

Protocol for the Examination of Specimens From Patients With Carcinoma of the Prostate Gland

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for the Members of the Cancer Committee, College of American Pathologists

The College of American Pathologists offers these protocols to assist pathologists in providing clinically useful and relevant information when reporting results of surgical specimen examinations. The College regards the reporting elements in the "Surgical Pathology Cancer Case Summary (Checklist)" portion of the protocols as essential elements of the pathology report. However, the manner in which these elements are reported is at the discretion of each specific pathologist, taking into account clinician preferences, institutional policies, and individual practice.

The College developed these protocols as an educational tool to assist pathologists in the useful reporting of relevant information. It did not issue the protocols for use in litigation, reimbursement, or other contexts. Nevertheless, the College recognizes that the protocols might be used by hospitals, attorneys, payers, and others. Indeed, effective January 1, 2004, the Commission on Cancer of the American College of Surgeons mandated the use of the checklist elements of the protocols as part of its Cancer Program Standards for Approved Cancer Programs. Therefore, it becomes even more important for pathologists to familiarize themselves with these documents. At

the same time, the College cautions that use of the protocols other than for their intended educational purpose may involve additional considerations that are beyond the scope of this document.

PROTOCOL FOR THE EXAMINATION OF SPECIMENS FROM PATIENTS WITH CARCINOMA OF THE PROSTATE GLAND

This protocol applies to invasive carcinomas of the prostate gland. The 7th edition TNM staging system for carcinoma of the prostate of the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) is recommended.

SURGICAL PATHOLOGY CANCER CASE SUMMARY (CHECKLIST)

Prostate Gland: Needle Biopsy

Select a Single Response Unless Otherwise Indicated

* Data elements with asterisks are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

Note: The Gleason grade and score and the tumor extent measures should be documented for each positive specimen (container). The essential information in each specimen could be conveyed with a simple diagnostic line such as, "Adenocarcinoma, Gleason grade 3 + 4 = score of 7, in 1 of 2 cores, involving 20% of needle core tissue, and measuring 4 mm in length." (See "Explanatory Notes.")

Histologic Type (note A)

- ___ Adenocarcinoma (acinar, not otherwise specified)
- ___ Other (specify): _____

Histologic Grade (note B)

Gleason Pattern

(If 3 patterns present, use most predominant pattern and worst pattern of remaining 2)

- ___ Not applicable
- ___ Cannot be determined

Primary (Predominant) Pattern

- ___ Grade 1
- ___ Grade 2
- ___ Grade 3
- ___ Grade 4
- ___ Grade 5

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Secondary (Worst Remaining) Pattern

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5

Total Gleason Score: ___

Tumor Quantitation (note C)

Number cores positive: ___

Total number of cores: ___
and

Proportion (percentage) of prostatic tissue involved by tumor: ___

or

Number cores positive: ___

Total number of cores: ___
and

Total linear millimeters of carcinoma: ___ mm

Total linear millimeters of needle core tissue: ___ mm

or

Number cores positive: ___

Total number of cores: ___
and

Proportion (percentage) of prostatic tissue involved by tumor: ___

and

Total linear millimeters of carcinoma: ___ mm

Total linear millimeters of needle core tissue: ___ mm

*Proportion (percentage) of prostatic tissue involved by tumor for core with the greatest amount of tumor: ___%

Periprostatic Fat Invasion (document if identified) (note D)

- * Not identified
- Present

Seminal Vesicle Invasion (document if identified) (note D)

- * Not identified
- Present

***Lymph-Vascular Invasion**

- * Not identified
- * Present
- * Indeterminate

***Perineural Invasion (note E)**

- * Not identified
- * Present

***Additional Pathologic Findings (select all that apply)**

- * None identified
- * High-grade prostatic intraepithelial neoplasia (PIN) (note F)
- * Atypical adenomatous hyperplasia (adenosis)
- * Inflammation (specify type): _____
- * Other (specify): _____

*Comment(s): _____

SURGICAL PATHOLOGY CANCER CASE SUMMARY (CHECKLIST)

Prostate Gland: Transurethral Prostatic Resection (TUR), Enucleation Specimen (Subtotal Prostatectomy)

Select a Single Response Unless Otherwise Indicated

* Data elements with asterisks are not required. However,

these elements may be clinically important but are not yet validated or regularly used in patient management.

