

# EBUS and Other Methods to Stage Lung Cancer

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Thailand  
Bangkok | 10-12 April



## Disclosures

- **NOTE: All are Research Funding only**
  - Patient Centered Outcomes Research Institute
  - NIH/NCI
  - Auris Medical
  - Boston scientific Corporation
  - Exact Sciences
  - Integrated Diagnostics/Biodesix
  - Olympus America
  - Oncimmune
  - Oncocyte
  - Prolung
  - Veracyte
  - Veran



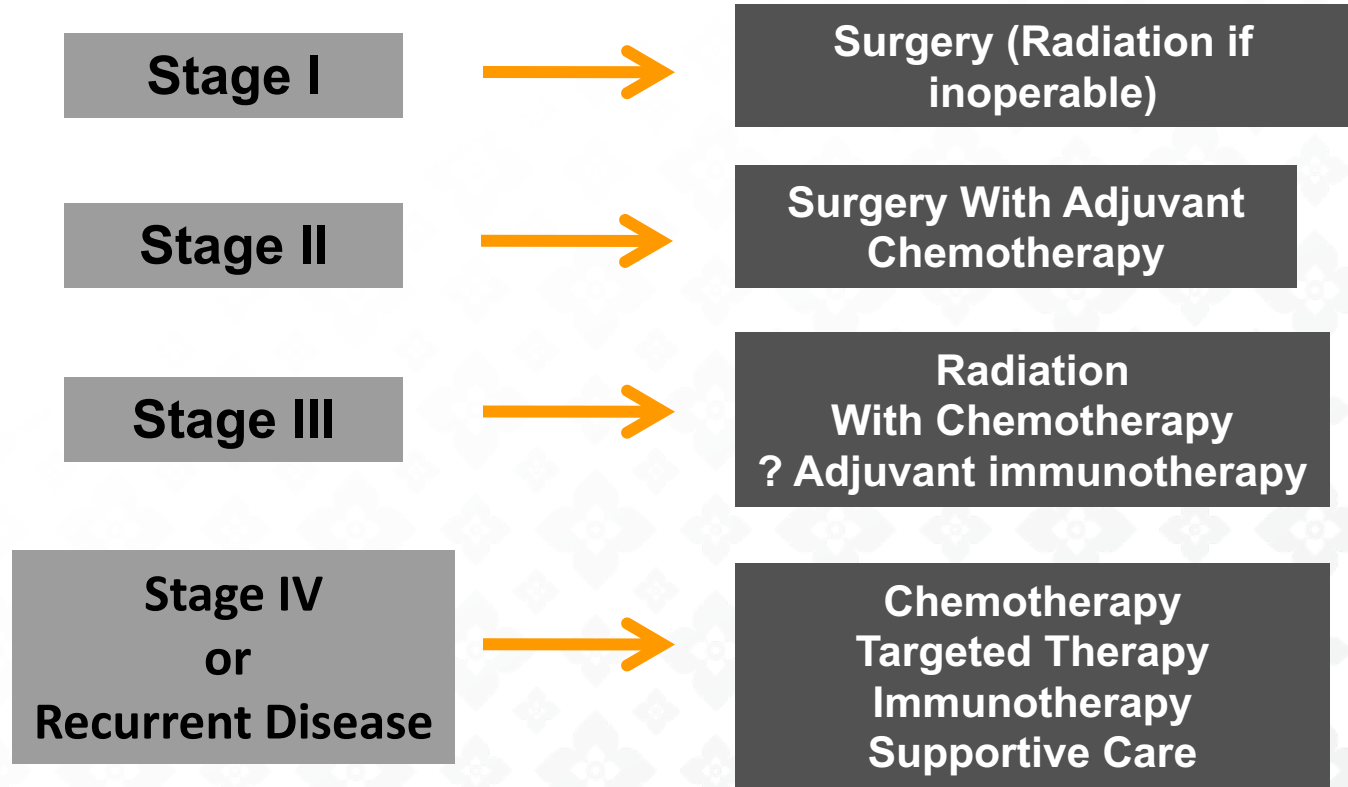
- Why stage
- Is EBUS comparable
- Cases
- Summary

# Staging

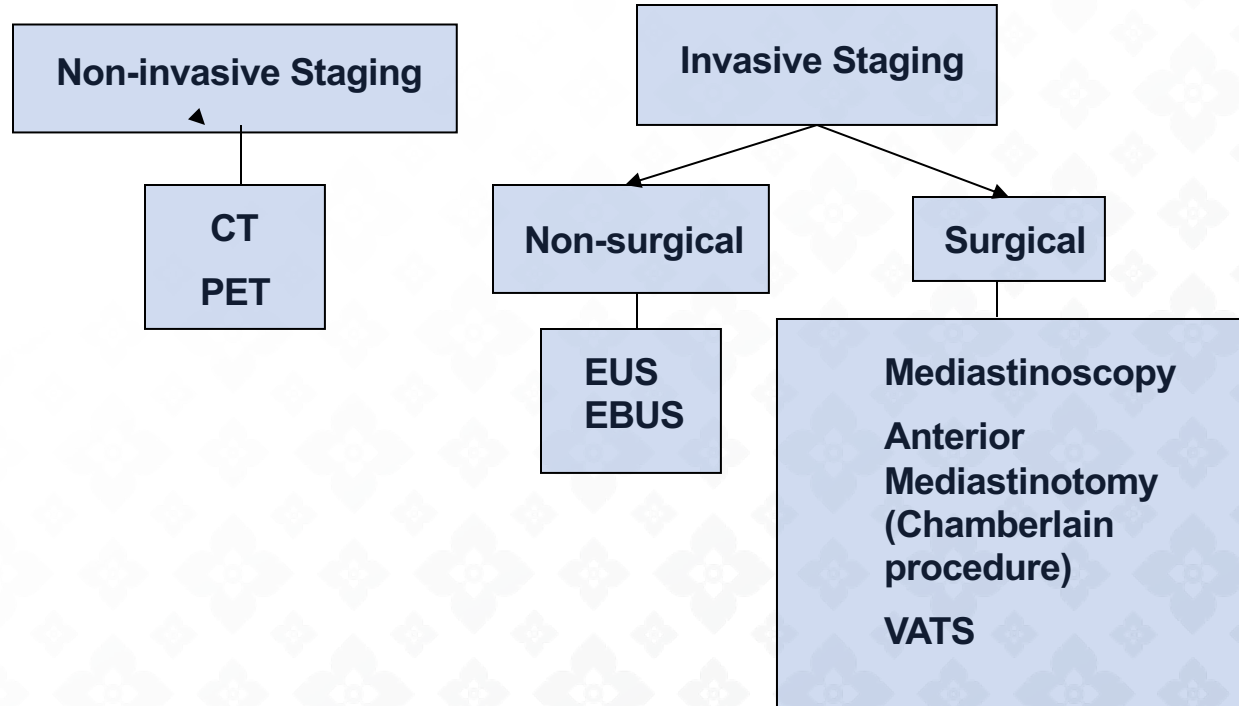


- Accurate staging is critical
  - Treatment options are stage dependent
  - Prognosis is based upon stage
  - Enrollment in clinical trials by stage
  - Provides a common language when discussing cases
  - Allows for study of large cohorts of patients

# Overview of NSCLC Treatment



# Staging for Lung Cancer



## Question 1

The most accurate method to stage the mediastinum in a patient with known or suspected lung cancer is?

1. CT scan with contrast
2. Mediastinoscopy
3. PET scan
4. EBUS

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3. PET scan
4. **EBUS**



Why do Invasive Staging?

Isn't CT, PET good enough?



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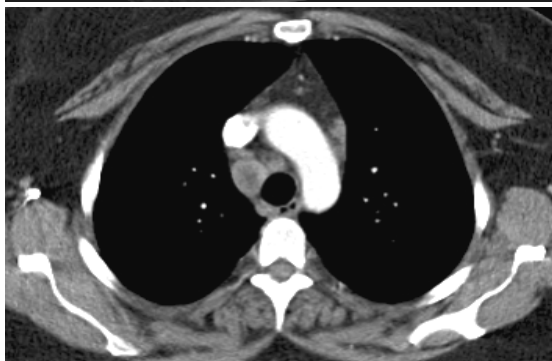
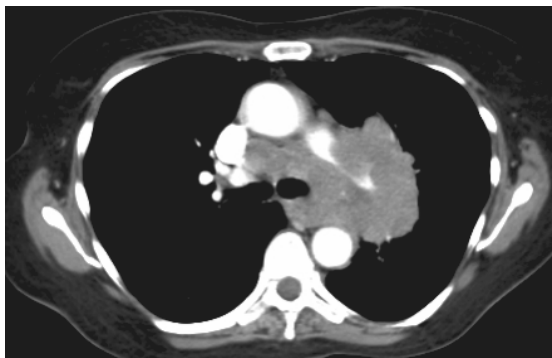
# Why Do Invasive Staging? Accuracy of CT and PET Staging Mediastinal Lymph Nodes

## Summary of 43 (CT) and 45 (PET) trials

	Sensitivity	Specificity
<b>CT</b> <b>N=7,368</b>	<b>55%</b>	<b>81%</b>
<b>PET</b> <b>N=4,105</b>	<b>80%</b>	<b>88%</b>

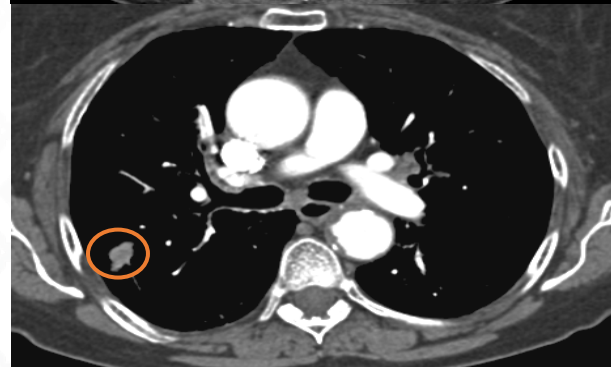
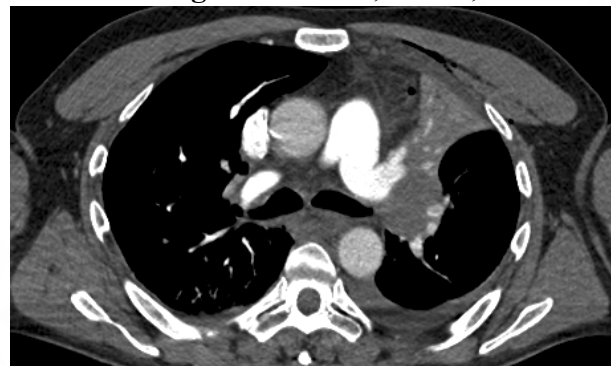
# Confirmation of Intrathoracic Stage

**Extensive Infiltration**



**Discrete N2, 3 enlargement**

**CT neg. but central, adeno, N1**



**Peripheral clinical stage I**

# Radiographic Groups

## Enlarged Nodes

- Radiographic group A
  - Mediastinal infiltration
    - Encircles vessels & airways
    - Discrete lymph nodes can not be discerned or measured
- Radiographic group B
  - Mediastinal node enlargement
    - Size of discrete nodes can be measured

## Normal Nodes

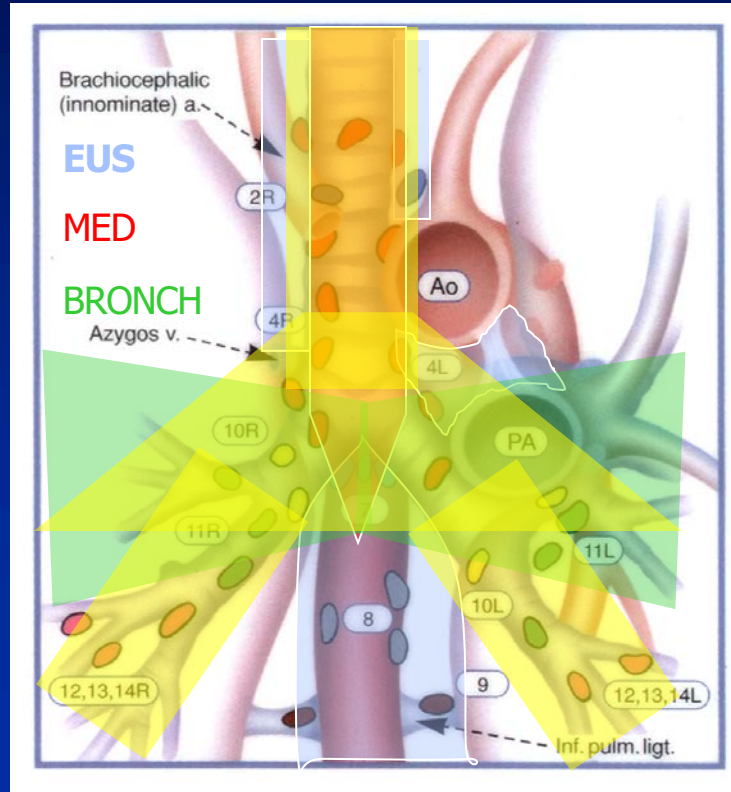
- Radiographic group C
  - Central tumor or suspected N1 disease
    - N2,3 nodal involvement relatively high
- Radiographic group D
  - Peripheral clinical stage I tumor
    - Distant metastases or mediastinal involvement is low

- Mediastinoscopy
- Mediastinotomy
- Thoracoscopy
- Trans bronchial needle aspirate
- EUS with FNA
- EBUS with FNA

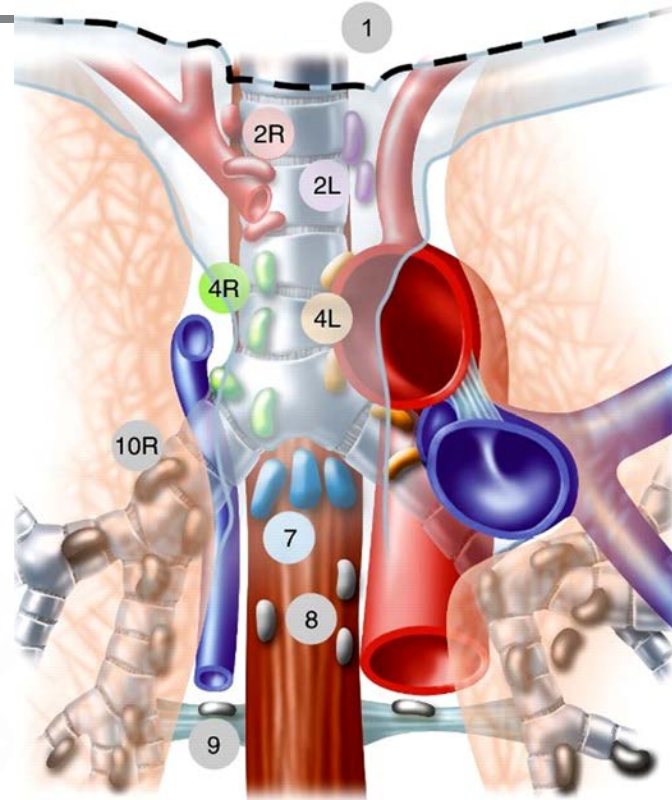
# Complementary Access to Mediastinum

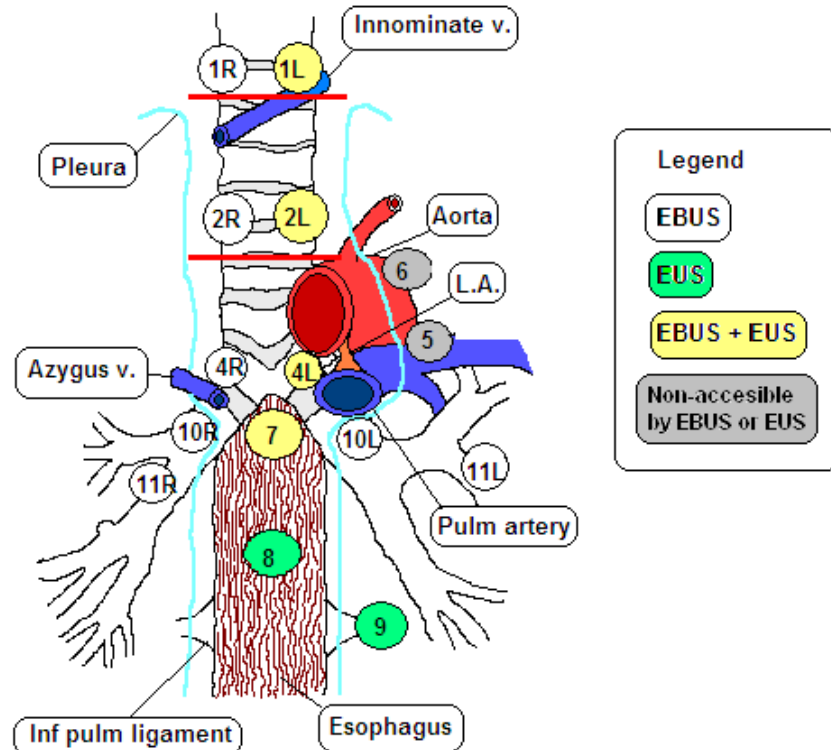
- Complementary Access of

- EUS
- Mediastinoscopy
- Bronchoscopy
- EBUS



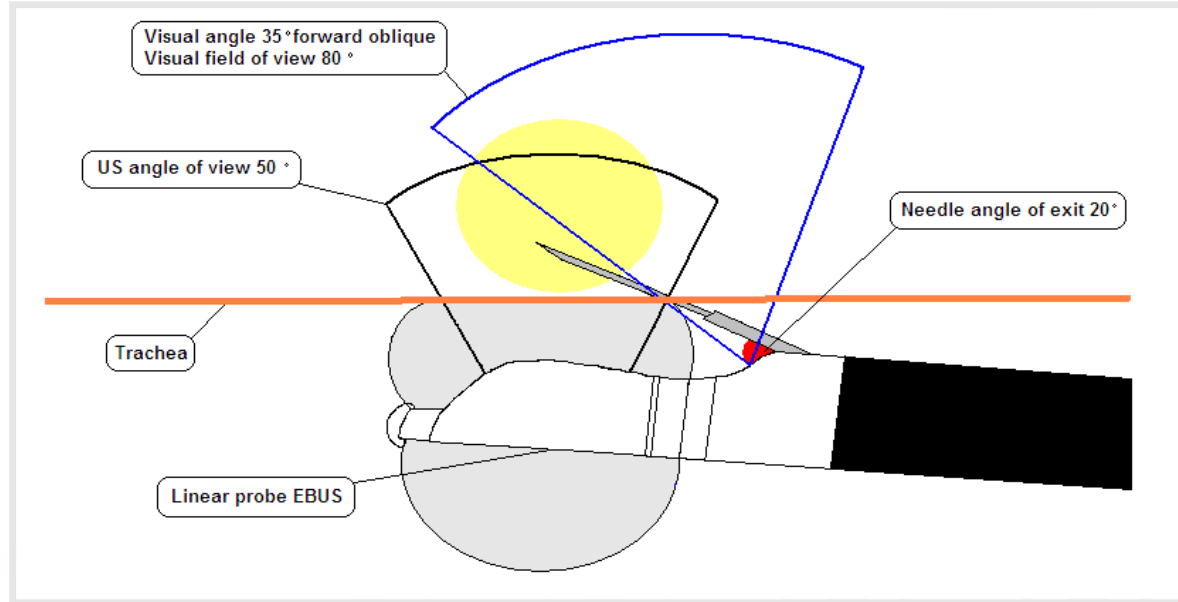
# Mediastinoscopy



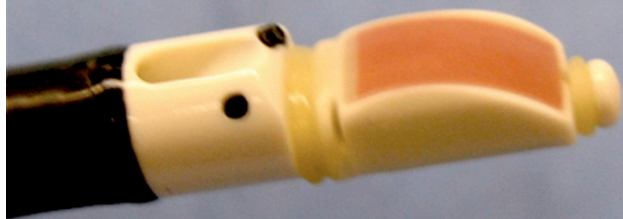




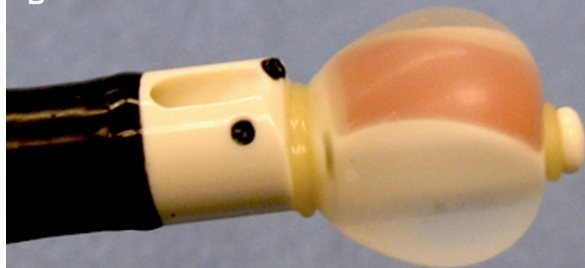
# Linear EBUS



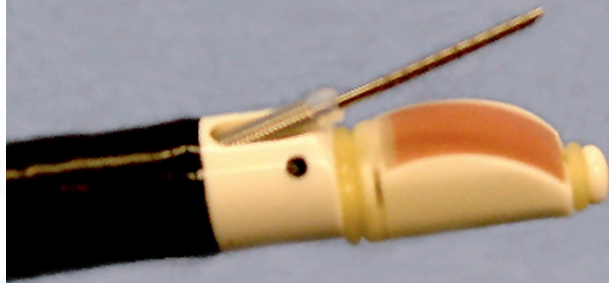
A

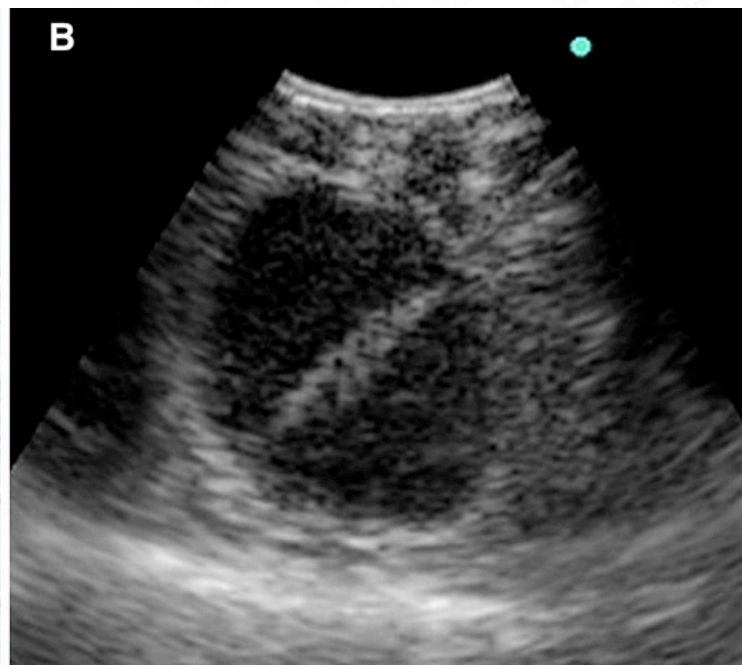
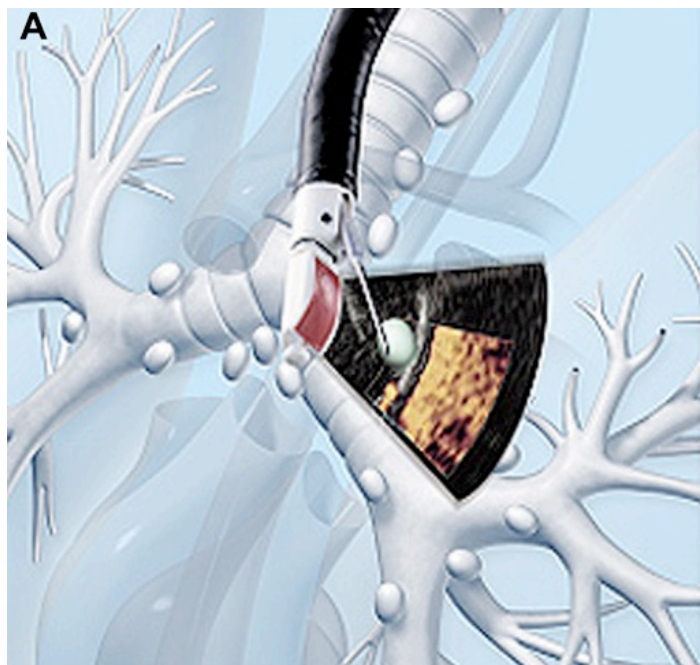


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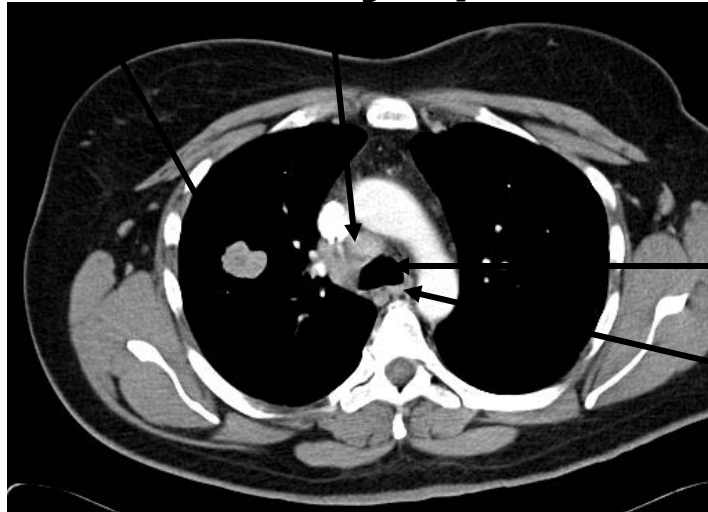


C





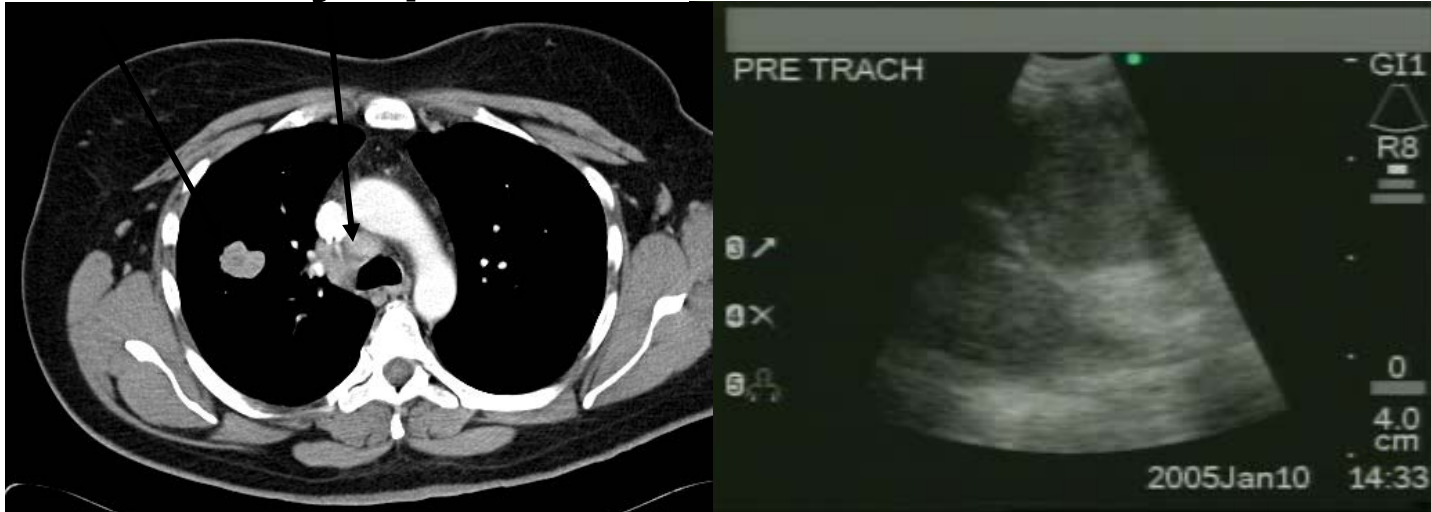
**Mass      Lymph node**



**Trachea**

**Esophagus**

## Mass      Lymph node



## Accuracy of Staging Tests in Lung Cancer Patients

Procedure	Number of Studies	N	Sens	Spec
Mediastinoscopy	33	9267	78	100
EUS	26	2443	88	100
EBUS	31	2756	89	100
EBUS/EUS	7	811	91	100

Silvestri et al. *CHEST* 2013; 143(5)(Suppl):e211S–e250S

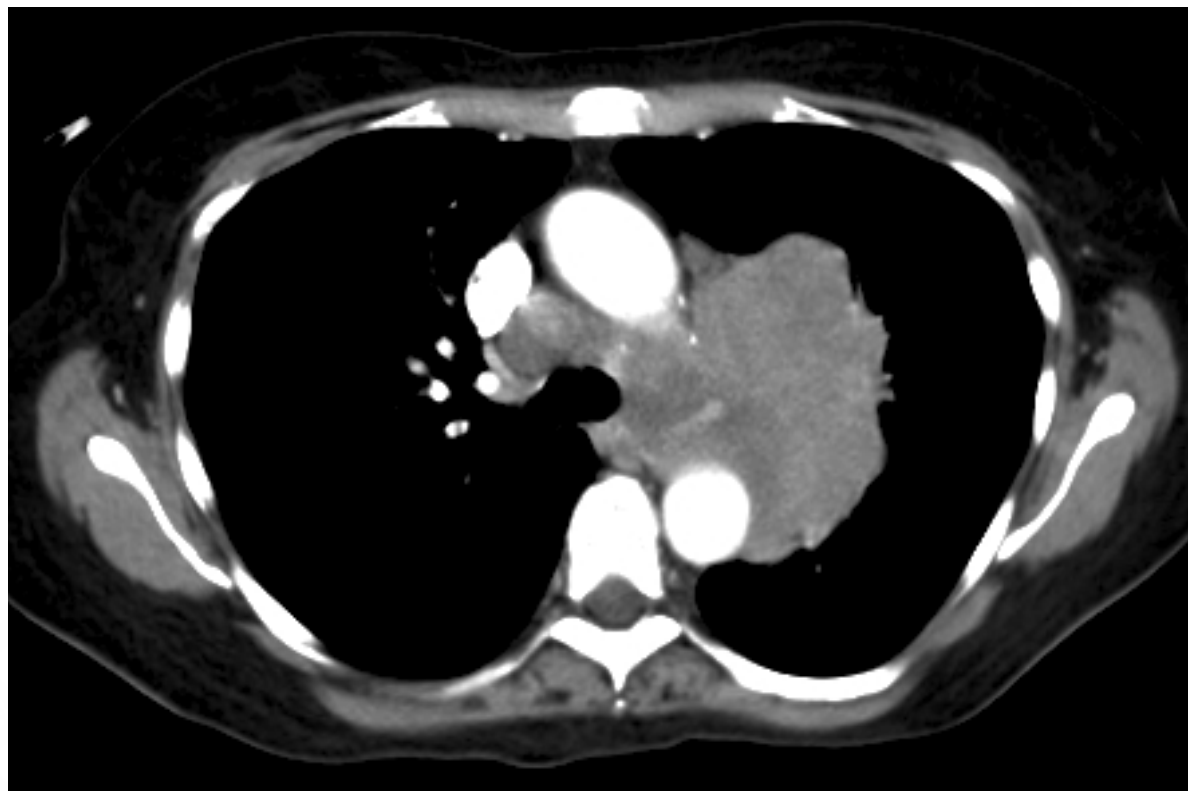


- ACCP guidelines 2007: Many invasive techniques for the confirmation of the N2,3 node status are suggested as reasonable approaches (eg, mediastinoscopy, EUS-NA, TBNA, EBUS-NA, or TTNA)
- ACCP guidelines 2013: In patients with high suspicion of N2,3 involvement, either by discrete mediastinal lymph node enlargement or PET uptake (and no distant metastases), a needle technique (EBUS- NA, EUS- NA or combined EBUS/EUS - NA) is recommended over surgical staging as a best first test

Detterbeck F et al. ACCP 2 guidelines Chest 2007

Silvestri et al. *CHEST* 2013; 143(5)(Suppl):e211S–e250S

# Extensive Mediastinal Infiltration

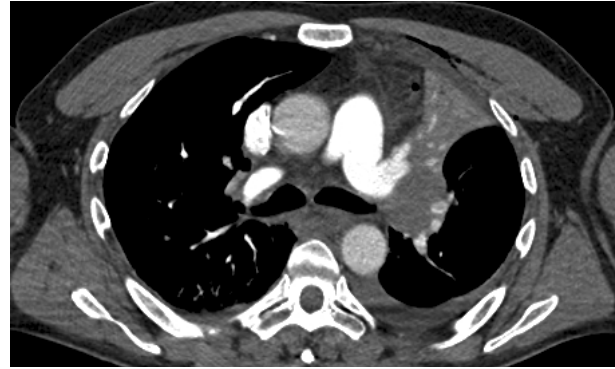
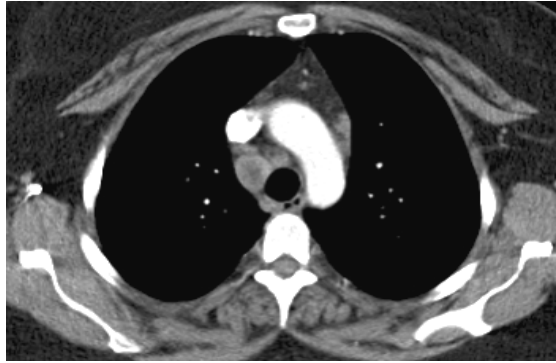




# ***Confirmation of Intrathoracic Stage***

- Extensive mediastinal infiltration:
  - No discrete nodes visible, encasement of structures
- Intrathoracic Stage is clear (stage IIIB)
- Issue is simply to confirm the diagnosis (could be SCLC)
- Use whatever test is easiest, least invasive
  - Sputum, Bronchoscopy with TBNA
  - EBUS-NA, TTNA

# Discrete Mediastinal Enlargement or Central Tumor

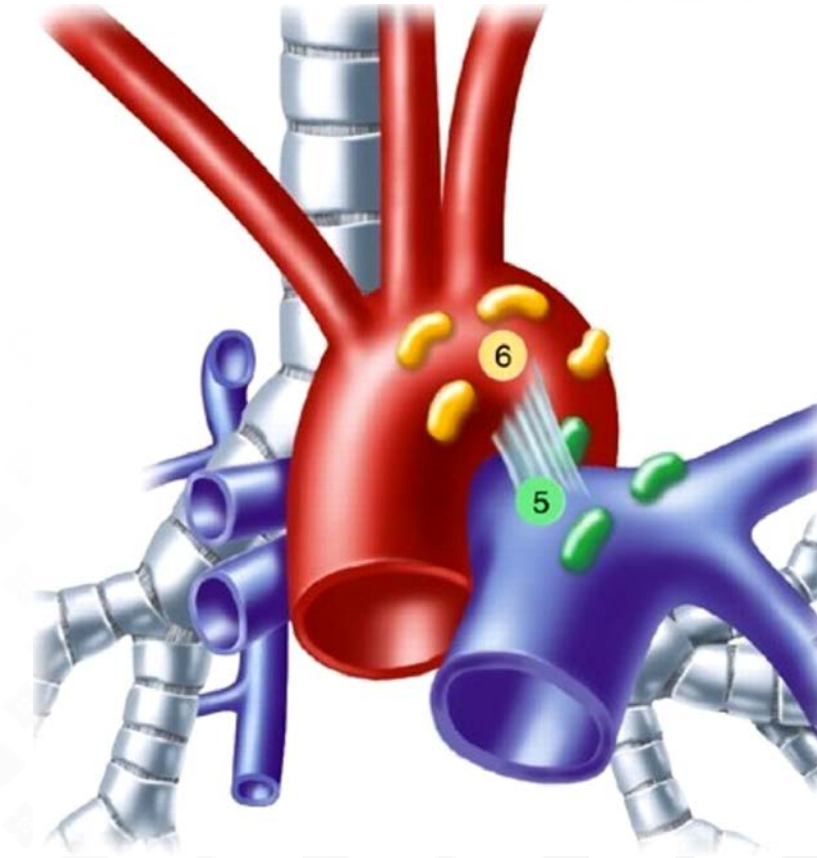


In patients with high suspicion of N2,3 involvement, either by discrete mediastinal lymph node enlargement or PET uptake (and no distant metastases) or Central tumor, a needle technique (EBUS- NA, EUS- NA or combined EBUS/EUS - NA) is recommended over surgical staging as a best first test

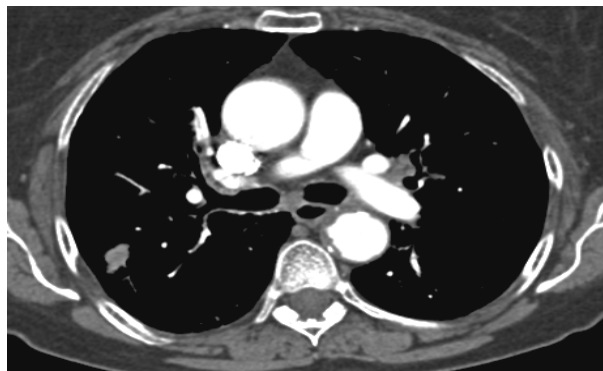


**4.4.10.1. For the patients with a LUL cancer in whom invasive mediastinal staging is indicated as defined by the previous recommendations, it is suggested that invasive assessment of the APW nodes be performed (via Chamberlain, VATS, or extended cervical mediastinoscopy) if other mediastinal node stations are found to be uninvolved (Grade 2B).**

## Chamberlain Procedure or VATS



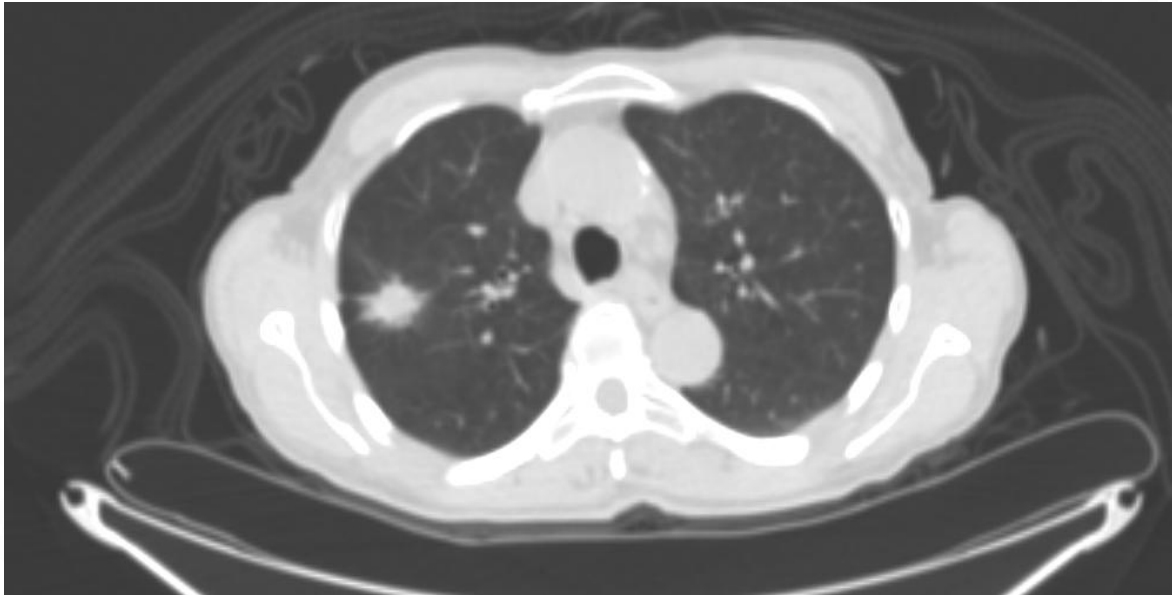
## Peripheral T1a Tumors



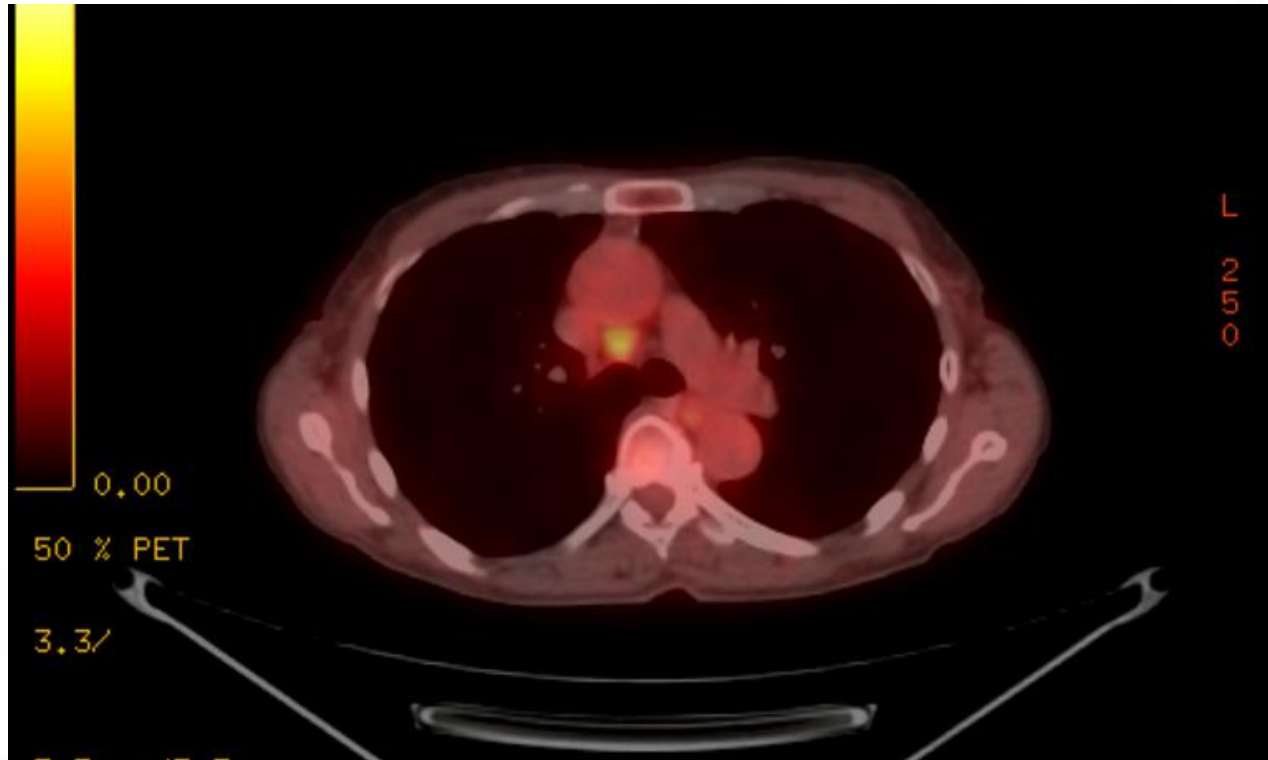
**4.4.8.1. For patients with a peripheral clinical stage IA tumor (negative nodal involvement by CT and PET), it is suggested that invasive pre-operative evaluation of the mediastinal nodes is not required (Grade 2B).**

## Illustrative Cases

- 62 y/o WW with >20 pack year tobacco
- CT for abnormal CXR prior to elective surgery



# PET



## EBUS Mediastinum – 4R (11mm)

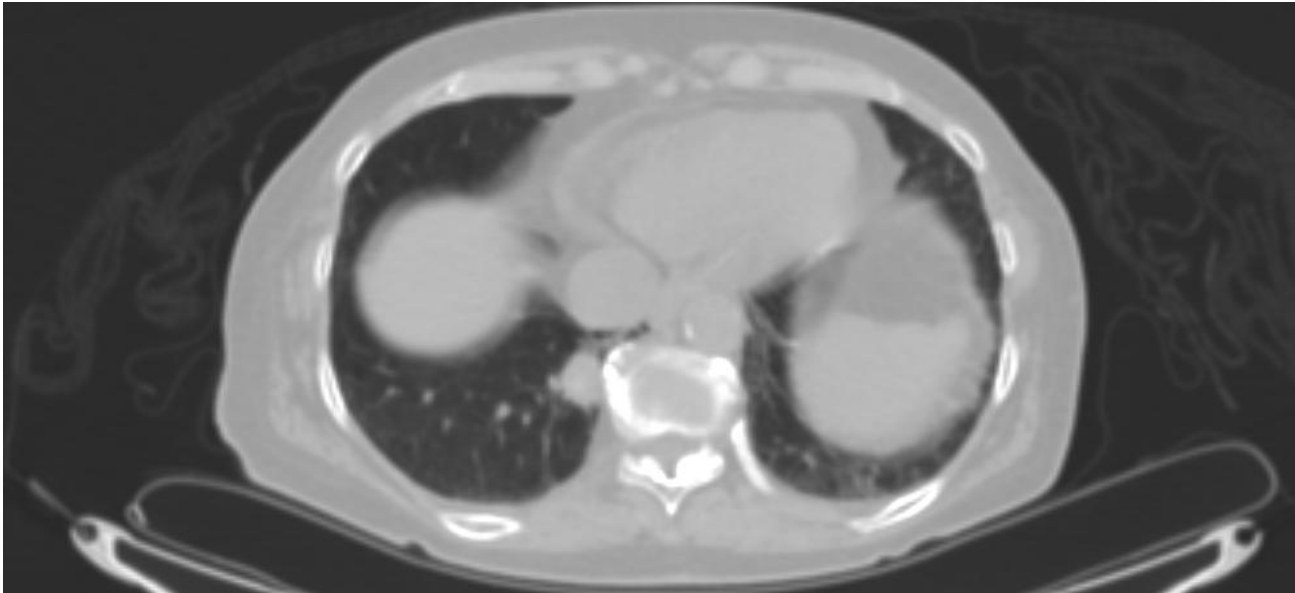


- Simultaneously diagnosed & staged
  - Adenocarcinoma stage IIIA
  - Patient went from surgical candidate to unresectable

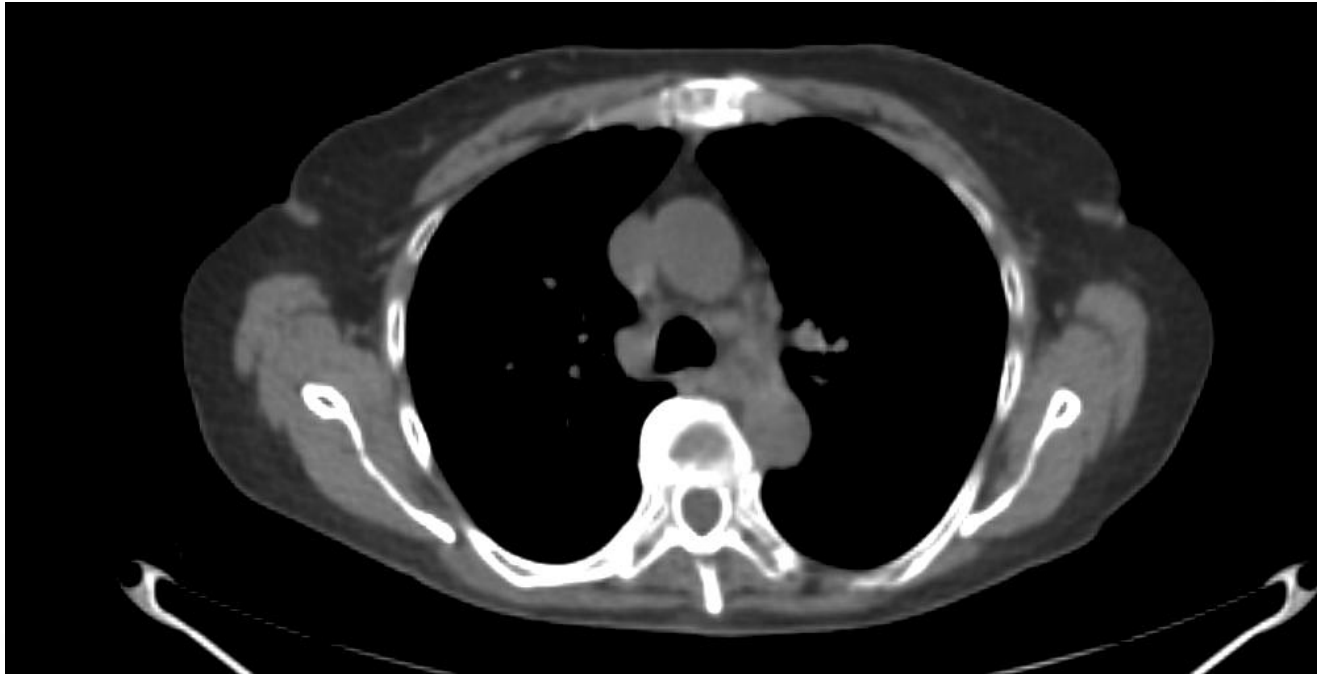


## Case 2

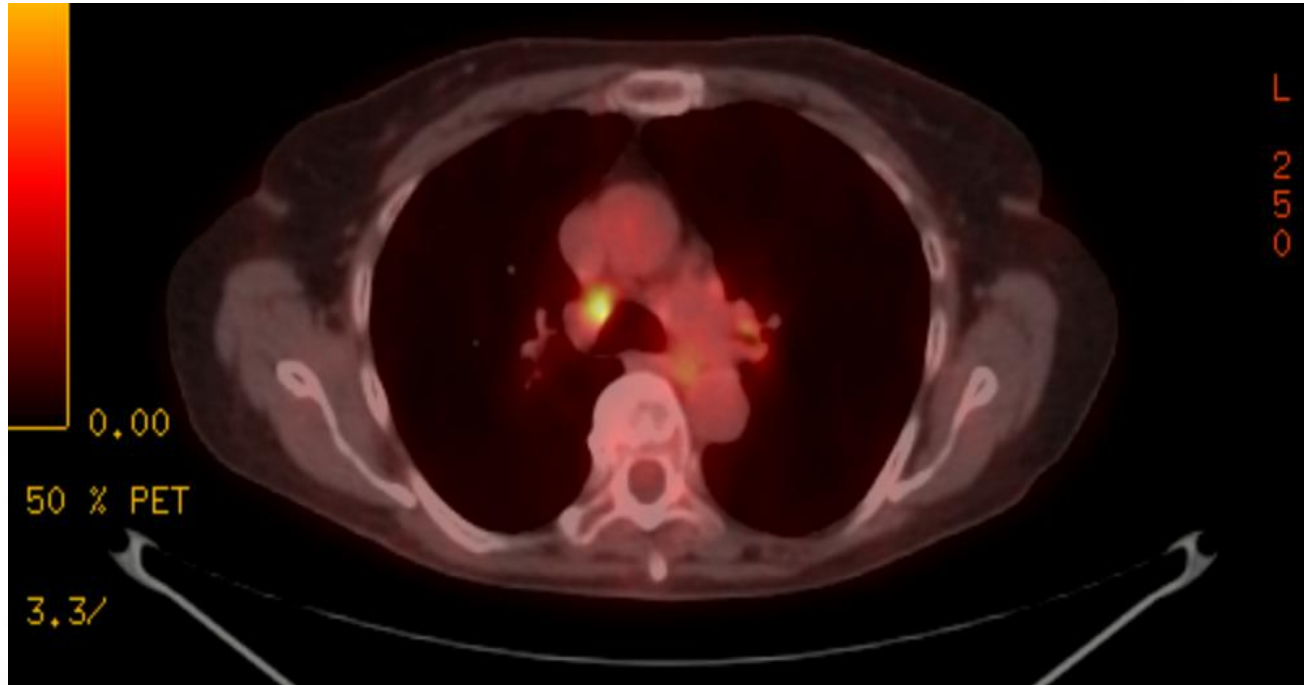
- 76 y/o never smoker
- CT chest during evaluation of abd pain



CT – 4R



## Patient 2 PET – 4R



CT – 10R



## PET – 10R



Pre-EBUS T1N2M0 (stage 3a) -> Post-EBUS T1N0M0 (stage IA)  
RLL resection confirmed stage IA adenocarcinoma

# Summary

- Imaging alone can not establish an appropriate stage and should not be relied upon to make clinical decisions. Tissue confirmation is necessary.
- Multiple tools exist to make a diagnosis and depend upon the patients presentation, availability of the technology and local expertise
- EBUS is the first test of choice for evaluating the mediastinum in patients with suspected lung cancer.