

# Testis

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

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*Protocol revision date: January 2004  
Based on AJCC/UICC TNM, 6<sup>th</sup> edition*

## Procedures

- **Radical Orchiectomy**
- **Retroperitoneal Lymphadenectomy (RPLND)**

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

*Protocol revision date: January 2004  
Applies to invasive cancers only  
Based on AJCC/UICC TNM, 6<sup>th</sup> 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)

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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.

**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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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
- |                                | <u>LDH</u>  |     | <u>HCG (mIU/mL)</u> |     | <u>AFP (ng/mL)</u> |
|--------------------------------|-------------|-----|---------------------|-----|--------------------|
| * <input type="checkbox"/> S1: | <1.5 x nl   | and | <5,000              | and | <1,000             |
| * <input type="checkbox"/> S2: | 1.5-10 x nl | or  | 5,000-50,000        | or  | 1,000-10,000       |
| * <input type="checkbox"/> 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

4 \* 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.

\_\_\_ 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)**

6                   \* 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.

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

*Protocol revision date: January 2004  
Applies to invasive cancers only  
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**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

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\_\_\_ 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)**

\* 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.

## Background Documentation

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*Protocol revision date: January 2004*

### 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 intertunicular fluid
    - (2) involvement of tunica vaginalis
    - (3) involvement of spermatic cord

- (4) involvement of paratesticular soft tissue
- 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.<sup>1-3</sup> 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<sup>#</sup>
- Other tissue(s) submitted with specimen

<sup>#</sup> 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.<sup>4-15</sup> 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)

Polyembryoma

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.<sup>16,17</sup> Additional criteria for staging seminomas according to a modification of the Royal Marsden system are also recommended.<sup>18</sup> 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.<sup>16-18</sup> 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.<sup>19</sup> 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

	LDH		HCG (mIU/mL)		AFP (ng/mL)
S1	less than 1.5 x N <sup>#</sup>	and	less than 5,000	and	less than 1,000
S2	1.5 to 10 x N <sup>#</sup>	or	5,000 to 50,000	or	1,000 to 10,000
S3	greater than 10 x N <sup>#</sup>	or	greater than 50,000	or	greater than 10,000

<sup>#</sup> 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
	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



## For Information Only

## Genitourinary • Testis

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.<sup>20-26</sup> 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).<sup>27,28</sup>

### 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.

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