The Urinary Tract System

Vertebral column
Lower ribs
Kidney
Pelvis
Ilum
Renal pelvis (hilum)
Ureter
Bladder
Urethra
Urinary Tract System:

**Kidney**
- Kidney parenchyma (glandular part) C64.9
- Kidney Renal Pelvis C65.9

**Ureter** C66.9

**Bladder** C67.9 (NOS)

**Urethra** C68.0

Bladder, Renal Pelvis, Ureter

- Definitions
  - **Upper urinary tract:**
    - kidney, renal pelvis and ureter
  - **Lower urinary tract:**
    - bladder, sphincter, urethra

**Urinary tract** (STR definition): structures lined by urothelium

Two different sections in STR manual:
- one for **kidney**, one for **urinary**
**Urinary Tract**

**Renal pelvis, ureter, bladder, urethra, prostatic urethra in males**

– Structures lined by *transitional epithelium*
– Tumor cells may shed and implant in structures lower in the tract causing multifocal tumors
– Transitional epithelium: preferred term is now *urothelial/transitional cells*
– Expandable (stretchable) epithelium with layered appearance- Bladder

**Kidney parenchyma (body)- glandular**

---

**Anatomy**

**Bladder, Renal Pelvis, Ureters**

Organs from front

Organs from front with anterior organs removed
FIGURE A: Bladder location

(Female)

(Female)

(Male)

(Male)
The urachus is an embryological canal connecting the urinary bladder of the fetus with the allantoid, a structure that contributes to the formation of the umbilical cord. The lumen (inside) of the urachus is normally obliterated during embryonic development, transforming the urachus into a solid cord, a functionless remnant. The urachus lies in the space of Retzius, between the transversalis fascia anteriorly and the peritoneum posteriorly.
ANATOMY OF KIDNEY

Upper Urinary Tract

- Capsule*
- Cortex*
- Perirenal fat*
- Medulla*
- Pyramid*
- Renal fascia* (Gerota's)
- Pararenal fat*
- Minor calyces
- Calyx
- Hilum
- Pelvis of kidney
- Renal vessels
- Ureter

Source: Snell, Clinical Anatomy for Medical Students

Codes: C64.9, C65.9, C66.9
The medial (inner) side of each kidney presents a concave notch called the **hilum**, (or hilus) means "depression" and is the place where the vessels enter the organ.

**Cross Section at Hilum**

**Renal pelvis and calyces**

**Cortex**

**Renal Sinus**: space outside the kidney and renal pelvis, but within a line drawn from the medial edge of the upper pole to the medial edge of the lower pole.

While the pelvis falls with in this region, the term refers to the **fatty tissue only**, not to the collecting system structures.
Upper Pole

Lower Pole

**Primary Site codes**

**Parts of Bladder**
(Code primary site C670 to C679)
Trigone, Dome, Lateral wall, Anterior wall, Posterior wall, Bladder neck, Ureteric orifice, Urachas, bladder base, bladder floor

**Parts of Renal Pelvis**
(code primary site as C65.9)
*Renal pelvis
*Calyx, calyces
*Renal sinus (renal hilum located w/in renal sinus)
*Pelvicureteric junction

**Ureter**  (code primary site as C66.9)

**Urethra**  (code primary site as C68.0)
Renal pelvis, Ureter, Bladder and other urinary

The following list is in priority order.

1. Code urinary bladder C678 when:
   A. The histology is non-invasive or in situ sessile carcinoma (may be called flat carcinoma, noninvasive flat carcinoma) AND
   B. ONLY bladder and one or both ureters are involved (no tumors in other urinary sites/organisms)

   Note: Overlapping non-invasive tumors of the bladder and ureter almost always originate in the bladder. They extend/overlap into the ureter by spreading along the mucosa. It is important to code these primaries to bladder C678, NOT to overlapping lesion of urinary organs C688.

