# Essential Mediastinal Anatomy for EBUS

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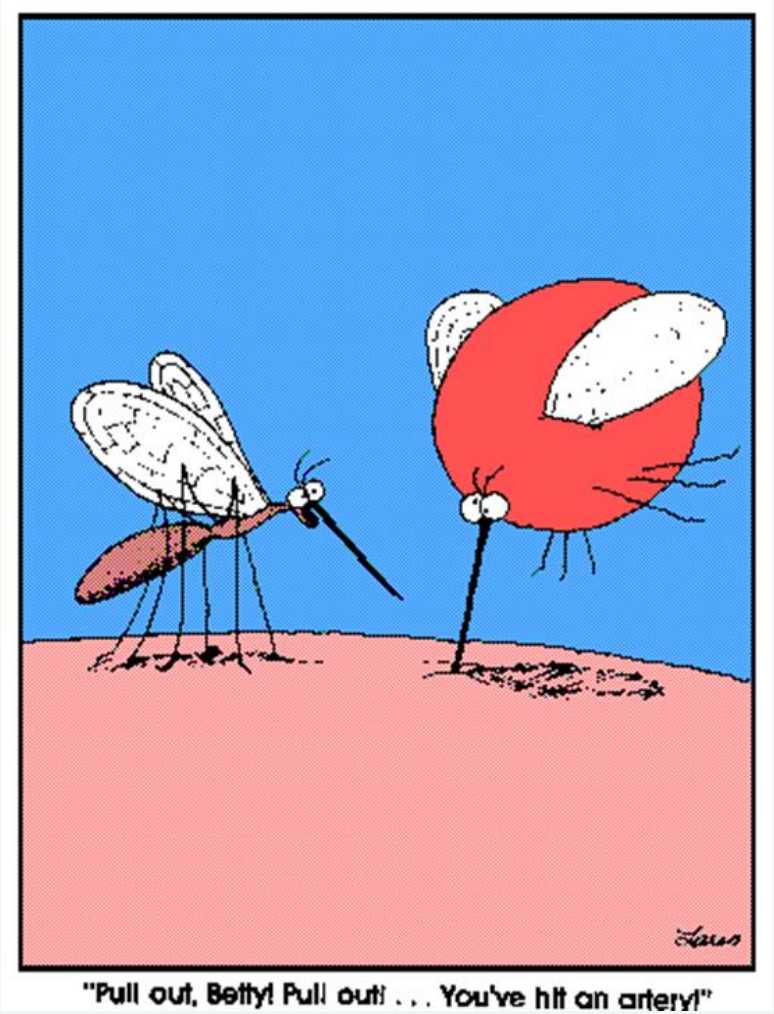
# Mediastinal Anatomy

# Aims

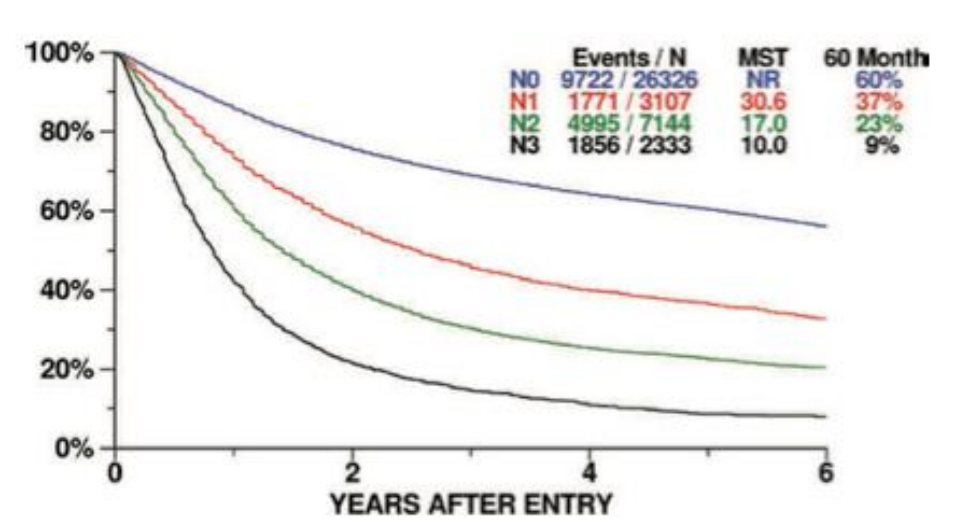
- Overview of mediastinal anatomy
- Review the most sampled lymph nodes stations
- Review of neighboring vascular anatomy
- Learn common airway landmarks corresponding to lymph node stations
- **NOT** an exhaustive anatomy lecture!

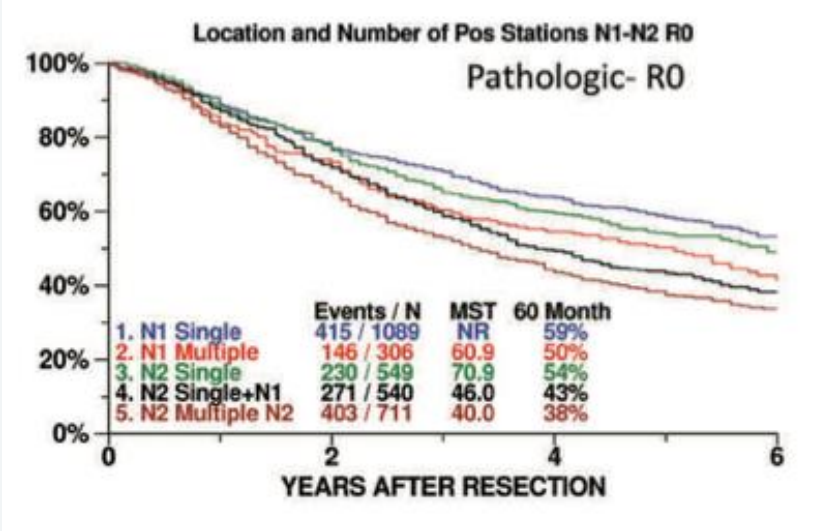


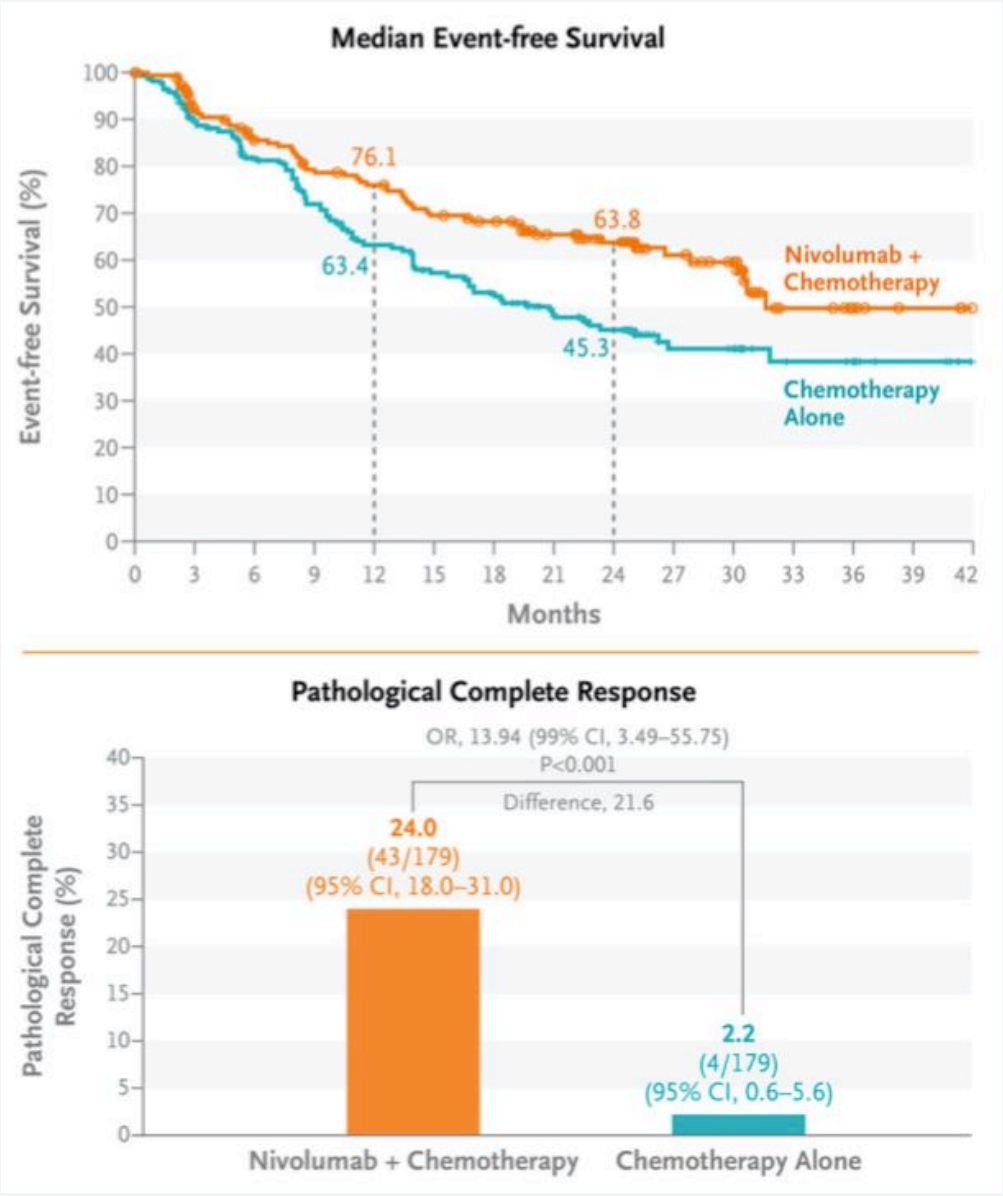
Journal of Thoracic Oncology
International Association for the Study of Lung Cancer

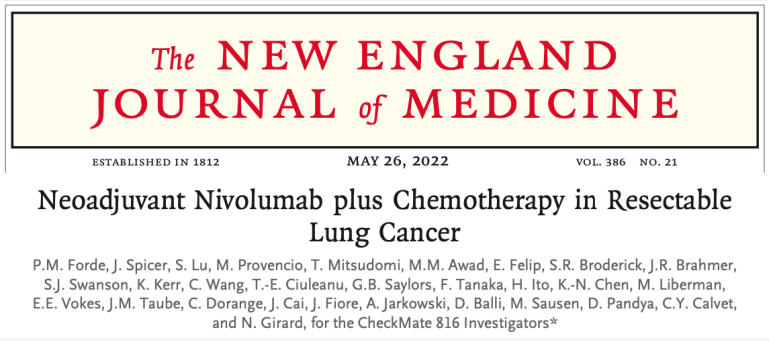
# The International Association for the Study of Lung Cancer Lung Cancer Staging Project

## *Proposals for the Revision of the N Descriptors in the Forthcoming 8th Edition of the TNM Classification for Lung Cancer*







The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 MAY 26, 2022 VOL. 386 NO. 21

Neoadjuvant Nivolumab plus Chemotherapy in Resectable Lung Cancer

P.M. Forde, J. Spicer, S. Lu, M. Provencio, T. Mitsudomi, M.M. Awad, E. Felip, S.R. Broderick, J.R. Brahmer, S.J. Swanson, K. Kerr, C. Wang, T.-E. Ciuleanu, G.B. Saylors, F. Tanaka, H. Ito, K.-N. Chen, M. Liberman, E.E. Vokes, J.M. Taube, C. Dorange, J. Cai, J. Fiore, A. Jarkowski, D. Balli, M. Sausen, D. Pandya, C.Y. Calvet, and N. Girard, for the CheckMate 816 Investigators*

