Protocol for the Examination of Specimens from Patients with Thymoma and Thymic Carcinoma

Protocol applies to thymic epithelial tumors located in any area of the mediastinum.

No AJCC/UICC TNM Staging System
Protocol web posting date: October 2009

Procedure
• Resection

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

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Surgical Pathology Cancer Case Summary (Checklist)

Protocol web posting date: October 2009

THYMUS: Resection

Select a single response unless otherwise indicated.

Specimen
___ Thymus
___ Thymus and other (specify): _____
___ Not specified

Procedure
___ Thymectomy
___ Partial thymectomy
___ Other (specify): _____
___ Not specified

Specimen Integrity
___ Intact
___ Disrupted
___ Indeterminate

Specimen Weight
Specify: ___ grams

Tumor Size
Greatest dimension: ___ cm
*Additional dimensions: ___ x ___ cm
___ Cannot be determined (see Comment)

Histologic Type (Note A)

Thymoma, specify:
___ Type A thymoma
___ Type AB thymoma
___ Type B1 thymoma
___ Type B2 thymoma
___ Type B3 thymoma
___ Other (specify): _____

Thymic carcinoma, specify:
___ Squamous cell carcinoma
___ Basaloid carcinoma
___ Mucoepidermoid carcinoma
___ Lymphoepithelioma-like carcinoma
___ Sarcomatoid carcinoma

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

___ Clear cell carcinoma
___ Adenocarcinoma
___ Well-differentiated neuroendocrine carcinoma, typical carcinoid
___ Well-differentiated neuroendocrine carcinoma, atypical carcinoid
___ Poorly differentiated neuroendocrine carcinoma, large cell neuroendocrine carcinoma
___ Poorly differentiated neuroendocrine carcinoma, small cell carcinoma, neuroendocrine type
___ Other (specify): _____

Other (specify): _____

Tumor Extension (select all that apply)
___ Not applicable
___ Not identified
___ Cannot be assessed
___ Pulmonary parenchyma
*Specify lobe(s) of lung: _____
___ Pleura
*Specify location: _____
___ Pericardium
___ Diaphragm
___ Other (specify): _____

Margins (Note B)
___ Cannot be assessed
___ Margins uninvolved by tumor
Distance of tumor from closest margin: ___ mm
___ Margin(s) involved by tumor
Specify margin(s): _____

Treatment Effect
___ Not applicable
___ Cannot be determined
___ Not identified
___ Present (specify: __% residual viable tumor)

Lymph-Vascular Invasion
___ Not identified
___ Present
___ Indeterminate

Regional Lymph Nodes
___ Cannot be assessed
___ No regional lymph node metastasis
___ Regional lymph node metastasis
Specify: Number examined: ___
Number involved: ___

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

Pathologic Staging for Thymomas (Modified Masaoka Stage) (applies only to thymomas) (Note C)

___ Stage I: Grossly and microscopically encapsulated (includes microscopic invasion into, but not through, the capsule)
___ Stage IIa: Microscopic transcapsular invasion
___ Stage IIb: Macroscopic capsular invasion
___ Stage III: Macroscopic invasion of neighboring organs
___ Stage IVa: Pleural or pericardial dissemination
___ Stage IVb: Hematogenous or lymphatic dissemination
___ Cannot be determined

Implants/Distant Metastasis (select all that apply) (Note D)

___ Cannot be assessed
___ Not identified
___ Present
Specify site(s):
___ Pleura
___ Pericardium
___ Other (specify)

Pathologic Staging for Thymic Carcinomas (pTNM) (does not apply to thymomas) (Note C)

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

___ m (multiple primary tumors)
___ r (recurrent)
___ y (post-treatment)

Primary Tumor (pT)

___ pTX: Primary tumor cannot be assessed
___ pT0: No evidence of primary tumor
___ pT1: Tumor completely encapsulated
___ pT2: Tumor invades pericapsular connective tissue
___ pT3: Tumor invades neighboring structures, such as pericardium, mediastinal pleura, thoracic wall, great vessels, and lung
___ pT4: Tumor with pleural or pericardial dissemination

Regional Lymph Nodes (pN)

___ pNX: Regional lymph nodes cannot be assessed
___ pN0: No regional lymph node metastases
___ pN1: Metastasis in anterior mediastinal lymph nodes
___ pN2: Metastasis in other intrathoracic lymph nodes, excluding anterior mediastinal lymph nodes
___ pN3: Metastasis in scalene and/or supraclavicular lymph nodes

Distant Metastasis (pM)

___ Not applicable
___ pM1: Distant metastasis
*Specify site(s), if known: _____

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

***Additional Pathologic Findings (select all that apply)**
*___ Age-appropriate involution changes
*___ Fibrosis
*___ Cortical hyperplasia
*___ Cystic changes in tumor
*___ Cystic changes in adjacent thymus
*___ Other (specify): _____

