Guidelines for Mediastinal Staging in NSCL Cancer

The recommendation of ESTS and IASLC

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Mediastinal Staging for NSCLC

Introduction

- Lung Cancer remains the leading cause of cancer related deaths
- Equally true for men and women
- Increase incidence related to smoking
- In NSCLC prognosis is related to stage
CURRENT TRENDS IN LUNG CANCER

Fig 1
Ca Cancer J. Clin. 2002;52;23-47
FIGURE 5

DISTRIBUTION OF 20 MOST COMMON MALIGNANCIES
1975 - 2001 (TOTAL CASES = 46,065)

- Breast
- Leukemia
- NHL
- Thyroid
- Oral Cavity
- Brain, CNS
- Lung, Pleura
- Colon, Rectum
- Liver
- Hodgkin's Disease
- Nasopharynx
- Esophagus
- Bladder
- Skin Non-Melanoma
- Soft Tissue
- Stomach
- Bone, Cartilage
- Cervix
- Kidney, Urinary
- Ovary

Number of cases:
- Male
- Female
DISTRIBUTION OF 20 MOST COMMON MALIGNANCIES
1975 - 2011 (TOTAL CASES = 72,557)
Tumor Registry Annual Report

Oncology Data Unit Department of Oncology

KFSH&RC 2011

DISTRIBUTION OF 20 MOST COMMON MALIGNANCIES 2011 ANALYTIC CASES (TOTAL CASES = 2,292)

MALE
- Colon, Rectum 90 (9.3%)
- Leukemia 83 (8.6%)
- NHL 71 (7.4%)
- Liver 62 (6.4%)
- Brain, CNS 56 (5.8%)
- Thyroid 30 (3.2%)
- Kidney, Urinary 49 (5.1%)
- Nasopharynx 47 (4.9%)
- Lung, Bronchus 46 (4.8%)
- Bladder 40 (4.1%)
- Hodgkin’s Lymphoma 42 (4.4%)
- Oral Cavity 38 (4.0%)
- Stomach 29 (3.0%)
- Bone 29 (3.0%)
- Soft Tissue 28 (2.9%)
- Prostate 25 (2.6%)
- Testis 21 (2.2%)
- Esophagus 19 (2.0%)
- Pancreas 19 (2.0%)
- Other Skin CA 17 (1.8%)

FEMALE
- Breast 380 (20.8%)
- Thyroid 167 (12.0%)
- Leukemia 81 (5.1%)
- Colon, Rectum 79 (5.3%)
- Corpus Uteri 71 (5.3%)
- Oral Cavity 59 (4.4%)
- NHL 45 (3.4%)
- Ovary 42 (3.2%)
- Brain, CNS 42 (3.2%)
- Cervix Uteri 31 (2.3%)
- Liver 30 (2.3%)
- Soft Tissue 30 (2.3%)
- Kidney, Urinary 30 (2.3%)
- Hodgkin’s Lymphoma 30 (2.3%)
- Bone 26 (2.0%)
- Stomach 23 (1.7%)
- Lung, Bronchus 22 (1.7%)
- Nasopharynx 16 (1.2%)
- Bladder 16 (1.2%)
- Eye 16 (1.2%)
Mediastinal Staging

Features of good staging system

- Reflect disease extend
- Relate to prognosis
- Dictate management
- Predict survival
- Internationally approved
- Easily duplicated
- Simple to use
- Dependent on accessible diagnostic tools
Update on Lung Cancer Staging

History

- TNM Staging in 1972 for NSCLC
- Updated by Cliff Mountain in 1987 (4th)
- Updated by Cliff Mountain in 1997 (5th)
- Revised by Sobin in 2002 NY (6th)
- The project started in 1998
- Two workshops in Brompton Hospital in 1998
- New Staging by IASLC in 2009 (7th)
- Revised guidelines by ESTS and IASLC 2014
Data for Lung Cancer Staging
The old and the new system

- **Old**
  - Single institute (M.D Anderson)
  - 5000 cases.
  - No new diagnostic tools.
  - Results not influenced by multi-treatment modality.
  - New surgical techniques.
  - Short follow up

- **New**
  - 46 centers, 19 countries, all continents
  - 100,869-67,725 cases
  - Included
  - Results of multi-treatment modality
  - Included VATS
  - Long follow up
Recent Data showed variable results from the old staging.

5 year survival after resection for primary non small cell lung carcinoma. An analysis of 200 patients

E. SEPSAS, K. AL KATTAN, E.R. TOWNSEND and S.W. FOUNTAIN

Department of Thoracic Surgery, Harefield Hospital (GB)
Disease recurrence after resection for stage I lung cancer

Khaled Al-Kattan, Evangelo Sepsas, S. William Fountain *, Edward R. Townsend

Harefield Hospital, Harefield, Middlesex UB9 6JH, UK

Received 9 October 1996; received in revised form 2 June 1997; accepted 11 June 1997
Why New guidelines for mediastinal Staging for NSCLC

"Are our investigations more sensitive?"