2. In situ or invasive - any histology:
   A. Code overlapping tumor of bladder C678 when a single tumor
      i. Overlaps urothelium of the bladder
   ii. Overlaps the bladder and ureter AND/ OR urethra
   B. Code bladder NOS C679 when there are multiple tumors within the bladder and the subsite origin is unknown/not documented.

Renal Pelvis, Ureter, Bladder, and Other Urinary Equivalent Terms and Definitions
C659, C668, C670-C679, C680-C689
(Excludes lymphoma and leukemia M9590 – M9592 and Kaposi sarcoma M9140)

C. Code overlapping lesion of urinary organs C688 when a single tumor overlaps two urinary sites and the origin is unknown/not documented. Use for overlapping tumor involving any of the following sites:
   i. Renal pelvis and ureter
   ii. Bladder and urethra

D. Code Urinary System NOS C689 when there are tumors in multiple organs within the urinary system.

Note: The physicians subject matter experts (SME) discussed the issue of coding primary site for multifocal multicentric urinary tract carcinoma. Although the SMEs understood and acknowledged the importance of coding a specific primary site, there is no literature or criteria for determining the organ of origin for multiple tumors involving multiple urinary sites.
Urinary Tract Histologies
Bladder, Renal Pelvis and Ureter

- **Urothelial carcinoma (transitional cell carcinoma, “TCC”)**
  - 90% of all urinary tract cancers
  - Papillary urothelial carcinoma (papillary transitional cell carcinoma, “Pap TCC”)

- **Squamous cell carcinoma**
  - 10% of renal pelvis tumors, 5% of bladder tumors

- **Adenocarcinoma**
  - Very rare in renal pelvis, ureters
  - < 1% of urinary tract tumors
  - Most likely a primary in kidney parenchyma with extension into renal pelvis or ureter

---

<table>
<thead>
<tr>
<th>Specific and NOS Histology Codes</th>
<th>Synonyms</th>
<th>Subtypes/Variants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urothelial carcinoma</td>
<td></td>
<td>Giant cell urothelial carcinoma 8120/3</td>
</tr>
<tr>
<td>Note 1: Previously called</td>
<td></td>
<td>Lymphophylitis-like urothelial carcinoma 8082/3</td>
</tr>
<tr>
<td>transitional cell carcinoma, a</td>
<td></td>
<td>Papillary urothelial (transitional cell)</td>
</tr>
<tr>
<td>term that is no longer</td>
<td></td>
<td>carcinoma in situ 8130/3</td>
</tr>
<tr>
<td>recommended</td>
<td></td>
<td>Microcystic urothelial carcinoma 8120/3</td>
</tr>
<tr>
<td>Note 2: Micropapillary</td>
<td></td>
<td>Poorly differentiated carcinoma 8120/3</td>
</tr>
<tr>
<td>8121 is a subtype/variant of</td>
<td></td>
<td>Transitional urothelial carcinoma 8120/3</td>
</tr>
<tr>
<td>papillary urothelial carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8120. It is an invasive/sub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>neoplasm with aggressive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>behavior.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Definitions

Papillary vs. Non-papillary urothelial (Flat Carcinoma)
Gross descriptions of tumor architecture or structure; not specific histologies
  – Both apply to transitional cell/urothelial carcinoma

Papillary tumor
Warty growth projecting from the wall
On a stalk
  • **Non-invasive** papillary urothelial ca (in situ)
  • **Invasive** papillary urothelial ca

Non-papillary urothelial: (Flat tumor)
Originates within mucosa
Does not project from the wall
  • **Non-invasive** CIS
  • **Invasive** urothelial ca

| Renal Pelvis, Ureter, Bladder, and Other Urinary Equivalent Terms and Definitions |
| C659, C669, C670-C679, C680-C689 |
| (Excludes lymphoma and leukemia M9590 – M9992 and Kaposi sarcoma M9140) |

