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
• Innovations and clinical implications of the 8th edition
• Summary
• Conclusions
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>TOTAL</td>
<td>94,708</td>
<td>100</td>
</tr>
</tbody>
</table>

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

Type of data

<table>
<thead>
<tr>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective</td>
</tr>
<tr>
<td>Prospective</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Content of this presentation

- Database
- Innovations and clinical implications of the 8th edition
- Summary
- Conclusions
T descriptors

- Tumour size
- Endobronchial location
- Atelectasis/pneumonitis
- Visceral pleura invasion
- Invasion of peripheral structures
- Invasion of central structures
- Separate tumour nodules in same lobe, same lung, contralateral lung

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
AJCC Physician to Physician Webinar
8th Edition Lung Cancer

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>
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<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

The T component
Measurement of tumour size

IASLC recommendation for the measurement of tumour size:

Lung window

Visceral pleura invasion

| PL0: | ---- |
| PL1 y PL2: | T2 |
| PL3: | T3 |

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

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Frequency of VPI

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

**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: 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></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>
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</thead>
<tbody>
<tr>
<td>T1a</td>
<td>IA1</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T1b</td>
<td>IA2</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T1c</td>
<td>IA3</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T2a</td>
<td>IB</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T2b</td>
<td>IIA</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T3</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IIIC</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
</tr>
<tr>
<td>T4</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IIIC</td>
<td>IVA</td>
<td>IVA</td>
<td>IVB</td>
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</tbody>
</table>

Stage grouping for the 8th edition

<table>
<thead>
<tr>
<th>Stage</th>
<th>Clinical Events/N</th>
<th>MST 24 months</th>
<th>MST 60 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA1</td>
<td>68/781</td>
<td>NR</td>
<td>92%</td>
</tr>
<tr>
<td>IA2</td>
<td>500/1108</td>
<td>NR</td>
<td>94%</td>
</tr>
<tr>
<td>IA3</td>
<td>546/2417</td>
<td>NR</td>
<td>90%</td>
</tr>
<tr>
<td>IB</td>
<td>993/721</td>
<td>NR</td>
<td>87%</td>
</tr>
<tr>
<td>IBa</td>
<td>275/135</td>
<td>NR</td>
<td>78%</td>
</tr>
<tr>
<td>IBb</td>
<td>730/1453</td>
<td>66.0</td>
<td>72%</td>
</tr>
<tr>
<td>IA</td>
<td>2052/3200</td>
<td>29.3</td>
<td>58%</td>
</tr>
<tr>
<td>IBa</td>
<td>1551/2140</td>
<td>19.0</td>
<td>44%</td>
</tr>
<tr>
<td>IBb</td>
<td>831/1956</td>
<td>12.6</td>
<td>24%</td>
</tr>
<tr>
<td>IA</td>
<td>539/484</td>
<td>11.8</td>
<td>22%</td>
</tr>
<tr>
<td>IBa</td>
<td>529/396</td>
<td>6.0</td>
<td>10%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pathological</th>
<th>Events/N</th>
<th>MST 24 months</th>
<th>MST 60 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA1</td>
<td>139/1389</td>
<td>NR</td>
<td>90%</td>
</tr>
<tr>
<td>IA2</td>
<td>823/533</td>
<td>NR</td>
<td>94%</td>
</tr>
<tr>
<td>IA3</td>
<td>875/420</td>
<td>NR</td>
<td>90%</td>
</tr>
<tr>
<td>IB</td>
<td>1618/105</td>
<td>NR</td>
<td>89%</td>
</tr>
<tr>
<td>IBa</td>
<td>3170/1945</td>
<td>NR</td>
<td>82%</td>
</tr>
<tr>
<td>IBb</td>
<td>2175/3226</td>
<td>NR</td>
<td>76%</td>
</tr>
<tr>
<td>IA</td>
<td>3219/3756</td>
<td>41.3</td>
<td>65%</td>
</tr>
<tr>
<td>IBa</td>
<td>1215/1729</td>
<td>22.0</td>
<td>47%</td>
</tr>
<tr>
<td>IBb</td>
<td>56/69</td>
<td>11.0</td>
<td>30%</td>
</tr>
</tbody>
</table>


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

Separate tumour nodules

Clinical data

- 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

**Clinical data**

**Pneumonic type adenocarcinomas**

- 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

**Clinical data**
## 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

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### Content of this presentation

- **Database**
- Innovations and clinical implications of the 8th edition
- **Summary**
- Conclusions
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

Content of this presentation

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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