- **Radiology**
  - Recent CT scans
  - MRA

- **Biopsy**
  - Wang needles
  - Endoscopic Ultrasound (EBUS)
  - Videoassisted mediastinoscopy

- **Functional**
  - PET scan (18 F-fluorodexyglucose)
Imaging Techniques

- **Chest CT Scan**: low sensitivity (55%) and specificity (81%)

- **MRI**: Diffusion weighted: not superior to CT

- **PET Scan**: Best and highest accuracy

- False negative in peripheral tumors of 3%

- False negative for central tumors 21%
Endoscopic Techniques

- **TBNA**: Node size dependent need 15-20 mm node in the short axis, sensitivity 78% and false negative in 28%

- **EBUS**: good for N7 and N8, size as small as 5 mm, can even biopsy N1 groups, sensitivity of 83-94%, false negative in 13-15%

- Higher rated if combined with **PET**
Surgical staging

- **Cervical mediastinoscopy**: traditional with higher results 90%
- **Video Assisted Med.**: Sensitivity 94%
- **VAMLA**: with lymphadenectomy: no data
- **VATS**: reaches 97%
Minimum requirements in Biopsy

- R4
- L4
- N7
- Additional 2R and 2L
- Additional N5 and N6 for left sided
- Additional if needed
- Need for Frozen section
Is the current LN map sufficient?
The Naruke Map
The modified Map
The IASLC Map
LN changes made
Definition of N0/N1

- **N0**: No regional lymph node metastases
- **N1**: Metastasis in ipsilateral intrapulmonary/ peribronchial/hilar lymph node(s), including nodal involvement by direct extension
Definition of N2

Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s), including "skip" metastasis without N1 involvement

Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s) associated with N1 disease
Definition of N3

- Metastasis in contralateral hilar/mediastinal/scalene/supracavitary lymph node(s)
- Metastasis in ipsilateral scalene/supraclavicular lymph node(s)
Why new N staging for NSCLC

Is N Staging (Lymph Node) accurate?:

- Lymph node map (N1 vs N2)
- Single station N1 vs multiple
- Single station N2 vs multiple
- Lymphadenectomy: To what extent?
- Sentinel lymph node
The New Staging
The N changes

- $N_x$ and $N_0$
- $N_1$
- $N_2$
- $N_3$
- No statistical difference so no changes where recommended

- Same
- $N_{1a}$ and $N_{1b}$ for single and multiple sites
- $N_{2a}$ and $N_{2b}$ for single and multiple sites
- $N_3$
### Proposed TNM stage grouping

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
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<tbody>
<tr>
<td>Stage 0</td>
<td>Tis</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IA</td>
<td>T1a,b</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IB</td>
<td>T2a</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IIA</td>
<td>T1a,b, T2a, T2b</td>
<td>N1, N0</td>
<td>M0, M0</td>
</tr>
<tr>
<td>Stage IIIA</td>
<td>T1,T2, T3, T4</td>
<td>N2, N1,N2, N0,N1</td>
<td>M0, M0, M0</td>
</tr>
<tr>
<td>Stage IIIB</td>
<td>T4, Any T</td>
<td>N2, N3</td>
<td>M0, M0</td>
</tr>
<tr>
<td>Stage IV</td>
<td>Any T</td>
<td>Any N</td>
<td>M1a,b</td>
</tr>
</tbody>
</table>
CT and PET or PET-CT

Mediastinal LN’s Negative
- cNO and Peripheral tumour (outer third of the lung) and tumour ≤ 3cm
  - Tissue confirmation: EBUS/EUS Or VAM (b)
    - Mediastinal LN’s Negative

Mediastinal LN’s Positive
- cN1or central tumour Tumour > 3cm (mainly AdenoCa with high FDG uptake) (a)
  - Tissue confirmation: EBUS/EUS (c)
    - Mediastinal LN’s Positive
      - Mediastinal LN’s Negative on EBUS/EUS
        - VAM (d)
        - Multimodality treatment
      - Mediastinal LN’s positive
        - Mediastinal LN’s negative

(a): In tumours > 3cm (mainly in adenocarcinoma with high FDG uptake) invasive staging should be considered
(b): Depending on local expertise to adhere to minimal requirements for staging
(c): Endoscopic technique are minimally invasive and are the first choice if local expertise with EBUS/EUS needle aspiration is available
(d): Due to its higher NPV, in case of PET positive or CT enlarged mediastinal LN’s, videoassisted mediastinoscopy (VAM) with nodal dissection or biopsy remain indicated when endoscopic staging is negative. Nodal dissection has an increased accuracy over biopsy.
Update on New Mediastinal Staging

- Staging was based on survival results with long follow up
- Multicentre recourses
- Will improve treatment strategy
- Will involve results where surgery with or without chemotherapy and radiotherapy were used
Update on the Mediastinal staging

- New tools like PET scan were is standard
- Use of EBUS for pathological findings prior to surgical biopsy
- The advantage of video assisted mediastinoscopy
- Value of frozen section
Video Assisted Mediastenoscopry