



# Mediastinal Evaluation in Early Lung Cancer

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# 'Early' Lung Cancer

	No	N1	N2	N3
T1	IA	IIB	IIIA	IIIB
T2a	IB	IIB	IIIA	IIIB
T2b	IIA	IIB	IIIA	IIIB
T3	IIB	IIIA	IIIB	IIIC
T4	IIIA	IIIA	IIIB	IIIC
M1a	IVA	IVA	IVA	IVA
M1b	IVA	IVA	IVA	IVA
M1c	IVB	IVB	IVB	IVB

Aim of mediastinal staging:

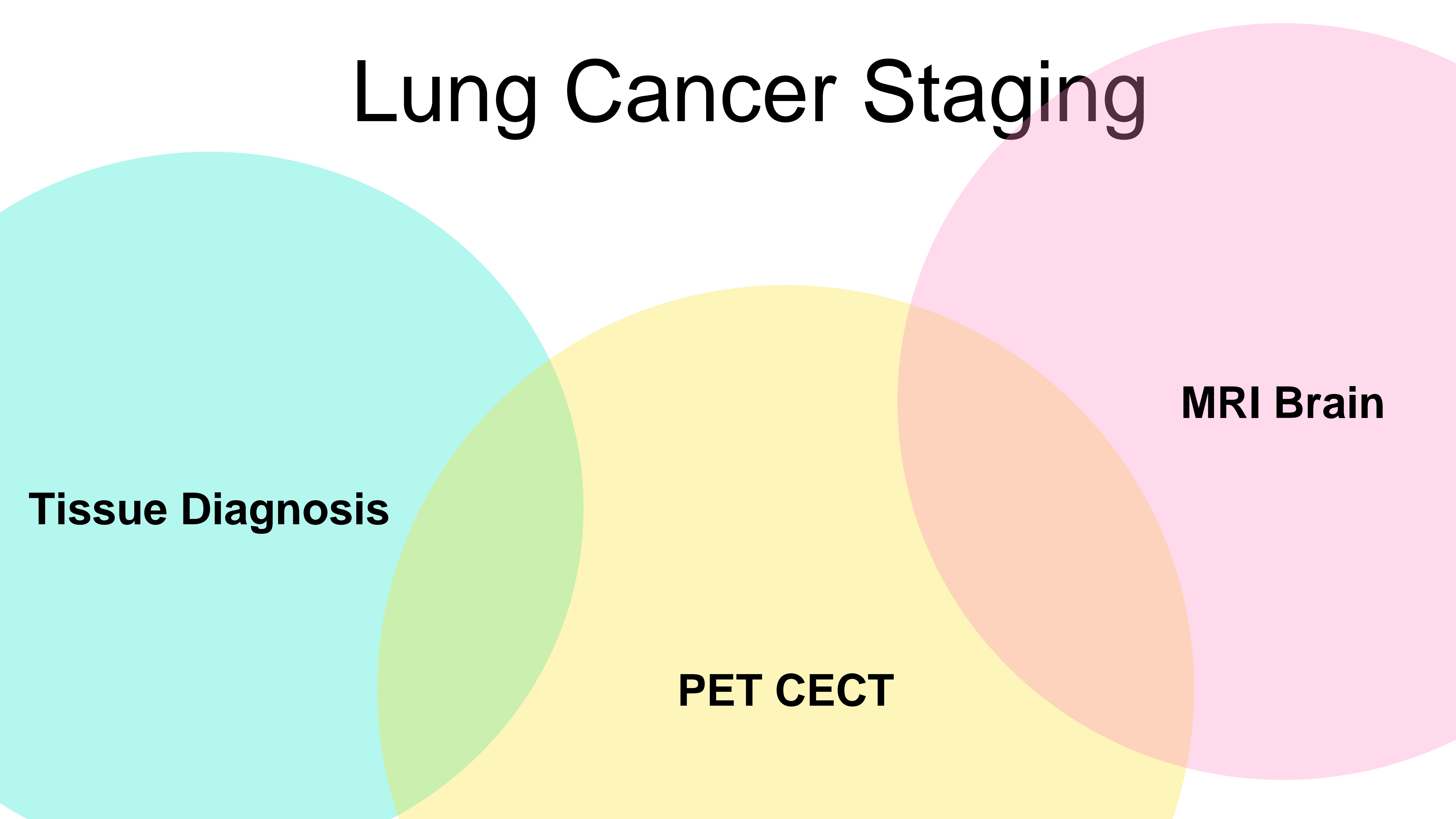
To detect  
*radiologically occult* N2/N3