Procedure

- Transurethral prostatic resection (note G)
- Enucleation
- Other (specify): _____
- Not specified

Specimen Size

Weight: ___ g
Size (enucleation specimens only): ___ × ___ × ___ cm

Histologic Type (note A)

- Adenocarcinoma (acinar, not otherwise specified)
- Other (specify): _____

Histologic Grade (note B)

Gleason Pattern

(If 3 patterns present, use most predominant pattern and worst pattern of remaining 2)

- Not applicable
- Cannot be determined

Primary (Predominant) Pattern

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5

Secondary (Worst Remaining) Pattern

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5

Total Gleason Score: ___

Tumor Quantitation: TUR Specimens (note C)

Proportion (percentage) of prostatic tissue involved by tumor: ___%

Tumor incidental histologic finding in no more than 5% of tissue resected with Gleason score 2 to 6 (cT1a)

Tumor incidental histologic finding in more than 5% of tissue resected or Gleason score 7 to 10 (cT1b)

*Number of positive chips: ___

*Total number of chips: ___

Tumor Quantitation: Enucleation Specimens (note C)

Proportion (percentage) of prostatic tissue involved by tumor: ___

* Tumor size (dominant nodule, if present):

*Greatest dimension: ___ cm

*Additional dimensions: ___ × ___ cm

Periprostatic Fat Invasion (document if identified) (note D)

- * Not identified
- Present

Seminal Vesicle Invasion (document if identified) (note D)

- * Not identified
- Present

***Lymph-Vascular Invasion**

- * Not identified
- * Present
- * Indeterminate

***Perineural Invasion** (note E)

- * ___ Not identified
- * ___ Present

***Additional Pathologic Findings (select all that apply)**

- * ___ None identified
- * ___ High-grade prostatic intraepithelial neoplasia (PIN) (note F)
- * ___ Atypical adenomatous hyperplasia (adenosis)
- * ___ Nodular prostatic hyperplasia
- * ___ Inflammation (specify type): _____
- * ___ Other (specify): _____

***Comment(s):** _____

**SURGICAL PATHOLOGY CANCER CASE SUMMARY
(CHECKLIST)**

Prostate Gland: Radical Prostatectomy

Select a Single Response Unless Otherwise Indicated

* Data elements with asterisks are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

Procedure (note G)

- ___ Radical prostatectomy
- ___ Other (specify): _____
- ___ Not specified

Prostate Size (note G)

- Weight: ___ g
- Size: ___ × ___ × ___ cm

Lymph Node Sampling (note G)

- ___ No lymph nodes present
- ___ Pelvic lymph node dissection

Histologic Type (note A)

- ___ Adenocarcinoma (acinar, not otherwise specified)
- ___ Prostatic duct adenocarcinoma
- ___ Mucinous (colloid) adenocarcinoma
- ___ Signet-ring cell carcinoma
- ___ Adenosquamous carcinoma
- ___ Small cell carcinoma
- ___ Sarcomatoid carcinoma
- ___ Undifferentiated carcinoma, not otherwise specified
- ___ Other (specify): _____

Histologic Grade (note B)

Gleason Pattern

(If 3 patterns are present, record the most predominant and second-most common patterns; the tertiary pattern should be recorded if higher than the primary and secondary patterns, but it is not incorporated into the Gleason score)

- ___ Not applicable
- ___ Cannot be determined

Primary Pattern

- ___ Grade 1
- ___ Grade 2
- ___ Grade 3
- ___ Grade 4
- ___ Grade 5

Secondary Pattern

- ___ Grade 1
- ___ Grade 2
- ___ Grade 3

- ___ Grade 4
- ___ Grade 5

Tertiary Pattern

- ___ Grade 3
- ___ Grade 4
- ___ Grade 5
- ___ Not applicable

Total Gleason Score: ___

Tumor Quantitation (note C)

Proportion (percentage) of prostate involved by tumor: ___%

and/or

Tumor size (dominant nodule, if present):

Greatest dimension: ___ mm

Additional dimensions: ___ × ___ mm

Extraprostatic Extension (select all that apply) (note H)

- ___ Not identified
- ___ Present
 - ___ Focal
 - * ___ Specify site(s): _____
 - ___ Nonfocal (established, extensive)
 - * ___ Specify site(s): _____
- ___ Indeterminate

Seminal Vesicle Invasion (invasion of muscular wall required) (note D)

- ___ Not identified
- ___ Present
- ___ No seminal vesicle present

Margins (select all that apply) (note I)

- ___ Cannot be assessed
- * ___ Benign glands at surgical margin
- ___ Margins uninvolved by invasive carcinoma
- ___ Margin(s) involved by invasive carcinoma
 - * ___ Unifocal
 - * ___ Multifocal
 - ___ Apical
 - ___ Bladder neck
 - ___ Anterior
 - ___ Lateral
 - ___ Posterolateral (neurovascular bundle)
 - ___ Posterior
 - ___ Other(s) (specify): _____

Treatment Effect on Carcinoma (select all that apply)

- ___ Not identified
- ___ Radiation therapy effect present
- ___ Hormonal therapy effect present
- ___ Other therapy effect(s) present (specify): _____

