Update on TNM Staging and Handling of Kidney Cancer
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Disclosure of Relevant Financial Relationships
Dr. Kiril Trpkov declares no conflicts of interest to disclose.

Prognostic factors in RCC
1. Pathologic stage
2. Tumor WHO/ISUP grade
3. Morphologic type
4. Sarcomatoid-rhabdoid differentiation
5. Tumor necrosis
(Microvascular invasion)

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Update on TNM Staging and Handling of Kidney Cancer - Objectives
Understand rationale for proper handling and staging of renal specimens
Identify differences in TNM staging compared to 7th AJCC edition
Understand prognostic rationale for the changes of the staging system for renal cancers

ISUP Consensus Meeting on Adult Renal Tumors
Vancouver, March, 2012
**Stage pT3a**

**pT3**
Tumor extends into major veins or perinephric tissues, but not into the ipsilateral adrenal gland and not beyond Gerota’s fascia.

**pT3a**
Tumor extends into the renal vein or its segmental branches, or invades the pelvicalyceal system, or invades perirenal and/or renal sinus fat but not beyond Gerota’s fascia.

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**Renal tumor stage summary of changes - AJCC/TNM 8th edition**

Definition of Primary Tumor (pT): T3a disease

Word “grossly” was eliminated from the description of renal vein involvement

“Muscle containing” - omitted as descriptor for “segmental veins”

Invasion of the pelvicalyceal system was added
Definition of Regional Lymph Node (N):
The N3 category of a metastasis in a single lymph node larger than 5 cm in greatest dimension has been collapsed into the N2 category.
N1: MS in a single node, ≤2 cm in greatest dimension
N2: MS in a single node, >2 cm in greatest dimension; or multiple lymph nodes

Key prognostic parameter Used in prognostic nomograms

7th edition (2009)
8th edition (2017)

Handling of renal tumors
Goals:
- Thorough gross examination
- Adequate sampling
- Reporting of stage and other important prognostic parameters

Specimen received in the lab
Identify and sample:
- Adrenal gland
- Vascular margins
- Ureter

Ureteral stump opened and examined

Ureteral invasion
Initial section of specimen along long axis (lateral or medial)

Probes in collecting system or in largest hilar veins

Consider additional parallel sections

Radical and partial nephrectomies should be inked

Complete  Localized  Selective (resection margin)

Renal tumor measurement (greatest dimension)

Measure any tumor invading into extracapsular tissue  Do not measure tumor invading into renal/caval vein

Stage T1 and T2
Tumor limited to kidney!

TNM 2009 (7th edition) same in AJCC/TNM 2017 (8th edition)

How many blocks should you submit for examination?

Important to assess tumor relationship with:
Renal capsule (perirenal fat)
Renal sinus
Adrenal gland
Renal pelvis

Areas of different appearance or consistency!
Sarcomatoid differentiation, necrosis etc.

T2a (>7 cm but ≤10 cm)
T2b (>10 cm)
Sarcomatoid carcinoma (dedifferentiation)

In any histologic type – poor prognosis! (report %)

Sampling of renal tumor for examination

One block per cm, minimum of 3 blocks (subject to modification)

Multiple renal tumors

Hereditary:
- Von Hippel Lindau disease
- Birt-Hogg Dubbé Sy
- Hereditary papillary carcinoma
- Tuberous sclerosis
- Oncocytosis

Sporadic:

Multiple renal tumors

Papillary RCC and bilateral more common
Index and satellite tumors mostly identical
Discordant TU 17-26% (clear cell + papillary)
Likely local recurrence if nephron-sparing surgery

Prognosis (with radical surgery)


Measurement of multiple tumors

Measure and report tumor dimensions for all tumors, up to a maximum of 5

Sampling and staging of multiple tumors

Minimum of 5 largest tumors (if smaller look similar)
If uncertain about histologic type or adverse findings in remaining tumors, do additional sampling
Largest T used – label with (m) mpT
Different subtype – separate stage
Stage pT3a

pT3
- Tumor extends into major veins or perinephric tissues, but not into the ipsilateral adrenal gland and not beyond Gerota’s fascia

pT3a
- Tumor extends into the renal vein or its segmental branches, or invades the pelvicalyceal system, or invades perirenal and/or renal sinus fat but not beyond Gerota’s fascia

