The 8th Edition of the TNM Classification for Lung Cancer

An AJCC Webinar

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Nomenclature

• **Components:** $T, N$ and $M$

• **Categories:** $T1a$, etc.; $N0$, etc.; $M1a$, etc.

• **Descriptors:** what defines the categories
Content of this presentation

- Database
- Innovations and clinical implications of the 8th edition
- Summary
- Conclusions
Content of this presentation

- Database
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Database for the 8th edition

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>46,560</td>
<td>49</td>
</tr>
<tr>
<td>Asia</td>
<td>41,705</td>
<td>44</td>
</tr>
<tr>
<td>North America</td>
<td>4,660</td>
<td>5</td>
</tr>
<tr>
<td>Australia</td>
<td>1,593</td>
<td>1.7</td>
</tr>
<tr>
<td>South America</td>
<td>190</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>94,708</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective</td>
<td>73,251</td>
</tr>
<tr>
<td>Prospective</td>
<td>3,905</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>77,156</td>
</tr>
</tbody>
</table>

Rami-Porta R et al. J Thorac Oncol 2014; 9: 1618-1624
Content of this presentation

• Database
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<table>
<thead>
<tr>
<th>T descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Tumour size</td>
</tr>
<tr>
<td>• Endobronchial location</td>
</tr>
<tr>
<td>• Atelectasis/pneumonitis</td>
</tr>
<tr>
<td>• Visceral pleura invasion</td>
</tr>
<tr>
<td>• Invasion of peripheral structures</td>
</tr>
<tr>
<td>• Invasion of central structures</td>
</tr>
<tr>
<td>• Separate tumour nodules in same lobe, same lung, contralateral lung</td>
</tr>
</tbody>
</table>

24 descriptors
T component

- Pathologic populations
  - pT1-4 N0 M0 R0
  - pT1-4 any N M0 R0
  - pT1-4 any N M0 any R

- Clinical populations
  - cT1-4 N0 M0
  - cT1-4 any N M0

- Univariate and multivariate analyses
- Adjusted for histology, region, age and sex
T: results

- Size: every cm counts
- Tumour size as descriptor in all T categories
- VPI: no change
- T2 & T3 endobronchial: same prognosis
- T2 & T3 atelectasis: same prognosis
- T3 diaphragm has a T4 prognosis
- T3 mediastinal pleura, rarely used
## The T component

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 1 cm</td>
<td>T1a</td>
</tr>
<tr>
<td>&gt;1-2 cm</td>
<td>T1b</td>
</tr>
<tr>
<td>&gt;2-3 cm</td>
<td>T1c</td>
</tr>
<tr>
<td>&gt;3-4 cm</td>
<td>T2a</td>
</tr>
<tr>
<td>&gt;4-5 cm</td>
<td>T2b</td>
</tr>
<tr>
<td>&gt;5-7 cm</td>
<td>T3</td>
</tr>
<tr>
<td>&gt;7 cm</td>
<td>T4</td>
</tr>
<tr>
<td>Bronchus &lt; 2 cm</td>
<td>T2</td>
</tr>
<tr>
<td>Total atelectasis</td>
<td>T2</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>T4</td>
</tr>
</tbody>
</table>

New T categories

Tis (AIS)

T1mi

The T component
Size measurement in part-solid non-mucinous ADK

Clinical size:
size of solid component

Pathologic size:
size of invasive component

Courtesy of Dr. H. Asamura

The T component

Measurement of tumour size

IASLC recommendation for the measurement of tumour size:

Lung window

Visceral pleura invasion

In case of doubt about the visceral pleura involvement, the use of elastic stains is recommended.

Travis WD et al. JTO 2008;3:1384-90
## Frequency of VPI

<table>
<thead>
<tr>
<th>Apparent Stage IA Histological subtype</th>
<th>N of cases</th>
<th>VPI, n (%)</th>
<th>Elastic stains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenocarcinoma</td>
<td>46</td>
<td>8 (17%)</td>
<td></td>
</tr>
<tr>
<td>Bronchioloalveolar</td>
<td>15</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Squamous</td>
<td>31</td>
<td>8 (26%)</td>
<td></td>
</tr>
<tr>
<td>Large cell</td>
<td>7</td>
<td>2 (29%)</td>
<td></td>
</tr>
<tr>
<td>Adenosquamous</td>
<td>1</td>
<td>1 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>19 (19%)</td>
<td></td>
</tr>
</tbody>
</table>

Use of elastic stains: 49 pathologists: never 25 (51%), some times 14 (29%), always 10 (20%)

Implications for clinical practice: T

- Every cm counts; careful follow-up
- Accurate tumour size measurement, important
- Worse prognosis of larger tumours
- Better prognosis for endobronchial location and total atelectasis and pneumonitis
- Prognosis refinement
- Better stratification for clinical trials
The N component

Quantification of nodal disease

Pathological - any R

N1 Single = N1a
N1 Multiple = N1b
N2 Single N2 ("skip mets") = N2a1
N2 Single N2 + N1 = N2a2
N2 Multiple N2 = N2b

N: recommendations

To keep the present descriptors as they are

To propose new descriptors for prospective testing:

- pN1a: involvement of single pN1 nodal station
- pN1b: involvement of multiple pN1 nodal stations
- pN2a1: involvement of single pN2 nodal station without pN1 (skip pN2)
- pN2a2: involvement of single pN2 nodal station with pN1
- pN2b: involvement of multiple pN2 nodal stations
- pN3: as it is

Implications for clinical practice: N

- The amount of nodal disease has prognostic impact
- Important to quantify nodal disease both at clinical and pathologic staging
- Upfront resection for single station cN2 will be discussed
- Prognosis refinement
- Better stratification
The M component: M1a

Prognosis for the different M1a descriptors is similar.

The M component:  \textbf{M1b}

Implications for clinical practice: M

- Number of M1s is more important than their location
- M1b: baseline definition of oligometastases and oligoprogression
- Prognosis refinement
- Better stratification
# Stage groupings

<table>
<thead>
<tr>
<th>T1a</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>M1a any N</th>
<th>M1b any N</th>
<th>M1c any N</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA1</td>
<td></td>
<td>II B</td>
<td>III A</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IA2</td>
<td></td>
<td>II B</td>
<td>III A</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IA3</td>
<td></td>
<td>II B</td>
<td>III A</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IB</td>
<td></td>
<td>II B</td>
<td>III A</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IIA</td>
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<td>II B</td>
<td>III A</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IIB</td>
<td></td>
<td>III A</td>
<td>IIIB</td>
<td>IIIC</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>IIIA</td>
<td></td>
<td>III A</td>
<td>IIIB</td>
<td>IIIC</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
</tbody>
</table>

Stage grouping for the 8th edition

Validation with National Cancer Database

Cancers with multiple lesions

Multiplicity of lesions is defined by DISEASE PATTERN

1. Second primary lung cancers
2. Separate tumour nodules
3. Multiple adenocarcinomas with GG/lepidic features
4. Pneumonic type adenocarcinoma

Lung cancers with multiple lesions
Second primary tumours

Clinical data

- Different histologic type
- Different radiographic appearance
- Different metabolic features
- Different biomarkers
- Different growth rate
- No nodal involvement or M1

RUL nodule
2.2 cm; SUVmax: 3.6

LLL nodule
1.6 cm; SUVmax: 1.8
Separate tumour nodules

- One typical solid lung cancer
- One or more separate solid nodules with similar CT features, with presumed or confirmed same histologic type
- Thought NOT to be synchronous tumours
- WITHOUT GG features
Multiple adenocarcinomas with GG/lepidic features

- Multiple sub-solid nodules (pure or part-solid) with at least one suspected (or proven) to be cancer
- With or without biopsy
- It applies to AIS, MIA and LPA
- GGOs <5cm suggestive of AAH do not count for TNM
Pneumonic type adenocarcinomas

Clinical data

- Single or multiple areas of infiltrates or consolidation
- One lobe, one or both lungs
- GG, consolidation or both
- With or without biopsy
- NO discrete GG nodules
- NO pneumonia or atelectasis
Cancers with multiple lesions

1. Multiple primary tumours:
   - One TNM for each tumour

2. Separate tumour nodules:
   - T3, T4, M1a

3. Multiple adenos with GGO/lepidic features:
   - Highest T (#/m) N M

4. Pneumonic type adenocarcinoma:
   - T3, T4, M1a

Detterbeck F et al.
J Thorac Oncol
2016; 11 (5):
639-650
651-665
666-680
681-692
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Summary

• More relevance to tumour size
• Reclassification of some T descriptors
• Validation of present N descriptors
• Acknowledgment of relevance of quantification of nodal disease
• Three metastatic groups
• More stages for better prognostic stratification
• More recommendations for uniform staging
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Conclusions

The innovations in the 8th edition of the TNM classification of lung cancer:

- increase our capacity to refine prognosis
- improve tumour stratification in future trials
- prompt future research
- facilitate homogeneous tumour classification and collection of prospective data