Protocol for the Examination of Biopsy and Transurethral Resection of Bladder Tumor (TURBT) Specimens From Patients With Carcinoma of the Urinary Bladder

Version: Urinary Bladder Biopsy/TURBT 4.0.2.0 Protocol Posting Date: February 2020

Accreditation Requirements
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 and transurethral resection of bladder tumor (TURBT)</td>
<td>Includes specimens designated biopsy, and transurethral resection of bladder tumor (TURBT)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinomas</td>
<td>Includes invasive carcinomas of the urinary tract, including urothelial carcinoma, its morphological variants, and other carcinoma (squamous cell carcinoma, adenocarcinoma, Müllerian carcinoma, neuroendocrine carcinoma, and sarcomatoid carcinoma)</td>
</tr>
</tbody>
</table>

The following should NOT be reported using this protocol:

<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resection (consider Urinary Bladder Resection protocol)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tumor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urachal Carcinoma</td>
</tr>
<tr>
<td>Lymphoma (consider the Hodgkin or non-Hodgkin Lymphoma protocols)</td>
</tr>
<tr>
<td>Sarcoma (consider the Soft Tissue protocol)</td>
</tr>
</tbody>
</table>

Authors
Gladell P. Paner, MD*; Ming Zhou, MD, PhD*; John R. Srigley, MD*; Mahul B. Amin, MD; Robert Allan, MD; Brett Delahunt, MD; Bernard H. Bochner, MD; Jonathan I. Epstein, MD; David J. Grignon, MD; Peter A. Humphrey, MD, PhD; 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. All other contributing authors are listed alphabetically.

Summary of Changes
Version 4.0.2.0
Modified Histologic Type (Squamous cell carcinoma)
Surgical Pathology Cancer Case Summary

Protocol posting date: February 2020

URINARY BLADDER: Biopsy and Transurethral Resection of Bladder Tumor (TURBT)

Note: This case summary is recommended for reporting biopsy and TURBT specimens but is NOT REQUIRED for accreditation purposes. Core data elements are bolded to help identify routinely reported elements.

Select a single response unless otherwise indicated.

Procedure (Note A)
___ Biopsy
___ Transurethral resection of bladder (TURBT)
___ Other (specify): ____________________________
___ Not specified

Tumor Site (select all that apply)
___ Trigone
___ Right lateral wall
___ Left lateral wall
___ Anterior wall
___ Posterior wall
___ Dome
___ Other (specify): ____________________________
___ Not specified

Histologic Type (select all that apply) (Note B)

Urothelial
___ Papillary urothelial carcinoma, noninvasive
___ Papillary urothelial carcinoma, invasive
___ Urothelial carcinoma in situ
___ Urothelial carcinoma, invasive
___ Urothelial carcinoma, nested (including large nested) variant
___ Urothelial carcinoma, microcystic variant
___ Urothelial carcinoma, micropapillary variant
___ Urothelial carcinoma, lymphoepithelioma-like variant
___ Urothelial carcinoma, plasmacytoid / signet ring / diffuse variant
___ Urothelial carcinoma, sarcomatoid variant
___ Urothelial carcinoma, giant cell variant
___ Urothelial carcinoma, poorly differentiated variant
___ Urothelial carcinoma, lipid-rich variant
___ Urothelial carcinoma, clear cell variant
___ Urothelial carcinoma with squamous differentiation
   + Specify percentage of squamous differentiation: _____%
___ Urothelial carcinoma with glandular differentiation
   + Specify percentage of glandular differentiation: _____%
___ Urothelial carcinoma with trophoblastic differentiation
   + Specify percentage of trophoblastic differentiation: _____%
___ Urothelial carcinoma with Müllarian differentiation
   + Specify percentage of Müllarian differentiation: _____%
Squamous
___ Squamous cell carcinoma
___ Verrucous carcinoma
___ Squamous cell carcinoma in situ (no invasive carcinoma identified)

Glandular
___ Adenocarcinoma
___ Adenocarcinoma, enteric
___ Adenocarcinoma, mucinous
___ Adenocarcinoma, mixed
___ Adenocarcinoma in situ (no invasive carcinoma identified)

