The IASLC Lymph Node Map
Ahmed H. El-Sherief, MD

Learning Objectives
After this lecture you will be able to:
- Accurately define and label thoracic lymph nodes to conform to the new IASLC lymph node map
- Recognize the differences between the new IASLC lymph node map and old MD-ATS lymph node map
- Recognize size criteria and pitfalls associated with each lymph node station
- Understand thoracic lymph node drainage patterns in lung cancer

Evolution of Thoracic Lymph Node Maps
First lymph node map developed by Naruke in the 1960s, was widely used in North America, Europe, and Japan

In the 1980s/1990s subsequent attempts to refine the anatomic descriptors of the Naruke map led to the development of two notable North American lymph node maps:
- A schema advocated by the American Thoracic Society (ATS)
- A schema advocated by the American Joint Committee of Cancer (AJCC) - an adaptation of the Naruke lymph node map

In 1996, the so-called Mountain-Dressler modification of the ATS map (MD-ATS) was developed which attempted to unify the ATS and AJCC schemas into a single map
- MD-ATS was fully accepted across North America but was only sporadically used in Europe
- Japan continued to use the Naruke lymph node map

Therefore in the 1990s and for the first decade of the 2000s, two different thoracic lymph node maps were commonly being used:
- Naruke lymph node map
- MD-ATS lymph node map

Important differences in the descriptors of mediastinal lymph nodes existed between the Naruke and MD-ATS lymph node maps
- Most significant discrepancy was that level 7 subcarinal lymph nodes in the MD-ATS map corresponded to levels 7 and 10 in the Naruke map
- As a result, some tumors staged as N2 according to the MD-ATS map, were staged N1 by the Naruke map

IASLC Lymph Node Map
To reconcile the differences between the Naruke and MD-ATS lymph node maps, the International Association for the Study of Lung Cancer (IASLC) developed a revised lymph node map
- Notable changes included the following:
  1. Anatomically distinct descriptions provided for all lymph node stations, with the upper and lower anatomic borders described in particular detail
  2. The boundary between right and left sided level 2 and level 4 nodes is reset to the left lateral wall of the trachea due to lymphatic drainage patterns
  3. Supraclavicular and sternal notch lymph nodes, which are not previously considered to constitute a lymph node station, are now categorized as level 1 nodes
  4. Certain lymph node stations are grouped into zones for future prognostic analyses and do not represent current standard nomenclature
Upper Paratracheal Lymph Nodes (Station 2)
- Right Upper Paratracheal Lymph Nodes (Station 2R)
  - Superior extent: Intersection of caudal margin of left innominate vein with the trachea
  - Inferior extent: Lower border of the azygous vein
  - Left lateral extent: Left lateral border of the trachea
- Left Upper Paratracheal Lymph Nodes (Station 2L)
  - Superior extent: Upper border of the manubrium
  - Inferior extent: Superior border of the aortic arch
  - Right lateral extent: Right lateral border of the trachea

Lower Paratracheal Lymph Nodes (Station 4)
- Right Lower Paratracheal Lymph Nodes (Station 4R)
  - Superior extent: Intersection of caudal margin of left innominate vein with the trachea
  - Inferior extent: Lower border of the azygous vein
  - Left lateral extent: Left lateral border of the trachea
- Left Lower Paratracheal Lymph Nodes (Station 4L)
  - Superior extent: Upper border of the manubrium
  - Inferior extent: Upper rim of the left main pulmonary artery
  - Right lateral extent: Right lateral border of the trachea

Prevascular and Retrotracheal Lymph Nodes (Stations 3a and 3p)
- Prevascular Lymph Nodes (Station 3a)
  - Superior extent: Upper border of the manubrium
  - Inferior extent: Carina
  - Anterior extent: Anterior aspect of the sternum
  - Posterior extent: On the right: anterior border of the SVC; on the left: left common carotid artery
- Retrotracheal Lymph Nodes (Station 3p)
  - Superior extent: Apex of chest
  - Inferior extent: Carina
  - Anterior extent: Posterior aspect of the trachea

Subaortic Lymph Nodes (aka: AP Window) (Station 5)
- Lymph nodes lateral to ligamentum arteriosum
  - Superior extent: Lower border of aortic arch
  - Inferior extent: Upper rim of the left main pulmonary artery
- Paraotic Lymph nodes (Station 6)
  - Lymph nodes anterior and lateral to ascending aorta and aortic arch
  - Superior extent: Line tangential to the upper border of the aortic arch
  - Inferior extent: The lower border of the aortic arch

