Protocol for the Examination of Radical Orchiectomy Specimens From Patients With Malignant Germ Cell and Sex Cord-Stromal Tumors of the Testis

Version: 4.1.0.1
Protocol Posting Date: November 2021
CAP Laboratory Accreditation Program Protocol Required Use Date: March 2022
The changes included in this current protocol version affect accreditation requirements. The new deadline for implementing this protocol version is reflected in the above accreditation date.

For accreditation purposes, this protocol should be used for the following procedures AND tumor types:

Procedure	Description
Radical Orchiectomy	Includes specimens designated orchiectomy and orchidectomy
Tumor Type	**Description**
Germ cell tumors	Includes seminoma and variants, all non-seminomatous germ cell tumors, mixed germ cell tumors, Leydig cell tumors, Sertoli cell tumors, granulosa cell tumors, and placental site trophoblastic tumors
Sex cord-stromal tumors	Includes Leydig cell tumors, Sertoli cell tumors, granulosa cell tumors, and mixed sex cord tumors

This protocol is NOT required for accreditation purposes for the following:

Procedure
Retroperitoneal lymphadenectomy (consider Testis Retroperitoneal Lymphadenectomy protocol)
Primary resection specimen with no residual cancer (eg, following neoadjuvant therapy)
Cytologic specimens

The following tumor types should NOT be reported using this protocol:

Tumor Type
Paratesticular malignancies (consider Soft Tissue protocol)
Non-testis germ cell tumors (consider Extragonadal Germ Cell protocol)
Lymphoma (consider the Hodgkin or non-Hodgkin Lymphoma protocols)
Sarcoma (consider the Soft Tissue protocol)

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With guidance from the CAP Cancer and CAP Pathology Electronic Reporting Committees.
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Accreditation Requirements

This protocol can be utilized for a variety of procedures and tumor types for clinical care purposes. For accreditation purposes, only the definitive primary cancer resection specimen is required to have the core and conditional data elements reported in a synoptic format.

- Core data elements are required in reports to adequately describe appropriate malignancies. For accreditation purposes, essential data elements must be reported in all instances, even if the response is "not applicable" or "cannot be determined."
- Conditional data elements are only required to be reported if applicable as delineated in the protocol. For instance, the total number of lymph nodes examined must be reported, but only if nodes are present in the specimen.
- Optional data elements are identified with "+" and although not required for CAP accreditation purposes, may be considered for reporting as determined by local practice standards.

The use of this protocol is not required for recurrent tumors or for metastatic tumors that are resected at a different time than the primary tumor. Use of this protocol is also not required for pathology reviews performed at a second institution (ie, secondary consultation, second opinion, or review of outside case at second institution).

Synoptic Reporting

All core and conditionally required data elements outlined on the surgical case summary from this cancer protocol must be displayed in synoptic report format. Synoptic format is defined as:

- Data element: followed by its answer (response), outline format without the paired Data element: Response format is NOT considered synoptic.
- The data element should be represented in the report as it is listed in the case summary. The response for any data element may be modified from those listed in the case summary, including "Cannot be determined" if appropriate.
- Each diagnostic parameter pair (Data element: Response) is listed on a separate line or in a tabular format to achieve visual separation. The following exceptions are allowed to be listed on one line:
    - Anatomic site or specimen, laterality, and procedure
    - Pathologic Stage Classification (pTNM) elements
    - Negative margins, as long as all negative margins are specifically enumerated where applicable
- The synoptic portion of the report can appear in the diagnosis section of the pathology report, at the end of the report or in a separate section, but all Data element: Responses must be listed together in one location

Organizations and pathologists may choose to list the required elements in any order, use additional methods in order to enhance or achieve visual separation, or add optional items within the synoptic report. The report may have required elements in a summary format elsewhere in the report IN ADDITION TO but not as replacement for the synoptic report ie, all required elements must be in the synoptic portion of the report in the format defined above.

Summary of Changes

v 4.1.0.1

- Reformatted answers in Serum Tumor Markers question

Reporting Template

Protocol Posting Date: November 2021
Select a single response unless otherwise indicated.