- NICE approved neoadjuvant therapy
- Stage IIA, IIB, IIIA, IIIB (T>4cm, N1, N2)
- **Expanding role of staging EBUS**

Forde NEJM 2022

ORIGINAL INVESTIGATION

# Preoperative Staging by EBUS in cN0/N1 Lung Cancer

## *Systematic Review and Meta-Analysis*

*Tracy L. Leong, FRACP,*† Paula M. Loveland, MBBS,‡ Alexandra Gorelik, MSc,†§ Louis Irving, FRACP,†‖ and Daniel P. Steinfort, PhD†‖*

- Prevalence of N2/ N3 disease was 15% (6–24%)
  - Prevalence in cN0 (6–17%)
- EBUS-TBNA had pooled sensitivity of 49%
  - negative predictive value 91% (82% to 100%)
- Number needed to detect occult N2/N3 disease was 14

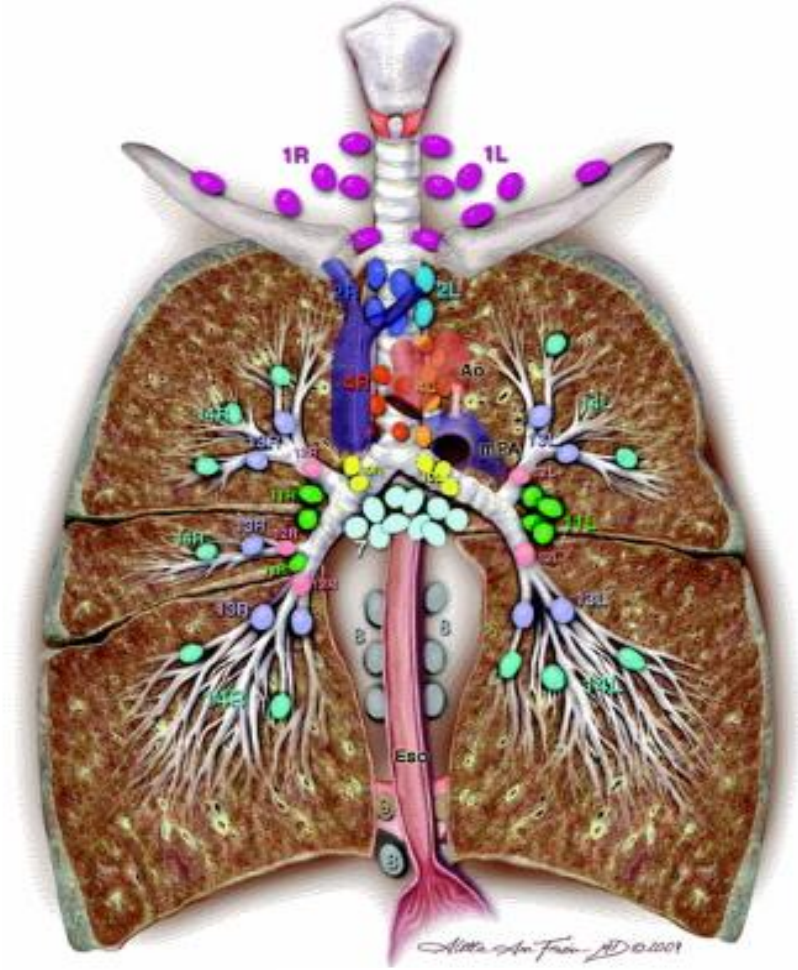
Presence of cN1 ✓

Tumour >30mm ✓

Central tumour location ✓

Adenocarcinoma ✓

# Lymph node zones




*Supraclavicular zone*

1 Low cervical, supraclavicular, and sternal notch nodes

**SUPERIOR MEDIASTINAL NODES**

*Upper zone*

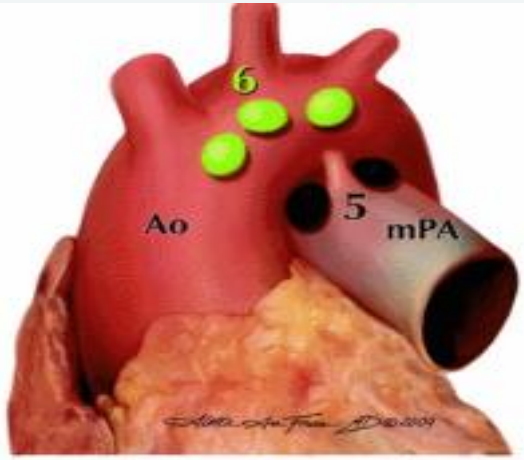
- 2R Upper Paratracheal (right)
- 2L Upper Paratracheal (left)
- 3a Prevascular
- 3p Retrotracheal
- 4R Lower Paratracheal (right)
- 4L Lower Paratracheal (left)

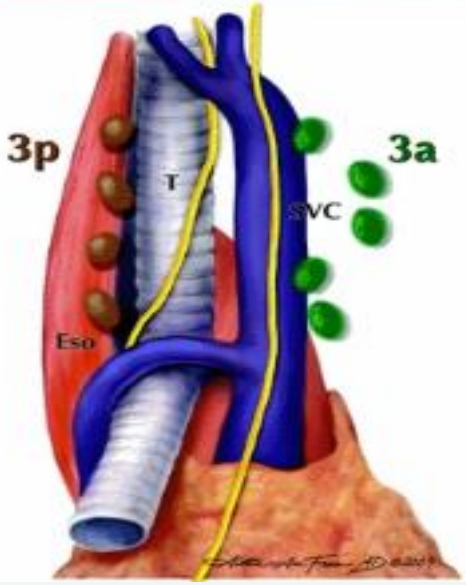
**AORTIC NODES**

*AP zone*

- 5 Subaortic
- 6 Para-aortic (ascending aorta or phrenic)

