EPITHELIAL KIDNEY TUMORS: PROBLEM DIAGNOSES AND NEW ENTITIES

WHO 2016 CLASSIFICATION EPITHELIAL TUMORS

**BENIGN**
- Papillary adenoma
- Metanephric adenoma
- Metanephric adenofibroma
- Oncocytoma

**MALIGNANT**
- Clear cell RCC
- Multilocular cystic renal neoplasm of low malignant potential
- Papillary RCC
- Chromophobe RCC
- Collecting duct carcinoma
- Medullary carcinoma
WHO 2016 CLASSIFICATION
EPITHELIAL TUMORS

MALIGNANT
- MIT family translocation carcinomas
  - Xp11 and t(6:11)
- Carcinoma associated with neuroblastoma
- Mucinous tubular and spindle cell ca
- Tubulocystic RCC
- Acquired cystic disease associated RCC

Acquired cystic disease associated RCC

WHO 2016 CLASSIFICATION
EPITHELIAL TUMORS

MALIGNANT
- Clear cell papillary RCC
- HLRCC syndrome associated RCC
- SDH deficiency associated RCC
- Unclassified RCC
- Emerging entities

Clear cell papillary RCC

RENAral CORTICAL ADENOMA

WHO 2004 DEFINITION
- 5 mm or less
- Tubulopapillary architecture

WHO 2016 DEFINITION
- 15 mm or less
- Tubulopapillary architecture
- Nuclear grade 1 or 2
- No pseudocapsule formation
RENAL CORTICAL ADENOMA

9 mm

RENAL CORTICAL ADENOMA

Nuclear Grade 2
No capsule

Kidney tumors with pink cells
DIFFERENTIAL DIAGNOSIS
ONOCYTOMA
CHROMOPHOBE RCC
CLEAR CELL RCC
UNCLASSIFIED RCC
PAPILLARY RCC
COLLECTING DUCT CA
TRANSLOCATION CARCINOMAS
SDH ASSOCIATED RCC
EPITHELIOID ANGIOMYOLIPOMA

RENNAL ONOCYTOMA
5% of kidney tumors in adults; wide age range; more common in females (2:3-1); majority are asymptomatic; variable cytogenetics: -1 and -Y most often reported

RENNAL ONOCYTOMA
ONCOCYTOMA – SPECIAL STUDIES

ONCOCYTOMA – IHC

RENAL ONCOCYTOMA
CHROMOPHobe CARCINoMA

5% of kidney tumors, adults, M=F, excellent prognosis (>90% survival); distinctive cytogenetic profile with -1, -2, -6, -13, -17, -21
“HYBRID” TUMORS

- **RENAL ONCOCYTOSIS**
  - Bilateral, multiple tumors
  - Oncocytoma, chromophobe RCC and hybrid tumors

- **BIRT HOGG DUBE SYNDROME**
  - Skin tumors (trichofolliculomas, achrocordons), multiple renal tumors and pneumothoraces
  - Oncocytoma, chromophobe and clear cell RCC, and hybrid tumors
  - Autosomal dominant, 17p11.2 (folliculin)

- **DE NOVO**
  - 4/425 cases in recent series

RENAL ONCOCYTOSIS

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27 year old female with multiple, bilateral kidney tumors
**ACQUIRED CYSTIC KIDNEY DISEASE**

- Examined 66 kidneys from 52 patients
- Identified a variety of tumor types:
  - ACD associated carcinoma 33%
  - Clear cell papillary carcinoma 21%
  - Papillary carcinoma 16%
  - Chromophobe carcinoma 16%
  - Clear cell carcinoma 14%
- Considered the first two potentially unique tumor types


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**ACQUIRED CYSTIC DISEASE ASSOCIATED RENAL CELL CARCINOMA**

- To date have occurred exclusively in patients with acquired cystic disease
- Increase in frequency with increased length of time on dialysis
- Occur at any age
- No specific genetic mutations recognized
- Limited prognostic information but metastases reported in 8% to 22% of patients

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**AcqCKD ASSOCIATED CARCINOMA**
AcqCKD ASSOCIATED CARCINOMA

CLEAR CELL PAPILLARY RCC

• 3 – 4% of resected kidney tumors
• Wide age range; slight male predominance
• 95% T1a (< 4 cm)
• Not genetically related to clear cell or papillary RCC
• Distinctive IHC profile
• Excellent prognosis
Clear cell Papillary RCC

CLEAR CELL PAPILLARY RCC

Clear cell Papillary RCC
EPITHELIAL KIDNEY TUMORS CLASSIFICATION

Cytogenetics of a Renal Adenocarcinoma in a 2-Year-Old Child
Bauke de Jong, Janke M. Molmaar, J. Albertus Louw, Vera J. S. Idsenberg, and J. Walter Oosterhuis

Figure 2. The karyotype of a cell from the tumor cells

Cancer Genet Cytogen 21:165, 1986

X:1 TRANSLOCATION ASSOCIATED CARCINOMA: FREQUENCY BY AGE


TRANSLOCATION ASSOCIATED CARCINOMA
X:1 TRANSLOCATION RCC

X:1 TRANSLOCATION RCC

CK AE1/AE3

TFE3

6:11 TRANSLOCATION CARCINOMA

Type IV collagen

Type IV collagen
Translocation associated renal cell carcinoma is in the differential diagnosis of ALL unclassifiable renal cell carcinomas

SDH ASSOCIATED RCC

- Patients with mutation of SDHB >> SDHC (rarely SDHA or SDHD)
- Paraganglioma and GIST
- Wide age range (14 – 76 yrs; median 35)
- Multifocal and/or bilateral in 30%
- Eosinophilic cells in nests and tubules; cytoplasmic inclusions; entrapped tubules; mast cells
- Most low grade but metastases develop in about 10% of patients

Williamson et al. Mod Pathol 28:80, 2015
SDH ASSOCIATED RENAL CELL CARCINOMA

HLRCC SYNDROME
- Patients with mutation of fumarate hydratase gene (1q42.3-q43)
- Cutaneous and uterine leiomyomas
- Wide age range (17 – 87 years)
- More common in females
- Complex solid and papillary histology with macro orangophilic nucleoli and perinucleolar halo
- Aggressive tumors with up to 50% with metastasis at diagnosis

HEREDITARY LEIOMYOMATOSIS
ONOCYTIC PAPILLARY RCC

THYROID-LIKE FOLLICULAR CARCINOMA OF THE KIDNEY

ATROPHIC KIDNEY-LIKE TUMOR OF THE KIDNEY
ATROPHIC KIDNEY-LIKE TUMOR OF THE KIDNEY

SOLID AND CYSTIC EOSINOPHILIC TUMOR

RCC WITH ANGIOEIOMYOMA-LIKE STROMA
RENAL ANGIOMYOADENOMATOUS (RAT) TUMOR
RCC WITH ANGIOLEIOMYOMA-LIKE STROMA

- 2012 Vancouver classification placed these in clear cell papillary RCC category
- Williamson et al (Mod Pathol Feb 2015) argue that this represents a distinct entity distinct from clear cell papillary RCC
- WHO Classification follows Vancouver classification and leaves these in clear cell papillary RCC group (Note: meeting occurred in March 2015)
- Hakimi et al (Mod Pathol June 2015) demonstrate that at least some of these harbor a TCEB-1 mutation
“Unclassified renal cell carcinoma represents a biologically heterogeneous group of tumors. To date pathologic stage and possibly nuclear grade are the best predictors of outcome.”