CASE SUMMARY: (TESTIS: Radical Orchiectomy)
Standard(s): AJCC-UICC 8

CLINICAL

+Pre-Orchiectomy Serum Tumor Markers (Notes A,B) (select 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

+Post-Orchiectomy Serum Tumor Markers (Notes A,B) (select 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

+Serum Tumor Markers (S) (Note B)
___ SX (serum marker studies not available or performed)
___ S0 (serum marker study levels within normal limits)
___ S1 (less than 1.5 x the upper limit of normal for the LDH assay, and HCG less than 5,000 mIU / mL, and AFP less than 1,000 ng / mL)
___ S2 (1.5-10 x the upper limit of normal for the LDH assay, or HCG 5,000-50,000 mIU / mL, or AFP 1,000-10,000 ng / mL)
___ S3 (greater than 10 x the upper limit of normal for the LDH assay, or HCG greater than 50,000 mIU / mL, or AFP greater than 10,000 ng / mL)

SPECIMEN

Specimen Laterality
___ Right
___ Left
___ Not specified

TUMOR

Tumor Focality
___ Unifocal
___ Multifocal
___ Cannot be determined: _____

Tumor Size

___ Greatest dimension of main tumor mass in Centimeters (cm): _____ cm
+Additional Dimension of Main Tumor Mass in Centimeters (cm): ____ x ____ cm
___ Cannot be determined (explain): _____

Additional Tumor Nodule(s) (may repeat for each nodule)

Greatest Dimension of Additional Tumor Nodule in Centimeters (cm)
___ Not applicable
___ Specify in Centimeters (cm): _____ cm
___ Cannot be determined (explain): _____

Histologic Type (Notes C,D,E) (select all that apply)

Intratubular germ cell neoplasia
___ Germ cell neoplasia in situ (GCNIS)
___ Other intratubular germ cell tumor (specify): _____
Seminoma
___ Seminoma
___ Seminoma with syncytiotrophoblastic cells
Non-seminomatous types
___ Embryonal carcinoma
___ Yolk sac tumor, postpubertal type
___ Choriocarcinoma
___ Mixed germ cell tumor
___ Seminoma (specify percentage): _____ %
___ Embryonal carcinoma (specify percentage): _____ %
___ Yolk sac tumor, postpubertal type (specify percentage): _____ %
___ Choriocarcinoma (specify percentage): _____ %
___ Teratoma (specify percentage): _____ %
___ Other (specify type and percentage): _____
Non-choriocarcinomatous trophoblastic tumors
___ Non-choriocarcinomatous trophoblastic tumor, NOS
___ Placental site trophoblastic tumor
___ Epithelioid trophoblastic tumor
___ Cystic trophoblastic tumor
Teratoma
___ Teratoma, postpubertal type
___ Teratoma with somatic-type malignancy (specify type): _____
Testicular scar / regressed germ cell tumor
___ Scar diagnostic of regressed germ cell tumor
___ Scar suspicious for regressed germ cell tumor
Germ Cell Tumors Unrelated to Germ Cell Neoplasia in situ
___ Spermatocytic tumor
___ Spermatocytic tumor with a sarcomatous component
___ Teratoma, prepubertal type
___ Well-differentiated neuroendocrine tumor (monodermal teratoma)
___ Other (specify): _____
___ Mixed teratoma and yolk sac tumor, prepubertal type
___ Yolk sac tumor, prepubertal type
Sex cord-stromal tumor
___ Leydig cell tumor
___ Leydig cell tumor, malignant

___ Sertoli cell tumor, NOS
___ Sertoli cell tumor, malignant
___ Sertoli cell tumor, large cell calcifying
___ Sertoli cell tumor, intratubular large cell hyalinizing
___ Granulosa cell tumor, adult type
___ Granulosa cell tumor, juvenile type
___ Fibroma-thecoma
___ Sex cord-stromal tumor, mixed type (specify components and approximate percentages): _____
___ Sex cord-stromal tumor type, unclassified

Tumor Containing Both Germ Cell and Sex Cord-Stromal Elements

___ Mixed germ cell-sex cord stromal tumor, gonadoblastoma
___ Other histologic type not listed (specify): _____

+Histologic Type Comment: _____

Tumor Extent (Note F) (select all that apply)