Table 3: Non-Reportable Urinary Tumors

<table>
<thead>
<tr>
<th>Histology Term and Code</th>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign perivascular epithelioid cell tumor 8714/0</td>
<td>Benign PEComa</td>
</tr>
<tr>
<td>Cerebral cell tumor 9580/0</td>
<td></td>
</tr>
<tr>
<td>Hemangioendothelioma 9120/0</td>
<td></td>
</tr>
<tr>
<td>Inflammatory myofibroblastic tumor 8815/1</td>
<td></td>
</tr>
<tr>
<td>Inverted urothelial papilloma 8121/0</td>
<td></td>
</tr>
<tr>
<td>Leiomyoma 8590/0</td>
<td></td>
</tr>
<tr>
<td>Melanoma 8940/0</td>
<td></td>
</tr>
<tr>
<td>Neurofibroma 9540/0</td>
<td></td>
</tr>
<tr>
<td>Nevus 8720/0</td>
<td></td>
</tr>
<tr>
<td>Papillary urothelial neoplasm of low-malignant potential 8120/1</td>
<td></td>
</tr>
<tr>
<td>Paraganglioma 8093/1</td>
<td>Extra-adrenal pheochromocytoma</td>
</tr>
<tr>
<td>Solitary fibrous tumor 8815/1</td>
<td></td>
</tr>
<tr>
<td>Squamous cell papilloma 8052/0</td>
<td>Keratotic papilloma</td>
</tr>
<tr>
<td>Urothelial dysplasia No code</td>
<td></td>
</tr>
<tr>
<td>Urothelial papilloma 8120/0</td>
<td></td>
</tr>
<tr>
<td>Villous adenoma 8361/0</td>
<td></td>
</tr>
</tbody>
</table>
Grade Table 19

Use these codes for adenoca and squamous cell carcinoma: 1, 2, 3, 9

Use these codes for urothelial cancers, L, H, 9

<table>
<thead>
<tr>
<th>Code</th>
<th>Grade Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G1: Well Diff</td>
</tr>
<tr>
<td>2</td>
<td>G2: Mod Diff</td>
</tr>
<tr>
<td>3</td>
<td>G3: Poorly Diff, undiff, anaplastic</td>
</tr>
<tr>
<td>L</td>
<td>LG: Low-grade</td>
</tr>
<tr>
<td>H</td>
<td>HG: High-grade</td>
</tr>
<tr>
<td>9</td>
<td>Grade cannot be assessed (GX); unknown</td>
</tr>
</tbody>
</table>
KIDNEY

KIDNEY- parenchyma
Kidney Parenchyma

- Bilateral organs
- Bean shaped
- 4” long, 2” wide, 1.5” thick
- Weight: up to 10 ounces
- 3% of all adult cancers
- 85% are Renal cell carcinoma (adenocarcinoma) or subtype/variants of RCC
  - ccRCC 8310 most common s/v
Kidneys—Anterior View

Kidneys from front

Kidneys from front with anterior organs removed

Source: Medi-clip: Grant’s Atlas, Thorax and Abdomen

Cross-section of Abdomen
Showing Kidneys in Retro-peritoneum

Source: Medi-clip: Grant’s Atlas, Thorax and Abdomen
Anatomy Definitions

Parenchyma
- Solid part of kidney where process of waste excretion takes place

Cortex
- outer layer of parenchyma consisting of connective tissue

Medulla
- Area of kidney where filtration and concentration of wastes takes place

Capsule
- Dense fibrous covering of kidney

Gerota's fascia
- Layer of connective tissue between kidneys and psoas muscles

C64.9
Kidney Anatomy

* not part of kidney parenchyma

Source: Snell, Clinical Anatomy for Medical Students
Kidney Equivalent Terms and Definitions
C649
(Excludes lymphoma and leukemia M9590 – M9992 and Kaposi sarcoma M9140)