# Lymph node zones




**INFERIOR MEDIASTINAL NODES**

*Subcarinal zone*

- 7 Subcarinal

*Lower zone*

- 8 Paraesophageal (below carina)
- 9 Pulmonary ligament

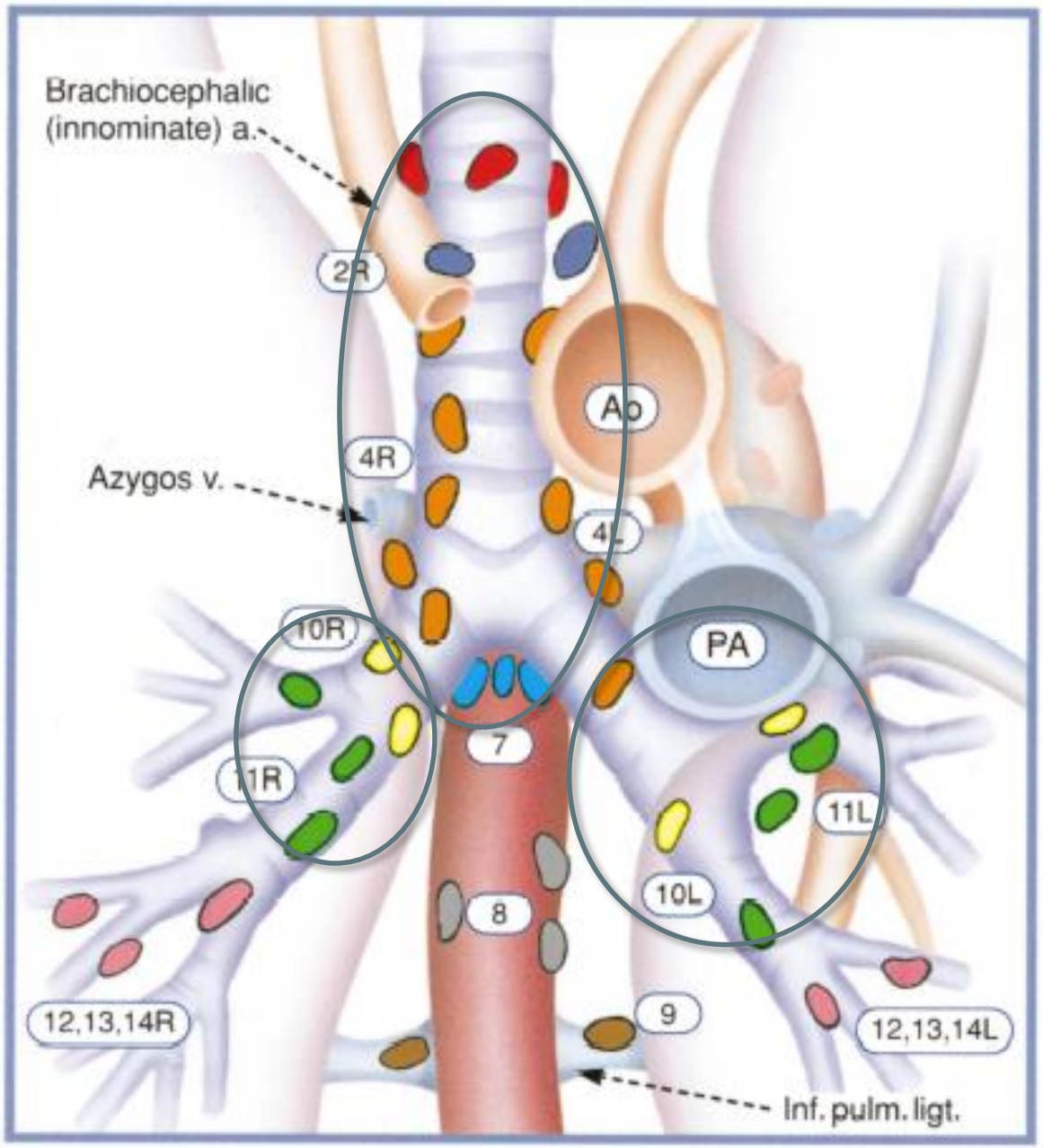
**N1 NODES**

*Hilar/Interlobar zone*

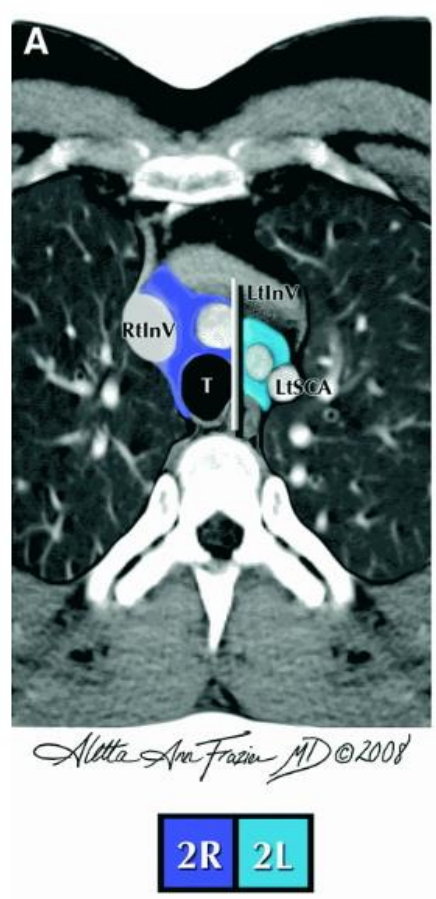
- 10 Hilar
- 11 Interlobar

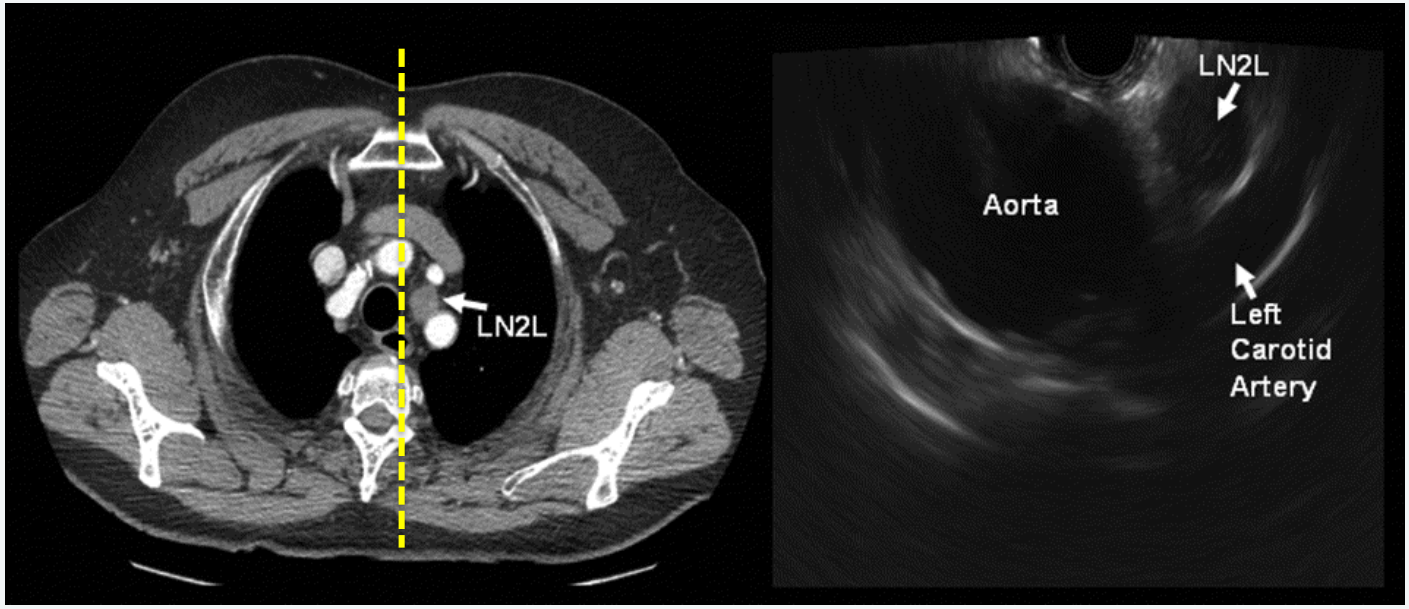
*Peripheral zone*

- 12 Lobar
- 13 Segmental
- 14 Subsegmental


Brachiocephalic (innominate) a.
2R
Ao
4R
Azygos v.
4L
10R
PA
7
11R
11L
10L
8
12,13,14R
9
12,13,14L
Inf. pulm. ligt.

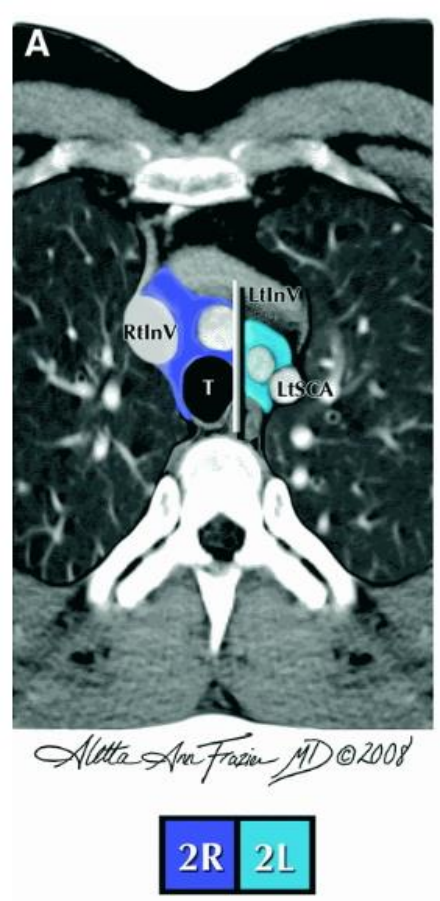
# Upper paratracheal station 2L

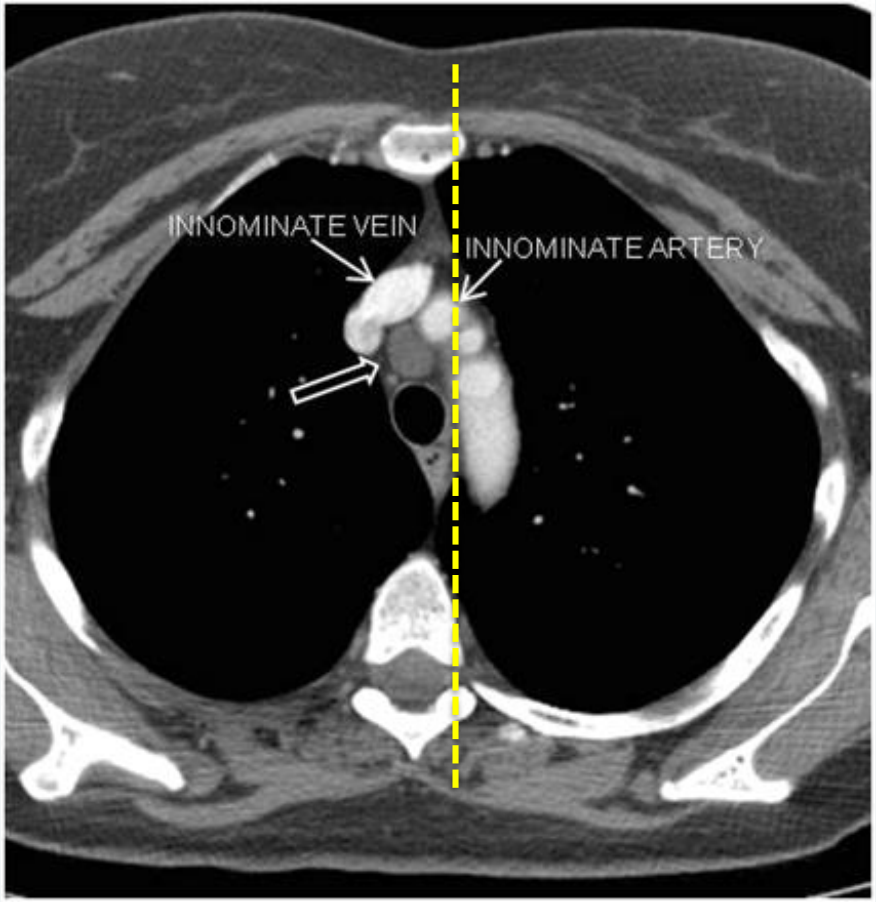


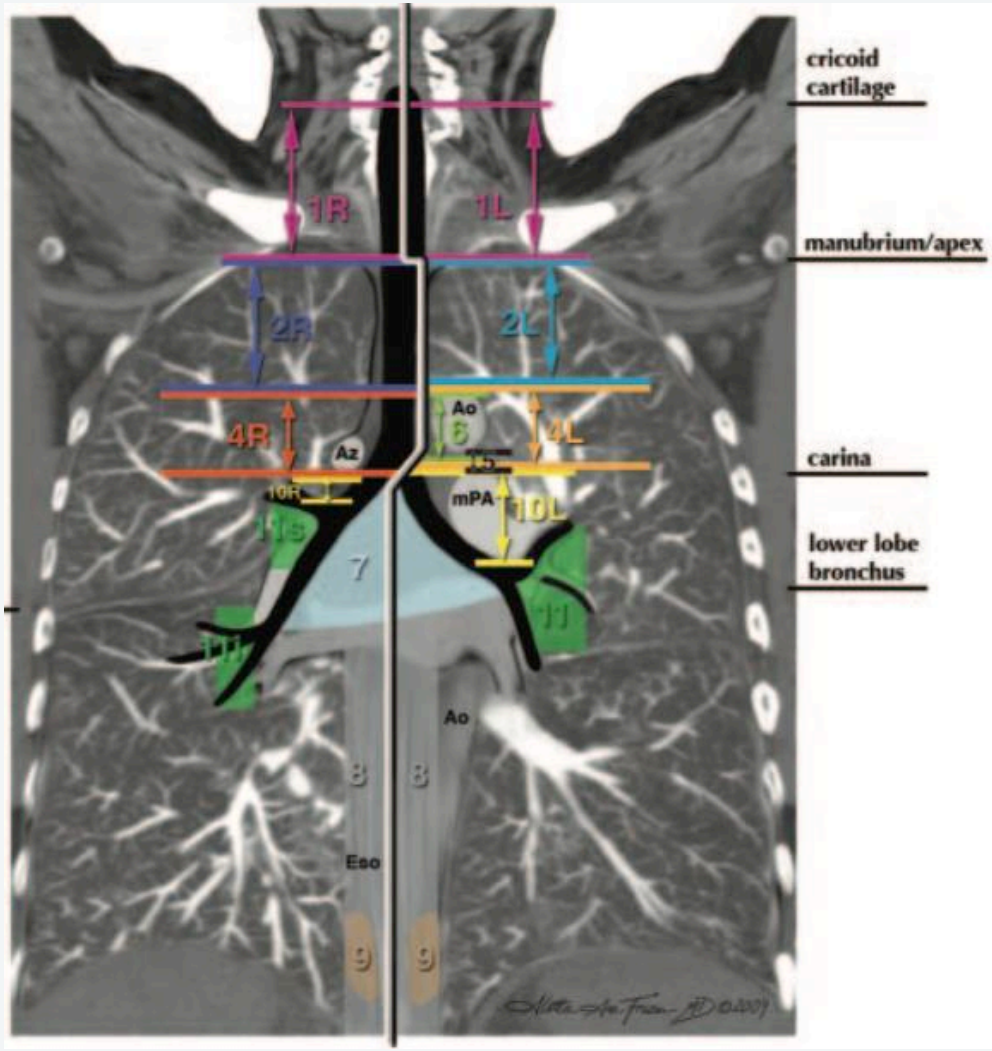

- **Upper border: apex of the lung and pleural space**
- **Lower border: superior border of the aortic arch**
- **Left of the left lateral border of the trachea**