# Lung Cancer Staging

**Tissue Diagnosis**

**PET CECT**

**MRI Brain**

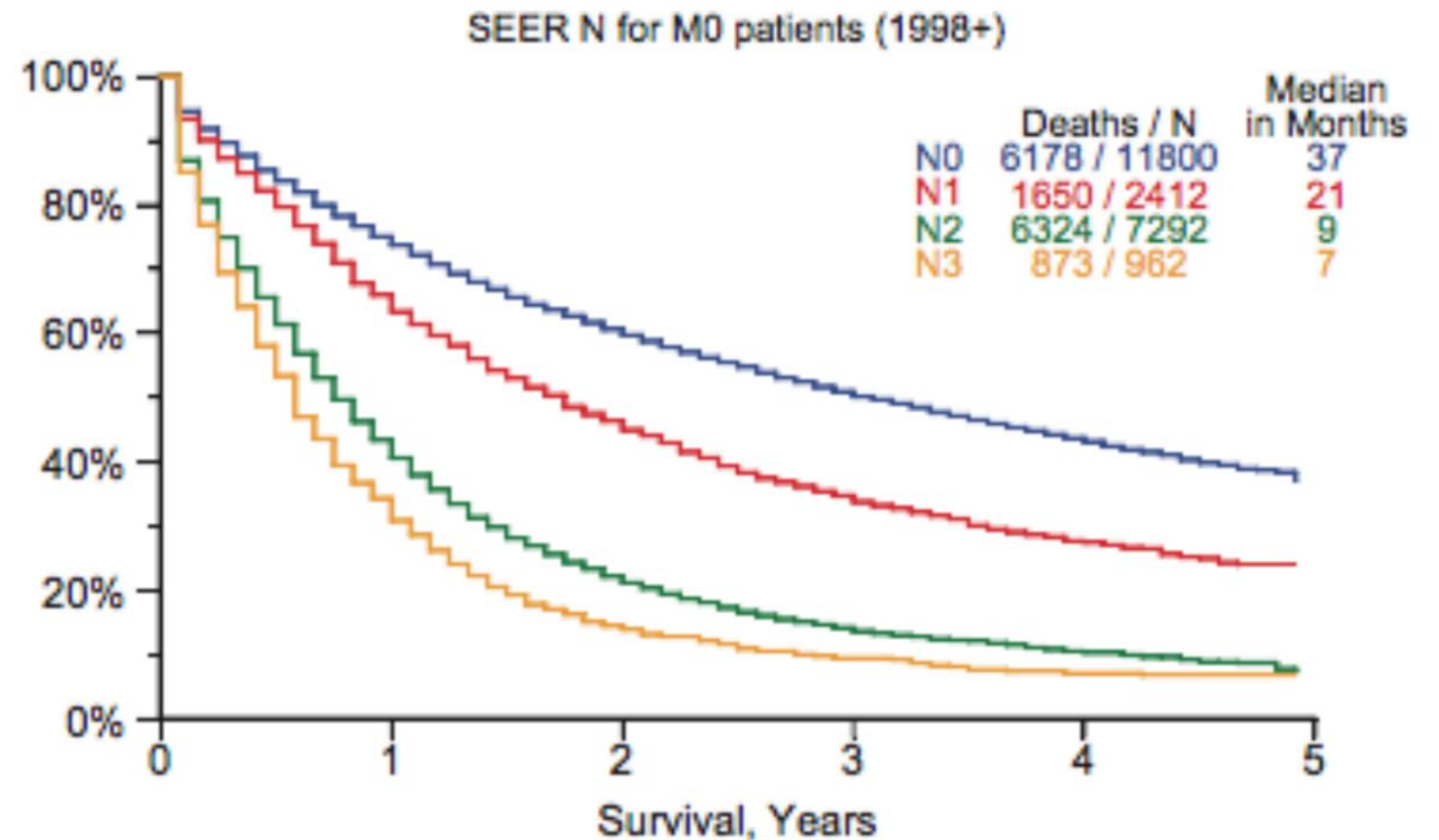


# Why stage the mediastinum?

Stage Distribution and 5-year Relative Survival by Stage at Diagnosis for 2001-2007, All Races, Both Sexes

Stage at Diagnosis	Stage Distribution (%)	5-year Relative Survival (%)
Localized (confined to primary site)	15	52.2
Regional (spread to regional lymphnodes)	22	24.3
Distant (cancer has metastasized)	56	3.6
Unknown (unstaged)	7	8.1

- Nodal status determines treatment opt
- Significantly affects survival
- 12.5% unforeseen N2 despite staging\*



\* Bousema et al. Lung Cancer Feb 2020



# When can we avoid it?

Invasive mediastinal staging is recommended in **ALL** patients of NSCLC **except:**

**Peripheral** (outer 1/3 of lung fields)

**AND**

**T1** ( $\leq 3$  cm)

**AND**

**Node negative** at hilum and mediastinum on PET scan

# Why is PET CT not enough?

## False Positive

- 18% in our series
- Country endemic for TB, granulomatous disease
- Upstages 1 in 5: may deny curative surgery

## False Negative

- Usually due to 'shine through' of organs with high uptake
- Understages
- Risk of inadequate treatment

