Benign kidney tumors

Cortical renal adenoma
- **Epithelial** tubulopapillary tumors with no cellular pleomorphism and with a maximum diameter <5 mm.
- **Clinical incidence** <1%. In autopsies the incidence varies between 7-23%.
- **More common** in men; multicentric in 25% of cases.
- **Associated with** VHL, smoking, and acquired cystic kidney disease.
- **Treatment**: surgical (conservative surgery) or active surveillance.

Metanephric adenoma
- **Grey or yellowish tumors** with a thin pseudocapsule, often containing Psamomma bodies. Their average size at diagnosis is 5 cm.
- **Benign tumor**, although 2 cases of distant metastasis have been described.
- **Tumor regression** phenomena have been observed in the form of scarring and calcification.
- **Diagnosis**: hypodense or isodense mass observed in both the CT and MRI scans.
- **Treatment**: surgical (conservative surgery). Monitoring is recommended.

Multiloculated cystic nephroma
- **Central kidney lesion**, well defined, with capsule and liquid cysts that are not interconnect-ed and divided by septa. Benign, but cases with sarcomatoid elements have been described.
- **Incidence**: peak in males between the ages of 2-3 yrs and women in the 4th-5th decade of life.
- **Usually unilateral** and unifocal with no family history.
- **Diagnosis**: Bosniak III/IV cysts with curvilinear calcifications and herniation of the renal pelvis (10-20%). Usually avascular/hypovascular with septa showing contrast enhancement.
- **Differential Diagnosis**: Wilms tumor in children and RCC in adults.
- **Treatment**: nephrectomy.

Renal leiomyomas
- **Benign, slow growing tumor** originating in the peripyal capsule or renal vein. Long fusiform muscular cells with scant mitosis and no pleomorphisms.
- **Diagnosis**: impossible to distinguish from RCC, though the lesion is confined to the capsule.
- **Treatment**: surgical.

Juxtaglomerular reninoma
- A variant of hemangiopericytoma with juxtaglomerular cells.
- **Shows strong positive immunostaining** for factor VIII and other antigens.
- **More common** in women in the 3rd or 4th decade of life.
- **Symptoms**: AHT and hypokalemia; also polyuria-polydipsia, myalgia, and headache.
- **Diagnosis**: small hypovascular lesions.
- **Treatment**: surgical (conservative surgery).

Mixed epithelial and stromal tumor of the kidney
- **Benign tumor**, cystic in appearance and contains epithelial and stromal elements with a solid, cystic growth pattern; probable hormonal involvement.
- **More frequent in women** in the 5th decade of life undergoing estrogen therapy.
- **Shows positive staining** for estrogen and progesterone receptors.
- **Diagnosis**: Bosniak III/IV cysts.
- **Treatment**: surgical (conservative surgery).
Renal oncocytoma

- **Incidence:** accounts for 3-7% of all solid kidney tumors.

- **Macroscopic characteristics:**
  - Benign, homogeneous, brown tumors that are well-circumscribed.
  - Usually have a pseudocapsule and a central scar.
  - Multicentric in 2-12% of cases.
  - Average size at diagnosis is 4-6 cm.
  - Bilateral in 4-12% of cases.
  - With metachronic recurrence in 4-13% of cases.
  - With cellular atypia in 12-30% of cases.
  - Extend to perirenal fat in 11-20% of cases.

- **Microscopic characteristics:**
  - Originate in the intercalated cells of the collecting tubules.
  - Contain eosinophilic cells with a high content of cytoplasmic mitochondria.
  - There are three growth patterns:
    - Organoid.
    - Tubule-cystic.
    - Mixed.

- **Associated cytogenetic abnormalities:** loss of chromosomes 1 and Y, balanced translocation of chromosome 11q-13, non-detectable changes to chromosome 14q. 96% are diploid.

- **Associations:** familial oncocytosis (Birt-Hogg-Dubé syndrome) combines dermatological disorders and kidney tumors (oncocytomas and RCC).

- **Symptoms:** over 60% are asymptomatic.

- **Diagnostic imaging techniques:**
  - **CT:** hypodense tumors, both without contrast and with contrast.
  - **MRI:** solid masses with well-defined capsule and central scar.
    - In T1: isointense signals.
    - In T2: hyperintense signals.
  - **Angiography:**
    - The classic angiographic finding is the spoke-wheel pattern with radial vascular disposition towards the center.
    - Hypervascularized ring around the lesion.

- **Differential diagnosis:**
  - Chromophobe cell carcinoma; eosinophilic variant.
  - 32% of oncocytomas coexist with a synchronic RCC.

- **Treatment:** surgical (conservative surgery).

Renal angiomyolipoma (AML)

- **A benign clonal neoplasm** with varying amounts of mature adipose tissue, smooth muscle, and thick vascularization of the wall. Treated more like a hamartoma than a neoplasm. Derived from the perivascular epithelioid cells, its growth is probably hormone-dependent as it is more common in women and rare before puberty.

- **Incidence:** 0.3% of autopsies and 0.13% of population screened with ultrasound. More common in women; average onset age = 50-60 years.

- **Associations:** associated with tuberous sclerosis (Pringle-Bourneville’s disease). In this autosomal-dominant disease, it more commonly presents bilaterally and multicentered, with rapid growth and an average onset age of 30 years. Associated with mental retardation, sebaceous adenomas, and epilepsy (50% of these patients develop angiomyolipomas).

- **Symptoms:**
  - Asymptomatic in over 50% of cases.
  - The most common symptom is low back pain.
  - 10% present with retroperitoneal hemorrhage (Wunderlich syndrome).
  - Pregnancy augments growth and promotes bleeding.
• **Diagnosis:**
  - **Ultrasound:** hyperechoic intrarenal mass
  - **CT:**
    - Hypodense renal lesion (-20 to -30 HU).
    - The absence of calcifications is characteristic.
    - A greater or lesser density depends on the components; if the fat component is low, radiological diagnosis with CT is more complicated.
  - **MRI:**
    - High signal intensity on T1; low on T2.
    - Especially useful if the CT is inconclusive or if the patient is pregnant.
    - Allows for differentiation from carcinoma.
• **Differential diagnosis:**
  - **Renal sarcoma:** immune-histochemical techniques (HMB 45) help differentiate between AML and various sarcoma subtypes. Positive staining is characteristic of AML.
  - **Hemangiopericytomas.**
  - **RCC:** especially in those cases with a lower fat component.
  - **Pecoma** (epithelioid AML): a recently described variant of AML derived from pericyte cells with uncertain biological behavior.
• **Treatment:**
  - **Observation:** for asymptomatic AMLs <4 cm. They have little capacity for growth and rarely become symptomatic. Monitoring with imaging tests (ultrasound) is recommended every 6 months to 1 year to determine growth rate.
  - **Surgical excision:** for larger (>4 cm), symptomatic AMLs. Surgical treatment should be assessed in women of childbearing age with AML or patients who cannot undergo periodic controls.
  - **Embolization:** in patients with active bleeding in the context of tuberous sclerosis, patients with bilateral or multicentric AML, or patients with kidney failure.
Renal Angiomyolipoma

- Single
  - < 4 cm: US/6 m or CT/12 m
  - > 4 cm
    - Symptoms: If it grows, Conservative surgery or embolization
    - No symptoms: US/6m

- Multiple or associated with Tuberous sclerosis
  - < 4 cm
  - > 4 cm