___ Germ cell neoplasia in situ only
___ Limited to testis

 # See Note D for definition of rete testis invasion

___ Invades rete testis#
___ Invades hilar soft tissue
___ Invades epididymis
___ Invades through tunica albuginea and perforates tunica vaginalis (mesothelial layer)
___ Invades spermatic cord
___ Invades scrotum
___ Invades other structures (specify): _____
___ Cannot be determined: _____
___ No evidence of primary tumor

Lymphovascular Invasion (Note G)

___ Not identified
___ Present
___ Cannot be determined: _____

+Tumor Comment: _____

MARGINS

Margin Status

___ All margins negative for tumor
___ Tumor present at margin

Margin(s) Involved by Tumor (select all that apply)

___ Spermatic cord
___ Other (specify): _____
___ Cannot be determined (explain): _____

___ Other (specify): _____
___ Cannot be determined (explain): _____
___ Not applicable

+Margin Comment: _____

REGIONAL LYMPH NODES

Regional Lymph Node Status
___ Not applicable (no regional lymph nodes submitted or found)
___ Regional lymph nodes present
___ All regional lymph nodes negative for tumor
___ Tumor present in regional lymph node(s)

Number of Lymph Nodes with Tumor
___ Exact number (specify): _____
___ At least (specify): _____
___ Other (specify): _____
___ Cannot be determined (explain): _____

Nodal Site(s) with Tumor (select all that apply)
___ Interaortocaval: _____
___ Paraaortic: _____
___ Paracaval: _____
___ Preaortic: _____
___ Precaval: _____
___ Retroaortic: _____
___ Retrocaval: _____
___ Other (specify): _____
___ Cannot be determined: _____
___ Not applicable

+Size of Largest Nodal Metastatic Deposit
Specify in Centimeters (cm)
___ Exact size: _____ cm
___ At least: _____ cm
___ Greater than: _____ cm
___ Less than: _____ cm
___ Other (specify): _____
___ Cannot be determined: _____

+Nodal Site with Largest Metastatic Deposit (select all that apply)
___ Interaortocaval: _____
___ Paraaortic: _____
___ Paracaval: _____
___ Preaortic: _____
___ Precaval: _____
___ Retroaortic: _____
___ Retrocaval: _____
___ Other (specify): _____
___ Cannot be determined: _____

Size of Largest Lymph Node with Tumor
Specify in Centimeters (cm)
___ Exact size: _____ cm
___ At least: _____ cm
___ Greater than: _____ cm
___ Less than: _____ cm
___ Other (specify): _____
___ Cannot be determined: _____

+Largest Lymph Node with Tumor (specify site): _____

Extranodal Extension
___ Not identified
___ Present
___ Cannot be determined: _____

Histologic Subtype of Germ Cell Tumor in Involved Lymph Node(s) (select all that apply)
___ Seminoma
___ Seminoma with syncytiotrophoblastic cells
___ Embryonal carcinoma
___ Yolk sac tumor, postpubertal type
___ Choriocarcinoma
___ Mixed germ cell tumor (specify components and approximate percentages):
_____
___ Non-choriocarcinomatous trophoblastic tumors
___ Placental site trophoblastic tumor
___ Epithelioid trophoblastic tumor
___ Cystic trophoblastic tumor
___ Teratoma, postpubertal type
___ Teratoma with somatic-type malignancy (specify type): _____
___ Spermatocytic tumor
___ Spermatocytic tumor with a sarcomatous component
___ Well-differentiated neuroendocrine tumor (monodermal teratoma)
___ Other histologic type not listed (specify): _____
___ Not applicable

___ Other (specify): _____
___ Cannot be determined (explain): _____

Number of Lymph Nodes Examined
___ Exact number (specify): _____
___ At least (specify): _____
___ Other (specify): _____
___ Cannot be determined (explain): _____

+Regional Lymph Node Comment: _____

DISTANT METASTASIS

Distant Site(s) Involved, if applicable (select all that apply)
___ Not applicable
___ Non-retroperitoneal lymph node(s): _____
___ Lung: _____
___ Other organ(s) or site(s) (specify): _____
___ Cannot be determined: _____

PATHOLOGIC STAGE CLASSIFICATION (pTNM, AJCC 8th Edition) (Note A)
Reporting of pT, pN, and (when applicable) pM categories is based on information available to the pathologist at the time the report is issued. As per the AJCC (Chapter 1, 8th Ed.) it is the managing physician's responsibility to establish the final pathologic stage based upon all pertinent information, including but potentially not limited to this pathology report.