Tumors of Müllerian Type
___ Clear cell carcinoma
___ Endometrioid carcinoma

Neuroendocrine Tumors
___ Small cell neuroendocrine carcinoma
   + Specify percentage of small cell neuroendocrine component: _____%
___ Large cell neuroendocrine carcinoma
   + Specify percentage of large cell neuroendocrine component: _____%
___ Well-differentiated neuroendocrine carcinoma
   + Specify percentage of well-differentiated neuroendocrine component: _____%
___ Other histologic type not listed (specify): ____________________________

Associated Epithelial Lesions (select all that apply) (Note C)
___ None identified
___ Urothelial papilloma
___ Urothelial papilloma, inverted type
___ Papillary urothelial neoplasm, low malignant potential (PUNLMP)
___ Urothelial dysplasia
___ Urothelial proliferation of uncertain malignant potential
___ Cannot be determined

Histologic Grade (Note C)
For urothelial carcinoma, other variants, or divergent differentiation
___ Low-grade
___ High-grade
___ Other (specify): ____________________________

For squamous cell carcinoma or adenocarcinoma
___ G1: Well-differentiated
___ G2: Moderately differentiated
___ G3: Poorly differentiated
___ GX: Cannot be assessed
___ Other (specify): ____________________________
___ Not applicable
___ Cannot be assessed
Tumor Configuration (select all that apply)
- Papillary
- Solid/nodule
- Flat
- Ulcerated
- Cannot be determined
- Other (specify): ____________________________

Muscularis Propria Presence (Note D)
- No muscularis propria (detrusor muscle) identified
- Muscularis propria (detrusor muscle) present
- Cannot be determined (explain): _________________________

Lymphovascular Invasion (Note E)
- Not identified
- Present
- Cannot be determined

Tumor Extension (select all that apply) (Note D)
- Noninvasive papillary carcinoma
- Carcinoma in situ
- Tumor invades lamina propria (subepithelial connective tissue)
- Tumor invades muscularis propria
- Urothelial carcinoma involving prostatic urethra in prostatic chips sampled by TURBT
- Urothelial carcinoma involving prostatic ducts and acini in prostatic chips sampled by TURBT
- Urothelial carcinoma invasive into prostatic stroma in prostatic chips sampled by TURBT
- Cannot be assessed

Additional Pathologic Findings (select all that apply)
- Urothelial dysplasia
- Inflammation/regenerative changes
- Therapy-related changes
- Cautery artifact
- Cystitis cystica et glandularis
- Keratinizing squamous metaplasia
- Intestinal metaplasia
- Other (specify): ____________________________

Comment(s)
Explanatory Notes

A. History
A relevant history is important for interpretation of all bladder specimens.1-4 Cystoscopic visualization findings hold useful information on the nature and extent of bladder lesions in biopsy and TURBT specimens. A history of renal stones, recent urinary tract procedures, infections, or obstruction may influence the interpretation of random biopsies obtained on patients with hematuria. Any neoplasms previously diagnosed should be specified, including the histologic type, primary site, and histologic grade. If prior therapy has been given, it should be described (systemic or intravesical chemotherapy, immunotherapy, radiation, etc).

References:

B. Histologic Type
The vast majority (more than 95%) of carcinomas of the urinary bladder, renal pelvis, and ureter are urothelial cell in origin. The most recent 2016 World Health Organization (WHO) classification of tumors of the urothelial tract, including urethra, urinary bladder, ureter, and renal pelvis, is provided in this note. Benign tumors are included in this classification because, within the same patient, a spectrum of differentiation from benign to malignant tumors may be seen in the bladder, either at the same time or over the clinical course of the disease. Also, clinicians stage most tumors irrespective of histologic grade.1-9 The distinction between a urothelial carcinoma with divergent squamous, glandular, or Müllerian differentiation and a pure squamous cell carcinoma, adenocarcinoma or Müllerian is rather arbitrary. Most authorities, including the 2016 WHO classification, require a pure histology of squamous cell carcinoma, adenocarcinoma or Müllerian to designate a tumor as such, all others with recognizable papillary, invasive, or flat carcinoma in situ (CIS) urothelial component being considered as urothelial carcinoma with divergent differentiation. A malignant neoplasm with small cell neuroendocrine carcinoma component arising in the urinary tract is designated as small cell carcinoma.

