Testis

Protocol applies to all malignant germ cell and malignant sex cord-stromal tumors of the testis, exclusive of paratesticular malignancies.

Protocol revision date: January 2005
Based on AJCC/UICC TNM, 6th edition

Procedures
• Radical Orchietomy
• Retroperitoneal Lymphadenectomy (RPLND)

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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 of surgical specimens. 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 the document. 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.
Summary of Changes to Checklist(s)

No changes have been made to the data elements of the checklist(s) since the January 2004 protocol revision.
Surgical Pathology Cancer Case Summary (Checklist)

Protocol revision date: January 2005
Applies to invasive cancers only
Based on AJCC/UICC TNM, 6th edition

TESTIS: Radical Orchiectomy

Patient name:
Surgical pathology number:

*Note: Check 1 response unless otherwise indicated.*

*Serum Tumor Markers (check all that apply)
(see optional Serum Tumor Markers Classification [S] in Microscopic section)
*___ Unknown
*___ Serum marker studies within normal limits
*___ Alpha-fetoprotein (AFP) elevation
*___ Beta-subunit of human chorionic gonadotropin (b-hCG) elevation
*___ Lactate dehydrogenase (LDH) elevation

MACROSCOPIC

Laterality
___ Right
___ Left
___ Both
___ Not specified

Focality
___ Unifocal
___ Multifocal

Tumor Size
Greatest dimension of main tumor mass: ___ cm
*Additional dimensions: ___ x ___ cm
Greatest dimensions of additional tumor nodules: ___cm, ___ cm, etc
___ Cannot be determined (see Comment)

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
MICROSCOPIC

Histologic Type
___ Intratubular germ cell neoplasm, unclassified only
___ Seminoma, classic type
___ Seminoma with syncytiotrophoblastic cells
___ Mixed germ cell tumor (specify components and percentages):
________________________________________________
________________________________________________
___ Embryonal carcinoma
___ Yolk sac tumor
___ Choriocarcinoma, biphasic
___ Choriocarcinoma, monophasic
___ Placental site trophoblastic tumor
___ Mature teratoma
___ Immature teratoma
___ Teratoma with a secondary malignant component
   (specify type): ____________________________
___ Monodermal teratoma, carcinoid
___ Monodermal teratoma, primitive neuroectodermal tumor
___ Monodermal teratoma, other (specify): ____________________________
___ Polyembryoma
___ Diffuse embryoma
___ Spermatocytic seminoma
___ Spermatocytic seminoma with a sarcomatous component
___ Testicular scar
___ Mixed germ cell-sex cord-stromal tumor, gonadoblastoma
___ Mixed germ cell-sex cord-stromal tumor, others
   (specify): ____________________________
___ Other (specify): ____________________________
___ Malignant neoplasm, type cannot be determined

Pathologic Staging (pTNM)

Primary Tumor (pT)
___ pTX: Cannot be assessed
___ pT0: No evidence of primary tumor
___ pTis: Intratubular germ cell neoplasia only (carcinoma in situ)
___ pT1: Tumor limited to the testis and epididymis without vascular/lymphatic invasion
   (tumor may invade tunica albuginea but not tunica vaginalis)
___ pT2: Tumor limited to the testis and epididymis with vascular/lymphatic invasion or
tumor extending through tunica albuginea with involvement of tunica vaginalis
___ pT3: Tumor invades spermatic cord with or without vascular/lymphatic invasion
___ pT4: Tumor invades scrotum with or without vascular/lymphatic invasion

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the Commission on Cancer. These elements may be clinically important,
but are not yet validated or regularly used in patient management.
Alternatively, the necessary data may not be available to the pathologist
at the time of pathologic assessment of this specimen.
Testis • Genitourinary

Regional Lymph Nodes (pN)
___ pNX: Cannot be assessed
___ pN0: No regional lymph node metastasis
___ pN1: Metastasis with a lymph node mass less than 2 cm in greatest dimension and
      5 or fewer positive nodes, none more than 2 cm in greatest dimension
___ pN2: Metastasis with a lymph node mass greater than 2 cm but not more than 5 cm
       in greatest dimension, or more than 5 nodes positive, none greater than 5 cm;
       or evidence of extranodal extension of tumor
___ pN3: Metastasis with a lymph node mass greater than 5 cm in greatest dimension
Specify: Number examined: ___
Number involved: ___