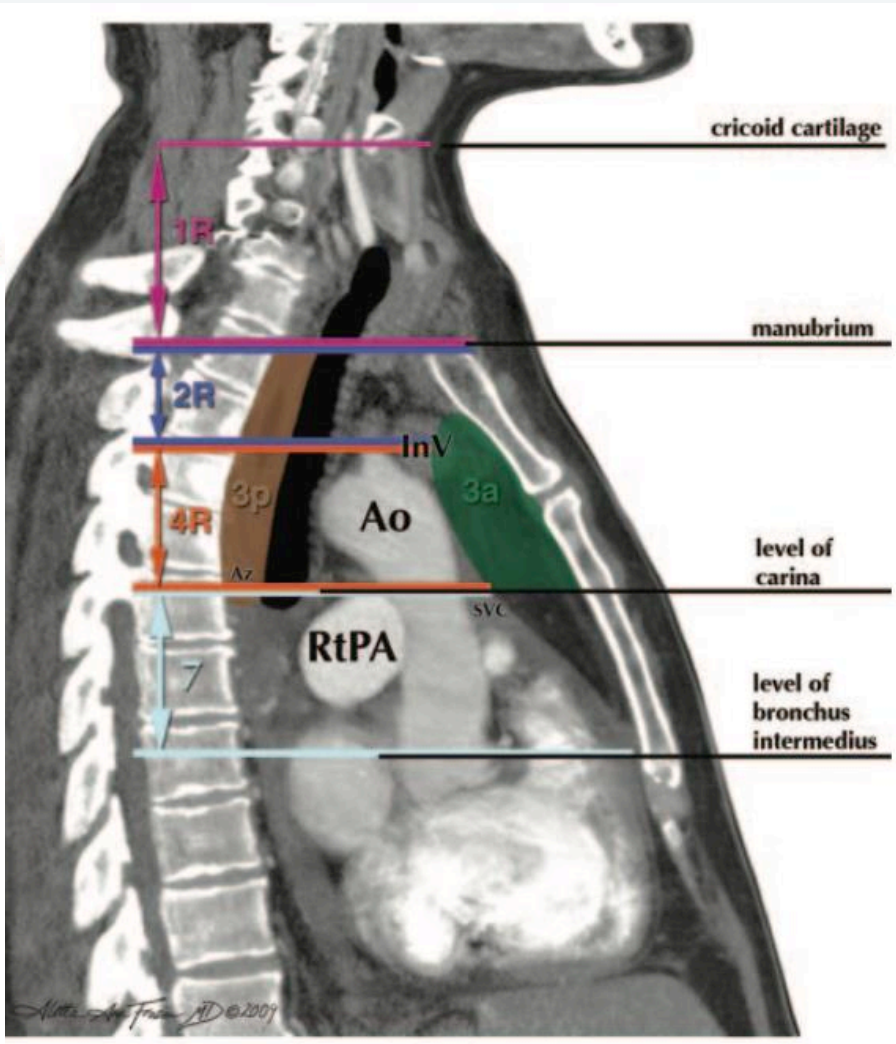
# Upper paratracheal station 2R



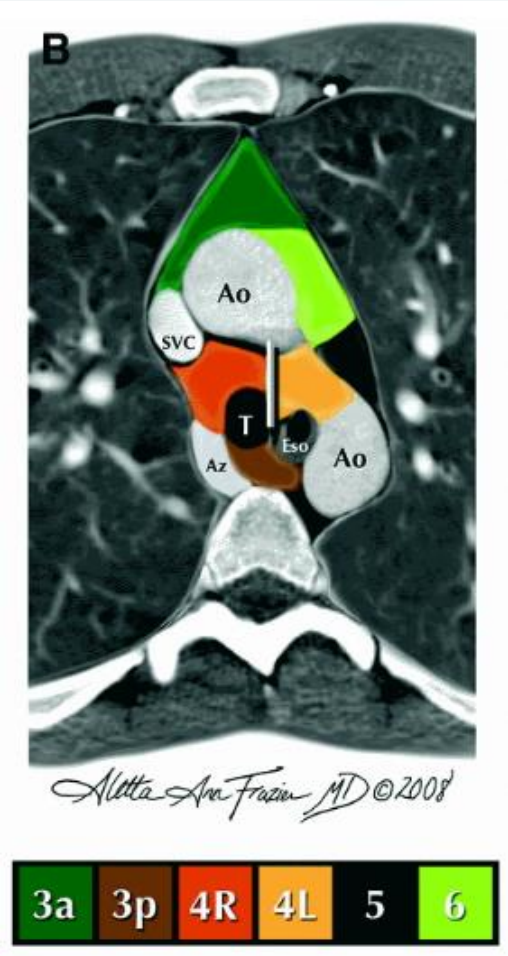



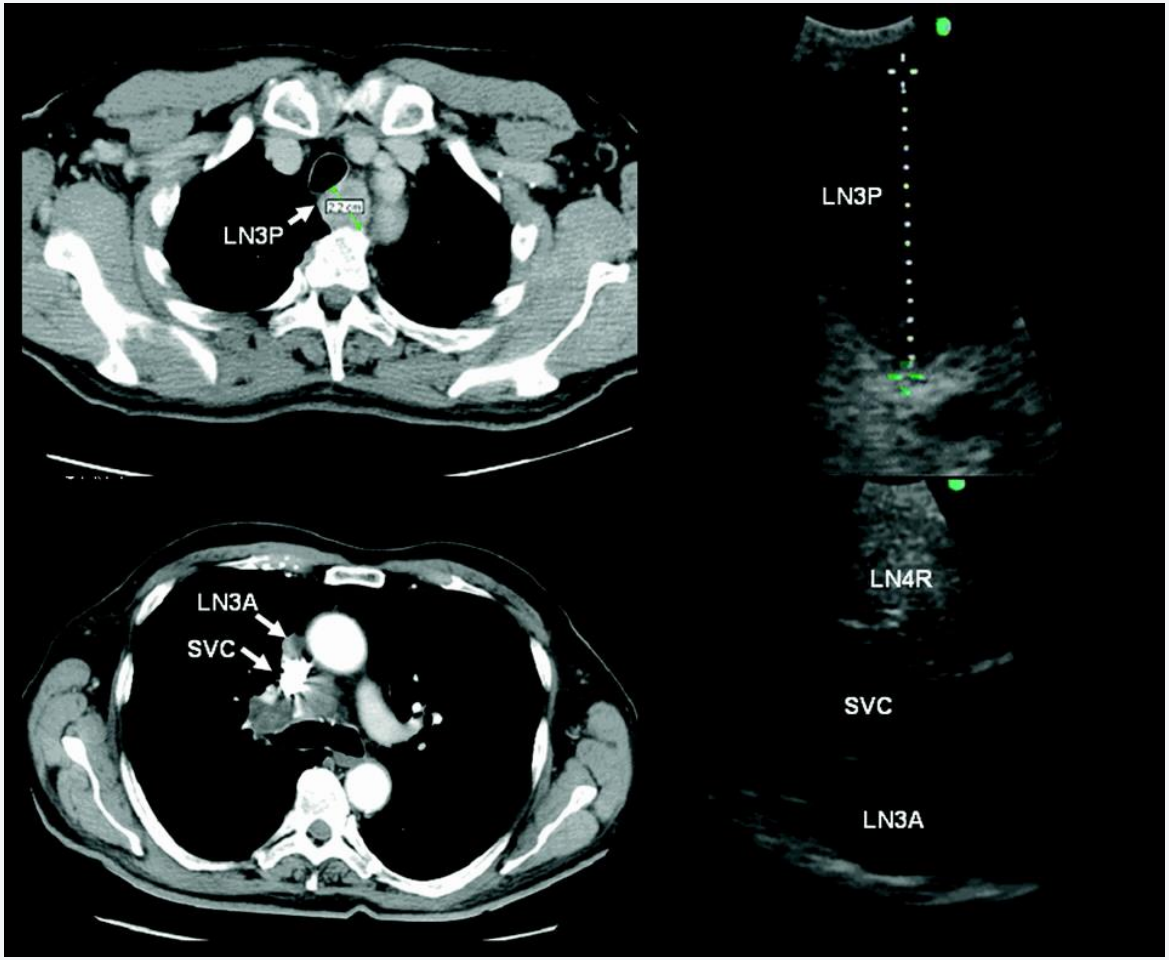

**For 2R, the inferior border is the intersection of the brachiocephalic vein with the trachea = level of apex of aortic arch**


cricoid cartilage
manubrium/apex
carina
lower lobe bronchus
1R
1L
2R
2L
4R
4L
Az
Ao
6
5
mPA
10R
10L
11s
7
11
Ao
8
8
Eso
9
9

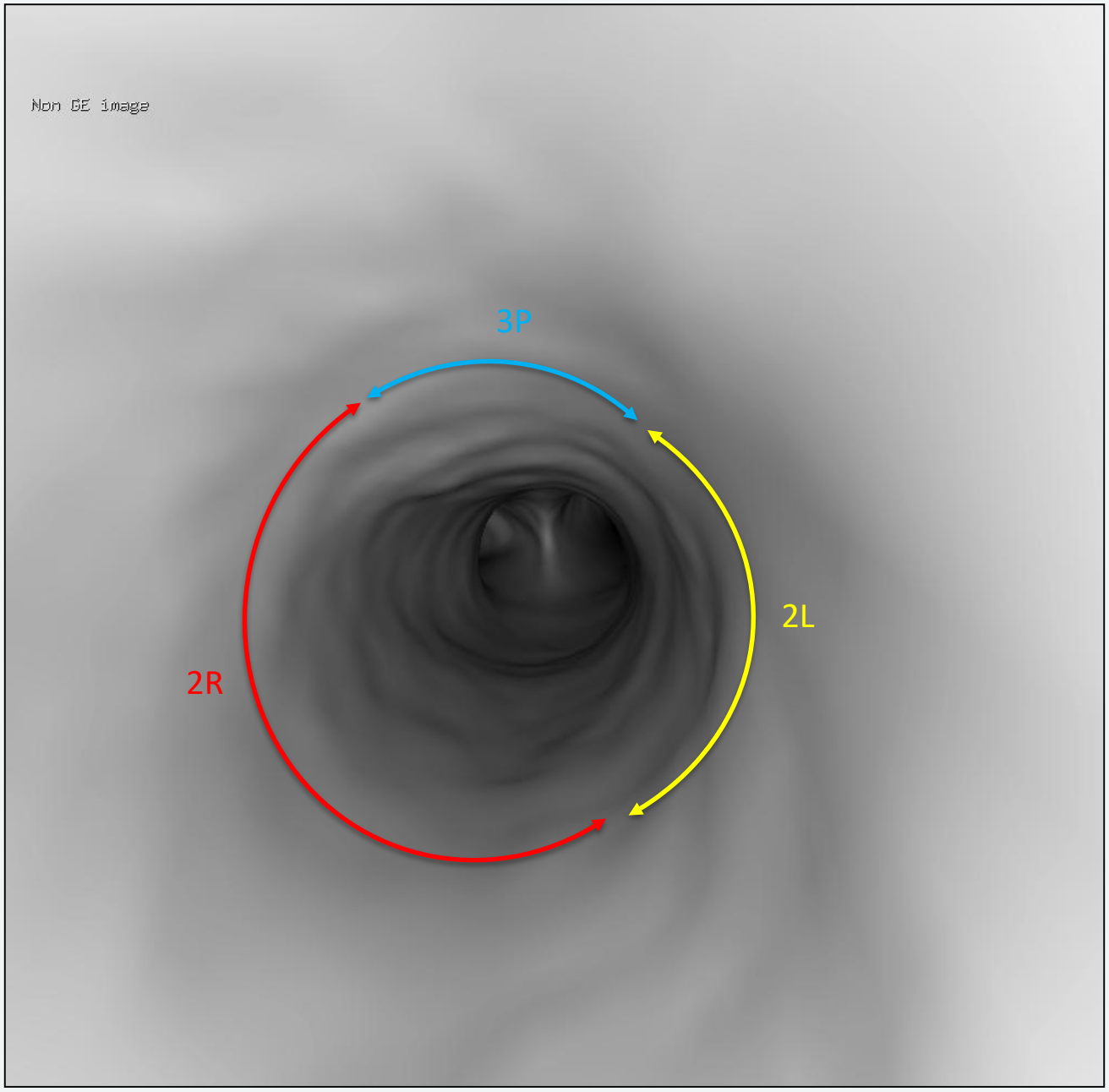

cricoid cartilage
manubrium
level of carina
level of bronchus intermedius
1R
2R
4R
7
InV
3p
3a
Ao
Az
SVC
RtPA