2016 WHO Classification of Tumors of the Urothelial Tract

Urothelial tumors

\textit{Infiltrating urothelial carcinoma}

- Nested, including large nested
- Microcystic
- Micropapillary
- Lymphoepithelioma-like
- Plasmacytoid/signet ring cell/diffuse
- Sarcomatoid
- Giant cell
- Poorly differentiated

\textit{Noninvasive urothelial lesions}

- Urothelial carcinoma in situ
- Noninvasive papillary urothelial carcinoma, low grade
- Noninvasive papillary urothelial carcinoma, high grade
- Papillary urothelial neoplasm of low malignant potential
- Urothelial papilloma
- Inverted urothelial papilloma
- Urothelial proliferation of uncertain malignant potential
- Urothelial dysplasia
Squamous cell neoplasms
Squamous cell carcinoma
Verrucous carcinoma
Squamous cell papilloma

Glandular neoplasms
Adenocarcinoma, NOS
Enteric
Mucinous
Mixed
Villous adenoma

Urachal carcinoma

Tumors of Mullerian type
Clear cell carcinoma
Endometrioid carcinoma

Neuroendocrine tumors
Small cell neuroendocrine carcinoma
Large cell neuroendocrine carcinoma
Well-differentiated neuroendocrine tumor
Paraganglioma

References:

C. Histologic Grade
Flat intraepithelial lesions and papillary and invasive lesions are graded separately.\(^1\)\(^-\)\(^8\) There has been significant controversy in the classification of these lesions. Flat lesions were graded as mild, moderate, and severe dysplasia and carcinoma in situ; or atypical hyperplasia and carcinoma in situ; or dysplasia and carcinoma in situ.\(^9\)\(^,\)\(^10\) Papillary lesions were classified as papillomas (grade 0) and transitional cell carcinomas, grades I, II and
or as papillomas, low-grade and high-grade transitional cell carcinomas.\textsuperscript{4-6} Due to variable classification systems and the need for a universally acceptable system, the World Health Organization/International Society of Urological Pathology (WHO/ISUP) consensus classification was proposed.\textsuperscript{4} This system is adopted in the WHO 2004 classification\textsuperscript{1} and 2004 Armed Forces Institute of Pathology (AFIP) fascicle,\textsuperscript{3} and has been validated by many studies to be prognostically significant. The 2016 WHO system used essentially the same classification with minor modification.\textsuperscript{2} Other systems (that were being used previously) may still be used according to institutional preference. Tumor grade according to both the WHO/ISUP (1998)\textsuperscript{4} / WHO (2004)\textsuperscript{1} system and the older WHO (1973)\textsuperscript{6} system may be concurrently used.

### 2004 WHO / ISUP Consensus Classification for Urothelial Lesions

<table>
<thead>
<tr>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal#</td>
</tr>
<tr>
<td>Hyperplasia</td>
</tr>
<tr>
<td>Flat hyperplasia</td>
</tr>
<tr>
<td>Papillary hyperplasia</td>
</tr>
<tr>
<td>Flat Lesions with Atypia</td>
</tr>
<tr>
<td>Reactive (inflammatory) atypia</td>
</tr>
<tr>
<td>Atypia of unknown significance</td>
</tr>
<tr>
<td>Dysplasia (low-grade intraurothelial neoplasia)#</td>
</tr>
<tr>
<td>Carcinoma in situ (high-grade intraurothelial neoplasia)##</td>
</tr>
<tr>
<td>Papillary Neoplasms</td>
</tr>
<tr>
<td>Papilloma</td>
</tr>
<tr>
<td>Inverted papilloma</td>
</tr>
<tr>
<td>Papillary neoplasm of low malignant potential</td>
</tr>
<tr>
<td>Papillary carcinoma, low-grade</td>
</tr>
<tr>
<td>Papillary carcinoma, high-grade###</td>
</tr>
<tr>
<td>Invasive Neoplasms</td>
</tr>
<tr>
<td>Lamina propria invasion</td>
</tr>
<tr>
<td>Muscularis propria (detrusor muscle) invasion</td>
</tr>
</tbody>
</table>

* May include cases formerly diagnosed as “mild dysplasia.”

## Includes cases with “severe dysplasia.”

### Option exists to add comment as to the presence of marked anaplasia.

Flat and papillary urothelial hyperplasia has been renamed as “urothelial proliferation of uncertain malignant potential” in the 2016 WHO classification.