Assessment of perinephric fat invasion (pT3a)

Pushing border, even if beyond normal kidney, NOT diagnostic of fat invasion

Invasion: lost smooth interface, or irregular nodules protruding into fat

Assessment of perinephric fat invasion (pT3a) - micro

Tumor touching fat

Tumor extending as irregular tongues into fat (with or without desmoplasia)

Problematic perinephric fat invasion (pT3a)
Problematic perinephric fat invasion (pT3a)

Central perinephric fat compartment
Between pelvicalyceal system and renal parenchyma
Main lymphovascular supply of kidney

Renal sinus invasion (pT3a)

Principal route for extrarenal extension:
Clear cell RCC, but also other types
>90% of clear cell RCCs ≥7 cm invaded renal sinus

Recognition of renal sinus invasion in the last 10-15 years prompted practice changes
Targeted sampling of renal sinus in nephrectomies – routine practice!

Renal sinus invasion - sampling

If sinus invasion grossly evident, or obviously absent (e.g. small peripheral tumor):
Sample only 1 block to confirm sinus invasion present or absent

When uncertain if sinus invasion present:
Sample at least 3 blocks of tumor – sinus interface

Renal sinus invasion present on micro if tumor seen in:

- Direct contact with sinus fat
- In loose connective tissue beyond renal parenchyma
- Any endothelial lined space within sinus, regardless of size

Renal vein invasion – AJCC 8th edition

Renal vein invasion (pT3a): “tumor (grossly) extends into renal vein or segmental branches”

Renal vein invasion

Tumor attached to the vessel wall or

Tumor fills and distends vessel lumen

Vein invasion in the renal sinus = pT3a

Vein invasion in the perinephric tissues = pT3a

Renal vein and margin sampling

Submit actual margin

Additional sections of tumor thrombus, if grossly suspected to be adherent to vein wall

Renal margin negative — retraction of vein after fixation

Renal vein margin positivity

Renal margin positive only if tumor adherent at actual margin, confirmed microscopically
Invasion into pelvicalyceal system = pT3a (new in AJCC 8th edition)

Vena cava invasion

Tumor into vena cava below or above diaphragm

Vena cava invasion – pT3c

Tumor grossly extends into vena cava above diaphragm or invades wall of vena cava

Specimen submitted as “caval thrombus”

Include 2 or more sections to search for adherent caval wall tissue and possible invasion

Adrenal gland involvement

Contiguous spread (pT4) Metastasis (pM1) Prognostic significance!

Direct adrenal gland involvement - pT4

Direct invasion into adrenal – pT4 disease Associated with significantly worse prognosis than perinephric fat invasion! Matches pT4 tumors (invasion into adjacent organs)
Metastatic adrenal gland involvement – M1

Assessment of hilar lymph nodes

Restrict evaluation to palpation and dissection of hilar fat only

Nodes found in less than 10% of cases

Nodes rarely identifiable!

Assessment of hilar lymph nodes

Grossly visible hilar nodes positive in 80% of cases

Microscopic nodes found in only 25% of cases

= all benign!

Searching for occult nodes not practical!


Regional lymph nodes – N1

Single or multiple regional nodes involved

Examine all submitted separately

Renal hilar

Caval (pre-, para-, retro-, interaortocaval)

Aortic (pre-, para-, retro-)

Sampling uninvolved renal parenchyma

Adjacent to tumor, as well as distant from tumor

Routine assessment for concurrent glomerular, tubulointerstitial and vascular kidney disease

Non-neoplastic kidney pathology

Diabetic nephropathy (KW nodules)

Hypertensive vascular disease
It is expected that AJCC 8th edition staging for renal cancer will perform (at least) as well as the 7th AJCC/TNM edition.

Take home messages:

- Proper staging depends on adequate sampling of renal specimens.
- AJCC 8th edition introduces some (minor) staging changes and refines some definitions, but retains most of the 7th edition parameters.
- Stage is key to prognostication of renal cancer patients.