Lymph-Vascular Invasion

- ___ Not identified
- ___ Present
- ___ Indeterminate

***Perineural Invasion** (note E)

- * ___ Not identified
- * ___ Present

Pathologic Staging (pTNM) (note K)

TNM Descriptors (required only if applicable) (select all that apply)

- ___ m (multiple)
- ___ r (recurrent)
- ___ y (posttreatment)

Primary Tumor (pT)

- ___ Not identified
- ___ pT2: Organ confined
- * ___ pT2a: Unilateral, involving one-half of 1 side or less
- * ___ pT2b: Unilateral, involving more than one-half of 1 side but not both sides
- * ___ pT2c: Bilateral disease
- ___ pT3: Extraprostatic extension
- ___ pT3a: Extraprostatic extension or microscopic invasion of bladder neck
- ___ pT3b: Seminal vesicle invasion
- ___ pT4: Invasion of rectum, levator muscles and/or pelvic wall (note J)

Note: There is no pathologic T1 classification. Subdivision of pT2 disease is problematic and has not proven to be of prognostic significance.

Regional Lymph Nodes (pN)

- ___ pNX: Cannot be assessed
- ___ pN0: No regional lymph node metastasis
- ___ pN1: Metastasis in regional lymph node or nodes
Specify: Number examined: ___
Number involved: ___
Diameter of largest lymph node metastasis:
___ (mm)

Distant Metastasis (pM)

- ___ Not applicable
- ___ pM1: Distant metastasis
- ___ pM1a: Nonregional lymph nodes(s)
- ___ pM1b: Bone(s)
- ___ pM1c: Other site(s) with or without bone disease

Note: When more than 1 site of metastasis is present, the most advanced category is used. pM1c is most advanced.

***Additional Pathologic Findings (select all that apply)**

- * ___ None identified
- * ___ High-grade prostatic intraepithelial neoplasia (PIN) (note F)
- * ___ Inflammation (specify type): _____
- * ___ Atypical adenomatous hyperplasia (adenosis)
- * ___ Nodular prostatic hyperplasia
- * ___ Other (specify): _____

***Ancillary Studies**

- *Specify: _____
- * ___ Not performed

***Comment(s):** _____

- Urothelial (transitional cell) carcinoma†
- Small cell carcinoma
- Sarcomatoid carcinoma
- Lymphoepithelioma-like carcinoma†
- Undifferentiated carcinoma, not otherwise specified

† This protocol does not apply to these carcinomas.

B: Gleason Score.—The Gleason grading system is recommended for use in all prostatic specimens containing adenocarcinoma, with the exception of those showing treatment effects, usually in the setting of androgen withdrawal.^{2,3} Gleason score is an important parameter used in nomograms, such as the Kattan nomograms,^{4,5} and the Partin tables,⁶ which guide individual treatment decisions. Readers are referred to the recommendations of a recent consensus conference dealing with the contemporary usage of the Gleason system.⁷ The Gleason score is the sum of the primary (most predominant in terms of surface area of involvement) Gleason grade and the secondary (second-most predominant) Gleason grade. Where no secondary Gleason grade exists, the primary Gleason grade is doubled to arrive at a Gleason score. The primary and secondary grades should be reported in addition to the Gleason score, that is, Gleason score 7 (3 + 4) or 7 (4 + 3).

In needle biopsy specimens, it is recommended that Gleason scores be assigned for each specimen (container). Alternatively, a Gleason score may be given for each positive, intact core in a container.

In needle biopsy specimens where there is a minor secondary component (<5% of tumor) and where the secondary component is of higher grade, the latter should be reported. For instance, a case showing more than 95% Gleason 3 and less than 5% Gleason 4 should be reported as Gleason score 7 (3 + 4). Conversely, if a minor secondary pattern is of lower grade, it need not be reported. For instance, where there is greater than 95% Gleason score 4 and less than 5% Gleason 3, the score should be reported as Gleason 8 (4 + 4).

In needle biopsy specimens where more than 2 patterns are present, and the worst grade is neither the predominant nor the secondary grade, the predominant and highest grade should be chosen to arrive at a score (eg, 75%, grade 3; 20%–25%, grade 4; <5%, grade 5 is scored as 3 + 5 = 8). This approach has been validated in a large clinical series.⁸

Rules of grading, similar to the above, apply to transurethral resection and enucleation (simple prostatectomy) specimens.

Tertiary Gleason patterns are common in radical prostatectomy specimens. When Gleason pattern 5 is present as a tertiary pattern, its presence should be recognized in the report. For instance, in a situation where the primary Gleason grade is 3, the secondary is 4, and there is less than 5% Gleason 5, the report should indicate a Gleason score of 7 (3 + 4) with tertiary Gleason pattern 5.

