Introduction

• Historical aspects
• Changes to the T component
  – Tumor size and measurement
  – Pleural invasion defined
  – Multifocality
  – Significance of invasion into other structures
  – Assessing bronchial involvement
• Changes to N component
• Changes to M component
  – Cytologic aspects of lung carcinoma
Historical Notes

- Professor Pierre Denoix
  - 1953 “Uniform Technique for Clinical Classification by the TNM System”
- UICC – Union Internationale Contre le Cancer
  - 1966 – Lung tumor fascicle
  - 1968 – UICC TNM Classification of Malignant Tumours
- AJCC – American Joint Committee on Cancer
  - 1973 - Dr. Clifton Fletcher Mountain (with Carr and Anderson)
  - 1st edition 1977

A SYSTEM FOR THE CLINICAL STAGING OF LUNG CANCER*

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STAGING of neoplastic disease is the procedure of assigning a simple coded designator to a patient in accordance with an established set of rules. Its purpose is to classify patients and group them with respect to the anatomic extent or biologic severity of their disease. Clinical staging is based only on those measures of disease extent which are available from diagnostic or evaluative studies undertaken prior to instituting therapy. This classification of patients into relatively homogeneous groups, with respect to estimates of their prognosis, is essential if different modalities of treatment are to be compared and if results are to be communicated in meaningful terms. Among the systems of classification proposed by international organizations and congresses,1,2,6,11,17 and individuals4 are classification schemes applicable specifically to lung cancer.1,13 Some of these have been found wanting,1,2,6,11,18 and none have achieved wide acceptance to date. The TNM classification scheme, first proposed by Denoix,1 meets many of the criteria and constraints noted above, and its principles are well established internationally.19 Therefore, the general rules of the TNM system were adopted in this investigation, undertaken under the auspices of the Task Force on Lung Cancer2 of the American Joint Committee on Cancer Staging and End
IASLC Lung Cancer Staging Project

- Problems with the Mountain Database
  - One country
  - Older cases (collected over 20 years)
  - Mostly surgical cases

- 1996 - International Association for the Study of Lung Cancer (IASLC)
  - Set up database in 1996.
  - 23 institutions in 12 countries >80,000 cases.
  - Call for data increased number to >100,000.
  - Analysis looking at survival data.
  - Help define specific structures
  - Pleural invasion, Nodal stations
T Component - Size

- First thing apparent on analysis…
- Size matters.
T Component - Tumor Size

**AJCC 6th** | **AJCC 7th**
---|---
T1: Size ≤3 cm | T1a: ≤2 cm
T1b: >2 to ≤3 cm
T2: Size > 3 cm | T2a: > 3 to ≤5 cm
T2b: > 5 to ≤7 cm
T3: > 7 cm
Issues in Measurement

• Effects of fixation
• Gross vs. Microscopic Assessment
  – Organizing pneumonia
  – Scarring

Tumor Size

• When tumor exceeds 3 cm, the stage increases from IA to IB in node-negative.
  – Patient may be offered chemotherapy
• Measure all tumors grossly.
  – Verify accuracy microscopically.
A New Dilemma

• Available online January 20, 2011
• “IASLC/ATS/ERS International Multidisciplinary Classification of Lung Adenocarcinoma”
• No bronchioloalveolar carcinoma
• Resurrecting the term “lepidic”
  – From lepidos – scale
  – Surface alveolar growth

Journal of Thoracic Oncology. 6(2):244-285, February 2011.
Old Surface Alveolar Growth

- Less than 3 cm and pure:
  - Adenocarcinoma in situ
- Less than 3 cm with less than 5 mm invasion:
  - Minimally invasive adenocarcinoma
- Less than 3 cm with more than 5 mm invasion (but still minor component)
  - Lepidic predominant adenocarcinoma
How about > 3cm?

• The data in the analysis are for tumors less than 2 or 3 cm.
• If greater than 3 cm
  – “Lepidic predominant adenocarcinoma, suspect AIS or MIA.”
  – “Lepidic predominant adenocarcinoma.”

New Recommendations

• Classify tumor according to predominant pattern, list percentages (by 5%’s) in comment.
• Measure invasive component for T staging.
• I report both measurements in comment.
Pleural Invasion

• No changes in pleural invasion leading to T2 designation.

What Constitutes Pleural Invasion?

• “Invasion into visceral pleura”
• Extension past alveolar elastica?
• Invasion past visceral pleura elastica?
• Pleural puckering?

