

**#MADEEASY**



**RENAL CELL  
CANCER**





# RENAL CELL CANCER

**Also known as Hypernephroma.**  
**Renal Cell Carcinoma arises from renal tubular epithelium, starting usually from the upper pole.**  
**MC malignant tumor of kidneys in adults, accounting for 90-95% of cases.**  
**Imagine kidney tumors to be worms growing on the kidneys. They start growing in the tubes and pipes of sewers and start at the upper pole.**

## **Epidemiology**

**Usually affects adults in 5th 7th decades.**  
**Usually affects males more than females.**  
**These worms grow in tubes that are more than 50 years old. There are more male worms than female worms.**

## **Risk factors**

- **Smoking**
- **Obesity**
- **Hypertension**
- **Dialysis**
- **Genetic predisposition**
- **These tubes and pipers not only receive sewage but also smoke.**



# Clinical features



- **Triad**
- **Flank pain**
- **Flank mass**
- **Hematuria**
- **Unexplained weight loss**
- **Low-grade fever**

***In males, a left sided varicocele may develop, as the left testes drains into Renal vein (as opposed to right testes draining directly into Inferior vena cava).***

***The male with RCC will have a palpable mass that he can feel in his flank area, with pain around it and blood in his urine. His left testes may also feel like a bag of worms.***





# Subtypes

## **Clear Cell RCC**

- **MC subtype.**
- **Arises from proximal tubular cells.**
- **Microscopic findings:**

**Glycogen and lipids get accumulate in the cytoplasm, giving it a clear appearance hence, the name.**

- **Associated with von Hippel Lindau gene mutation.**
- **There are the clear worms that are most common, they grow in pretty tubes and are very Hip and popular.**

## **Papillary RCC**

- **Arises from distal tubular cells.**
- **Involves bilateral kidneys.**
- **Microscopic findings:**
- **Cells have papillary structure.**
- **Psammoma bodies may be present**

## **Associated with**

- **Trisomy 7**
- **Dialysis induced cystic disease**
- **Papa worms grow in dirty tubes and are present everywhere, they might have**
- **Momma (psammoma) worms with them.**





# Chromophobe RCC

- Has the best prognosis.

## Microscopic findings:

- Large cells having perinuclear halo (resinoid nucleus)
- Prominent cell borders.
- Associated with chromosome losses (hypoploidy).

There are colorful worms as well, they are the best looking and have halos on their head as well. But they are less in number (hypoploidy)

## Collecting duct RCC

- Has the worst prognosis.
- Also called Bellini duct cancer.
- Arises from collecting duct of the renal medulla.

## Microscopic findings:

- Irregular glandular structure.
- Anaplasia
- Infiltrative growth

There are con worms as well, but they don't live in the tubes. They come from the ducts in the middle. They are very aggressive and infiltrative.





## Genetic variants Associated with RCC

### Von Hippel Lindau syndrome

- Mutation in VHL gene (tumor suppressor gene)
- Located on chromosome 3p

### Pathogenesis:

VHL gene suppresses HIF (hypoxia-induce factor)  
In case of mutation, HIF accumulates--> promotes angiogenesis --> tumor growth.

Can be associated to both sporadic and familial variants of clear cell RCC.

### Includes

- Cerebellar hemangioblastoma
- Pheochromocytoma
- Renal cell cancer
- Mnemonic: CRP

Very Hip worms are clear worms.





## **MET proto-oncogene mutation**

***Associated with Papillary RCC.***

***Pathogenesis:***

***Gain of function mutation in MET gene leads to the proliferation and growth of tumor cells.***

***FH (Fumarate Hydroxylase) gene mutation***

- ***Associated with RCC and Hereditary Leiomyomatosis***

***Pathogenesis:***

- ***Inactivation of FH leads to accumulation of fumarate.***

***Markers***

- ***Immunochemical markers include: RCC marker, CD 10 & PAX8***

***Metastasis***

- ***MC metastasis is to Lungs***