Distant Metastasis (pM)
___ pMX: Cannot be assessed
pM1: Distant metastasis present
___ pM1a: Non-regional lymph nodes or pulmonary metastasis
___ pM1b: Distant metastasis other than to non-regional lymph nodes and lungs
       *Specify site(s), if known: ___________________________

*Serum Tumor Markers (S)
* ___ SX: Serum marker studies not available or performed
* ___ S0: Serum marker study levels within normal limits
       LDH     HCG (mIU/mL)     AFP (ng/mL)
* ___ S1: <1.5 x nl and <5,000 and <1,000
* ___ S2: 1.5-10 x nl or 5,000-50,000 or 1,000-10,000
* ___ S3: >10 x nl or >50,000 or >10,000

Margins (check all that apply)

Spermatic Cord Margin
___ Cannot be assessed
___ Uninvolved by tumor
___ Involved by tumor

Other Margin(s)
___ Cannot be assessed
___ Uninvolved by tumor (specify): ____________________________
___ Involved by tumor (specify): ____________________________
___ Not applicable

Direct Extension of Invasive Tumor (check all that apply)
* ___ Rete testis
* ___ Epididymis
___ Peri-hilar fat
___ Spermatic cord
___ Tunica vaginalis
___ Scrotal wall
___ None of the above

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Venous/Lymphatic (Large/Small Vessel) Invasion (V/L)
___ Absent
___ Present
___ Indeterminate

*Additional Pathologic Findings (check all that apply)
*___ None identified
*___ Intratubular germ cell neoplasia
*___ Hemosiderin-laden macrophages
*___ Atrophy
*___ Other (specify): ____________________________

*Comment(s)
Surgical Pathology Cancer Case Summary (Checklist)

Protocol revision date: January 2005
Apllies to invasive cancers only
Based on AJCC/UICC TNM, 6th edition

TESTIS: Retroperitoneal Lymphadenectomy

Patient name: ________________
Surgical pathology number: ________________

Note: Check 1 response unless otherwise indicated.

*Prelymphadenectomy Treatment
*___ Chemo/radiation therapy
*___ No chemo/radiation therapy
*___ Unknown

*Serum Tumor Markers (check all that apply)
*___ Unknown
*___ Serum marker studies within normal limits
*___ Alpha-fetoprotein (AFP) elevation
*___ Beta subunit of human chorionic gonadotropin (b-hCG) elevation
*___ Lactate dehydrogenase (LDH) elevation

MACROSCOPIC

*Specimen Site(s)
*Specify: ____________________________

*Number of Nodal Groups Present
*Specify: ___
*___ Cannot be determined

Size of Largest Metastasis
Greatest dimension: ___ cm
*Additional dimensions: ___ x ___ cm

MICROSCOPIC

Viability of Tumor (if applicable)
___ Viable tumor present
___ Non viable tumor present
___ No tumor present

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**Histologic Type of Metastatic Tumor**

___ Seminoma, classic type
___ Seminoma with syncytiotrophoblastic cells
___ Mixed germ cell tumor (specify components and percentages): 

________________________________________________
________________________________________________
___ Embryonal carcinoma
___ Yolk sac tumor
___ Choriocarcinoma, biphasic
___ Choriocarcinoma, monophasic
___ Placental site trophoblastic tumor
___ Mature teratoma
___ Immature teratoma
___ Teratoma with a secondary malignant component 
   (specify type): 
   ________________________________________________
___ Monodermal teratoma, carcinoid
___ Monodermal teratoma, primitive neuroectodermal tumor
___ Polyembryoma
___ Diffuse embryoma
___ Spermatocytic seminoma
___ Spermatocytic seminoma with a sarcomatous component
___ Other (specify): ____________________________
___ Malignant neoplasm, type cannot be determined