TNM Descriptors (select all that apply)
___ Not applicable: _____
___ m (multiple)
___ r (recurrent)
___ y (post-treatment)

pT Category
___ pT not assigned (cannot be determined based on available pathological information)
___ pT0: No evidence of primary tumor
___ pTis: Germ cell neoplasia *in situ*
pT1: Tumor limited to testis (including rete testis invasion) without lymphovascular invasion
 # Subclassification of pT1 applies only to pure seminoma.
___ pT1a: Tumor smaller than 3 cm in size#
___ pT1b: Tumor 3 cm or larger in size#
___ pT1 (subcategory cannot be determined)
___ pT2: Tumor limited to testis (including rete testis invasion) with lymphovascular invasion, or tumor invading hilar soft tissue or epididymis or penetrating visceral mesothelial layer covering the external surface of tunica albuginea with or without lymphovascular invasion
___ pT3: Tumor directly invades spermatic cord soft tissue with or without lymphovascular invasion
___ pT4: Tumor invades scrotum with or without lymphovascular invasion

pN Category
___ pN not assigned (no nodes submitted or found)
___ pN not assigned (cannot be determined based on available pathological information)
___ pN0: No regional lymph node metastasis
___ pN1: Metastasis with a lymph node mass 2 cm or smaller in greatest dimension, and less than or equal to five nodes positive, none larger than 2 cm in greatest dimension
___ pN2: Metastasis with a lymph node mass larger than 2 cm but not larger than 5 cm in greatest dimension, or more than five nodes positive, none larger than 5 cm; or evidence of extranodal extension of tumor
___ pN3: Metastasis with a lymph node mass larger than 5 cm in greatest dimension

pM Category (required only if confirmed pathologically)
___ Not applicable - pM cannot be determined from the submitted specimen(s)
pM1: Distant metastasis
___ pM1a: Non-retroperitoneal nodal or pulmonary metastases
___ pM1b: Non-pulmonary visceral metastases

___ pM1 (subcategory cannot be determined)

ADDITIONAL FINDINGS (Note H)

+Additional Findings (select all that apply)
___ None identified
___ Germ cell neoplasia in situ (GCNIS)
___ Microlith
___ Sertoli cell nodule (Pick's adenoma)
___ Atrophy
___ Other (specify): _____

COMMENTS

Comment(s): _____

Explanatory Notes

A. Staging

The protocol recommends staging according to the AJCC TNM staging system.[1] Additional criteria for staging seminomas according to a modification of the Royal Marsden system are also recommended.[2] 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. 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.[3] 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 TNM and Stage Groupings

By AJCC 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.

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.

References
1. Amin MB, Edge SB, Greene FL, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York, NY: Springer; 2017.
2. Thomas G, Jones W, VanOosterom A, Kawai T. Consensus statement on the investigation and management of testicular seminoma 1989. Prog Clin Biol Res. 1990;357:285-294.
3. von der Maase H, Specht L, Jacobsen GK, et al. Surveillance following orchidectomy for stage I seminoma of the testis. Eur J Cancer. 1993;29A:1931-1934

B. 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.[1,2,3] 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. Postorchiectomy serum markers are important for the assignment of stage IS.

The serum tumor markers (S) category comprises the following:

- Alpha fetoprotein (AFP) – half-life 5 to 7 days
- Human chorionic gonadotropin (hCG) – half-life 1 to 3 days
- Lactate dehydrogenase (LDH)

References
1. Chisolm GG. Tumour markers in testicular tumours. Prog Clin Biol Res. 1985;203:81-91.
2. Javadpour N. Tumor markers in testicular cancer: an update. Prog Clin Biol Res. 1985;203:141-154.
3. Aass N, Klepp O, Cavallin-Stahl E, et al. Prognostic factors in unselected patients with nonseminomatous metastatic testicular cancer: a multicenter experience. J Clin Oncol. 1991;9:818-826.