# Posterior to trachea (3P)

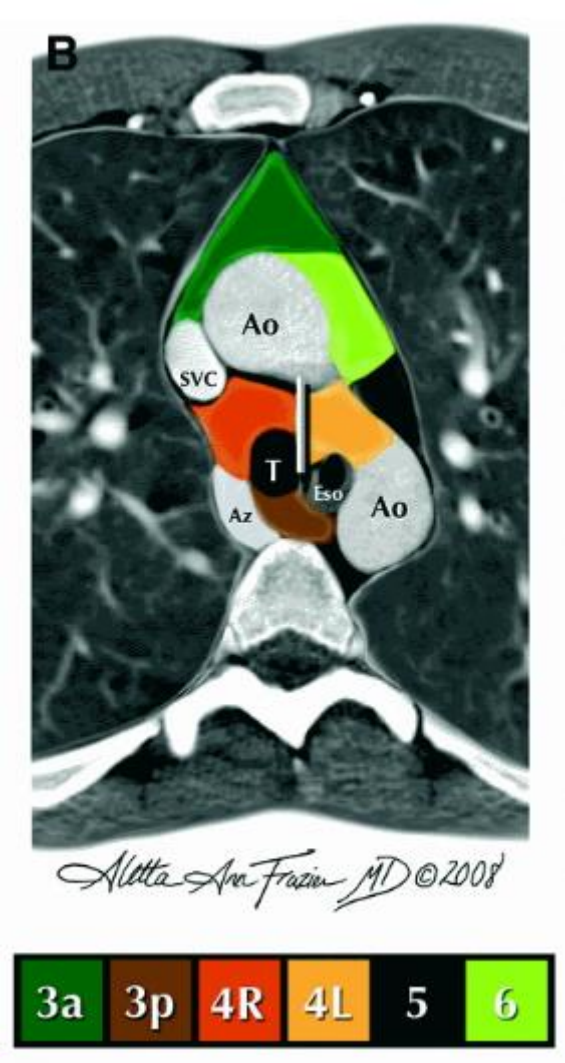


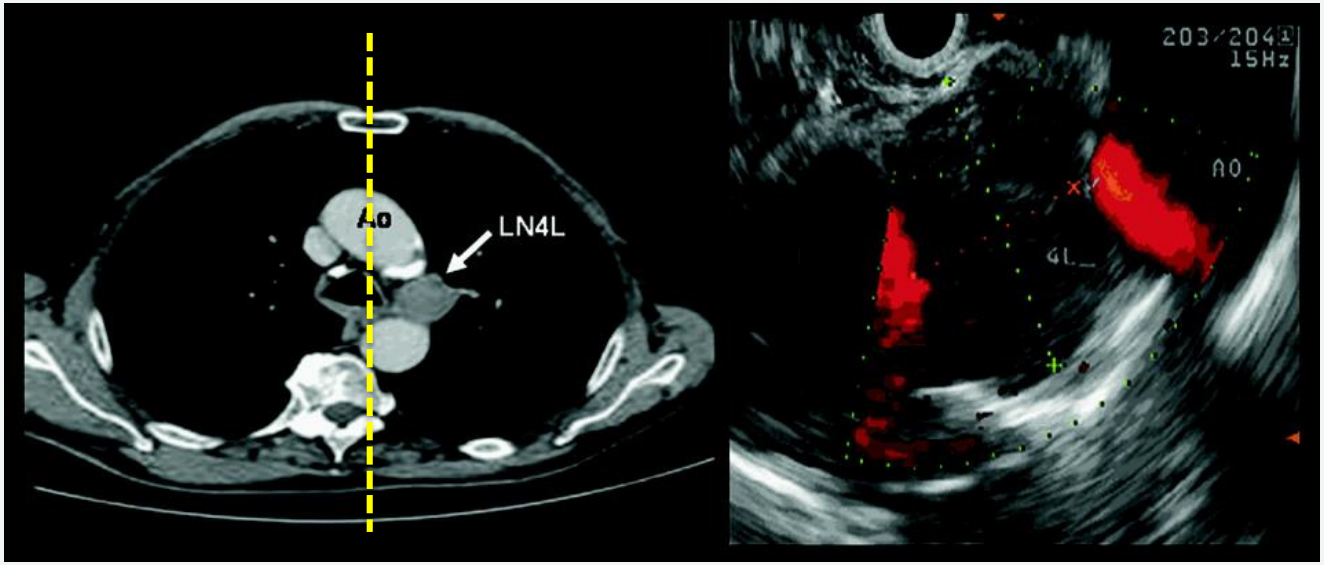




**3P: Posterior to trachea from sternal notch to carina**

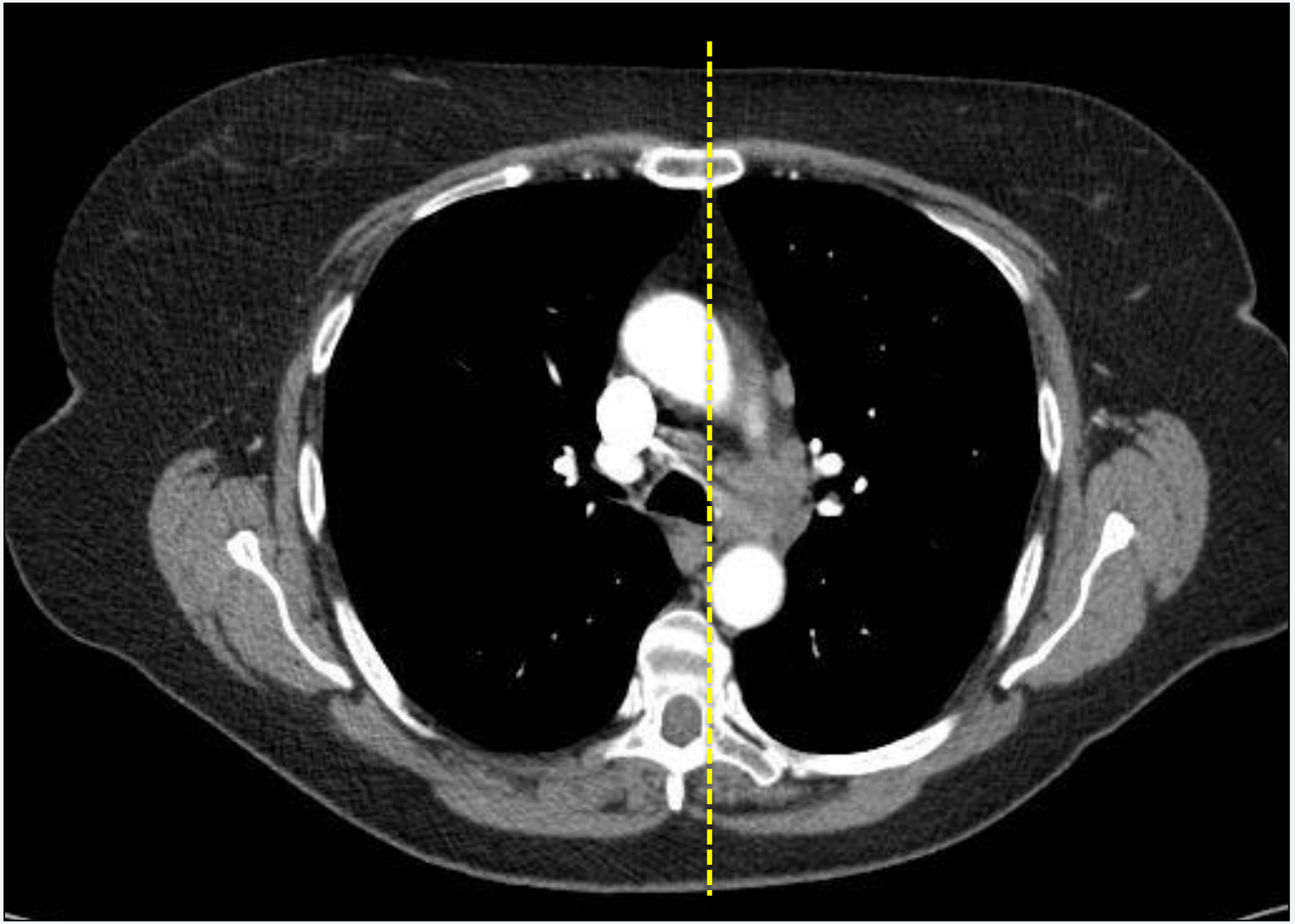

Non GE image
3P
2L
2R

# Lower paratracheal station (4L)

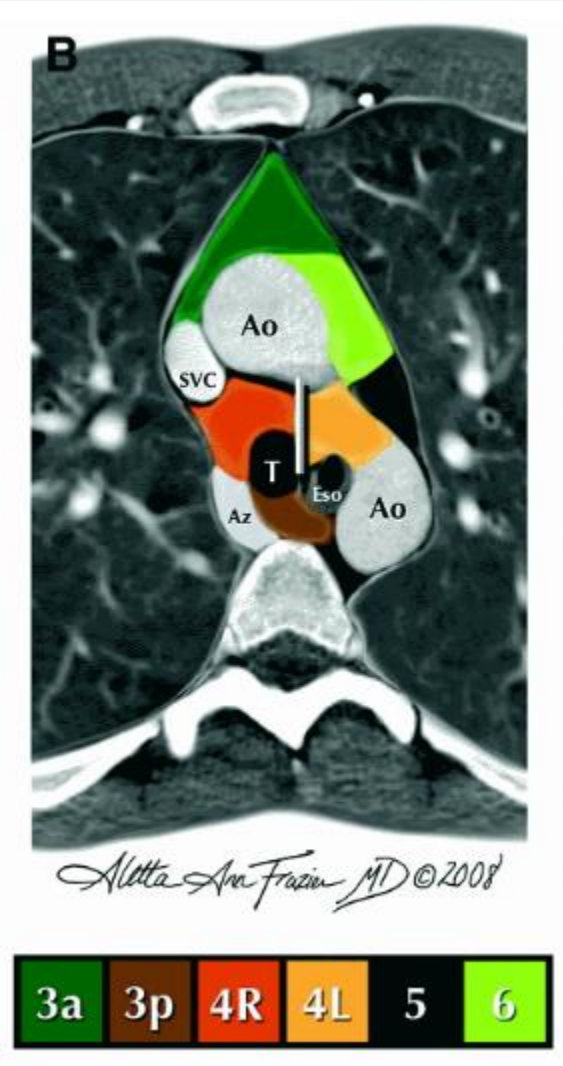


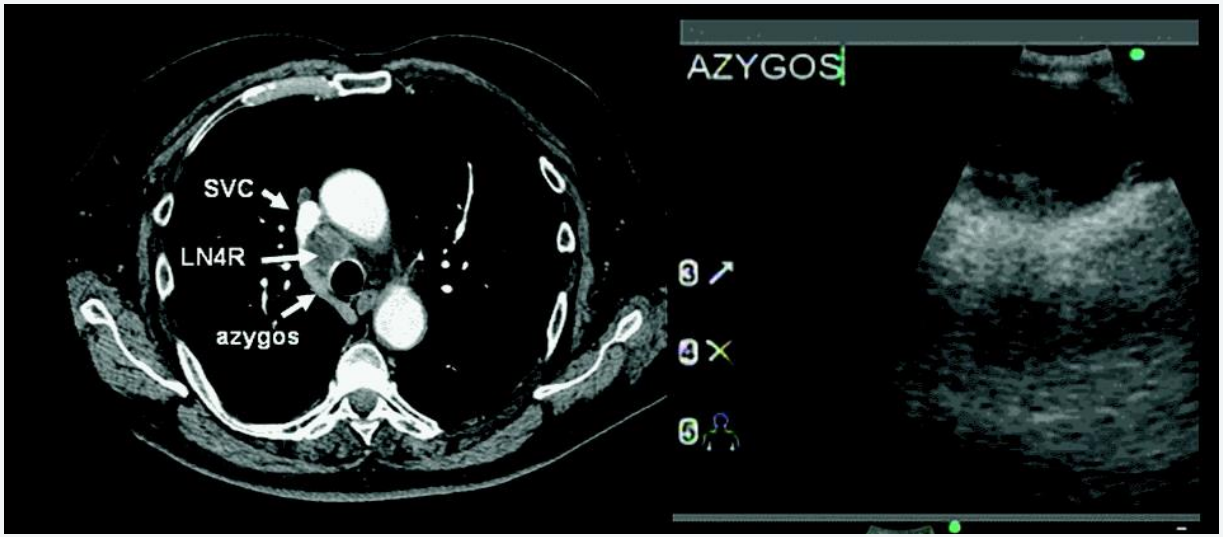