**Regional Lymph Nodes (pN)**

___ pNX: Cannot be assessed
___ pN0: No regional lymph node metastasis
___ pN1: Metastasis with a lymph node mass less than 2 cm in greatest dimension and 5 or fewer positive nodes, none greater than 2 cm in greatest dimension
___ pN2: Metastasis with a lymph node mass greater than 2 cm but no more than 5 cm in greatest dimension, or more than 5 nodes positive, none greater than 5 cm; or evidence of extranodal extension of tumor
___ pN3: Metastasis in a lymph node greater than 5 cm in greatest dimension

Specify: Total number examined: ___
Total number involved: ___

**Nonregional Lymph Node Metastasis (M1a)**

___ Not applicable
___ Absent
___ Present

*Comment(s)*

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*Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.*
I. Radical Orchiectomy

A. Clinical Information
1. Patient identification
   a. Name
   b. Identification number
   c. Age (birth date)
2. Responsible physician(s)
3. Date of procedure
4. Other clinical information
   a. Relevant history
      (1) previous cryptorchidism treated by orchiopexy
      (2) previous contralateral testicular tumor treated by orchiectomy and lymphadenectomy
      (3) retroperitoneal or paraortic lymphadenopathy
      (4) other
   b. Relevant findings
      (1) testicular enlargement or atrophy
      (2) gynecomastia
      (3) ambiguous genitalia, feminization, or other features of intersex disorders
      (4) serum levels of alpha-fetoprotein (AFP) (Note A)
      (5) serum levels of beta subunit of human chorionic gonadotropin (b-hCG) (Note A)
      (6) imaging studies (eg, ultrasound, abdominal computerized tomograms, chest radiographs)
   c. Clinical diagnosis
   d. Procedure
   e. Operative findings
      (1) laterality of testis
      (2) inguinal or abdominal orchiectomy in cases of cryptorchidism

B. Macroscopic Examination
1. Specimen
   a. Organ(s)/tissue(s) included
   b. Unfixed/fixed (specify fixative)
   c. Dimensions, including length of spermatic cord
   d. External aspect
   e. Cut surface
   f. Results of intraoperative consultation
2. Tumor
   a. Location
   b. Number, size, and shapes of distinct tumor nodules
   c. Descriptive characteristics (eg, color, hemorrhage, necrosis)
   d. Borders (circumscribed vs invasive)
   e. Extent of invasion
      (1) description of intertunical fluid
      (2) involvement of tunica vaginalis
      (3) involvement of spermatic cord
      (4) involvement of paratesticular soft tissue
For Information Only

Genitourinary • Testis

3. Additional pathologic findings, if present
   a. Scars
   b. Calcification
   c. Other(s)
4. Tissues submitted for microscopic evaluation (Note B)
5. Special studies (specify) (eg, electron microscopy, cytogenetics, molecular studies)

C. Microscopic Evaluation
   1. Tumor
      a. Histologic type (estimate percentage of each component for mixed tumors) (Note C)
      b. Intratubular, invasive, or both
      c. Extent of invasion (Note D)
         (1) invasion beyond tunica albuginea (specify)
         (2) involvement of paratesticular structures (specify)
      d. Venous/lymphatic vessel invasion (specify if in testis or paratestis/spermatic cord) (Note E)
   2. Status of resection margin(s), including spermatic cord (Note B)
   3. Additional pathologic findings, if present (Note F)
   4. Regional lymph nodes (if identified in spermatic cord)
      a. Number present
      b. Number involved by tumor
   5. Other tissue(s)
      a. Involved by tumor
      b. Uninvolved by tumor
   6. Results/status of special studies (specify)
   7. Comments
      a. Correlation with intraoperative consultation, as appropriate
      b. Correlation with other specimens, as appropriate
      c. Correlation with clinical information, as appropriate