Squamous carcinomas and adenocarcinomas may be graded as well-differentiated, moderately differentiated, and poorly differentiated.

References:


D. Extent of Invasion

A critical role of the surgical pathologist is to diagnose the depth and extent of invasion into the subepithelial connective tissue/lamina propria/submucosa (pT1), muscularis propria (pT2), or beyond (pT3 or pT4).\(^1\) In papillary tumors, invasion occurs most often at the base of the tumor and very infrequently in the stalk. In the urinary bladder, a tumor infiltrating the lamina propria (pT1) is sometimes overdiagnosed as vascular invasion; hence, caution should be exercised when diagnosing this feature, which in some cases may be supported by performing immunohistochemical studies for endothelial markers.\(^4\) Depth of invasion is a critical prognostic determinant in invasive urothelial carcinoma. In T1 disease, several substaging methods have been proposed but have been difficult to adopt due in part to the inherent lack of orientation of the specimen.\(^5,6\) Pathologists are, however, encouraged to provide some assessment as to the extent of lamina propria invasion (ie, maximum dimension of invasive focus, or depth in millimeters, or by level – above, at, or below muscularis mucosae).

Designation of a tumor as merely muscle invasive is inappropriate, but the type of muscle invasion, ie, muscularis mucosae (pT1 tumors) versus muscularis propria (pT2 tumors) invasion, needs to be clearly stated.\(^7,8\) Descriptive terminology, such as “urothelial carcinoma with muscle invasion, indeterminate for type of muscle invasion,” may be used when it is not possible to be certain whether the type of muscle invaded by the tumor is hypertrophic muscularis mucosae or muscularis propria. A comment on thermocoagulation effect may be made, especially if its presence impedes diagnostic evaluation.\(^9\) In TURBT specimens invasive into muscularis propria, no attempt should be made to stage the depth of muscularis propria invasion. Since fat may be present in the lamina propria and muscularis propria, the presence of tumor in adipose tissue is not necessarily diagnostic of extravesical spread; this determination is reserved for cystectomy specimens.\(^8,10\)

Involvement of the prostate gland may occur in several different patterns. Tumors (flat carcinoma in situ, papillary or invasive carcinoma) can first spread along the prostatic urethral mucosa and prostate glands and subsequently invade prostatic stroma (transurethral mucosal route) (Figure 1, B). Tumors may also invade through the bladder wall and the base of the prostate directly into the prostate gland (Figure 1, A, straight arrow).\(^11\) Tumors can also invade into extravesical fat and then extend back into the prostate gland (Figure 1, B, curved arrow). The latter two routes are considered direct transmural invasion. The American Joint Committee on Cancer (AJCC) 8th edition staging manual defines direct extension of urinary bladder cancer into the prostate gland as T4 disease and excludes transurethral mucosal prostatic stroma invasion from the pT4a staging status. However, there is limited data on the best methodology to stage urothelial carcinoma that concurrently involves the urinary bladder and the prostatic urethra. In patients who have a large urinary bladder carcinoma that has invaded through the full thickness of the bladder wall and thereby secondarily involves the prostatic stroma, a T4 stage should be assigned per urinary bladder staging. In other circumstances in which involvement by urothelial carcinoma is seen in both sites, separate urinary bladder and prostatic urethral staging should be assigned. Transmucosal route into prostatic stroma from a bladder cancer without transmural prostatic stromal invasion is now categorized as pT2 per urethral cancer staging, and the concomitant bladder proper cancer is given a separate stage category according to the bladder cancer staging.
E. Lymphovascular Invasion

Urothelial carcinoma may invade blood vessels or lymphatic channels. Lymphovascular invasion has been shown to be an independent predictor of recurrence and decreased overall survival. Presence of lymph-vascular invasion in TURBT specimens is associated with higher nodal metastasis. In suspicious cases, blood vessels can be highlighted by immunohistochemical staining for factor VIII-related antigen, CD31 or CD34. Staining will not resolve the problem of differentiating lymphatic versus artifactual space entrapment by tumor cells, and as mentioned, this is frequently seen in urothelial tumors invading the lamina propria. Retraction artifact is also prominent in the “micropapillary variant” of urothelial carcinoma.3
References: