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Updates in TNM Staging of Testicular Cancer

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<table>
<thead>
<tr>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
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<th>6TH</th>
<th>7TH</th>
<th>8TH</th>
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</thead>
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# Testicular TNM AJCC staging 1977

<table>
<thead>
<tr>
<th>Primary Tumor (T)</th>
<th>Nodal Involvement (N)</th>
<th>Distant Metastasis (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TX</strong> Minimum requirements cannot be met (in the absence of orchiectomy, TX must be used)</td>
<td><strong>NX</strong> Minimum requirements cannot be met</td>
<td><strong>MX</strong> Not assessed</td>
</tr>
<tr>
<td><strong>T0</strong> No evidence of primary tumor</td>
<td><strong>N0</strong> No evidence of involvement of regional lymph nodes</td>
<td><strong>MO</strong> No (known) distant metastasis</td>
</tr>
<tr>
<td><strong>T1</strong> Limited to body of testis</td>
<td><strong>N1</strong> Involvement of a single homolateral regional lymph node which, if inguinal, is mobile</td>
<td><strong>M1</strong> Distant metastasis present</td>
</tr>
<tr>
<td><strong>T2</strong> Extends beyond the tunica albuginea</td>
<td><strong>N2</strong> Involvement of contralateral or bilateral or multiple regional lymph nodes which, if inguinal are mobile</td>
<td>Specify ________</td>
</tr>
<tr>
<td><strong>T3</strong> Involvement of the rete testis or epididymis</td>
<td><strong>N3</strong> Palpable abdominal mass present or fixed inguinal lymph nodes</td>
<td></td>
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<tr>
<td><strong>T4a</strong> Invasion of spermatic cord</td>
<td><strong>N4</strong> Involvement of juxtaregional nodes</td>
<td></td>
</tr>
<tr>
<td><strong>T4b</strong> Invasion of scrotal wall</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Testicular TNM AJCC staging 1977

• T stage was based on the progression of tumor
  • Extent of involvement of adjacent structures
  • No size criteria's as compared to other systems

• N stage, extent of disease
  • Based on focality, laterality, palpability and juxtaregional nodes

• M stage, any metastasis
  • Presence or absence of metastasis

• No S category defined
<table>
<thead>
<tr>
<th>Change</th>
<th>Details of Change</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of Primary Tumor (T)</strong></td>
<td>In pure seminoma, T1 is subclassified to T1a to T1b according to tumor's size using a 3cm cutoff</td>
<td>I</td>
</tr>
<tr>
<td><strong>Definition of Primary Tumor (T)</strong></td>
<td>Epididymal invasion is considered T2 rather than T1</td>
<td>II</td>
</tr>
<tr>
<td><strong>Definition of Primary Tumor (T)</strong></td>
<td>Hilar soft tissue invasion is considered T2</td>
<td>II</td>
</tr>
<tr>
<td><strong>Definition of Distant Metastasis (M)</strong></td>
<td>Discontinuous involvement of the spermatic cord by vascular-lymphatic invasion represents M1 disease</td>
<td>III</td>
</tr>
</tbody>
</table>
## Cancer Not staged with AJCC

<table>
<thead>
<tr>
<th>Histopathologic types of tumor</th>
<th>Staging classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spermatocytic tumor</td>
<td>No AJCC staging system</td>
</tr>
<tr>
<td>Nonmalignant sex cord-/gonadal-stromal tumors</td>
<td>No AJCC staging system</td>
</tr>
<tr>
<td>Prepubertal germ cell tumors</td>
<td>No AJCC staging system</td>
</tr>
<tr>
<td>Hematolymphoid tumors</td>
<td>Hematologic malignancies</td>
</tr>
<tr>
<td>Paratesticular neoplasms</td>
<td>No AJCC staging systems</td>
</tr>
</tbody>
</table>
Testicular TNM AJCC staging 2017

- PRIMARY TUMOR (T)
  - The extent of primary tumor is usually classified after radical orchiectomy and, for this reason, a pathologic stage is assigned.
  - pTX: Primary tumor cannot be assessed
  - pT0: No evidence of primary tumor (e.g., histologic scar in testis)
  - pTis: Germ cell neoplasia in situ
  - pT1: Tumor limited to the testis (including rete testis) without lymphovascular invasion
    - PT1a*: Tumor smaller than 3 cm in size
    - PT1b*: Tumor larger than 3 cm in size
  - pT2: Tumor limited to the testis (including rete testis) 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 vascular invasion
  - pT3: Tumor invades spermatic cord with or without lymphovascular invasion
  - pT4: Tumor invades scrotum with or without lymphovascular invasion
  - *Subclassification of T1 applies only to pure seminoma.
Germ Cell Neoplasia In Situ (GCNIS)

- Replaced “intratubular germ cell neoplasia, unclassified”.
- GCNIS associated tumors
  - Seminomatous and nonseminomatous germ cell tumor
- Non-GCNIS tumors
  - Spermatocytic Tumor,
  - Prepubertal teratoma, prepubertal yolk sac tumor and mixed
- Prepubertal YST and mixed tumor classification
  - AJCC or alternatively COG
Macroscopic Evaluation of Orchiectomy

- The extent of primary tumor is usually classified after radical orchiectomy
- Tumor size
- Multifocality
- Location
- Invasion of adjacent structures
  - hilum, tunica albuginea, tunica vaginalis, epididymis, spermatic cord and scrotum
Seminoma size

- Tumors limited to the testis in the absence of lymphovascular invasion are classified as pT1
- Subclassify seminoma based on size
  - 3 cm or less pT1a
  - > 3 cm pT1b
- Size matters - adjuvant radiation or carboplatin-based chemotherapy
- Conservative approach by AJCC, higher cut off may be considered
- No size for other germ cell tumors.
- Seminoma with syncytiotrophoblasts is not a mixed germ cell tumor.
Hilar soft tissue and Rete testis Invasion

- Hilar soft tissue upstaged to pT2
- Epididymal invasion upstaged to pT2
  - Some evidence to even stage higher
- Rete testis invasion may be associated with a higher clinical stage but not upstaged
  - Limited evidence
  - Future refinement possible
  - Pagetoid extension versus stromal invasion of rete testis.
pT1 = without vascular/lymphatic invasion

pT1 = involvement of rete testis

pT1 = involvement of tunica albuginea

T. albuginea

T. vaginalis
Rete testis stromal invasion
pT2

Hilar soft tissue invasion
Vascular Invasion

• Any vascular invasion is pT2
  • Intratesticular
  • Spermatic cord
Intratesticular Vascular invasion
Spermatic cord vascular Invasion
Spermatic cord soft tissue Invasion

- Continuous spermatic cord invasion is pT3
- Discontinuous invasion
  - Likely due to vascular transport and invasion of soft tissue
  - Upstaged as M1
  - With or without vascular invasion
Invasion of Scrotum pT4

- Extremely Rare
- Advanced clinical stage disease
Testicular TNM AJCC staging 2017

- Regional lymph node (pN)
  - NX  Regional lymph nodes cannot be assessed
  - N0  No regional lymph node metastasis
  - pN1 Metastasis with a lymph node mass 2 cm or less in greatest dimension and less than or equal to 5 nodes positive, none more than 2 cm in greatest dimension
  - pN2 Metastasis with a lymph node mass more than 2 cm but not 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
  - pN3 Metastasis with a lymph node mass more than 5 cm in greatest dimension
Post-Rx Necrosis & Reaction
"Fibrosis"
Testicular TNM AJCC staging 2017

• Distant Metastasis (M)
  • M0  No distant metastasis
  • M1  Distant metastasis
    • M1a  Non-retroperitoneal nodal or pulmonary metastasis
    • M1b  Non pulmonary visceral metastasis
Testicular TNM AJCC staging 2017

- Serum Tumor Markers (S)
- SX Marker studies not available or not performed
- S0 Marker study levels within normal limits
- S1 LDH < 1.5 X N\* AND hCG (mIU/ml) < 5000 AND AFP (ng/ml) < 1000
- S2 LDH 1.5 –10 x N OR hCG (mIU/ml) 5000–50,000 OR AFP (ng/ml) 1000–10,000
- S3 LDH > 10 x N OR hCG (mIU/ml) > 50,000 OR AFP (ng/ml) > 10,000
AJCC Prognostic Score Groups

- Based on TNM and S classification
- Range from Stage group 0 to IIIC
- Stage IV is not assigned because of excellent prognosis
Few other things

- pTx category is only used when the tissue is not available or the specimen is insufficient to render a diagnosis.
  - Avoid if you can
- y qualifier should use for posttherapy specimens
- r qualifier for recurrent cases
- a qualifier for autopsy
- Germ cell tumors are not graded
- Imaging may help in size and extent estimation.
- Topography ICDO codes are provided (WHO)
- Mx is not a valid M category