For radical prostatectomy specimens, Gleason score should be assigned to the dominant nodule(s), if present. Where more than one separate tumor is clearly identified, the Gleason scores of individual tumors can be recorded separately, or, at the very least, a Gleason score of the dominant or most significant lesion should be recorded. For instance, if there is a large Gleason score 4 (2 + 2) transition zone tumor and a separate, smaller Gleason score 8 (4 + 4), peripheral zone cancer, both scores should

EXPLANATORY NOTES

A: Histologic Type.—This protocol applies only to carcinomas of the prostate gland. The histologic classification of prostate carcinoma is recommended and shown below.¹ However, this protocol does not preclude the use of other systems of classification or histologic types. Mixtures of different histologic types should be indicated.

Histologic Classification of Carcinoma of the Prostate

- Adenocarcinoma (conventional, acinar)
- Special variants of adenocarcinoma and other carcinomas
- Prostatic duct adenocarcinoma
- Mucinous (colloid) adenocarcinoma
- Signet-ring cell carcinoma
- Adenosquamous carcinoma
- Squamous cell carcinoma†
- Basaloid (basal cell) and adenoid cystic carcinoma†

be reported, or, at the very least, the latter score should be reported rather than these scores being averaged.

C: Quantitation of Tumor.—There are many methods of estimating the amount of tumor in prostatic specimens.^{9–17} For needle core biopsy specimens, it is suggested that the number of positive cores out of the total number of cores always be reported, except in situations where fragmentation precludes accurate counting. The estimated proportion (percentage) of prostatic tissue involved by tumor and/or the linear millimeters of the tumor should also be reported. Reporting of the positive core with the greatest percentage of tumor is an option. In transurethral resections, the proportion (percentage) of tissue involved by carcinoma should always be reported, in addition to the number of positive chips and the ratio or percentage of positive chips to total chips. In subtotal and radical prostatectomy specimens, the percentage of tissue involved by tumor can also be eyeballed by simple visual inspection. Additionally, in these latter specimens, it may be possible to measure a dominant tumor nodule in at least 2 dimensions and/or to indicate the number of blocks involved by tumor out of the total number of prostatic blocks submitted.

D: Local Invasion in Needle Biopsies.—Occasionally, in needle biopsies, periprostatic fat is present and involved by tumor.⁹ This observation should be noted because it indicates that the tumor is at least pT3a in the TNM system. Furthermore, if seminal vesicle tissue is present (either unintentionally or intentionally, as in a directed biopsy) and involved by tumor, this should be reported because it indicates that the tumor is at least pT3b. Seminal vesicle invasion is defined by involvement of the muscular wall.^{9,18} At times, especially in needle biopsy specimens, it is difficult to distinguish between seminal vesicle and ejaculatory duct tissue. It is important not to overinterpret the ejaculatory duct as the seminal vesicle because involvement of the former by tumor does not constitute pT3b disease. If there is doubt as to whether the involved tissue represents the seminal vesicle or the ejaculatory duct, then invasion of the seminal vesicle should not be definitively diagnosed.

E: Perineural Invasion.—Perineural invasion in needle core biopsies has been associated with extraprostatic extension in some correlative radical prostatectomy studies, although its exact prognostic significance remains to be determined.^{9,14,19–22} Perineural invasion has also been found to be an independent risk factor, in some studies, for predicting an adverse outcome in patients treated with external beam radiation¹⁹ but not for patients treated with brachytherapy or radical prostatectomy.²⁰ The value of perineural invasion as an independent prognostic factor has been questioned in a multivariate analysis.²²

F: Prostatic Intraepithelial Neoplasia.—The diagnostic term *prostatic intraepithelial neoplasia* (PIN), unless qualified, refers to high-grade PIN. Low-grade PIN is not reported. The presence of an isolated PIN (PIN in the absence of carcinoma) should be reported in all biopsy specimens.⁹ The reporting of PIN in biopsies with carcinoma is considered optional. High-grade PIN in a biopsy without evidence of carcinoma has, in the past, been a risk factor for the presence of carcinoma on subsequent biopsies, but the magnitude of the risk has diminished, and, in some studies, high-grade PIN was not a risk factor at all, unless

multiple cores were positive for PIN.^{23–26} The reporting of high-grade PIN in prostatectomy specimens is optional.

G: Submission of Tissue for Microscopic Evaluation in Transurethral Resection and Radical Prostatectomy Specimens.—Transurethral resection specimens that weigh 12 g or less should be submitted in their entirety, usually in 6 to 8 cassettes.²⁷ For specimens that weigh more than 12 g, the initial 12 g are submitted (6 to 8 cassettes), and 1 cassette may be submitted for every additional 5 g.

In general, random chips are submitted; however, if some chips are firmer or have a yellow or orange-yellow appearance, they should be submitted preferentially.