II. Retroperitoneal Lymphadenectomy
A. Clinical Information
   1. Patient identification
      a. Name
      b. Identification number
      c. Age (birth date)
   2. Responsible physician(s)
   3. Date of procedure
   4. Other clinical information
      a. Relevant history
         (1) previous cryptorchidism treated by orchiopexy
         (2) previous contralateral testicular tumor treated by orchiectomy and lymphadenectomy
         (3) other
      b. Relevant findings
         (1) testicular enlargement or atrophy
         (2) gynecomastia
         (3) ambiguous genitalia, feminization, or other features of intersex disorders
         (4) serum levels of alpha-fetoprotein (AFP) (Note A)
(5) serum levels of beta subunit of human chorionic gonadotropin (b-hCG) (Note A)
(6) imaging studies (eg, ultrasound, abdominal computerized tomograms, chest radiographs)
c. Clinical diagnosis
d. Procedure (eg, radical, nerve-sparing or other form of retroperitoneal lymphadenectomy [RPLND])
e. Operative findings
f. Anatomic site(s) of specimen(s)

B. Macroscopic Examination
1. Specimen
   a. Organ(s)/tissues included
   b. Unfixed/fixed (specify fixative)
c. Results of intraoperative consultation
2. Regional lymph nodes
   a. Number of lymph node groups and site of each
   b. For each nodal group
      (1) size of nodal group (3 dimensions)
      (2) number of lymph nodes identified
      (3) number of lymph nodes involved by tumor
         i. size ranges of identifiable tumor nodules or dimensions of tumor-matted nodes
         ii. descriptive features of tumor, if present (eg, color, hemorrhage, necrosis)
3. Spermatic cord structures, if present
   a. Descriptive characteristics
   b. Involvement by tumor
4. Tissues submitted for microscopic evaluation (Note B)
   a. All nodal groups
      (1) number of lymph nodes identified per group
      (2) number lymph nodes submitted for each group
   b. Spermatic cord structures
   c. Frozen section tissue fragment(s) (unless saved for special studies)
5. Special studies (specify)

C. Microscopic Evaluation
1. Regional lymph nodes
   a. Number of lymph nodes in each nodal group
   b. Number involved by tumor in each nodal group
      (1) histologic type(s) (Notes C and G)
      (2) extent of nodal replacement (estimate percentage of nodal involvement)
      (3) involvement of extra-nodal soft tissues, including residual spermatic cord
      (4) necrosis, if present
      (5) associated scar tissue
2. Results/status of special studies (specify)
3. Comments
   a. Correlation with intraoperative consultation, as appropriate
   b. Correlation with other specimens, as appropriate
   c. Correlation with clinical information, as appropriate
Explanatory Notes

A. Serum Markers
The protocol emphasizes the importance of relevant clinical information in the pathologic evaluation of specimens. Serum marker studies play a key role in the clinical management of patients with testicular germ cell tumors. The occurrence of elevated serum levels of alpha-fetoprotein (AFP) or the beta subunit of human chorionic gonadotropin (b-hCG) may indicate the need for additional sections of certain specimens if the initial findings do not account for such elevations. Information regarding serum marker status (lactate dehydrogenase [LDH], AFP and b-hCG) is also important in the “S” categorization of the tumor for stage groupings.

B. Tissues Submitted for Microscopic Evaluation
The entire testicular tumor may be blocked if it requires 10 blocks or less (tissue may be retained for special studies); 10 blocks of larger tumors may be taken, unless the tumor is greater than 10 cm, in which case 1 block may be submitted for every 1 cm of maximum tumor dimension. Some blocks should contain the interface with non-tumorous testis because lymphatic invasion is best appreciated there. Tissues to be sampled include:

- All of the grossly different types of tumor
- Testicular hilus
- Uninvolved testis
- Epididymis
- Spermatic cord, including cord margin
- Other lesion(s)
- All identifiable lymph nodes
- Other tissue(s) submitted with specimen

For large masses which have obliterated individual nodes, 1 section for every centimeter of maximum tumor dimension, especially fleshy appearing foci, may be taken.

The margins in a specimen resected for a malignant tumor of the testis, depending on the extent of the surgery, includes spermatic cord margin, the parietal layer of tunica vaginalis and scrotal skin.