Defining Pleural Invasion

- Sam Hammar 1988
- Japan Lung Cancer Society
Studies of Prognostic Value

- Osaki et al, 2004:
  - 5 yr survival rates
    - PL0 = 68.0%
    - PL1 = 43.9%
    - PL2 = 54.9%
- Shimizu et al, 2004:
  - 5 yr survival rates (≤ 3 cm, > 3 cm)
    - PL0 = 79%, 60%
    - PL1 = 63%, 39%
    - PL2 = 42%, 35%

Analysis of Pleural Invasion with EVG Staining

- Once visceral pleural invasion is defined, need of EVG stain is apparent.
- Butnor et al, 2007
  - Some cases are easy, others there is a lack of agreement.
- Taube et al, 2007
  - Pleural invasion is an elusive finding
  - Need EVG stain
  - 19% of 100 T1 peripheral tumors understaged

Taube JM, et al. AJSP 31(6): 953-956
Pleural Invasion

- Use EVG stain for all tumors approaching the pleura.
- Stage tumor as T2a if external elastic layer is penetrated (visceral pleural elastica).
  - Raises stage from IA to IB in small tumors.
- Penetration of external layer is not sufficient to call “chest wall invasion.”
  - Look for penetration into parietal fat.
- Can use PL designations if desired
  - Past elastica PL1, on pleural surface PL2, into chest wall PL3

Multifocal Tumors

- Change in staging
  - T4 to T3
  - M1 to T4
## Multifocality - T Component

<table>
<thead>
<tr>
<th></th>
<th>AJCC 6th</th>
<th>AJCC 7th</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4: Same lobe</td>
<td>T3: Same lobe nodule</td>
<td>T3: Same lobe nodule</td>
</tr>
<tr>
<td>nodule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1: Same lung,</td>
<td>T4: Same lung, different lobe nodule</td>
<td>T4: Same lung, different lobe nodule</td>
</tr>
<tr>
<td>different lobe</td>
<td></td>
<td></td>
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<tr>
<td>nodule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1: Contralateral</td>
<td>Contralateral lung nodule</td>
<td>M1a: Contralateral lung nodule</td>
</tr>
<tr>
<td>lung nodule</td>
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</tbody>
</table>

## Met or Synchronous Primary?

- AJCC previously used criteria of Martini and Melamed.
  - Different locations
  - In situ component in each
  - No lymphatic invasion
  - No extrapulmonary mets
Met or Synchronous Primary?

- Current guide states synchronous if:
  - Different histologic types.
  - Same histologic type if
    - it is “the opinion of the pathologist...they represent differing subtypes of the same histopathological cell type,” and
    - Have no evidence of mediastinal nodal metastases or of nodal metastases within a common nodal drainage.

Met or Synchronous Primary?

- Associated carcinoma in situ
- Differences in morphology
  - Girard et al, AJSP
- Differences in immunohistochemistry
- Different molecular profiles

Small Cell Carcinoma?

- Prior staging systems lacked enough numbers of small cell to validate.
- Previously staged as “limited” and “extensive” based on whether confined to one hemithorax.
- Over 8,000 small cell cases examined in IASLC database.
- Over 500 carcinoid tumors examined.
- Use TNM for all SCLC and carcinoids
Other Tricky Issues

• Crossing from one lobe to the next.
  – T2 if continuous (even if interlobar fissure not defined by EVG)
• Invasion of proximal fatty tissue
  – If lobectomy, likely T2 (hilar fat)
  – If pneumonectomy, likely T4 (mediastinal fat)
• Invasion of mainstem bronchus
  – Dependent on distance to carina
• Obstructive pneumonia
  – Must extend to hilum
  – T3 if less than whole lung, T4 if whole lung

N Component

• The N component will stay the same.
• New lymph node map!

• As the nodal station increases, the N status decreases:
  1 = N3 = supraclavicular or sternal notch
  2-9 = N2 = nodes in mediastinum
  10+ = N1 = nodes in lung
Pleural reflections

Lymph node with Partially compressed vessel
Tricky Node Case

- Tumor of left upper lobe invades into chest wall.
- A lymph node is positive, in the chest wall, adjacent to the tumor.
- Since regional lymph nodes are defined as the stations 1-14, a chest wall node is a distant metastasis – T3,N0,M1b.

Caveo numeros Romanorum
M Component

- Splitting the M component in two.
- M1a:
  - Metastasis to contralateral lung.
  - Pleural nodules.
  - Malignant pleural or pericardial effusion.
- M1b:
  - Distant extrapulmonary metastasis.

Cytologic Assessment of Pleural Effusions

- If you can’t tell, it will come back worse and it will be easier.
- Immunohistochemical panel on cell block
  - Reactive mesothelial cells?
    - Calretinin, D2-40, WT-1, CK5/6, desmin
  - Carcinoma?
    - MOC-31, TTF-1
    - B72.3, CD15, CEA
Take Home Points

• T component - Size matters.
• New classification of adenocarcinomas.
• Pleural invasion - use an EVG stain.
• Multifocal tumors - Common sense currently less expensive than molecular markers.
• Small cell and carcinoids- TNM works.
• N component – New map. “Verso pollice”
• M component - Split local and distant.

Thank You.