# Invasive mediastinal staging

## **EBUS +/- EUS-B**

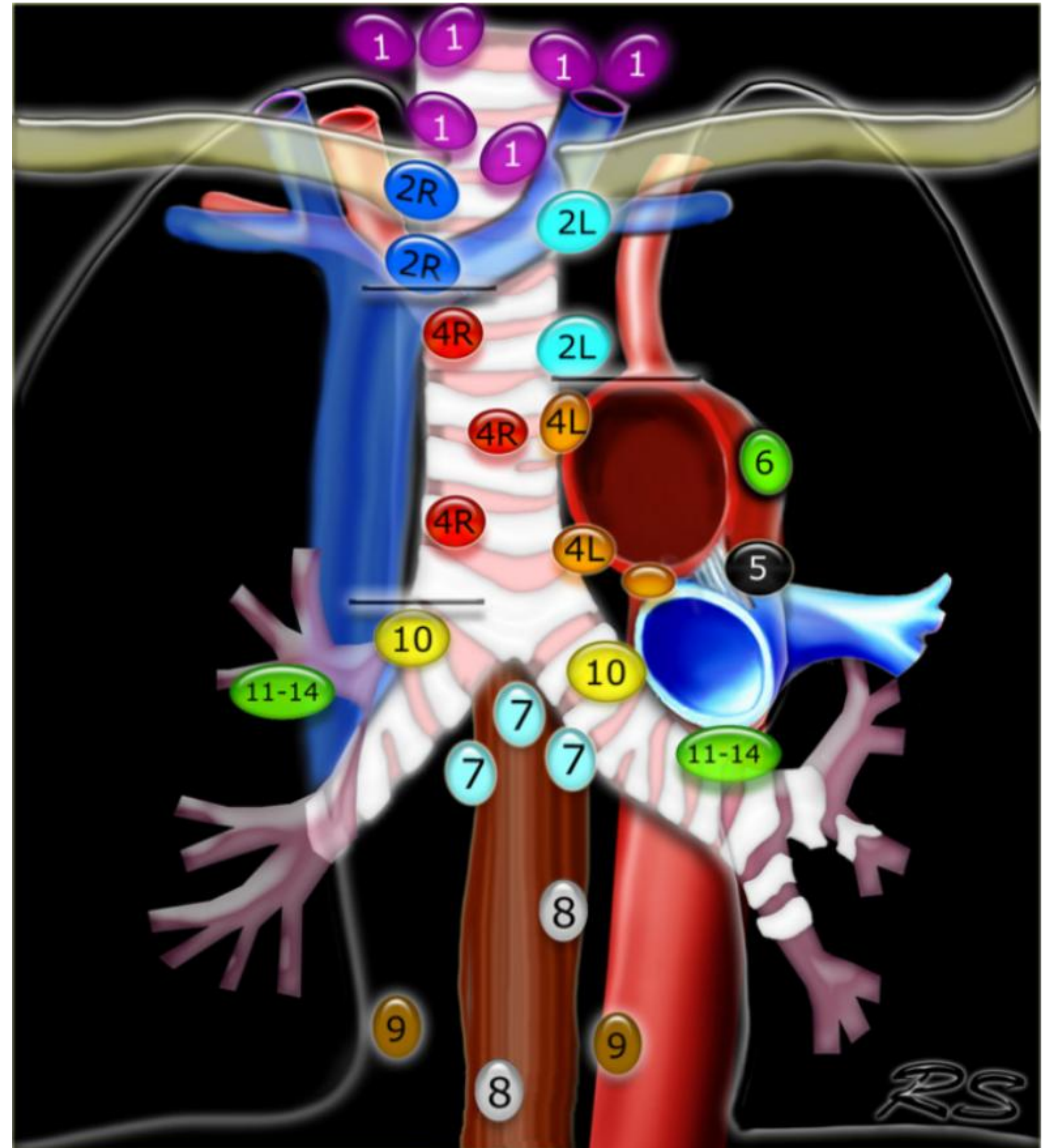
- Less 'invasive'
- Under conscious sedation
- Recommended initial step
- Rapid on-site examination
- Negligible complications

## **Mediastinoscopy**

- Surgical procedure under GA
- Standard / video (Gold Standard)
- False negative: 2%
- Complications: 6%

# Nodal stations addressed

- EBUS: 2,4,7,10,11
- EUS-B: 8,9 (liver, adrenal mets)
- M'scopy: 2,4,7,5
- Blind spots: 5,6





# The genesis of EBUS

**A prospective controlled trial of endobronchial ultrasound-guided transbronchial needle aspiration compared with mediastinoscopy for mediastinal lymph node staging of lung cancer**

2004