C. Histologic Type
The protocol applies to malignant tumors of the testis, the vast majority of which are of germ cell origin. It may also be applied to other malignant or potentially malignant tumors of the testis included in the classification shown below. For lymphomas and plasmacytomas of the testis, refer to the non-Hodgkin lymphoma protocol.
Modified Armed Forces Institute of Pathology (AFIP) and World Health Organization (WHO) Histologic Classification of Testicular Tumors

Germ Cell Tumors
Precursor lesion
  Intratubular germ cell neoplasm, unclassified
  Intratubular germ cell neoplasm, specific type
Tumors of 1 histologic type
  Seminoma
    Variant: Seminoma with syncytiotrophoblastic cells
  Spermatocytic seminoma
    Variant: Spermatocytic seminoma with a sarcomatous component
  Embryonal carcinoma
  Yolk sac tumor
  Choriocarcinoma
    Variant: “Monophasic” type
  Placental site trophoblastic tumor
  Trophoblastic tumor, unclassified
  Teratoma
    Mature
    Immature
    With a secondary malignant component
  Monodermal variants
    Carcinoid
    Primitive neuroectodermal tumor
    Others
Tumors of more than 1 histologic type
  Mixed germ cell tumor (specify components; estimate percentage)
  Polymorphoma
  Diffuse embryoma
Regressed (“burnt out”) germ cell tumors
  Scar only
  Scar with intratubular germ cell neoplasia
  Scar with minor residual germ cell tumor

Sex Cord-Stromal Tumors
Leydig cell tumor
Sertoli cell tumor
  Variant: Large cell calcifying Sertoli cell tumor
  Variant: Sclerosing Sertoli cell tumor
Granulosa cell tumor
  Variant: Adult type
  Variant: Juvenile type
Mixed and indeterminate (unclassified) sex cord stromal tumor

Mixed Germ Cell- Sex Cord-Stromal Tumors
Gonadoblastoma
Unclassified

Miscellaneous
Sarcoma (specify type)
Plasmacytoma
Lymphoma (specify type)
Granulocytic sarcoma or leukemic infiltrates
Adenocarcinoma of rete testis
Carcinomas and borderline tumors of ovarian type
Malignant mesothelioma

D. Staging
The protocol recommends staging according to the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) TNM staging system. Additional criteria for staging seminomas according to a modification of the Royal Marsden system are also recommended. Some studies suggest that the staging of patients with seminoma by the TNM system is less meaningful therapeutically than staging by a modification of the Royal Marsden method. The latter staging system subdivides cases with retroperitoneal metastases into several groups according to the total tumor dimension rather than the size of the largest lymph node, as in the TNM system. Also, the data from a large Danish study of seminomas clinically limited to the testis do not support the conclusion that local staging of the primary tumor, as performed in the TNM system, provides useful prognostic information; rather, the most valuable prognostic indicator was the size of the seminoma. This protocol, therefore, encourages the use of the TNM system with optional use of the modified Royal Marsden staging system for patients with seminoma.

AJCC/UICC TNM and Stage Groupings
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 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.

Primary Tumor (T)
TX Primary tumor cannot be assessed
T0 No evidence of primary tumor (eg, histologic scar in testis)
Tis Intratubular germ cell neoplasia (carcinoma in situ)
T1 Tumor limited to the testis and epididymis without vascular/lymphatic invasion; tumor may invade tunica albuginea but not tunica vaginalis
T2 Tumor limited to the testis and epididymis with vascular/lymphatic invasion or tumor extending through tunica albuginea with involvement of tunica vaginalis
T3 Tumor invades spermatic cord with or without vascular/lymphatic invasion
T4 Tumor invades scrotum with or without vascular/lymphatic invasion
Regional Lymph Nodes (N)
NX Regional nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Metastasis with a lymph node mass 2 cm or less in greatest dimension and 5 or fewer positive nodes, none more than 2 cm in greatest dimension
N2 Metastasis with a lymph node mass greater than 2 cm but no more than 5 cm in greatest dimension, or more than 5 nodes positive, none more than 5 cm; or evidence of extranodal extension of tumor
N3 Metastasis with a lymph node mass greater than 5 cm in greatest dimension

Distant Metastasis (M)
MX Distant metastasis cannot be assessed
M0 No distant metastasis
M1 Distant metastasis present
M1a Nonregional lymph node or pulmonary metastasis
M1b Distant metastasis other than to nonregional lymph nodes and lungs