C. 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. Blocks must contain the interface with nontumorous testis, as well as the tunica albuginea, even away from the tumor, because lymphatic invasion is best appreciated in the peritumoral tissue, as well as in the vessels within and under/parallel to the tunica. When there are multifocal tumors (with greater than or equal to 2 separate tumor nodules), additional tumor nodule(s) should also be sampled. Tissues to be sampled include:

- Tumor, including interface with surrounding testis, and tunica albuginea
- All of the grossly different appearing areas in the tumor
- Testicular hilum/mediastinum testis
- Uninvolved testis, including tunica albuginea
- Epididymis
- Spermatic cord, including cord margin
- Other lesion(s)
- All identifiable lymph nodes#
- Other tissue(s) submitted with specimen

For large masses that have obliterated individual nodes, 1 section for every centimeter of maximum tumor dimension, including grossly different looking areas, is recommended.

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

D. Histologic Type

The protocol mainly 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.[1,2,3,4,5,6,7,8,9,10,11,12] For hematolymphoid neoplasms involving the testis, refer to the corresponding CAP protocols.

World Health Organization (WHO) Histologic Classification of Testicular Tumors (2016)[13]

Germ Cell Tumors Derived From Germ Cell Neoplasia In Situ

Noninvasive germ cell neoplasia

- Germ cell neoplasia in situ
- Specific forms of intratubular germ cell neoplasia

Tumors of a single histologic type (pure forms)

- Seminoma
- Seminoma with syncytiotrophoblastic cells

Nonseminomatous germ cell tumors

- Embryonal carcinoma
- Yolk sac tumor, postpubertal type
- Trophoblastic tumors
  - Choriocarcinoma
  - Nonchoriocarcinomatous trophoblastic tumors
  - Placental site trophoblastic tumor
  - Epidermoid trophoblastic tumor
  - Cystic trophoblastic tumor
- Teratoma, postpubertal type
- Teratoma with somatic-type malignancy

Nonseminomatous germ cell tumors of more than one histologic type

- Mixed germ cell tumor

Germ cell tumors of unknown type

- Regressed germ cell tumor

Germ Cell Tumors Unrelated to Germ Cell Neoplasia In Situ

Spermatocytic tumor

Teratoma, prepubertal type

- Dermoid cyst
- Epidermoid cyst
- Well-differentiated neuroendocrine tumor (monodermal teratoma)
- Yolk sac tumor, prepubertal type

Mixed teratoma and yolk sac tumor, prepubertal type

York sac tumor, prepubertal type

Sex Cord-Stromal Tumors

Pure tumors

Leydig cell tumor

- Malignant Leydig cell tumor

Sertoli cell tumor

- Malignant Sertoli cell tumor
- Large cell calcifying Sertoli cell tumor
- Intratubular large cell hyalinizing Sertoli cell neoplasia

Granulosa cell tumor

- Adult granulosa cell tumor
- Juvenile granulosa cell tumor

Tumors in the fibroma-thecoma group

Mixed and unclassified sex cord stromal tumor

- Mixed sex cord-stromal tumor
- Unclassified sex cord-stromal tumor

Tumor Containing Both Germ Cell and Sex Cord-Stromal Elements

Gonadoblastoma

Miscellaneous

Ovarian epithelial-type tumors

- Serous cystadenoma
- Serous tumor of borderline malignancy

- Serous cystadenocarcinoma
- Mucinous cystadenoma
- Mucinous borderline tumor
- Mucinous cystadenocarcinoma
- Endometrioid adenocarcinoma
- Clear cell adenocarcinoma
- Brenner tumor