If an unsuspected carcinoma is found in tissue submitted, and it involves 5% or less of the tissue examined, the remaining tissue may be submitted for microscopic examination, especially in younger patients.

A radical prostatectomy specimen may be submitted in its entirety or partially sampled in a systematic fashion.^{28,29} For partial sampling in the setting of a grossly visible tumor, the tumor and associated periprostatic tissue and margins, along with the entire apical and bladder neck margins and the junction of each seminal vesicle with the prostate proper, should be submitted. If there is no grossly visible tumor, a number of systematic sampling strategies may be used. One that yields excellent prognostic information involves submitting the posterior aspect of each transverse slice along with a mid anterior block from each side.²⁹ The anterior sampling detects the T1c cases arising in the transition zone and extending anteriorly. The entire apical and bladder neck margins and the junction of each seminal vesicle with the prostate should also be submitted.

H: Extraprostatic Extension.—*Extraprostatic extension* (EPE) is the preferred term for the presence of tumor beyond the confines of the prostate gland.^{28,30–32} Tumor admixed with fat constitutes extraprostatic extension. Tumor involving loose connective tissue in the plane of fat or beyond, even in the absence of direct contact between the tumor and the adipocytes, indicates EPE. Extraprostatic extension may also be reported when the tumor involves perineural spaces in the neurovascular bundles, even in the absence of periprostatic fat involvement. In certain locations, such as the anterior and apical prostate and bladder neck regions, there is a paucity of fat, and in these locations, EPE is determined when the tumor extends beyond the confines of the normal glandular prostate. In the distal, apical, perpendicular margin section, it is often difficult to identify EPE. Sometimes, there is a distinct bulging tumor nodule, which may be associated with a desmoplastic stromal reaction. The specific location(s) and the number of sites (blocks) of EPE are useful to report. Descriptors of EPE (focal versus nonfocal) should be used. Focal EPE equates with only a few neoplastic glands being outside the prostate or a tumor involving less than 1 high-power field in 1 or 2 sections³⁰; nonfocal (established) EPE is more extensively spread beyond the prostatic edge.

I: Margins.—The entire surface of the prostate should be inked to evaluate the surgical margins.^{28–36} Usually, surgical margins should be designated as *negative* if tumor is not present at the inked margin, and as *positive* if tumor cells touch the ink at the margin. When tumor is located very close to an inked surface but is not actually in contact

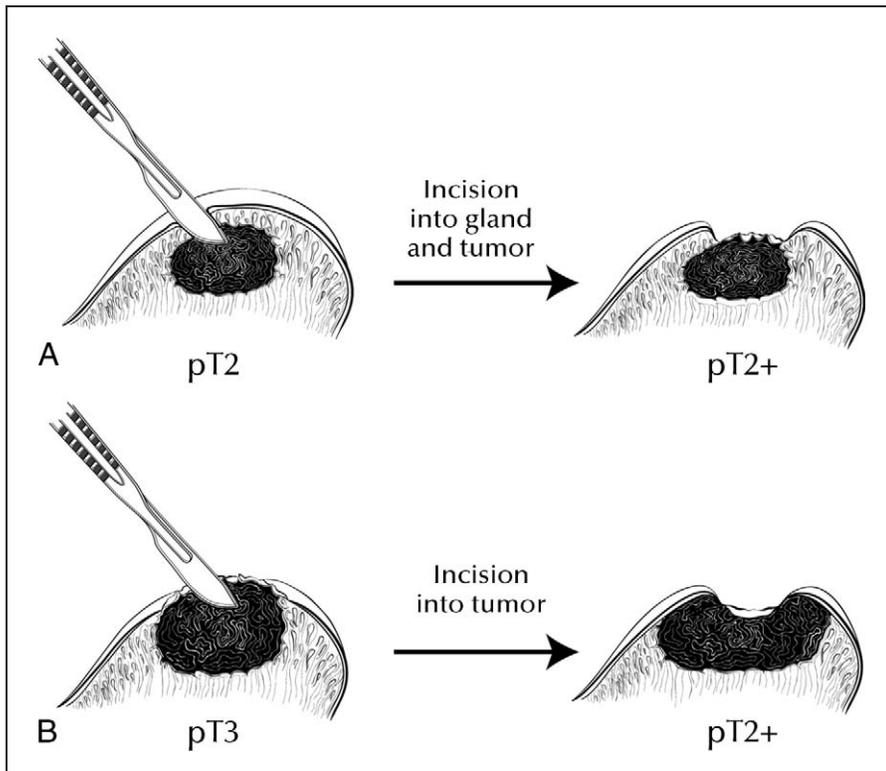


Figure 1. Surgical incision can create stage pT2+ from either pT2 (A) or pT3 (B) disease.

with the ink, the margin is considered negative. Positive surgical margins should not be interpreted as extraprostatic extension. Intraprostatic margins are positive in the setting of intraprostatic incision (so-called pT2+ disease; Figure 1, A and B).²⁸ If the surgical margin finding is positive, the pathologist should state that explicitly, although this finding is not relied on for pathologic staging. The specific locations of the positive margins should be reported, and it should be specified whether EPE or intraprostatic incision is present at each site of margin positivity. There should be some indication of the extent of margin positivity. At the 2009 International Society of Urological Pathology Consensus Conference on Handling and Staging of Radical Prostatectomy Specimens, it was recommended that the extent of a positive margin be reported as millimeters of involvement.

