Renal Parenchymal Neoplasms

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BENIGN TUMORS :

Benign renal tumors include renal adenoma, oncocytoma, angiomyolipoma, leiomyoma, lipoma, hemangioma, and juxtaglomerular tumors.

The renal adenoma is the most common benign renal parenchymal lesion . They are typically asymptomatic and usually identified incidentally. At autopsy, 7–22% of patients are found to have a renal adenoma.

Renal oncocytoma has a spectrum of behavior ranging from benign to malignant. An estimated 3–5% of renal tumors are oncocytomas . Men are affected more often than women.

Angiomyolipomas (Renal Hamartoma) are found in approximately 45–80% of patients with tuberous sclerosis and is characterized by 3 major histologic components: mature fat cells, smooth muscle, and blood vessels.

MALIGNANT TUMORS:

RENAL CELL CARCINOMA (RCC)

Also called adenocarcinoma of the kidney or hypernephroma . RCC accounts for roughly 2.8% of adult cancers and constitutes approximately 85% of all primary malignant renal tumors. RCC occurs most commonly in the fifth to sixth decade and has a male-female ratio of 2:1. black men demonstrating a higher incidence than in men of all other races.

Etiology and risk factors

The cause of renal adenocarcinoma is unknown. Cigarette smoking is the only risk factor consistently linked to RCC , with most investigations demonstrating at least a 2-fold increase in risk for the development of RCC in smokers . Exposure to asbestos, solvents, and cadmium has also been associated with an increased incidence of RCC . RCC occurs in two forms, inherited and sporadic.

Pathogenesis

RCCs are vascular tumors that tend to spread either by direct invasion through the renal capsule into perinephric fat and adjacent visceral structures or by direct extension into the renal vein.

Approximately 25–30% of patients have evidence of metastatic disease at presentation.

The most common site of distant metastases is the lung. However, liver, bone (osteolytic), ipsilateral adjacent lymph nodes and adrenal gland, brain, the opposite kidney, and subcutaneous tissue are frequent sites of disease spread.

Tumor Staging

International TNM Staging System for Renal Cell Carcinoma

T: Primary Tumor	
T0 No evidence of primary tumor **T1 Tumor ≤7.0 cm and confined to the kidney** **T1a** Tumor ≤4.0 cm and confined to the kidney **T1b** Tumor >4.0 cm and ≤7.0 cm and confined to the kidney **T2 Tumor >7.0 cm and confined to the kidney** **T2a** Tumor >7.0 cm and ≤10.0 cm and confined to the kidney **T2b** Tumor >10.0 cm and confined to the kidney **T3 Tumor extends into major veins or perinephric tissues but not into the ipsilateral adrenal gland and not beyond the Gerota fascia**	**T3a** Tumor grossly extends into the renal vein or its segmental (muscle containing) branches or tumor invades perirenal and/or renal sinus fat but not beyond the Gerota fascia **T3b** Tumor grossly extends into the vena cava below the diaphragm **T3c** Tumor grossly extends into the vena cava above the diaphragm or invades the wall of the vena cava **T4 Tumor invades beyond the Gerota fascia (including contiguous extension into the ipsilateral adrenal gland)**
	N: Regional Lymph Nodes **N0**: No regional lymph nodes metastasis **N1**: Metastasis in regional lymph node(s)
	M: Distant Metastases **M0** No distant metastasis **M1** Distant metastasis present

Clinical Findings

A. SYMPTOMS AND SIGNS

The classically described triad of gross hematuria, flank pain, and a palpable mass occurs in only 7–10% of patients and is frequently a manifestation of advanced disease. Patients may also present with dyspnea, cough, and bone pain which are typically symptoms secondary to metastases. Asymptomatic renal tumors are increasingly detected incidentally (>50%).

B. PARANEOPLASTIC SYNDROMES

RCC is associated with a wide spectrum of paraneoplastic syndromes, these manifestations can occur in 10–40% of patients with RCC.

1. Raised erythrocyte sedimentation rate.
2. Hypertension
3. Anemia
4. Raised levels of serum calcium (hypercalcemia).
5. non metastatic hepatic dysfunction (Stauffer's syndrome): abnormal liver function test .
6. Less common manifestations include pyrexia, neuromyopathy, and amyloidosis.

RCC is known to produce a multitude of other biologically active products that result in clinically significant syndromes including: Cushing's syndrome, protein enteropathy,

galactorrhea, hypoglycemia, gynecomastia and decreased libido in males ; or hirsutism, amenorrhea in females.

Diagnosis

Diagnosis of renal cell carcinoma begins with a full history and examination. A full blood count; erythrocyte sedimentation rate; and serum calcium, liver, and renal function test all are indicated to exclude any of the associated paraneoplastic conditions.

- ***Imaging***

Ultrasonography allows diagnosis of many renal tumours and is particularly good at distinguishing solid masses from simple cysts.
Abdominal computed tomography, A typical finding of RCC on CT is a mass that becomes enhanced with the use of intravenous contrast media. CT scanning is also the method of choice in staging the patient.
Magnetic resonance imaging can be used when venous involvement is suspected or the patient is allergic to intravenous contrast medium.
Chest x ray is usually sufficient to lung metastasis.
Other imaging studies like renal angiogram, radionuclide images, and positron emission tomography **(PET)** may required for further evaluation and proper diagnosis.

- ***Fine-needle aspiration***

Fine-needle aspiration cytology has had a limited role in the evaluation of RCC. It is indicated specifically for those patients with clinically apparent metastatic disease who may be candidates for nonsurgical therapy. Other settings in which fine-needle aspiration may be appropriate include differentiating a primary RCC from a renal metastasis in patients with known primary cancers of nonrenal origin, and evaluating some radiographically indeterminate lesions.

Treatment

❖ ***Surgery***

Traditionally, open or laproscopic approach can be used. Radical nephrectomy was indicated for all cases without metastasis. Partial nephrectomy allows preservation of ipsilateral renal function and it can be reserved for patients with bilateral tumors, solitary kidney tumors, and current or possible future renal impairment.
Nephrectomy may also be performed to "debulk" the tumor load before immunotherapy.

❖ ***Ablation***

Small cancers may be treated by cryotherapy or radiofrequency ablation. These tumours need to be imaged clearly and are targeted best if they are on the periphery of the kidney.

❖ ***Adjuvant therapy***

Chemotherapy—Renal cell cancer is resistant to chemotherapy.

Immonotherapy—Various immunotherapeutic regimens have been described, Interferon alpha and interleukin 2 are used to treat metastatic disease, especially after debulking of the primary tumour with surgery.

Radiotherapy— Despite that RCC is a relatively radioresistant tumor, radiation is used for symptomatic bone or brain metastases.