***Ancillary Studies (Note E)**
*___ Immunohistochemical staining
*Specify results: _____

***Comment(s)**

Explanatory Notes

A. Histologic Type

For consistency in reporting, the histologic classification published by the World Health Organization (WHO) for tumors of the thymus is recommended.[1] The histologic types are listed in this protocol in the order they appear in the WHO classification. Difficulties in diagnostic reproducibility have been encountered with the WHO classification scheme and this protocol does not preclude the use of other systems of classification of histologic types.[2,3]

Type A, AB, and B thymomas show thymic architectural features.[1] Thymic carcinomas are a heterogeneous group of malignant epithelial tumors with diverse morphology showing morphologies that resemble carcinomas encountered outside the thymus (designated type C thymomas in the previous WHO classification).[1] Because thymic carcinoids have the capacity to recur and metastasize, they are classified as neuroendocrine carcinomas.[1,4]

B. Margins

Thymectomy involves dissection and mobilization of the thymus from the pericardium and mediastinal pleura. In most thymectomy specimens, the posterior surface constitutes a true margin. Unless it has been marked by the surgeon, the posterior surface of thymectomy specimens is difficult to locate. If the completeness of excision is in question, the orientation of the specimen should be confirmed by the surgeon before grossing and all surgical margins inked. In addition to thymus, some specimens also include attached neighboring structures (eg, pleura, pericardium, lung). The margins of any attached structures should be properly identified by the surgeon and inked to facilitate accurate histologic assessment of margin status. In addition to tumor stage and histologic type, completeness of resection is an important prognostic parameter.[1]

C. Pathologic Staging of Thymic Epithelial Neoplasms

No TNM protocol has been officially authorized by the American Joint Committee on Cancer (AJCC) or the International Union Against Cancer (UICC) for the staging of thymic epithelial neoplasms. The scheme developed by Masaoka for thymoma and revised by others is frequently used for staging.[5-8] A tentative classification for thymic carcinoma and other malignant thymic epithelial tumors appeared in the UICC TNM Supplement.[9]

The modified Masaoka staging scheme requires assessment of capsular invasion and invasion of adjacent structures. Encapsulated thymomas are completely surrounded by a fibrous capsule of variable thickness. Tumors that invade into, but not through, the capsule should still be considered encapsulated. Minimally invasive tumors are those that focally invade through the capsule (ie, transcapsular invasion) into the mediastinal fat, whereas widely invasive tumors directly extend into adjacent structures such as the lung or pericardium.[1]

Assessment of capsular invasion is sometimes difficult, because a capsule may be either partially or entirely lacking in some thymomas and in a substantial proportion of thymic carcinomas.[1] Areas of adherence to other mediastinal structures may be the only indication of capsular penetration by tumor and hence the only indicator of aggressive

behavior. However, adherence to adjacent structures does not necessarily indicate invasion. Such areas should be carefully sampled. Uncertainties regarding the nature and degree of capsular adherence should be discussed with the surgeon. Any areas of macroscopic adherence or foci otherwise deemed suggestive of invasion should be sampled and evaluated histologically.

D. Implants and Distant Metastases

Thymomas sometimes exhibit tumor nodules separate from the main mass on the pericardial or pleural surface that have been referred to as implants by the WHO.[1] The WHO designates distant metastases as metastases to distant sites, most commonly the lung, liver, and skeletal system. From a practical standpoint, there are no reliable morphologic criteria for determining whether dissemination to the pericardium and/or pleura represents implants or metastatic disease. For this reason, these items are incorporated into a single heading in this protocol.

It is important to note that metastases to lymph nodes or local extension into adjacent organs are not included under the heading of distant metastases, but instead are reflected in the pN category and under the tumor extension section, respectively.[1]

E. Ancillary Studies

Ancillary studies, such as immunohistochemistry, are often employed in the diagnosis of thymic epithelial neoplasms. The types of ancillary studies utilized vary with the histologic appearance of the tumor. Immunostaining for cytokeratins is helpful in distinguishing between thymomas and lymphoid lesions. In selected cases, the use of immunohistochemistry for CD1a and terminal deoxynucleotidyl transferase (TdT) may be helpful in defining the cortical thymocyte phenotype of thymoma, as distinguished from the typical peripheral T-cell phenotype of tumor-infiltrating lymphocytes associated with other tumors. CD5 reactivity can be somewhat helpful in separating thymic carcinoma from thymoma and other tumors that have a tendency to involve the mediastinum, but it should be noted that some B3 thymomas express CD5.[10-12] Immunostains for human chorionic gonadotropin (HCG), placental alkaline phosphatase (PLAP), carcinoembryonic antigen (CEA), and α-fetoprotein are helpful in differentiating among thymic carcinomas and mediastinal germ cell tumors.

References

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