J: Apex and Bladder Neck.—The apex should be carefully examined because it is a common site of margin positivity.²⁸⁻³¹ At the apex, tumor admixed with skeletal muscle elements does not constitute extraprostatic extension. The apical and bladder neck surgical margins should be submitted entirely, preferably with a perpendicular sectioning technique. Microscopic involvement of bladder neck muscle fibers in radical prostatectomy specimens indicates pT3a disease.³⁷

K: TNM and Stage Groupings.—The protocol recommends the use of the TNM Staging System for carcinoma of the prostate of the AJCC and the UICC.³⁸

By AJCC/UICC convention, the designation *T* refers to a primary tumor that has not been previously treated. The symbol *p* refers to the pathologic classification of the TNM, as opposed to the clinical classification, and is based on gross and microscopic examination. pT entails a resection of the primary tumor or a biopsy adequate to evaluate

the highest pT category, pN entails removal of nodes adequate to validate lymph node metastasis, and pM implies microscopic examination of distant lesions. Clinical classification (cTNM) is usually carried out by the referring physician before treatment, during initial evaluation of the patient, or when pathologic classification is not possible.

Pathologic staging is usually performed after surgical resection of the primary tumor. Pathologic staging depends on pathologic documentation of the anatomic extent of disease, whether or not the primary tumor has been completely removed. If a biopsied tumor is not resected for any reason (eg, when technically unfeasible), and if the highest T and N categories or the M1 category of the tumor can be confirmed microscopically, the criteria for pathologic classification and staging have been satisfied without total removal of the primary cancer. pT2, pT3a, and pT3b are illustrated in Figures 2 through 5.³⁹

Primary Tumor (T): Clinical Classification

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- T1 Clinically inapparent tumor neither palpable nor visible by imaging
 - T1a Tumor incidental histologic finding in 5% or less of tissue resected
 - T1b Tumor incidental histologic finding in more than 5% of tissue resected
 - T1c Tumor identified by needle biopsy (eg, because of elevated prostate specific antigen [PSA])
- T2 Tumor confined within prostate†
 - T2a Tumor involves one-half of one lobe or less
 - T2b Tumor involves more than one-half of one lobe but not both lobes
 - T2c Tumor involves both lobes
- T3 Tumor extends through the prostate capsule#