Juvenile xanthogranuloma

Hemangioma

Hematolymphoid Tumors

Diffuse large B-cell lymphoma

Follicular lymphoma

Extranodal NI/T-cell lymphoma, nasal type

Plasmacytoma

Myeloid sarcoma

Rosai-Dorfman disease

Tumors of Collecting Duct and Rete Testis

Adenoma

Adenocarcinoma

Tumors of Paratesticular Structures

Adenomatoid tumor

Mesothelioma

- Well-differentiated papillary mesothelioma

Epididymal tumors

- Cystadenoma of the epididymis
- Papillary cystadenoma
- Adenocarcinoma of the epididymis

Squamous cell carcinoma

Melanotic neuroectodermal tumor

Nephroblastoma

Paraganglioma

Mesenchymal Tumors of the Spermatic Cord and Testicular Adnexa

Apipocytic tumors

Lipoma

Well-differentiated liposarcoma

Dedifferentiated liposarcoma

Myxoid liposarcoma

Pleomorphic liposarcoma

References

1. Lawrence WD, Young RH, Scully RE. Sex cord-stromal tumors. In: Talerman A, Roth LM, eds. Pathology of the Testis and Its Adnexa. New York, NY: Churchill Livingstone; 1986:67-92.
2. Proppe KH, Scully RE. Large-cell calcifying Sertoli cell tumor of the testis. Am J Clin Pathol. 1980;74:607-619.
3. Young RH, Talerman A. Testicular tumors other than germ cell tumors. Semin Diagn Pathol. 1987;4:342-360.
4. Kim I, Young RH, Scully RE. Leydig cell tumors of the testis: a clinicopathological analysis of 40 cases and review of the literature. Am J Surg Pathol. 1985;9:177-192.
5. Mostofi FK, Price EBJ. Tumors of the Male Genital System: Atlas of Tumor Pathology. 2nd series. Fascicle 8. Washington DC: Armed Forces Institute of Pathology; 1973.
6. Eble JN, Sauter G, Epstein JI, Sesterhenn IA. World Health Organization Classification of Tumours: Pathology and Genetics of Tumours of the Urinary System and Male Genital Organs. Lyon, France: IARC Press; 2004.
7. Mostofi FK, Spaander P, Grigor K, Parkinson CM, Skakkebaek NE, Oliver RT. Consensus on pathological classifications of testicular tumours. Prog Clin Biol Res. 1990;357:267-276.
8. Young RH, Scully RE. Testicular Tumors. Chicago, IL: ASCP Press; 1990.
9. Ulbright TM. Testicular and paratesticular tumors. In: Mills SE, ed. Sternberg's Diagnostic Surgical Pathology. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004:2167-2232.
10. Ulbright TM, Amin MB, Young RH. Tumors of the Testis, Adnexa, Spermatic Cord, and Scrotum. Third Series. Fascicle 25. Washington, DC: Armed Forces Institute of Pathology; 1999.
11. Ro JY, Dexeus FH, El-Naggar A, Ayala AG. Testicular germ cell tumors: clinically relevant pathologic findings. Pathol Annu. 1991;26:59-87.
12. Ferry JA, Harris NL, Young RH, Coen J, Zietman A, Scully RE. Malignant lymphoma of the testis, epididymis, and spermatic cord: a clinicopathologic study of 69 cases with immunophenotypic analysis. Am J Surg Pathol. 1994;18:376-390.
13. Moch H, Humphrey PA, Ulbright TM, Reuter VE. WHO Classification of Tumours of the Urinary System and Male Genital Organs. Geneva, Switzerland: WHO Press; 2016.

E. Scar

Testicular scars, particularly in patients presenting with metastatic disease and clinically inapparent testicular primaries, may represent regressed, "burnt-out" testicular germ cell tumors. There are 2 established criteria to indicate a scar is diagnostic of a regressed germ cell tumor (GCT): a scar with associated germ cell neoplasia in situ (GCNIS) or a scar that contains coarse intratubular calcifications within expanded tubular profiles, which correspond to dystrophic calcifications that occurred in completely necrotic intratubular embryonal carcinoma. Features that are suspicious for, although not diagnostic of,

regressed germ cell tumors include testicular atrophy, microlithiasis, and, in the scar, lymphoplasmacytic infiltrates and prominent vascularity.[1] In otherwise pure seminoma, such partial regression may have clinically important implications, since it is possible that some of these scars may represent regression of a nonseminomatous germ cell tumor component of the tumor.

