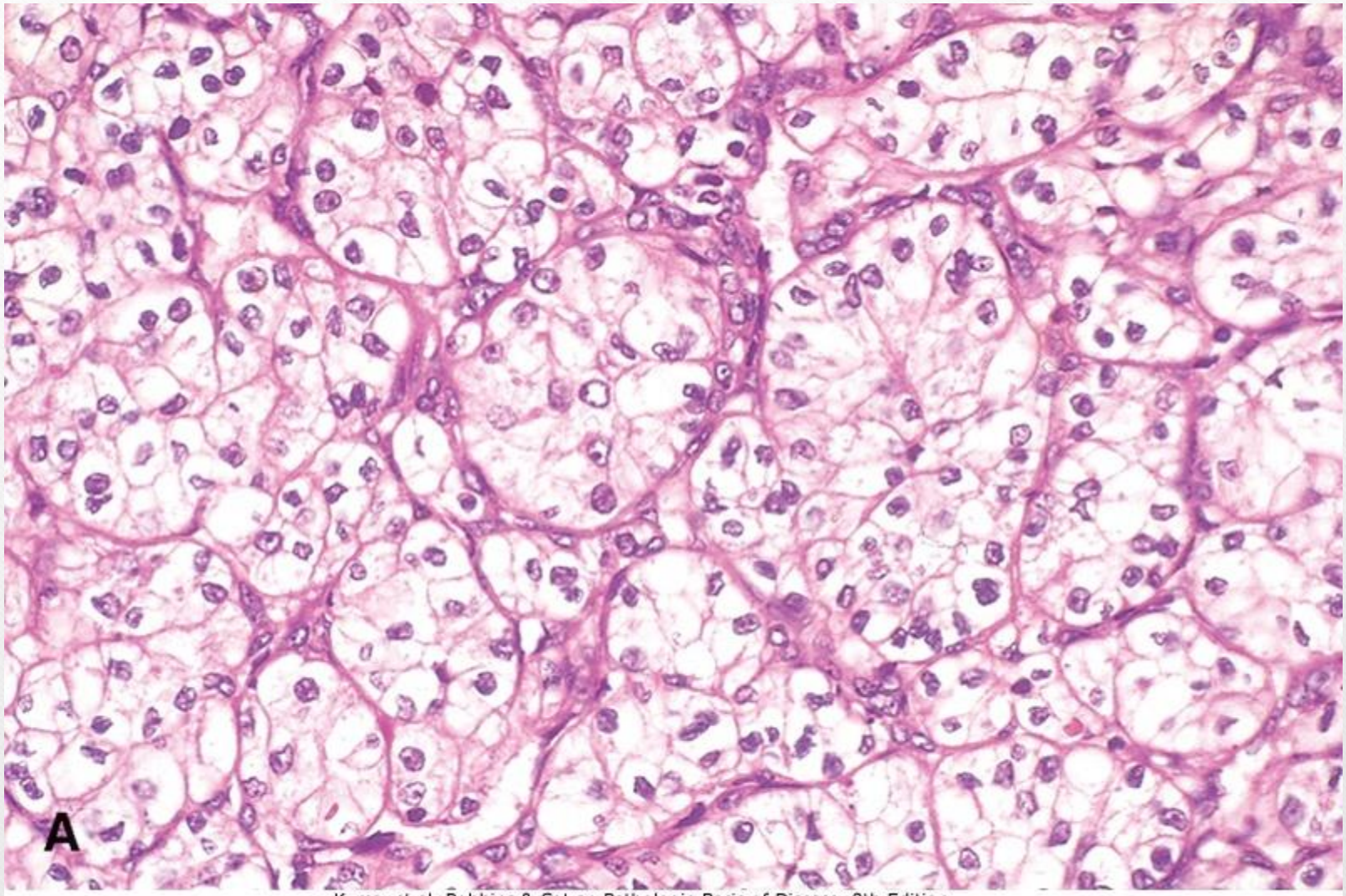
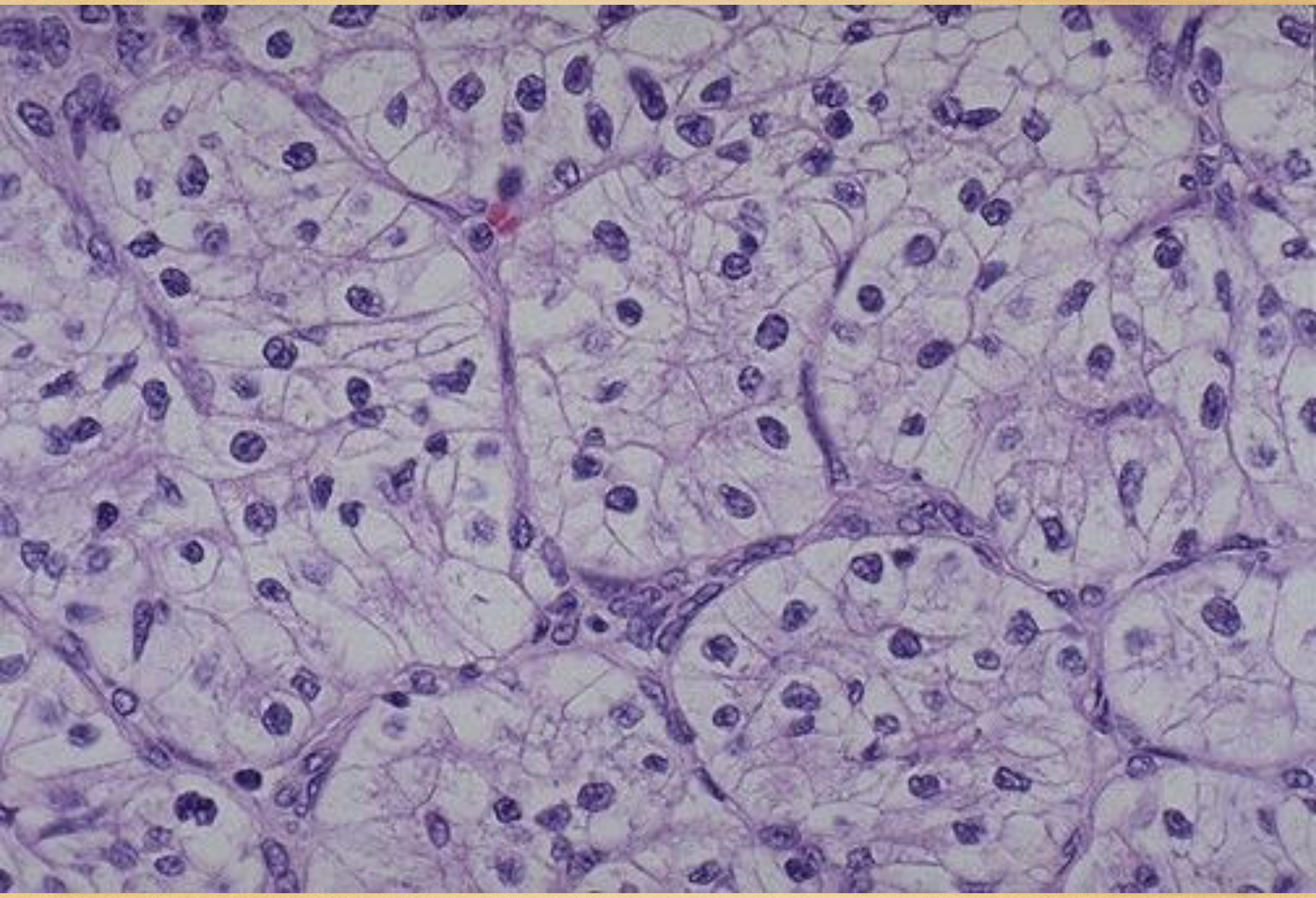
Renal cell carcinoma. Typical cross-section of yellowish, spherical neoplasm in one pole of the kidney. Note the tumor in the dilated thrombosed
renal vein.