<table>
<thead>
<tr>
<th>NOS/Specific Histology Term and Code</th>
<th>Synonyms</th>
<th>Subtypes/Variant(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephroblastoma 8850</td>
<td>Wilms tumor</td>
<td></td>
</tr>
<tr>
<td>Neoplasm, neuroendocrine tumor (NET) 8041</td>
<td>Carcinoid [OBS] Small cell neuroendocrine tumor/carcinoma</td>
<td></td>
</tr>
<tr>
<td>Renal cell carcinoma NOS 8532</td>
<td>RCC Sarcomatoid carcinoma</td>
<td>Acquired cystic disease-associated renal cell carcinoma/tubulocystic renal cell carcinoma 8531a Clear cell papillary renal cell carcinoma 8323/3 Note: The 2010 WHO 4th Edition Classification of Tumors of the Urinary System and Male Genital Organs has reclassified this histology as a “1b” because it is low nuclear grade and is now thought to be a nephroma. This change was not implemented in the 2018 ICD-O update. Clear cell renal cell carcinoma (ccRCC) 8310 Collecting duct carcinoma 8319 Hereditary leiomyomatosis and renal cell carcinoma-associated renal cell carcinoma 8311a Mit family translocation renal cell carcinoma 8311b Note: Hereditary leiomyomatosis and renal cell carcinoma-associated renal cell carcinoma and Mit family translocation renal cell carcinoma have the same ICD-O code but are distinctly different histologies. Because they are different, they are on different lines in column 3. Mucinous tubular and spindle cell carcinoma 8480a Papillary renal cell carcinoma (PRCC) 8260 Renal medullary carcinoma 8510a Note: This is a new term (previously called renal spindled cell carcinoma)</td>
</tr>
<tr>
<td>Rhabdomyosarcoma 8870/3</td>
<td>Angiosarcoma 9120/3 Clear cell sarcoma (non-embryonal) tumor of childhood 8964/3 Leiomyosarcoma renal vein 8909/3 Osseous sarcoma 9140/3 Primitive/Peripheral neuroectodermal tumor pNET 8942/3 Ewing sarcoma 9354/3 Rhabdomyosarcoma 8909/3 Alveolar rhabdomyosarcoma 8920/3 Embryonal rhabdomyosarcoma 8940/3 Pleomorphic rhabdomyosarcoma 8901/3 Spindle cell/sclerosing rhabdomyosarcoma 8912/3 Synovial sarcoma 0640/3</td>
<td></td>
</tr>
</tbody>
</table>

* These new codes were approved by the IARC/WHO Committee for ICD-O.
GRADE Table 18

<table>
<thead>
<tr>
<th>Code</th>
<th>Grade Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G1: Nucleoli absent or inconspicuous and basophilic at 400x magnification</td>
</tr>
<tr>
<td>2</td>
<td>G2: Nucleoli conspicuous and eosinophilic at 400x magnification, visible but not prominent at 100x magnification</td>
</tr>
<tr>
<td>3</td>
<td>G3: Nucleoli conspicuous and eosinophilic at 100x magnification</td>
</tr>
<tr>
<td>4</td>
<td>G4: Marked nuclear pleomorphism and/or multinucleate giant cells and/or rhabdoid and/or sarcomatoid differentiation</td>
</tr>
<tr>
<td>A</td>
<td>Well differentiated</td>
</tr>
<tr>
<td>B</td>
<td>Moderately differentiated</td>
</tr>
<tr>
<td>C</td>
<td>Poorly differentiated</td>
</tr>
<tr>
<td>D</td>
<td>Undifferentiated, anaplastic</td>
</tr>
<tr>
<td>9</td>
<td>Grade cannot be assessed (GX); Unknown</td>
</tr>
</tbody>
</table>

The Urinary Tract System

[Diagram of the urinary tract system]
GU Primary Site Quiz Answers

1. d. C689 Urinary system NOS when there are tumors in multiple organs, Rule D.
2. b. C678 Bladder, overlapping lesion
3. c. C678 Bladder, overlapping lesion
4. b. C671 Bladder dome
5. b. C649 Kidney
Questions?
lori-somers@uiowa.edu