Protocol for the Examination of Biopsy Specimens from Patients with Invasive Carcinoma of Renal Tubular Origin

**Version:** 4.1.0.0  
**Protocol Posting Date:** June 2021

The use of this protocol is recommended for clinical care purposes but is not required for accreditation purposes.

This protocol should be used for the following procedures AND tumor types:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biopsy</td>
<td>Includes specimens designated needle biopsy, incisional biopsy (wedge), and others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal cell carcinomas</td>
<td>Includes all renal cell carcinoma variants</td>
</tr>
</tbody>
</table>

This protocol is NOT required for accreditation purposes for the following:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resection (consider Kidney Resection protocol)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urothelial tumors (consider Ureter, Renal Pelvis protocol)</td>
<td></td>
</tr>
<tr>
<td>Wilm’s tumors (Consider Wilm’s Tumor protocol)</td>
<td></td>
</tr>
<tr>
<td>Lymphoma (consider the Hodgkin or non-Hodgkin Lymphoma protocols)</td>
<td></td>
</tr>
<tr>
<td>Sarcoma (consider the Soft Tissue protocol)</td>
<td></td>
</tr>
</tbody>
</table>

**Authors**

John R. Srigley, MD*; Gladell P. Paner, MD*; Ming Zhou, MD, PhD*; Lara R. Harik, MD; Robert Allan, MD; Mahul B. Amin, MD; Steven C. Campbell, MD; Anthony Chang, MD; Brett Delahunt, MD; David J. Grignon, MD; Peter A. Humphrey, MD, PhD; Bradley C. Leibovich, MD; Rodolfo Montironi, MD; Jason Pettus, MD; Victor E. Reuter, MD.

With guidance from the CAP Cancer and CAP Pathology Electronic Reporting Committees.

* Denotes primary author.
Accreditation Requirements
The use of this case summary is recommended for clinical care purposes but is not required for accreditation purposes. The core and conditional data elements are routinely reported. Non-core data elements are indicated with a plus sign (+) to allow for reporting information that may be of clinical value.

Summary of Changes

v 4.1.0.0

- General Reformatting
- New Tumor Site Section
- Elements that are recommended for clinical care purposes are designated as Core and Conditional (indicated by bolded text), while Non-core elements are now indicated with a plus (+) sign
Reporting Template

Protocol Posting Date: June 2021
Select a single response unless otherwise indicated.

CASE SUMMARY: (KIDNEY: Biopsy)
Standard(s): AJCC-UICC 8
This case summary is recommended for reporting biopsy specimens, but is not required for accreditation purposes.

SPECIMEN

Procedure
___ Needle biopsy
___ Incisional biopsy, wedge
___ Other (specify): _________________
___ Not specified

Specimen Laterality
___ Right
___ Left
___ Not specified

TUMOR

Tumor Site (select all that apply)
___ Upper pole
___ Middle
___ Lower pole
___ Other (specify): _________________
___ Not known

Histologic Type (Note A)
___ Clear cell renal cell carcinoma
___ Multilocular cystic clear cell renal cell neoplasm of low malignant potential
___ Papillary renal cell carcinoma
___ Papillary renal cell carcinoma, Type 1
___ Papillary renal cell carcinoma, Type 2
___ Chromophobe renal cell carcinoma
___ Collecting duct carcinoma
___ Renal medullary carcinoma
___ MiT family translocation renal cell carcinoma
___ Xp11 translocation renal cell carcinoma
___ t(6;11) renal cell carcinoma
___ Mucinous tubular and spindle renal cell carcinoma
___ Tubulocystic renal cell carcinoma
___ Acquired cystic disease associated renal cell carcinoma
___ Clear cell papillary renal cell carcinoma
___ Hereditary leiomyomatosis and renal cell carcinoma-associated renal cell carcinoma
___ Succinate dehydrogenase (SDH) deficient renal carcinoma
___ Renal cell carcinoma, unclassified
___ Other histologic type not listed (specify): ___________________
  +Histologic Type Comment: ____________________

Histologic Grade (WHO / ISUP) (Note B)
___ G1 (nucleoli absent or inconspicuous and basophilic at 400x magnification)
___ G2 (nucleoli conspicuous and eosinophilic at 400x magnification, visible but not prominent at 100x magnification)
___ G3 (nucleoli conspicuous and eosinophilic at 100x magnification)
___ G4 (extreme nuclear pleomorphism and / or multi-nuclear giant cells and / or rhabdoid and / or sarcomatoid differentiation)
___ GX (cannot be assessed)
___ Not applicable: ____________________

Sarcomatoid Features (Note C)
___ Not identified
___ Present
  +Percentage of Sarcomatoid Element
    ___ Specify percentage: ____________________ %
    ___ Other (specify): ____________________
    ___ Cannot be determined
    ___ Cannot be determined

Rhabdoid Features (Note C)
___ Not identified
___ Present
___ Cannot be determined

+Necrosis (Note D)
___ Not identified
___ Present

+Lymphovascular Invasion
___ Not identified
___ Present
___ Cannot be determined: ____________________

+Tumor Comment: ____________________

ADDITIONAL FINDINGS

+Additional Findings
___ None identified
___ Other pathology present (specify): ____________________