Other microscopic type

Papillary renal cell carcinoma,

- It comprises about 15% of all cases of renal cell carcinoma.
- Have papillary pattern of growth.
- Renal tumors arising in patients on chronic hemodialysis are of this type.
- Bilateral & multifocal tumors.
- Include Familial & sporadic cancers with chromosome 7 abnormality
- Microscopically, complex papillary formations are seen, and psammoma bodies are numerous. Stroma is heavily infiltrated by neutrophils and foamy macrophages.
- As a group, papillary renal cell carcinoma has a better prognosis than conventional RCC

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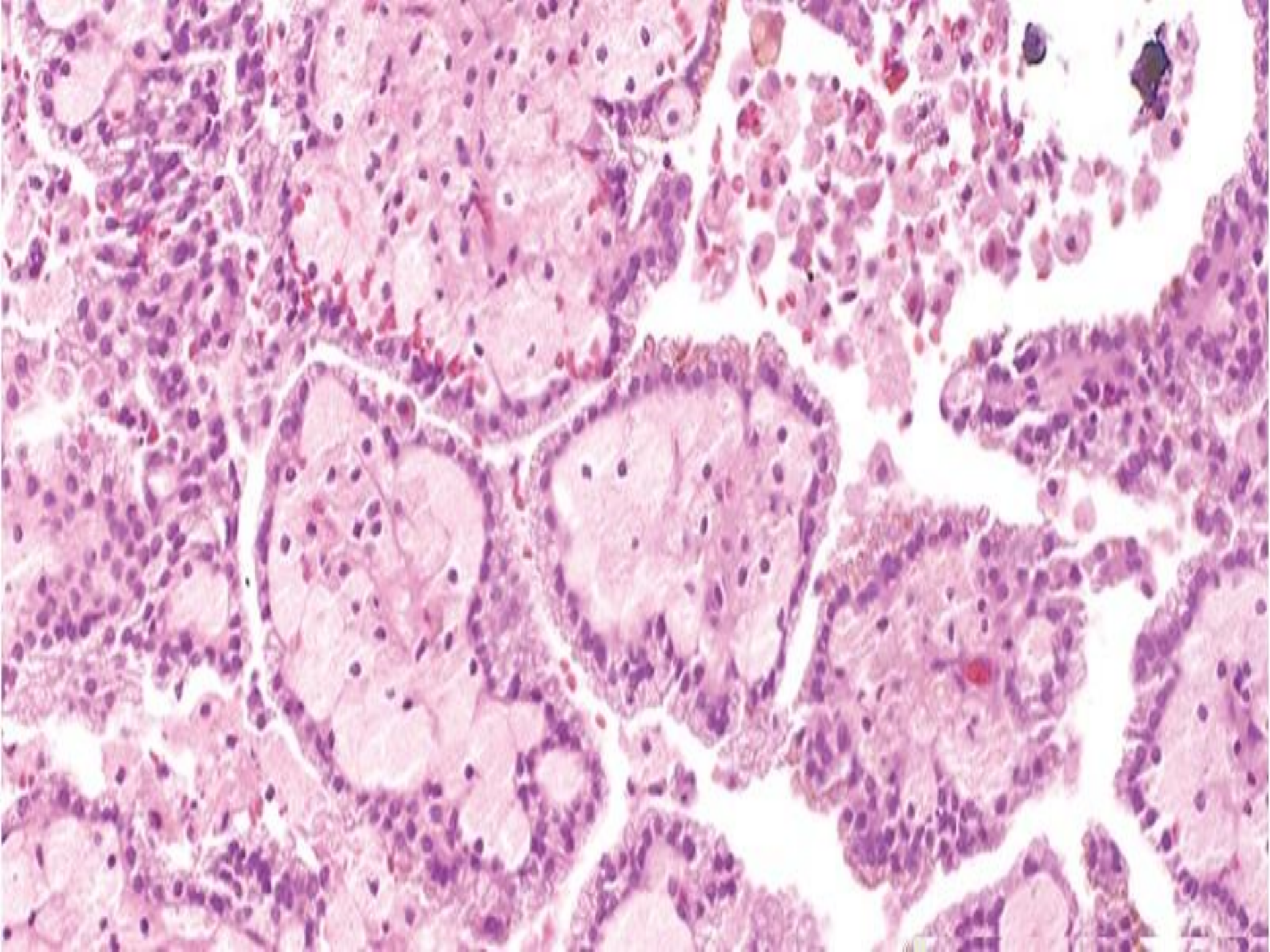
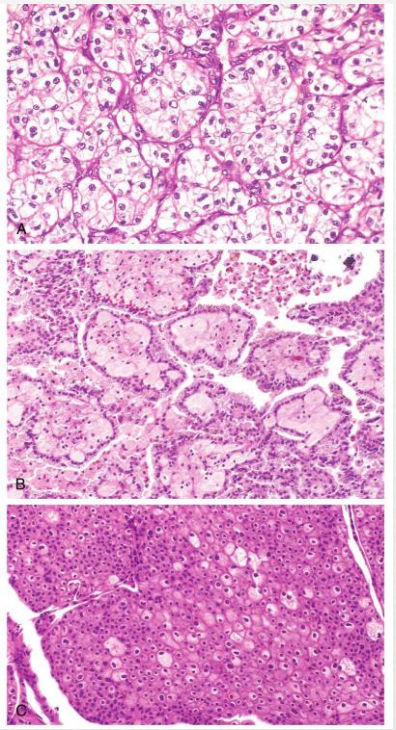
- Papillary carcinoma shows papillae with fibrovascular cores with cells have clear or pink cytoplasm.