**From the upper margin of the aortic arch to the upper rim of the left main pulmonary artery**



# Lower paratracheal station (4R)

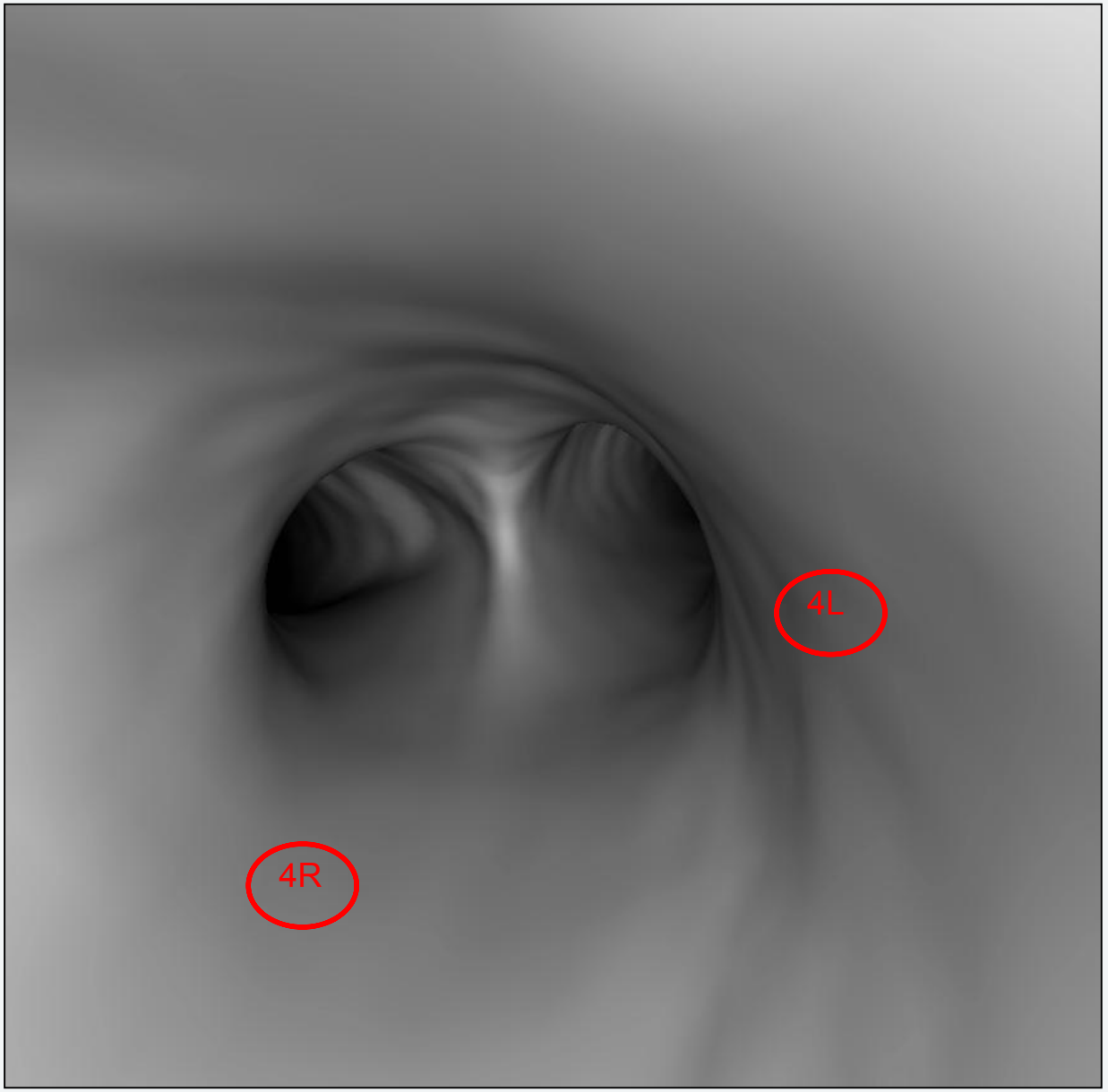


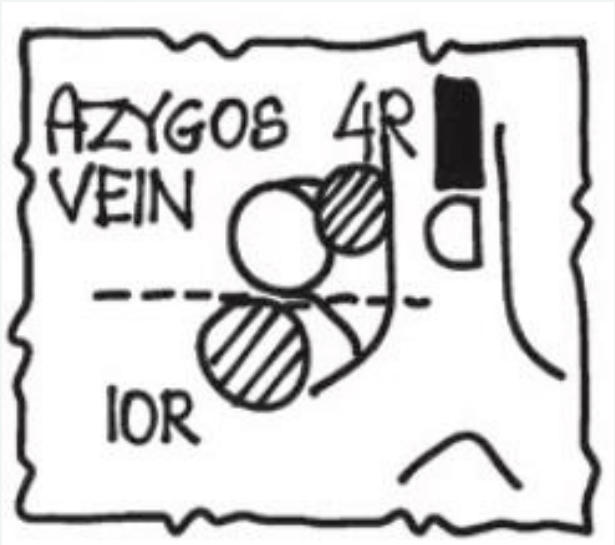



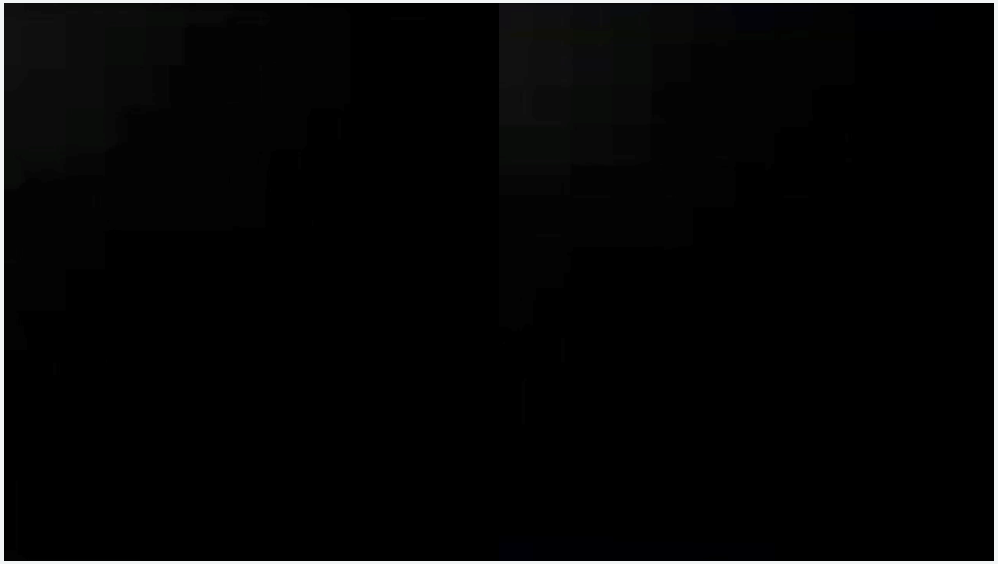

**Station 4R:**

**Upper border - at level of aortic arch**

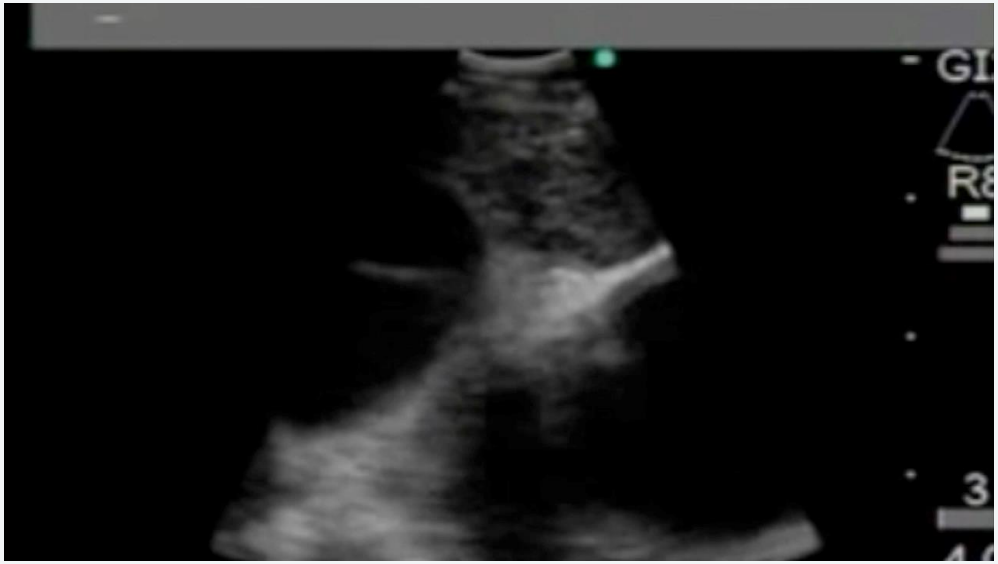
**Inferior border - inferior border of the azygos vein**

