De nieuwe anatomische afbakening van de mediastinale lymfeklieren

Peroperatieve N staging

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LN mapping and staging

Lymph node mapping
7th edition TNM classification 2010
Peroperative staging

Naruke T
JTCS 1978; 76:832-9

14 LN stations
single digit  N2
double digits  N1

anatomical description
English version since 2000

Mountain - Dresler
Chest 1997; 111:1718-23
Proposed changes LN stations - zones

↑ lower margin cricoid
↓ clavicles, ↑ manubrium

N3 !

Rusch V. J Thorac Oncol 2009; 4:568-77
Proposed changes LN stations - zones

5 lateral to ligamentum arteriosum
4L medial

↑ carina of trachea
↓ L ↑ border LLL bronchus
R ↓ border of bronchus intermedius

10 R+L ↓ interlobar region
main bronchus medial 7 N2 lateral 10, 11 N1

Oncological midline

↑ carina of trachea
↓ L ↑ border LLL bronchus
R ↓ border of bronchus intermedius

↑ grote regio!
LN mapping and staging

Lymph node mapping
7th edition TNM classification 2010

Peroperative staging

IASLC: Complete Resection Subcommittee

Complete resection R0

- free resection margins proved microscopically bronchial, venous, arterial stumps, peribronchial soft tissue, any peripheral margin near tumor or of additionally resected tissue
- systematic or lobe-specific systematic nodal dissection:
  ≥ 6 nodal stations (3 mediastinal)
- no extracapsular extension in nodes removed separately or at the margin of the lung specimen
- highest mediastinal lymph node must be negative


IASLC: Complete Resection Subcommittee

Incomplete resection R1 - R2

- tumor involvement of resection margins
- extracapsular extension in nodes removed separately or at the margin of the lung specimen
- + nodes that were not removed
  R2 if recognized by surgeon
- + cytology of pleural or pericardial effusions

IASLC: Complete Resection Subcommittee
Uncertain resection Rx

Resection margins free of disease microscopically but one of the following applies:

- less rigorous LN evaluation
- intracapsular involvement highest mediastinal node extracapsular = R2
- bronchial margin: ca. in situ
- + pleural lavage cytology R1 cy+


Systematic nodal dissection

Dissection of mediastinal, hilar and lobar LN in a systematic fashion

- 240 pts: cT1-3 N0-1 NSCLC
- 3% expl. thoracotomy - 20% N2 disease
- skip metastases: 34% N2 disease
- no subgroup 0% incidence of N2 metastases

Graham A. Systematic nodal dissection in the intrathoracic staging of patients with NSCLC. J Thorac Cardiovasc Surg 1999; 117:246-51

Systematic nodal dissection

- peripheral tumors < 2 cm.: 24% LN mets
- necessary for accurate staging NSCLC
- gold standard for mediastinal staging
- confusion: radical lymphadenectomy
- lymph node sampling
- R: 4R, 7, 8, 9
- L: 5, 6, 4

Graham A. Systematic nodal dissection in the intrathoracic staging of patients with NSCLC. J Thorac Cardiovasc Surg 1999; 117:246-51

Accuracy PET-CT scanning anno 2009

- 200 patients operated lung cancer
- PET-CT followed by staging mediastinoscopy and resection, if appropriate
- PET-CT correct staging 99 pts 49.5%
- under-staged 59 29.5%
- over-staged 42 21%
- superior mediastinal nodes not correctly staged in 19%


Lobe-specific systematic nodal dissection

Dissection of intrapulmonary (lobar, interlobar, segmental) and hilar LN + ≥ 3 mediastinal LN stations:

- RUL - RML 7 + (2R or 4R or X)
- RLL 7 + 4R + (8 or 9)
- LUL 5, 6, 7
- LLL 7, 8, 9
- LN specimen: ≥6 LN: 3 hilar, intrapulmonary 3 mediastinal (station 7)


Sampling vs lymph node dissection

- ECOG 3590: randomized prospective trial of adjuvant therapy in patients with completely resected stages II and IIIA NSCLC (adjuvant RT vs. CTRT)
- stratification, nonrandomized comparison (n=373):
- SS: systematic sampling
- MLND: complete mediastinal lymph node dissection (complete removal of all lymph nodes)

Sampling vs lymph node dissection

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<th>N1</th>
<th>N2</th>
<th>MST</th>
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<td>SS</td>
<td>187</td>
<td>40</td>
<td>60%</td>
<td>29.2mos</td>
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<tr>
<td>MLND</td>
<td>186</td>
<td>41</td>
<td>59%</td>
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- SS as efficacious as MLND in staging pts. NSCLC
- MLND identifies more levels of N2 disease
- MLND improved survival with right NSCLC ↔ SS


Sampling vs lymph node dissection

- randomized trial (532 pts)
- lung resection with systematic nodal dissection – SND
  vs mediastinal LN sampling - MLS

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<td>268</td>
<td>43mos</td>
</tr>
<tr>
<td>MLS</td>
<td>264</td>
<td>32</td>
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- p < .0001

Wu Y. A randomized trial of systematic nodal dissection in resectable NSCLC. Lung Cancer 2002; 36:1-6

Sampling vs lymph node dissection

<table>
<thead>
<tr>
<th>stage</th>
<th>5-ys</th>
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<th>II</th>
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- p = .02
- p = .05
- p = .0009

Multivariate analysis: LN dissection
- stage (pT/NM)
- tumor size
- n LN metastases

Wu Y. Lung Cancer 2002; 36:1-6

Guidelines peroperative LN staging

- systematic nodal dissection recommended
  - en bloc 2-4R, en bloc 7-9, 3a and 3p when present
  - L 4L, 5, 6, en bloc 7-9
  - lobes: always station 7, at least 6 nodal stations N1+2
  - RUL-RML 2R, 4R, 7 LUL 5, 6, 7
  - RLL 4R, 7, 8, 9 LLL 7, 8, 9
  - induction therapy: same recommendation, technically more difficult
  - high-risk patients: node assessment may be minimized


Surgical - pathologic N1

- N1: heterogeneous group
  - 1174 pts NSCLC: N0 50% N1 22% N2 28%
  - 5-year survival N1: 47.5%
    - intralobar N1 (level 12,13) 53.6%
    - extralobar, hilar N1 (10,11) 38.5% p = .001
  - intralobar N1 ≠ N0
  - extralobar N1 ≠ N2, single station

# Lymph node staging

**AIM = COMPLETE RESECTION**

- 7th edition TNM LN staging
  - anatomical boundaries, nodal zones, N1-N2
  - oncological midline: L side trachea
- mediastinoscopy: N1 nodes!
- peroperative staging: T and N factor, surgical stage
  - systematic nodal dissection gold standard
  - lobe-specific nodal dissection: minimum 6 stations