3. Chromophobe renal carcinomas.

- 5% of cases of renal cell carcinoma.
- Arise from cortical collecting ducts.
- Have losses of entire chromosomes (1, 2, 6, 10, 13, 17 & 21).
- Chromophobe carcinoma consists of cells with clear cytoplasm & distinct cell membranes, nuclei usually surrounded by halo of cleared cytoplasm.

Renal cell carcinoma. A, Clear cell type. B, Papillary type. Note the papillae and foamy macrophages in the stalk. C, Chromophobe type.



Spread and metastasis

- About 1/3 of renal cell carcinomas are found to invade perinephric fat and/or regional lymph nodes at the time of operation.
- Renal vein invasion is seen on only 10% of cases.
- Approximately 1/3 of patients with renal cell carcinoma already have distant metastases at the time they seek medical advice, lung and skeleton, being the most common sites.
- Metastases can also develop in the adrenals, liver, skin, soft tissue, CNS, ovary, and almost any other site. Sometimes, these metastases develop years or decades after the removal of the primary tumor.

Pediatric Tumors And Tumor-Like Conditions

1/Nephroblastoma (Wilm's Tumor)

- Is the most common primary tumor of kidney in children.
- Mostly between 2 – 5 years.

- There is no sex predilection.

- The classical clinical presentation in form of an abdominal mass, hematuria and pain are rare.

Morphologic features

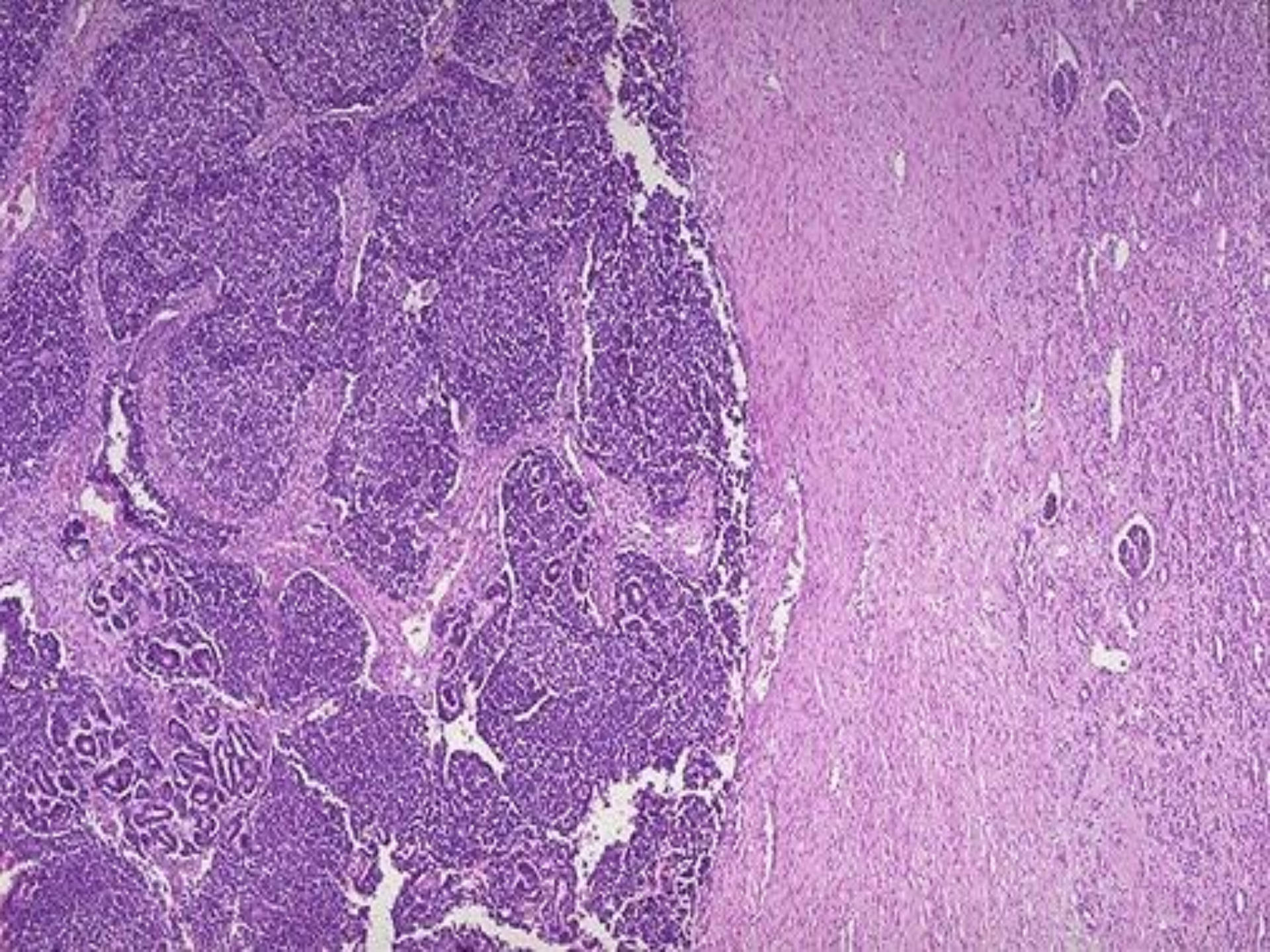
Grossly:

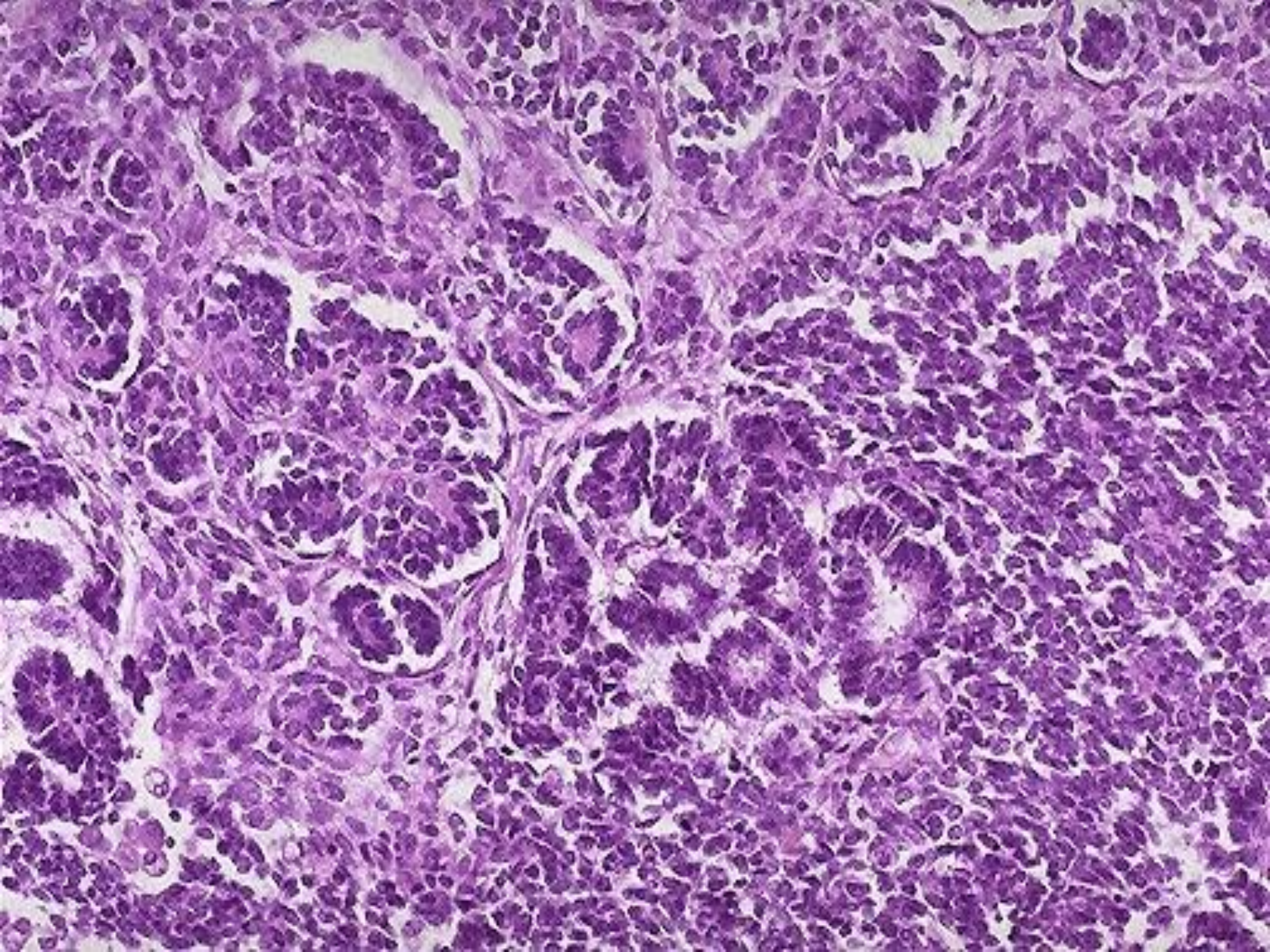
- Tumors are solitary, well circumscribed, rounded and of soft in consistency.
- The size is variable, with a median weight of 550gm.
- The cut section is predominantly solid and pale gray or tan and often exhibits areas of cystic change, necrosis, and hemorrhage.

Microscopically:

- Classically tumor consists of three components (Blastemal cells, Stromal cells, & Epithelial cells).
- Blastemal cells are arranged in form of small sheets of small blue cells.
- Epithelial cells take the form of tubules, glomeruli (abortive tubules & glomeruli).
- Stromal cells showing the features of fibrocytic, myxoid, skeletal muscles differentiation.

1. Some cases of Wilms tumor contain foci of squamous, mucinous epithelium, smooth muscles, fat, cartilage, osteoid tissue, & neural tissue.
2. 10% of cases contain areas of Anaplasia.





Molecular genetic features

- The genetic loci predisposing to nephroblastoma are:

1. WT1 located on 11p13.
2. WT2 located on 11p15.5.
3. Other chromosomal abnormalities include, 1, 7q, 12, & 16.

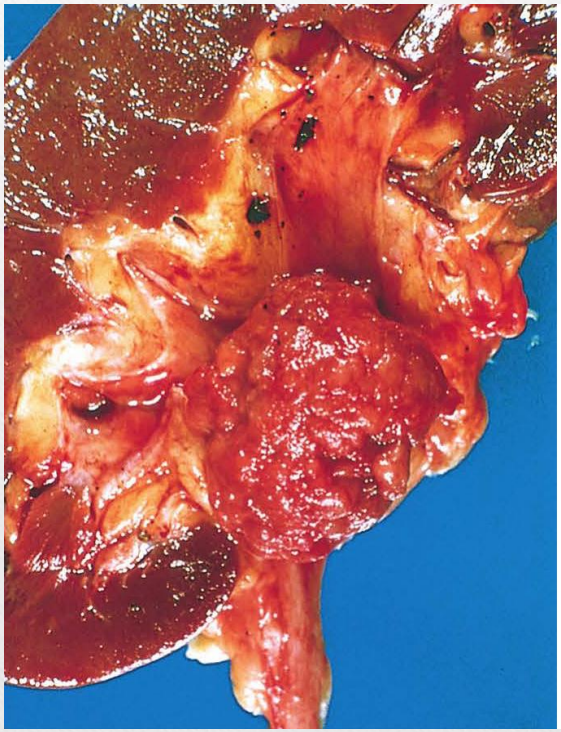
Tumors of Renal Pelvis and Ureters

Transitional Cell Carcinoma;

Most cases occur in adults.

- There is a history of analgesic abuse and/or coexistence of renal papillary necrosis in approximately 1/4 of cases.
- Cases have been seen following administration of thorotrast
- Grossly, the tumors are soft, grayish/reddish masses, often diffusely involving the entire renal pelvis and may extend to the ureters. Tumors of the ureters might be located anywhere along their length.

Urothelial carcinoma of the renal pelvis. The pelvis has been opened to expose the nodular irregular neoplasm, just proximal to the ureter.



- Clear cell renal cell carcinoma is the most common subtype
- of malignant renal neoplasms, which often involves VHL ,
- a tumor suppressor gene.
- • Papillary renal cell carcinoma is the second most common
- subtype of malignant renal neoplasms, which may involve
- the MET proto-oncogene.
- • Hereditary forms of renal cell carcinoma have led to the
- discovery of important genes (e.g., VHL, BHD) in renal
- carcinogenesis.
- • Urothelial tumors resembling similar tumors in the urinary
- bladder can also originate in the renal pelvis. These tumors
- have a poor prognosis.