Subcarinal Lymph Nodes (Station 7)
- Superior extent: Upper border of the carina
- Inferior extent: On the right: lower border of the bronchus intermedius; on the left: upper border of the left lower lobe bronchus
Mediastinal Lymph Nodes

Anterior Mediastinal Group
Paratracheal (4A)

Afferent drainage from:
Thyroid
Thymus
Heart/pericardium
Middle diaphragmatic lymph nodes

Efferent drainage to:
Right and left bronchomediastinal trunks — right lymphatic duct, thoracic duct, independently into the jugulo-subclavian venous confluence

Mediastinal Lymph Nodes

Posterior Mediastinal Group
Paraesophageal (6)

Afferent drainage from:
Thymus
Tracheobronchial group (esp: subcarinal)

Efferent drainage to:
Middle diaphragmatic lymph nodes
Tracheal/paratracheal lymph nodes
Subdiaphragmatic para-aortic/celiac nodes

Lymph node metastasis according to location of primary tumor

RUL lung cancer
Pulmonary lymph nodes
Right Hilar (10)
Right Intrapulmonary (11-14)
Mediastinal lymph nodes
Subcarinal (7)
Right paratracheal (4)

LML/RLL lung cancer
Pulmonary lymph nodes
Right Hilar (10)
Right Intrapulmonary (11-14)
Mediastinal lymph nodes
Subcarinal (7)
Right paratracheal (4)

LLL lung cancer
Pulmonary lymph nodes
Left Hilar (10)
Left Intrapulmonary (11-14)
Mediastinal lymph nodes
Subcarinal (7)
Left paratracheal (4)
Right paratracheal (4)

LUL lung cancer (excluding lingular segment)

Pulmonary lymph nodes
Left Hilar (10)
Left Intrapulmonary (11-14)
Mediastinal lymph nodes
Subcarinal (7)
Subaortic (5)
Paraaoic (6)

LUL lung cancer (lingular segment)

Pulmonary lymph nodes
Left Hilar (10)
Left Intrapulmonary (11-14)
Mediastinal lymph nodes
Subcarinal (7)
Subaortic (5)
Paraaoic (6)

Size Criteria

Lymph nodes measuring 10-mm or more in the short axis are considered significant in size and suspicious for metastatic disease, although the predictive accuracy of this criterion is limited.

Lower paratracheal and subcarinal can measure up to 11-mm
Upper paratracheal are generally small and measure up to 7-mm
Right hilar LNs can measure up to 13-mm
Left hilar LNs can measure up to 7-mm
Mediastinal lymph nodes can measure up to 11-mm
Paraesophageal LNs can measure up to 5-mm

No size criteria for internal mammary, retrocrural, and extrapleural nodes, and detection of these nodes should be considered abnormal.

Comparison studies to evaluate for new or enlarging lymph nodes (even if the lymph nodes are less than 1 cm in short axis diameters) are helpful in evaluating for metastatic disease.
Common Pitfalls:

- Pericardial recesses/sinuses are often mistaken for lymph nodes.
  - For example:
    - Superior aortic recess (and its “high-riding” variant): Often confused for paratracheal, paraesophageal, or subaortic lymph nodes.
    - Oblique sinus: Often confused for subcarinal lymph nodes.
    - Pulmonary venous recesses: Often confused for pulmonary lymph nodes.

Axillary Lymph Nodes

- 4 Groups
  - Anterior group: lie deep to pectoralis major
  - Lateral group: lie on the lateral wall of the axilla
  - Posterior group: lie to the lateral edge of the subscapularis muscle on the posterior wall of the axilla
  - Apical group: lie at the apex of the axilla immediately behind the clavicle

Internal Mammary Lymph Nodes

- Located at the anterior ends of the intercostal spaces, along the internal mammary (internal thoracic) vessels.

Posterior Intercostal Lymph Nodes

- Located near the heads and necks of the posterior ribs.

References

Ahmed H El-Sherief, MD
ahelsherief@gmail.com

Section of Thoracic Imaging
Imaging Institute
Cleveland Clinic