Serum Tumor Markers (S)
SX Serum marker studies not available or performed
S0 Serum marker study levels within normal limits
S1 less than 1.5 x N# and less than 5,000 and less than 1,000
S2 1.5 to 10 x N# or 5,000 to 50,000 or 1,000 to 10,000
S3 greater than 10 x N# or greater than 50,000 or greater than 10,000

# N indicates the upper limit of normal for the LDH assay.

Stage Groupings
Stage 0 pTis N0 M0 S0,SX
Stage I pT1-4 N0 M0 SX
Stage IA pT1 N0 M0 S0
Stage IB pT2 N0 M0 S0
pT3 N0 M0 S0
pT4 N0 M0 S0
Stage IS Any pT/TX N0 M0 S1-3
Stage II Any pT/TX N1,N2,N3 M0 SX
Stage IIA Any pT/TX N1 M0 S0
Any pT/TX N1 M0 S1
Stage IIB Any pT/TX N2 M0 S0
Any pT/TX N2 M0 S1
Stage IIC Any pT/TX N3 M0 S0
Any pT/TX N3 M0 S1
Stage III Any pT/TX Any N M1,M1a SX
Stage IIIA Any pT/TX Any N M1,M1a S0
Any pT/TX Any N M1,M1a S1
Stage IIIB Any pT/TX N1,N2,N3 M0 S2
Any pT/TX Any N M1,M1a S2
Stage IIIC Any pT/TX N1,N2,N3 M0 S3
Any pT/TX Any N M1,M1a S3
Any T Any N M1b Any S
TNM Descriptors
For identification of special cases of TNM or pTNM classifications, the “m” suffix and “y,” “r,” and “a” prefixes are used. Although they do not affect the stage grouping, they indicate cases needing 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 at the time of that examination. The “y” categorization is not an estimate of tumor prior to multimodality therapy (ie, before initiation of neoadjuvant therapy).

The “r” prefix indicates a recurrent tumor when staged after a documented disease-free interval, and is identified by the “r” prefix: rTNM.

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

Additional Descriptors
Residual Tumor (R)
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).

Modified Royal Marsden Staging System
Stage I Tumor confined to the testis
Stage II Infradiaphragmatic nodal involvement
   IIA greatest dimension of involved nodes less than 2 cm
   IIB greatest dimension of involved nodes 2 cm or more but less than 5 cm
   IIC greatest dimension of involved nodes 5 cm or more but less than 10 cm
   IID greatest dimension of involved nodes 10 cm or more
Stage III Supraclavicular or mediastinal involvement
Stage IV Extranodal metastases

E Venous/Lymphatic Vessel Invasion
In several studies, the presence of vascular space invasion (usually lymphatic but possibly also capillary or venous invasion) has been correlated with a significantly
elevated risk for distant metastasis.\textsuperscript{20-26} This observation, therefore, is most pertinent for patients who have clinical stage I disease, ie, those who have no evidence of spread beyond the testis by clinical examination (including radiographic and serum marker studies). Some clinicians treat patients who have clinical stage I disease and whose testicular germ cell tumors lack evidence of lymphatic or vascular invasion (and possibly have other favorable prognostic features, such as relatively small amounts of embryonal carcinoma) by close follow-up examinations rather than intervention. This practice currently is more accepted for patients who have tumors with 1 or more non-seminomatous components than it is for patients with pure seminoma.

F. Additional Pathologic Findings
Important findings include Leydig cell-hyperplasia, which may be correlated with b-hCG elevation; scarring, the presence of hemosiderin-laden macrophages, and intratubular calcification, which may indicate regression of a tumor; testicular atrophy; and abnormal testicular development (eg, dysgenesis or androgen-insensitivity syndrome).\textsuperscript{27,28}

G. Metastatic Teratoma
Often the most important distinction in patients with metastatic testicular germ cell tumor, particularly following initial chemotherapy, is the differentiation of metastatic teratoma from nonteratomatous types of germ cell tumor. Pure teratomatous metastasis is generally treated by surgical excision, whereas patients who have metastatic embryonal carcinoma, yolk sac tumor, etc, are usually treated with chemotherapy.

References

Bibliography