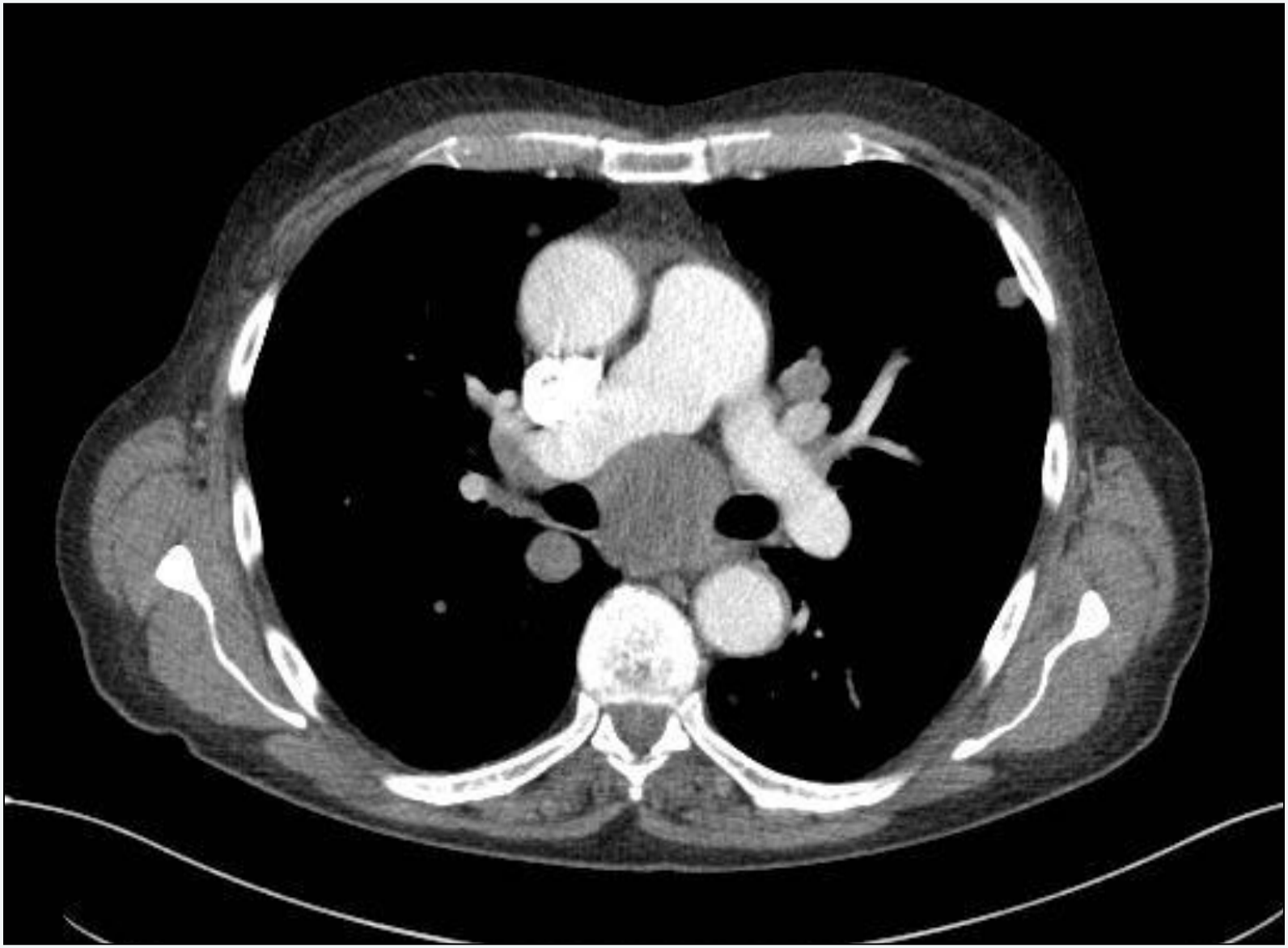

4L
4R


AZYGOS
VEIN
4R
10R

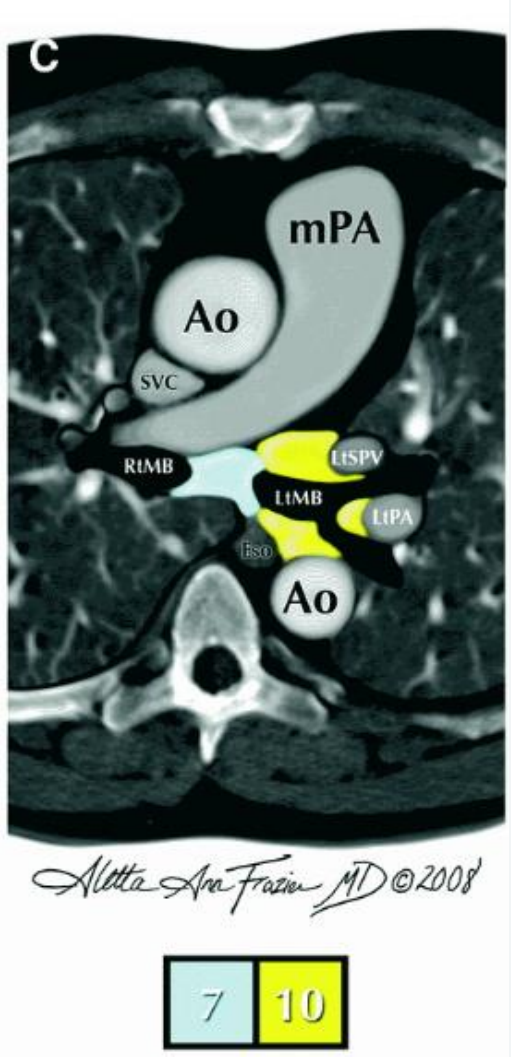


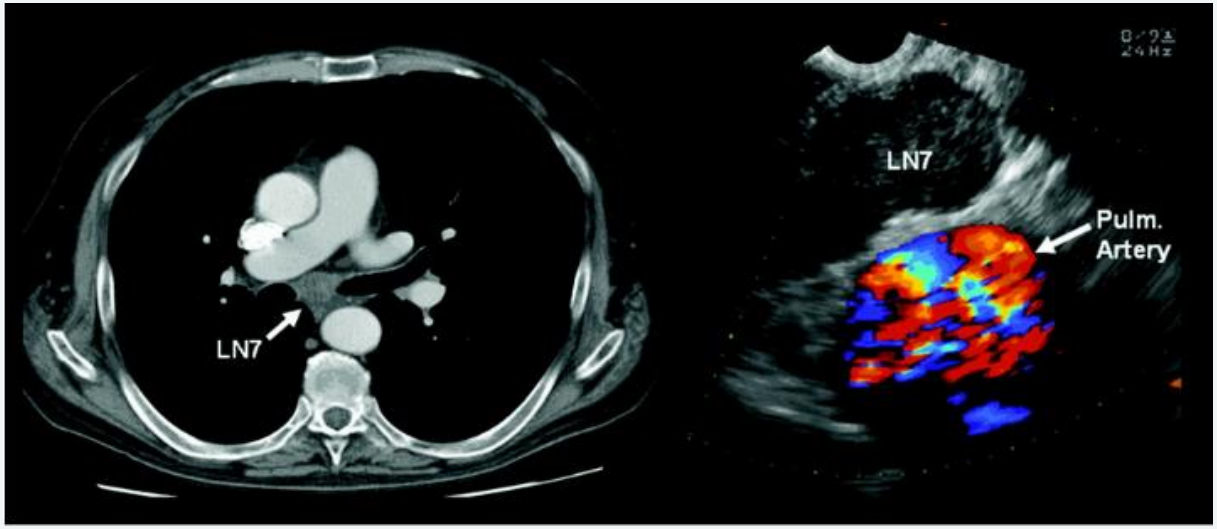

AORTIC
ARCH
D
LEFT
PULMONARY
ARTERY





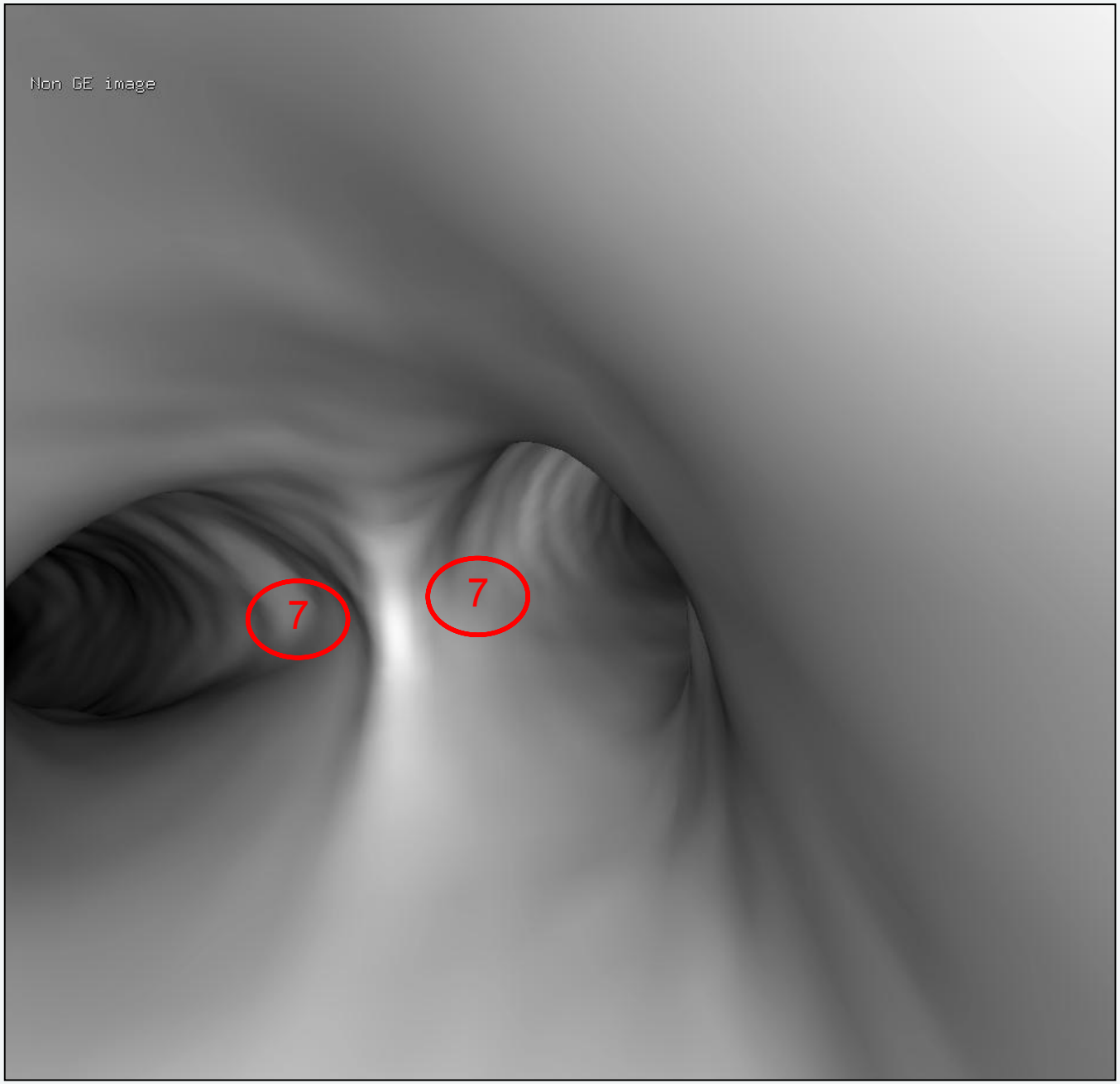
# Subcarinal station 7



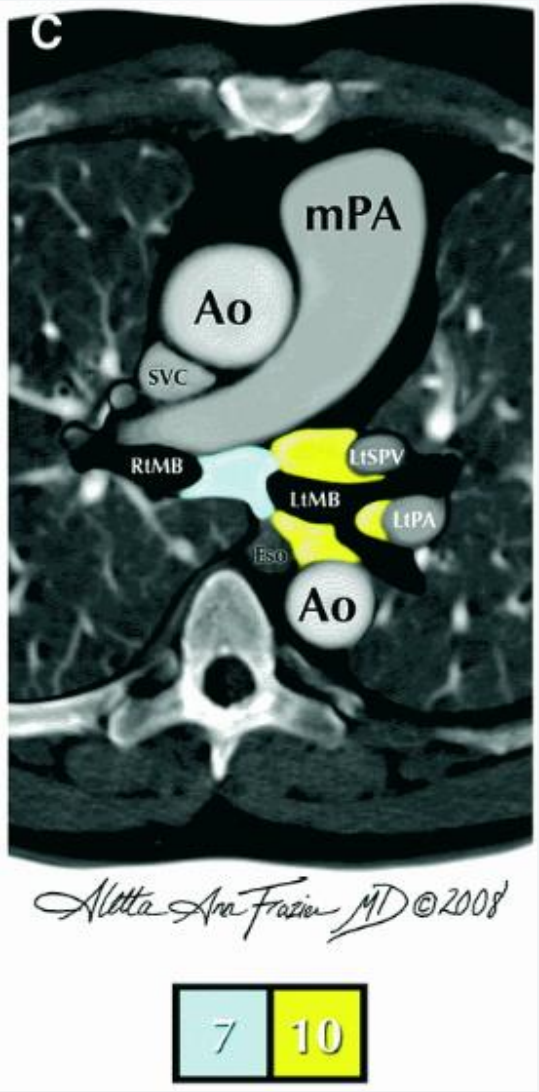



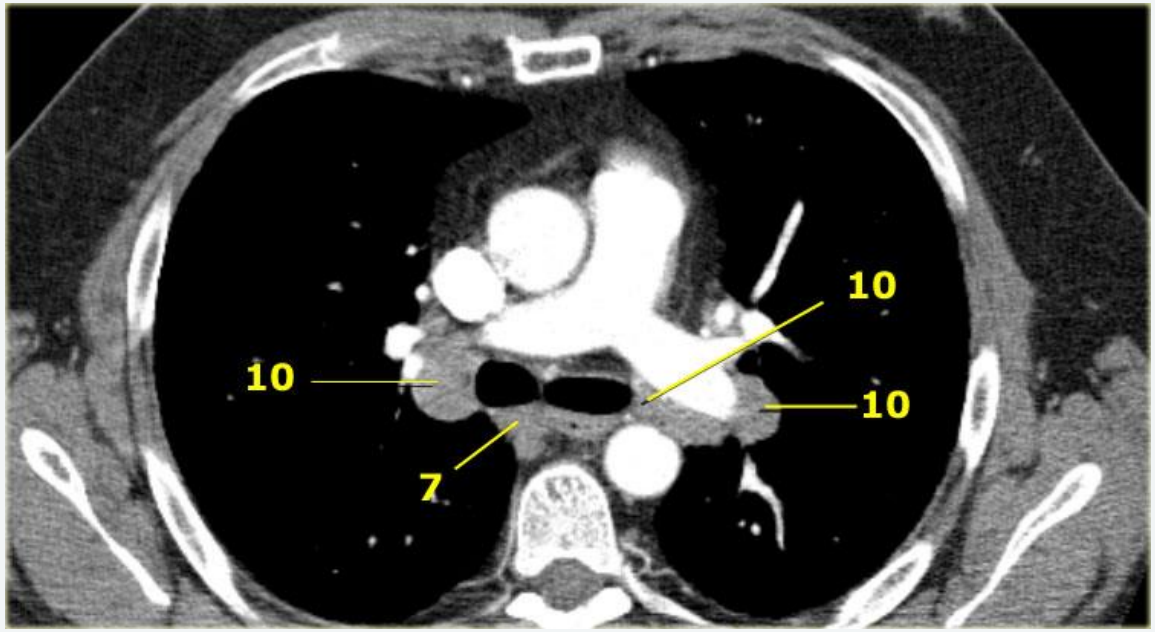

**Inferior border:**

- **Entrance to left lower lobe bronchus on left**
- **Inferior border of intermediate bronchus on right**

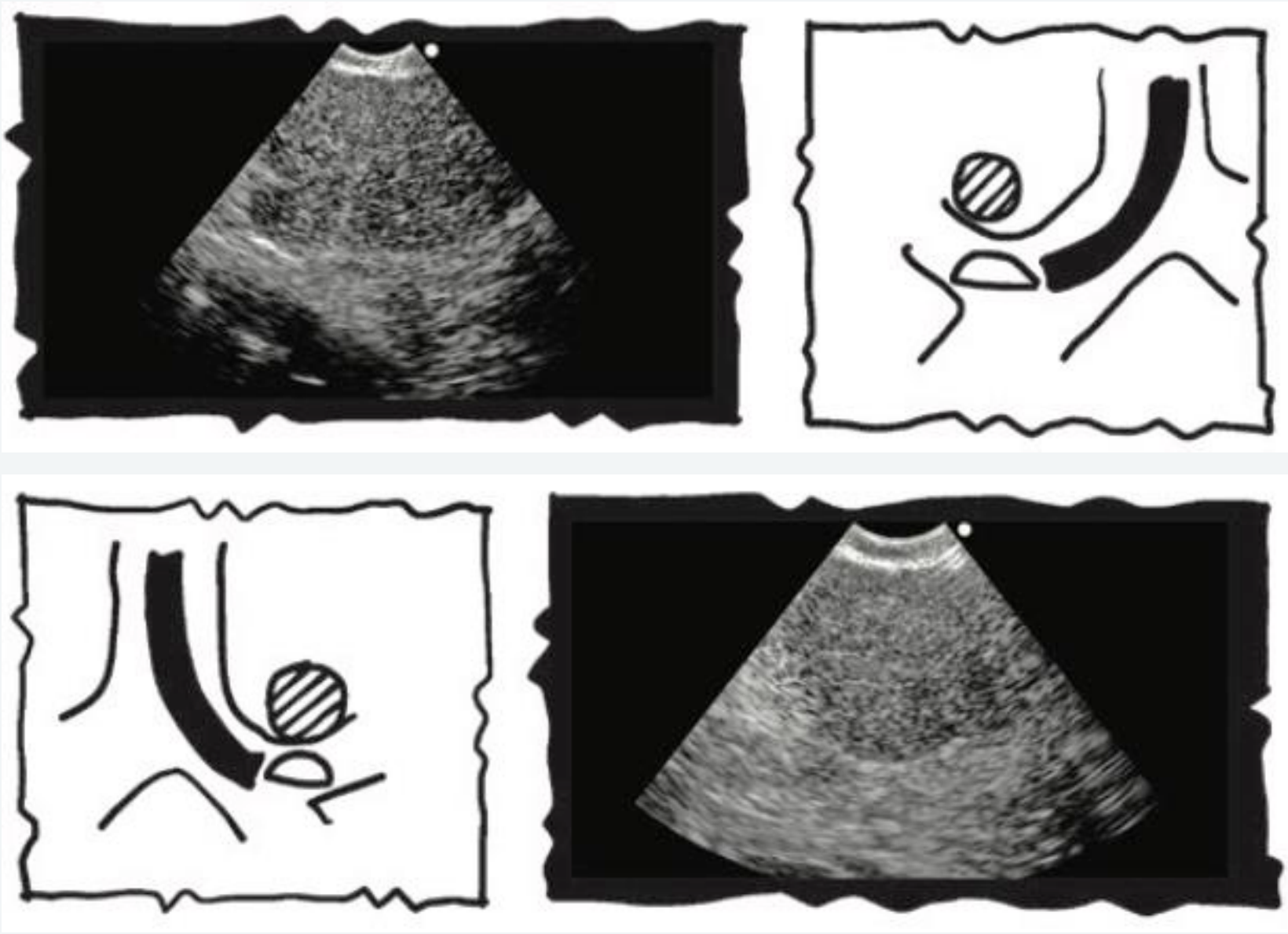

Non GE image
7
7

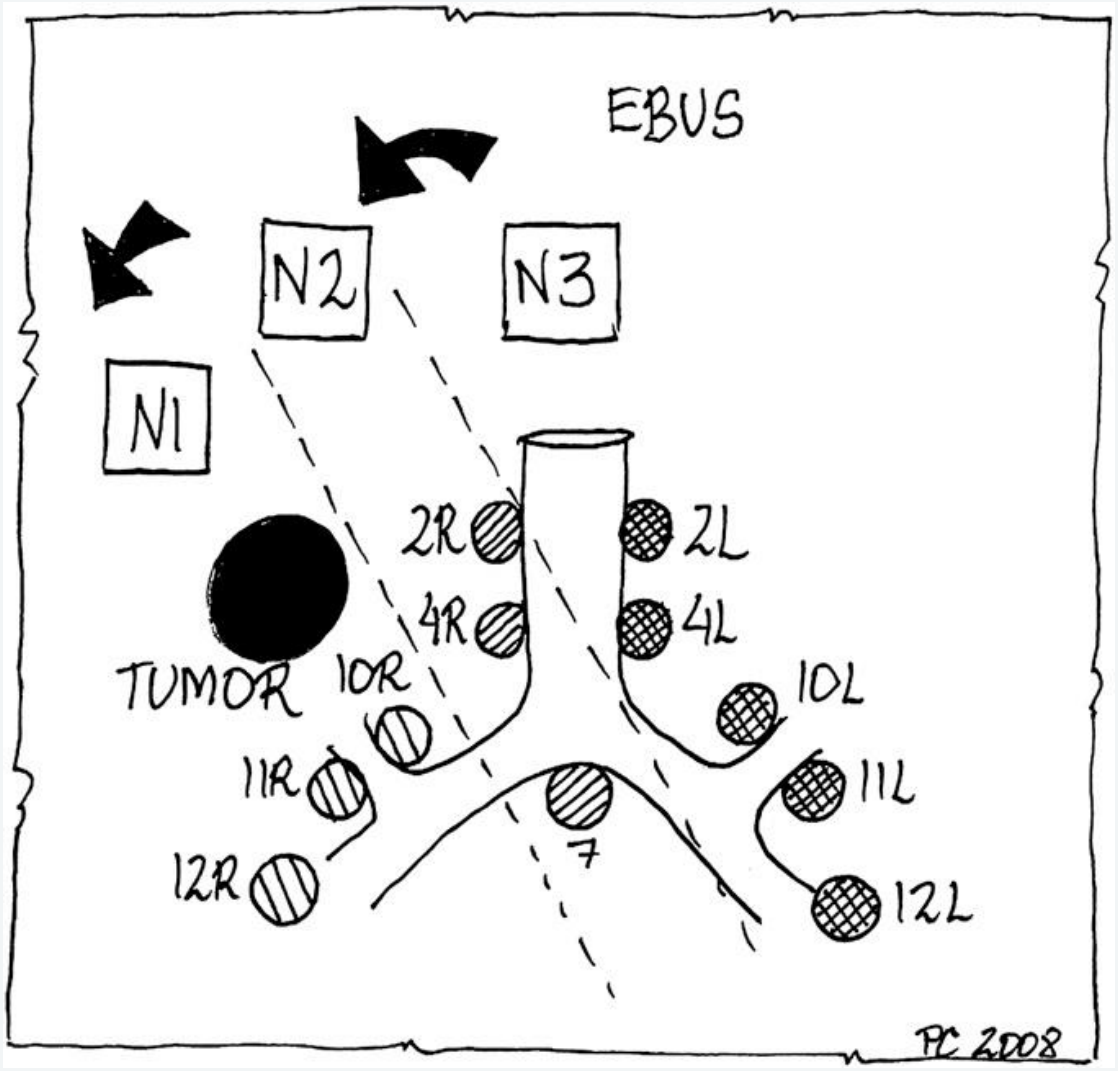
# Hilar station 10




- Hilar nodes adjacent to the mainstem bronchi
- Caudal to the azygos vein on the right
- Caudal to superior rim of left pulmonary artery






*Vilmann et al Clinical Gastroenterology 2009*

# Summary

- Lymph node stations 2, 4, 7, and 10/11 are the commonly sampled
- Review the CT to plan EBUS procedure and exclude vascular anomalies / cystic structures
- Use the doppler function prior to sampling
- Common airway landmarks corresponding to lymph node stations

# Reading List

[ Special Features ]

CHEST

## The Eighth Edition Lung Cancer Stage Classification

CrossMark

*Frank C. Detterbeck, MD, FCCP; Daniel J. Boffa, MD; Anthony W. Kim, MD, FCCP; and Lynn T. Tanoue, MD, FCCP*

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ESTABLISHED IN 1812 MAY 26, 2022 VOL. 386 NO. 21

## Neoadjuvant Nivolumab plus Chemotherapy in Resectable Lung Cancer

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Review Article

## Ultrasound techniques in the evaluation of the mediastinum, part 2: mediastinal lymph node anatomy and diagnostic reach of ultrasound techniques, clinical work up of neoplastic and inflammatory mediastinal lymphadenopathy using ultrasound techniques and how to learn mediastinal endosonography

Christian Jenssen[1], Jouke Tabe Annema[2], Paul Clementsen[3,4], Xin-Wu Cui[5], Mathias Maximilian Borst[6], Christoph Frank Dietrich[5]

## The International Association for the Study of Lung Cancer Lung Cancer Staging Project

*Proposals for the Revision of the N Descriptors in the Forthcoming 8th Edition of the TNM Classification for Lung Cancer*

# Thank you

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