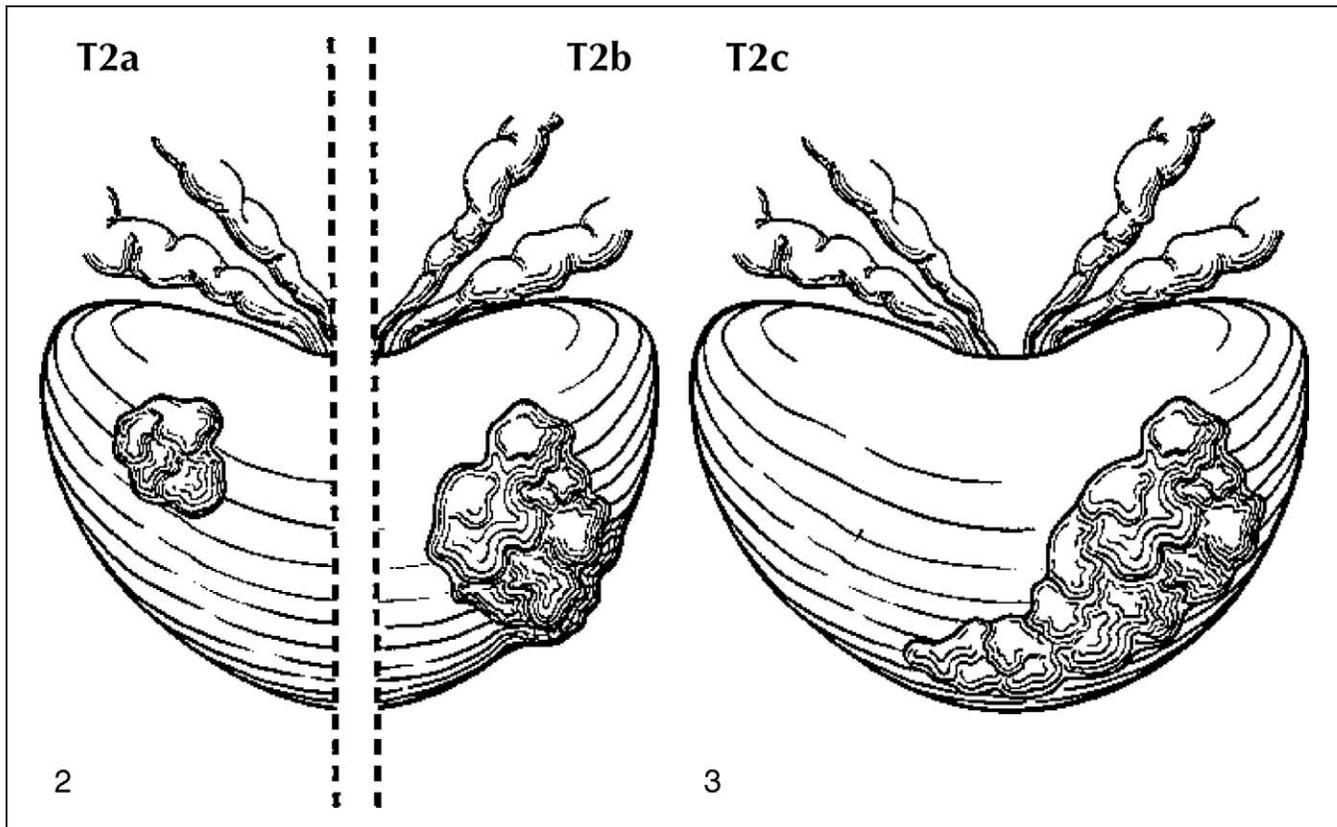


Figure 2. T2a (left) shows tumor involving one-half of one lobe (side) or less, whereas T2b (right) shows tumor involving more than one-half of one lobe but not both lobes. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al⁹⁹ and published by Springer Science and Business Media, LLC, <http://www.springerlink.com>.

Figure 3. T2c tumor involving both lobes (sides). Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al⁹⁹ and published by Springer Science and Business Media, LLC, <http://www.springerlink.com>.

- T3a Extracapsular extension (unilateral or bilateral) including microscopic bladder neck involvement
- T3b Tumor invades seminal vesicle(s)
- T4 Tumor is fixed or invades adjacent structures other than seminal vesicles: bladder neck, external sphincter, rectum, levator muscles, and/or pelvic wall

‡ Tumor found in one or both lobes by needle biopsy that is not palpable or reliably visible by imaging, is classified as T1c.

Invasion into the prostatic apex or into (but not beyond) the prostatic capsule is classified not as T3 but as T2.

The 2009 Anatomic Stage/Prognostic Groups incorporate serum PSA level and Gleason score:

Anatomic Stage/Prognostic Groups

Group	T	N	M	PSA	Gleason
I	T1a-c	N0	M0	PSA < 10	Gleason ≤ 6
	T2a	N0	M0	PSA < 10	Gleason ≤ 6
	T1-2a	N0	M0	PSA X	Gleason X
IIA	T1a-c	N0	M0	PSA < 20	Gleason 7
	T1a-c	N0	M0	10 ≤ PSA < 20	Gleason ≤ 6
	T2a	N0	M0	PSA < 20	Gleason ≤ 7
	T2b	N0	M0	PSA < 20	Gleason ≤ 7

	T2b	N0	M0	PSA X	Gleason X
IIB	T2c	N0	M0	Any PSA	Any Gleason
	T1-2	N0	M0	PSA ≥ 20	Any Gleason
	T1-2	N0	M0	Any PSA	Gleason ≥ 8
III	T3a-c	N0	M0	Any PSA	Any Gleason
IV	T4	N0	M0	Any PSA	Any Gleason
	Any T	N1	M0	Any PSA	Any Gleason
	Any T	Any N	M1	Any PSA	Any Gleason

Note: When either PSA or Gleason is not available, grouping should be determined by T stage and/or whichever of the either PSA or Gleason is available.

TNM Descriptors

For identification of special cases of TNM or pTNM classifications, the *m* suffix and the *y*, *r*, and *a* prefixes are used. Although they do not affect the stage grouping, they indicate cases that need separate analysis.

The *m* suffix indicates the presence of multiple primary tumors in a single site and is recorded in parentheses: pT(m)NM.