References

1. Balzer BL, Ulbright TM. Spontaneous regression of testicular germ cell tumors: an analysis of 42 cases. Am J Surg Pathol. 2006;30(7):858-865.

F. Invasion of the Rete Testis, Hilar/Mediastinal Soft Tissue, Epididymis or Tunica Vaginalis

Tumors invading the tunica vaginalis (perforating the mesothelial lining) (Figure 1, Tumor A) are considered category pT2 by the American Joint Committee on Cancer (AJCC) TNM staging system. Invasion of rete testis is not assigned a higher pT category than that for a tumor limited to the testis. Rete testis invasion has been reported by some to be associated with higher risk of relapse in clinical stage I seminoma.[1] Rete testis invasion is that the invasive tumor involves the rete testis stroma, with or without luminal involvement. Pagetoid extension of GCNIS into the rete testis should not be considered rete testis invasion. Hilar soft tissue invasion (Figure 1, Tumor B) is the predominant pathway of extratesticular extension for testicular tumors.[2,3] There is evidence beginning to accumulate that rete testis and hilar soft tissue invasion have predictive value for metastatic disease in patients with nonseminomatous GCTs.3 Invasion of epididymis and hilar soft tissue is staged as pT2 by the 8th edition of AJCC TNM.[4]

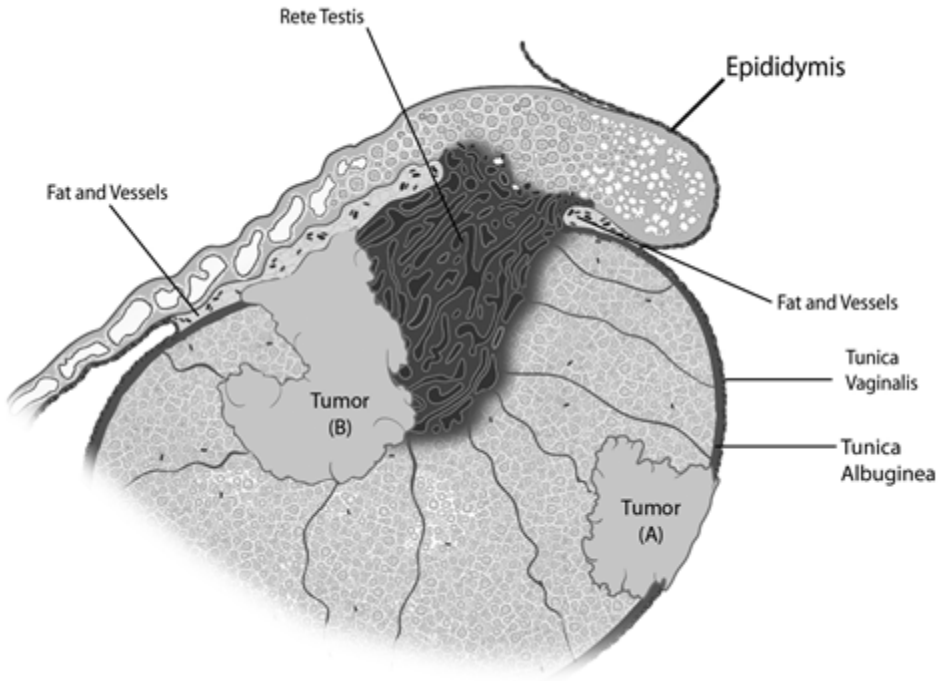

Figure 1. Diagrammatic representation of a tumor (Tumor A) invading tunica vaginalis, perforating through the mesothelium, and another tumor (Tumor B) partly involving the rete testis and invading the hilar soft tissue. Figure courtesy of Satish K. Tickoo, MD.