Kazuhiro Yasufuku, MD, PhD,<sup>a</sup> Andrew Pierre, MD, MSc,<sup>a</sup> Gail Darling Thomas Waddell, MD, PhD,<sup>a</sup> Michael Johnston, MD,<sup>a</sup> Gilda da Cunha William Geddie, MD,<sup>b</sup> Scott Boerner, MD,<sup>b</sup> Lisa W. Le, MSc,<sup>c</sup> and Sha

ORIGINAL ARTICLE

**Endobronchial Ultrasound versus Mediastinoscopy for Mediastinal Nodal Staging of Non-Small-Cell Lung Cancer**

Sang-Won Um, MD, PhD,\* Hong Kwan Kim, MD, PhD,† Sin-Ho Jung, PhD,‡ Joungho Han, MD, PhD,§ ID,\* Hye Yun Park, MD, PhD,\* Yong Soo Choi, MD, PhD,† Young Mog Shim, MD, PhD,† -Ju Ahn, MD, PhD,|| Keunchil Park, MD, PhD,|| Yong Chan Ahn, MD, PhD,¶ ng Choi, MD, PhD,# Kyung Soo Lee, MD, PhD,\*\* Gee Young Suh, MD, PhD,\* yo Chung, MD, PhD,\* O Jung Kwon, MD, PhD,\* Jhngook Kim, MD, PhD,† and Hojoong Kim, MD, PhD\*

**Mediastinoscopy vs Endosonography for Mediastinal Nodal Staging of Lung Cancer**  
A Randomized Trial

Jouke T. Annema, MD, PhD  
Jan P. van Meerbeek, MD, PhD  
Robert C. Rintoul, FRCP, PhD  
Christophe Doms, MD, PhD

**Context** Mediastinal nodal staging is recommended for patients with resectable non-small cell lung cancer (NSCLC). Surgical staging has limitations, which results in the performance of unnecessary thoracotomies. Current guidelines acknowledge minimally invasive endosonography followed by surgical staging (if no nodal metastases are found by endosonography) as an alternative to immediate surgical staging.

All surgeons!



# Impressive results!

	Yasufuku	Won-Um	Mediastinoscopy
Sensitivity (%)	81	88	81
NPV	91	85	78
Accuracy (%)	93	92	89
Specificity(100%)	100	100	100
PPV	100	100	100

# Are they reproducible?

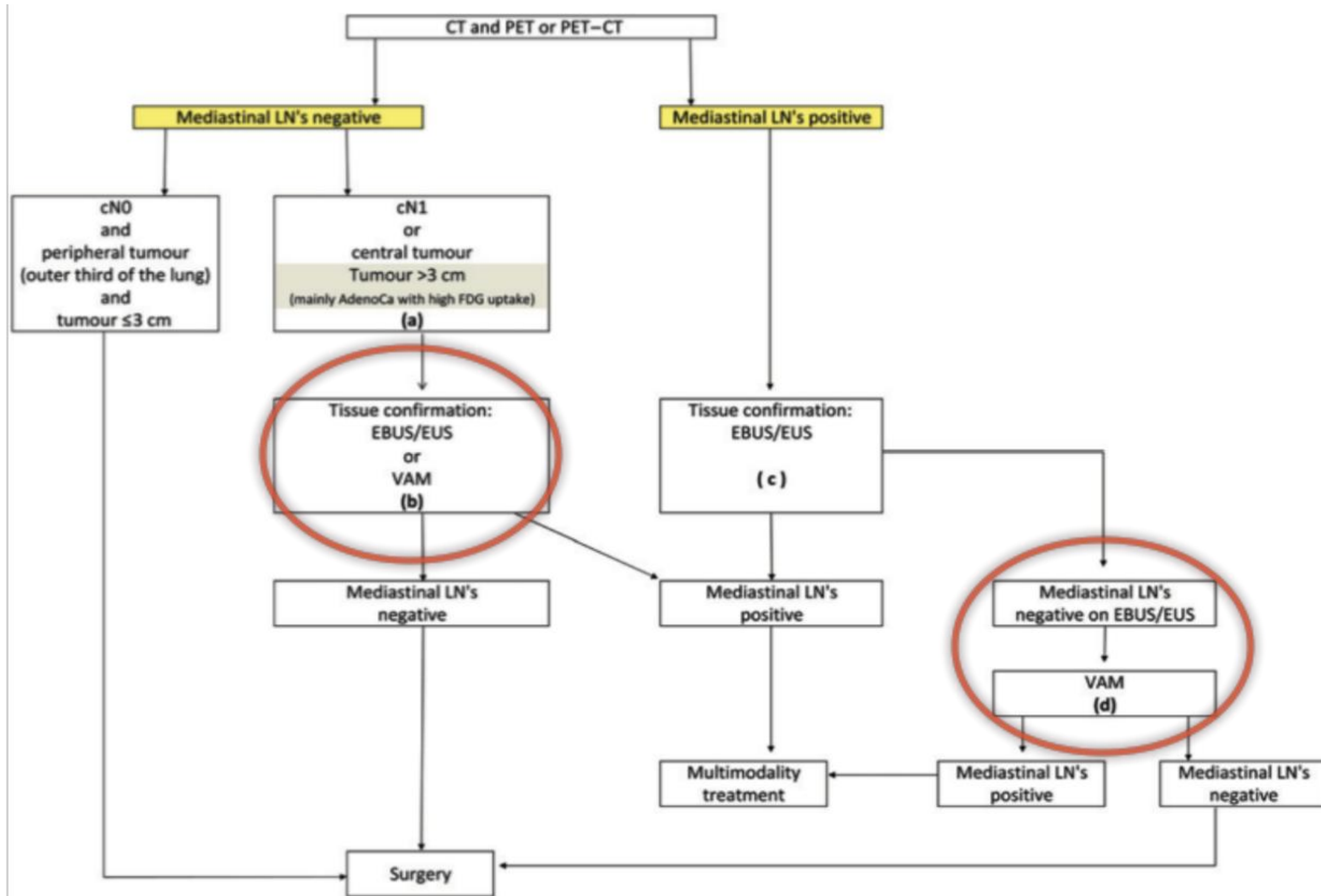
- Operator dependent, learning curve
- Single centre experiences: False -ve upto 20%!
- High price to pay

A randomized trial comparing endosonography followed by surgical staging versus surgical mediastinal staging alone in non-small cell lung cancer: The ASTER study.

[K. G. Tournoy](#) , [C. A. Doms](#) , [R. C. Rintoul](#) , [P. Deleyn](#) , [A. G. Nicholson](#) , [E. Deschepper](#)...

- Sensitivity surgical staging alone: 79%
- Sensitivity EBUS/EUS-B + SS: 94%!
- Futile thoracotomies: 18% v/s 7%

# ESTS 2014 Guideline





# EBUS today

- Systematic nodal sampling > selective strategy: **SCORE study**
- **Improving false negative rates**: inching closer to M'scopy
- Sensitivity and specificity: 88% and 100%!
- Almost **NO complications**

# Confirmatory M'scopy mandatory?

## Why not?

- Limited additional nodal met detection
- Increased morbidity
- Treatment delay and cost
- Micro-met N2: questionable impact on survival

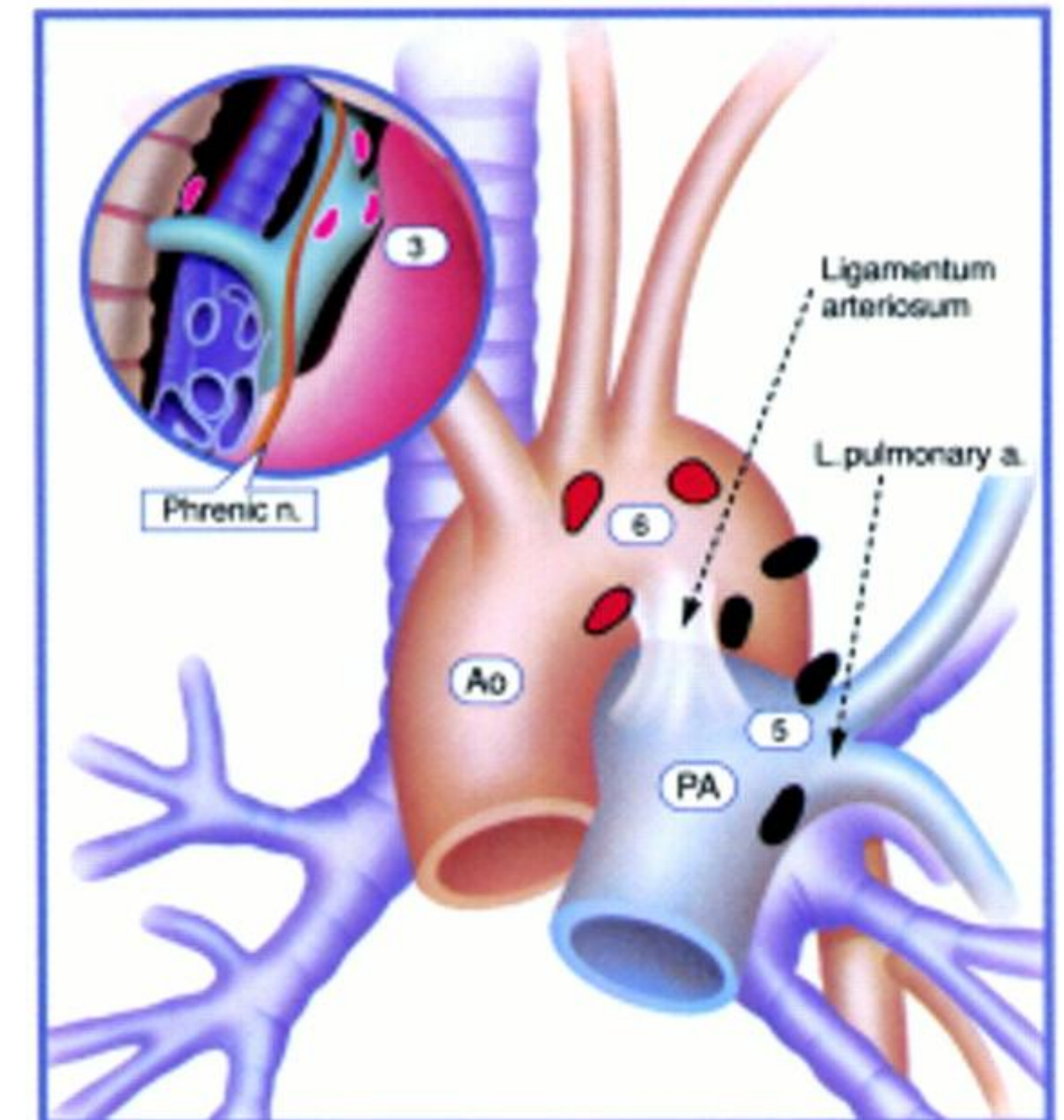
## Bousema et al. meta-analysis

- Unforeseen N2 rate: 9.6% v/s 9.9%
- 6% morbidity: RLN palsy, chyle leak
- Unforeseen N2: no impact on survival

**MEDIASTrial**

# Value addition with VAMLA

- Assessing 'resectability' of nodes
- Good clearance for left sided tumours
- Acceptable morbidity: RLN palsy: 2.4%
- The surgeon is enough!
- Can be timed with the resection of primary: if frozen section available



# How perfect is perfect?

**EBUS/EUS-B**

**+**

**M'scopy:**

**Sensitivity: 94%!**

***But...***

- We still got it wrong in 9.6%
- 7% still underwent futile thoracotomies
- Cost and time!
- Infrastructure



# How feasible is perfect?

Adherence to the mediastinal staging guideline and unforeseen N2 disease in patients with resectable non-small cell lung cancer: Nationwide results from the Dutch Lung Cancer Audit - Surgery

Jelle E. Bousema<sup>a</sup>, David J. Heineman<sup>b</sup>, Marcel G.W. Dijkgraaf<sup>c</sup>, Jouke T. Annema<sup>d</sup>,  
Frank J.C. van den Broek<sup>a,\*</sup>

- EBUS/EUS as initial staging: 43%
- M'scopy as initial staging: 10%
- Confirmatory M'scopy in -ve EBUS: 44%
- **Strict invasive mediastinal staging: 19%!**



Denmark!