The *y* prefix indicates those cases in which classification is performed during or following initial multimodality therapy (ie, neoadjuvant chemotherapy, radiation therapy, or both chemotherapy and radiation therapy). The cTNM or pTNM category is identified by a *y* prefix. The ycTNM or ypTNM categorizes the extent of tumor actually present

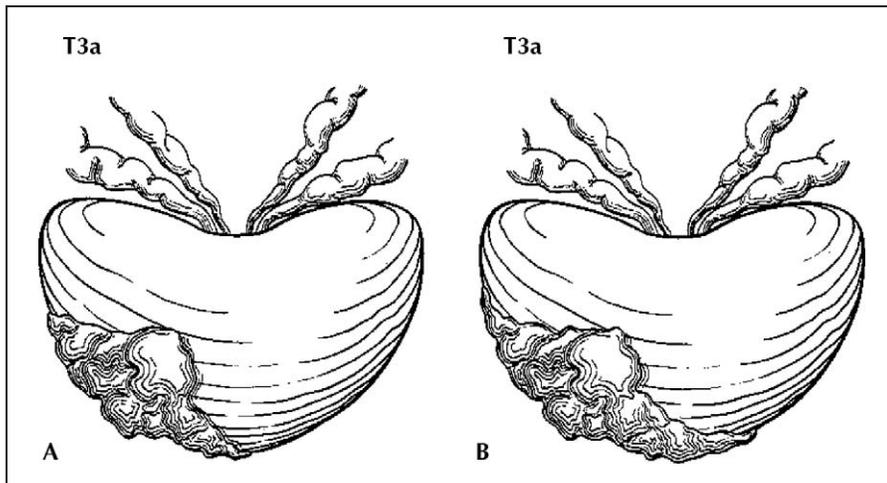


Figure 4. T3a is defined as a tumor with unilateral extraprostatic extension (A) or with bilateral extension (B). Microscopic extension into the bladder neck is also pT3a. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al¹⁹ and published by Springer Science and Business Media, LLC, <http://www.springerlink.com>.

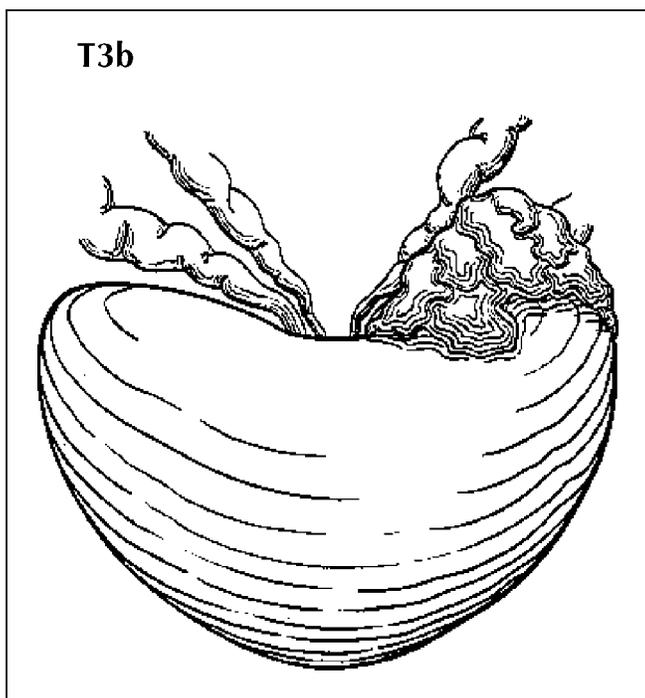


Figure 5. T3b tumor invading the seminal vesicle. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al¹⁹ and published by Springer Science and Business Media, LLC, <http://www.springerlink.com>.

at the time of that examination. The *y* categorization is not an estimate of tumor before multimodality therapy (ie, before initiation of neoadjuvant therapy).

The *r* prefix indicates a recurrent tumor when staged after a documented disease-free interval: rTNM.

The *a* prefix designates the stage determined at autopsy: aTNM.

Additional Descriptors

Residual Tumor.—Tumor remaining in a patient after therapy with curative intent (eg, surgical resection for cure) is categorized by a system known as R classification, shown below.

RX Presence of residual tumor cannot be assessed

- R0 No residual tumor
- R1 Microscopic residual tumor
- R2 Macroscopic residual tumor

For the surgeon, the R classification may be useful to indicate the known or assumed status of the completeness of a surgical excision. For the pathologist, the R classification is relevant to the status of the margins of a surgical resection specimen. That is, tumor involving the resection margin on pathologic examination may be assumed to correspond to residual tumor in the patient and may be classified as macroscopic or microscopic according to the findings at the specimen margin(s).

Lymph-Vascular Invasion.—Lymph-vascular invasion (LVI) indicates whether microscopic, lymph-vascular invasion is identified in the pathology report. LVI includes lymphatic invasion, vascular invasion, or lymph-vascular invasion. By AJCC/UICC convention, LVI does not affect the T category, indicating local extent of tumor, unless specifically included in the definition of a T category.

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