COMMENTS

Comment(s): ____________________
Explanatory Notes

A. Histologic Type
The current World Health Organization (WHO) classification (2016) is based on the International Society of Urological Pathology (ISUP) Vancouver Classification of Renal Neoplasia 2012.1,2

Clear cell renal cell carcinoma
Multilocular clear cell renal cell neoplasm of low malignant potential
Papillary renal cell carcinoma
   Type 1
   Type 2
Chromophobe renal cell carcinoma
Collecting duct carcinoma
Renal medullary carcinoma
MiT family translocation renal cell carcinoma
Mucinous tubular and spindle cell carcinoma
Tubulocystic renal cell carcinoma
Acquired cystic disease associated renal cell carcinoma
Clear cell papillary/tubulopapillary renal cell carcinoma
Hereditary leiomyomatosis and renal cell carcinoma-associated renal cell carcinoma
Succinate dehydrogenase (SDH) deficient renal carcinoma
Renal cell carcinoma, unclassified
Papillary adenoma
Renal oncocyto ma

Many subtypes of renal cell carcinoma, including many newly described variants, have differing clinical behaviors and prognosis.1,2,3,4 Additionally the usage of adjuvant therapy is related to tumor subtype.5 The concept of an emerging/provisional category of renal cell carcinoma was introduced in the 2012 ISUP Vancouver classification.5 These tumors, while appearing distinctive, had not been fully characterized morphologically or by ancillary techniques. This category in the 2016 WHO classification includes the following entities: oncocytoid renal cell carcinoma (RCC) postneuroblastoma, thyroid-like follicular RCC, anaplastic lymphoma kinase (ALK) rearrangement-associated RCC, and RCC with (angio) leiomyomatous stroma.1 For the purpose of the protocol, these emerging tumors should be classified under “other” and the name specified.

Occasionally more than 1 histologic type of carcinoma occurs within the same kidney specimen. Each tumor type should be separately recorded along with its associated prognostic factors.6

References

### B. Histologic Grade

The WHO/ISUP grading system has supplanted the Fuhrman system as the grading standard.\(^1,4\) This grading system has been validated for both clear cell and papillary renal cell carcinoma; however, it has not been validated for other RCC subtypes.\(^3,4\) Nevertheless, the WHO/ISUP grade may be included for descriptive purposes. Currently it is recommended that chromophobe renal cell carcinoma not be graded with the WHO/ISUP system. Details are shown below:

- **Not applicable**
- **Grade X- Cannot be assessed**
- **Grade 1** - Nucleoli absent or inconspicuous and basophilic at 400x magnification
- **Grade 2** - Nucleoli conspicuous and eosinophilic at 400x magnification, visible but not prominent at 100x magnification
- **Grade 3** - Nucleoli conspicuous and eosinophilic at 100x magnification
- **Grade 4** - Extreme nuclear pleomorphism and/or multinuclear giant cells and/or rhabdoid and/or sarcomatoid differentiation

Although the grading system does reference the tinctorial characteristics of the nucleoli, the determining feature is the nucleolar prominence. Grade should be assigned based on the single high-power field showing the greatest degree of pleomorphism.

### References


### C. Sarcomatoid and Rhabdoid Features

Sarcomatoid carcinoma is not a specific morphogenetic subtype of renal cell carcinoma but is considered as a pattern of dedifferentiation.\(^1,3,4\) Sarcomatoid change in a renal cell carcinoma is associated with an adverse outcome.\(^1,4\) Sarcomatoid morphology may be found in any histologic subtypes of renal cell carcinomas, including clear cell, papillary, chromophobe, collecting duct, and other rare and unclassified subtypes.\(^1,2,3,4\) When the background carcinoma subtype is recognized, it should be specified under histologic type (see Note A). Pure sarcomatoid carcinoma or sarcomatoid carcinoma associated with epithelial elements that do not conform to usual renal carcinoma cell types should be considered as unclassified renal cell carcinoma. Sarcomatoid morphology is also incorporated into the WHO/ISUP grading system as grade 4.

There is some indication that the percentage of sarcomatoid component in a renal cell carcinoma has prognostic importance.\(^3,4\)
Rhabdoid features, like sarcomatoid, are a characteristic of high-grade disease. Rhabdoid cells have abundant eosinophilic cytoplasm with an eccentric nucleus often with a prominent nucleolus. Rhabdoid changes are associated with an adverse outcome and in cases with rhabdoid morphology, about 25% of them also show sarcomatoid features. Rhabdoid morphology is an important component of the new WHO/ISUP grading system (grade 4). No solid evidence exists on the prognostic significance of the extent of rhabdoid morphology.

References

D. Necrosis
Tumor necrosis is an important prognostic factor in renal cell carcinoma. It is recommended that both macroscopic and microscopic (coagulative) necrosis be recorded. The prognostic significance of necrosis independent of tumor stage has been identified in clear cell and chromophobe renal cell carcinoma. The prognostic significance of necrosis in papillary renal cell carcinoma is controversial. Large papillary carcinomas not uncommonly display cystic necrosis and yet don't exhibit extra renal spread. Tumor necrosis as a prognostic factor cannot be assessed in a situation where patients have undergone presurgical arterial embolization.

At present, the prognostic significance of the extent of necrosis is unclear; however, it is recommended that this be recorded as a percentage.

References