# The balancing act



**EBUS**

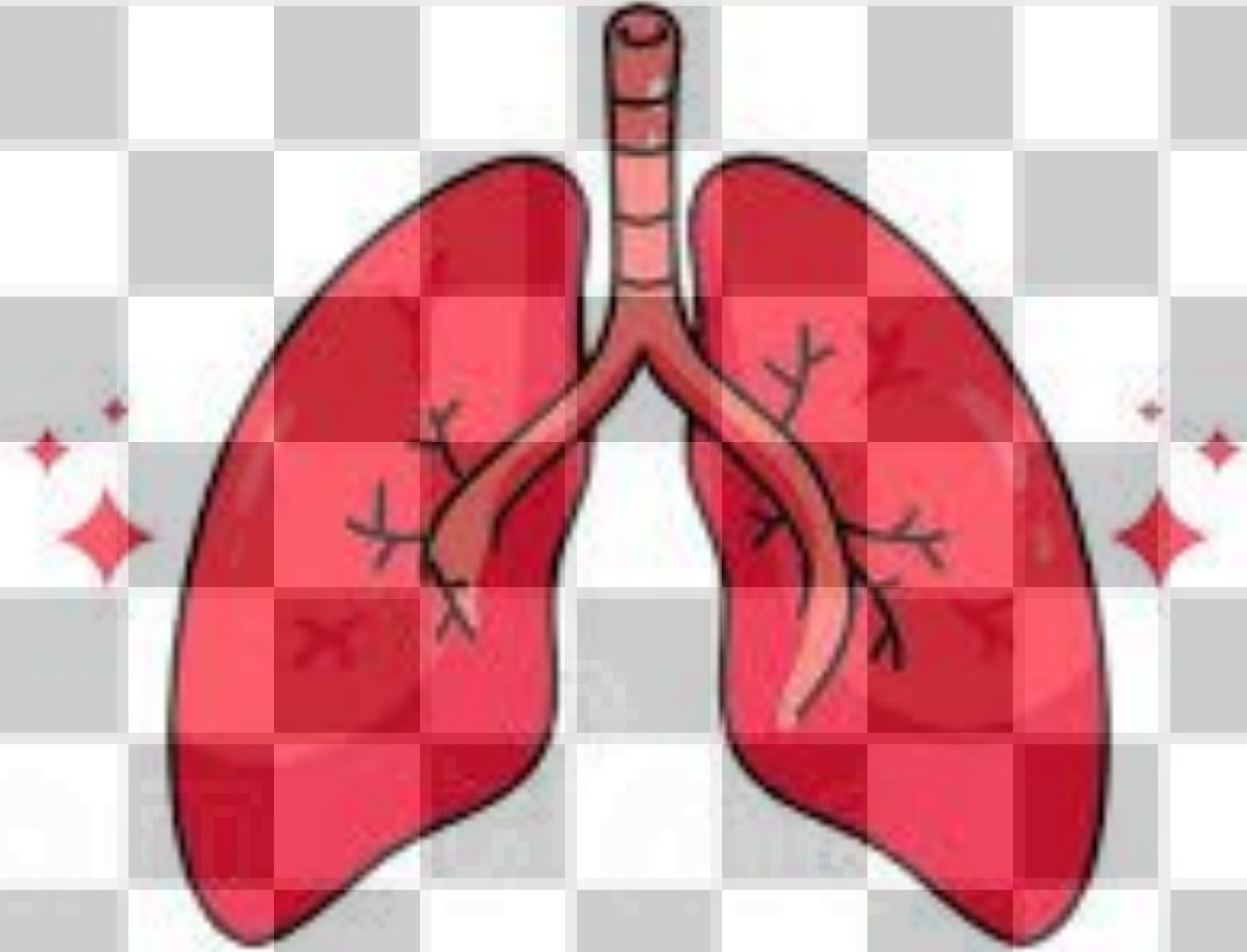
High chance of nodes  
coming positive

**Mediastinoscopy**

High chance of nodes  
coming negative

# In conclusion

- Nodal status significantly impacts treatment options and prognosis
- What you see is not always what you get: invasive staging a must!
- If it's difficult to be perfect, be wise



# Thank You!

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