References

1. Warde P, Specht L, Horwich A, Oliver T, Panzarella T, Gospodarowicz M, von der Maase H. Prognostic factors for relapse in stage I seminoma managed by surveillance: a pooled analysis. J Clin Oncol. 2002;20:4448-4452.
2. Dry SM, Renshaw AA. Extratesticular extension of germ cell tumors preferentially occurs at the hilum. Am J Clin Pathol. 1999;111:534-538.
3. Yilmaz A, Cheng T, Zhang J, Trpkov K. Testicular hilum and vascular invasion predict advanced clinical stage in nonseminomatous germ cell tumors. Mod Pathol. 2013;26(4):579-586.
4. Amin MB, Edge SB, Greene FL, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York, NY: Springer; 2017.

G. 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.[1,2,3,4,5,6,7] 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 manage the patients with clinical stage I disease who lack evidence of lymphatic or vascular invasion in their orchiectomy specimens (with possibly other favorable prognostic features, such as relatively small amounts of embryonal carcinoma) by close follow-up examinations rather than intervention.

According to the 8th edition AJCC TNM staging system, discontinuous involvement of the spermatic cord soft tissue via a vascular thrombus is better regarded as a metastatic deposit (pM1). Presence of only an intravascular tumor in the spermatic cord in the absence of parenchymal invasion is considered pT2.[8]

References

1. Jacobsen GK, Rorth M, Osterlind K, et al. Histopathological features in stage I non-seminomatous testicular germ cell tumours correlated to relapse: Danish Testicular Cancer Study Group. APMIS. 1990;98:377-382.
2. Marks LB, Rutgers JL, Shipley WU, et al. Testicular seminoma: clinical and pathological features that may predict para-aortic lymph node metastasis. J Urol. 1990;143:524-527.
3. Hoeltl W, Pont J, Kosak D, Honetz N, Marberger M. Treatment decision for stage I non-seminomatous germ cell tumours based on the risk factor “vascular invasion.” Br J Urol. 1992;69:83-87.
4. Sesterhenn IA, Weiss RB, Mostofi FK, et al. Prognosis and other clinical correlates of pathologic review in stage I and II testicular carcinoma: a report from the Testicular Cancer Intergroup Study. J Clin Oncol. 1992;10:69-78.
5. Horwich A, Alsanjari N, A’Hern R, Nicholls J, Dearnaley DP, Fisher C. Surveillance following orchidectomy for stage I testicular seminoma. Br J Cancer. 1992;65:775-778.
6. Sturgeon JF, Jewett MA, Alison RE, et al. Surveillance after orchidectomy for patients with clinical stage I nonseminomatous testis tumors. J Clin Oncol. 1992;10:564-568.
7. Moul JW, McCarthy WF, Fernandez EB, Sesterhenn IA. Percentage of embryonal carcinoma and of vascular invasion predicts pathological stage in clinical stage I nonseminomatous testicular cancer. Cancer Res. 1994;54:362-364.
8. Amin MB, Edge SB, Greene FL, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York, NY: Springer; 2017

H. Additional Findings

Important findings include Leydig cell hyperplasia, which may be correlated with b-hCG elevation; scarring, the presence of hemosiderin-laden macrophages, and coarse intratubular calcifications in expanded tubular profiles (distinct from microlithiasis), which may indicate regression of a tumor; testicular atrophy; sertoli

cell nodules (Pick's adenoma), which most often are associated with undescended testes, and abnormal testicular development (eg, dysgenesis or androgen-insensitivity syndrome).[1,2]

References

1. Rutgers JL, Scully RE. Pathology of the testis in intersex syndromes. Semin Diagn Pathol. 1987;4:275-291.
2. Wallace TM, Levin HS. Mixed gonadal dysgenesis: a review of 15 patients reporting single cases of malignant intratubular germ cell neoplasia of the testis, endometrial adenocarcinoma, and a complex vascular anomaly. Arch Pathol Lab Med. 1990;114:679-688.

I. Metastatic Tumor

Often the most important distinction in patients with metastatic testicular germ cell tumor following initial chemotherapy is the differentiation of metastatic residual teratoma from nonteratomatous types of germ cell tumor. Pure teratomatous metastasis is generally treated by surgical excision alone, whereas patients who have other residual germ cell tumor components are usually treated with additional chemotherapy.