



ITOCB
September 2010



Thoraxklinik am Universitätsklinikum Heidelberg
Internistische Onkologie der Thoraxtumoren – Thoraxchirurgie
Competence – the legacy of tradition

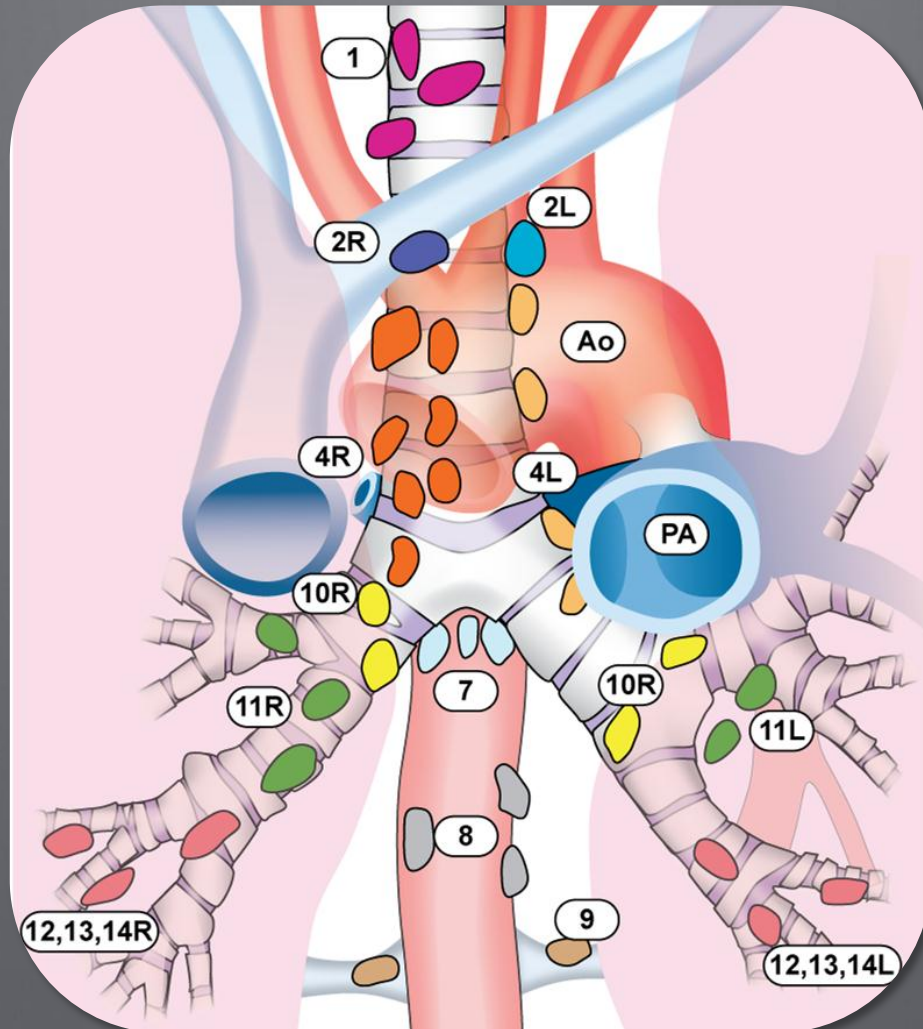


Minimally invasive non-surgical methods for staging lung cancer

FJF Herth

20.10.2010

Thoraxklinik, University of Heidelberg, Germany



TNM Subgroups

T and M		N0	N1	N2	N3
UICC6 and Descriptor	New T/M	Stg	Stg	Stg	Stg
T1 (<=2cm)	T1a	IA	IIA	IIIA	IIIB
T1 (>2 – 3 cm)	T1b	IA	IIA	IIIA	IIIB
T2(<5cm)	T2a	IB	IIA	IIIA	IIIB
T2 (>5-7cm)	T2b	IIA	IIB	IIIA	IIIB
T2 (>7cm))	T3	IIB	IIIA	IIIA	IIIB
T3 invasion		IIB	IIIA	IIIA	IIIB
T4 (same lobe nodules)		IIB	IIIA	IIIA	IIIB
T4 (extension)		IIIA	IIIA	IIIB	IIIB
M1 (ipsilateral lung)	T4	IIIA	IIIA	IIIB	IIIB
T4 (pleural effusion)	M1a	IV	IV	IV	IV
M1 (contralateral lung)		IV	IV	IV	IV
M1 (distant)		M1b	IV	IV	IV

 = Change in Classification



Established techniques

	Sensitifity	Specificity	PPV	NPV	mortality
CT¹	0.56	0.79	0.82	0.84	0
PET-CT²	0.74	0.85	0.75	0.96	0
MES³	0.78	1.0	1.0	0.89	0.07

¹Silvestri et al., Chest 2008

² ACCP guideline, Chest 2007

³ Detterbeck et al., Chest 2007



Lymphnodes

ATS/ERS 1997

LN > 1cm

ACCP 2003

LN > 1cm

ASCO 2004

LN > 1cm

NICE 2005

LN > 1cm

PET +

ACCP 2007

LN > 1cm

PET +

ESTS 2007

LN > 1 cm

PET +

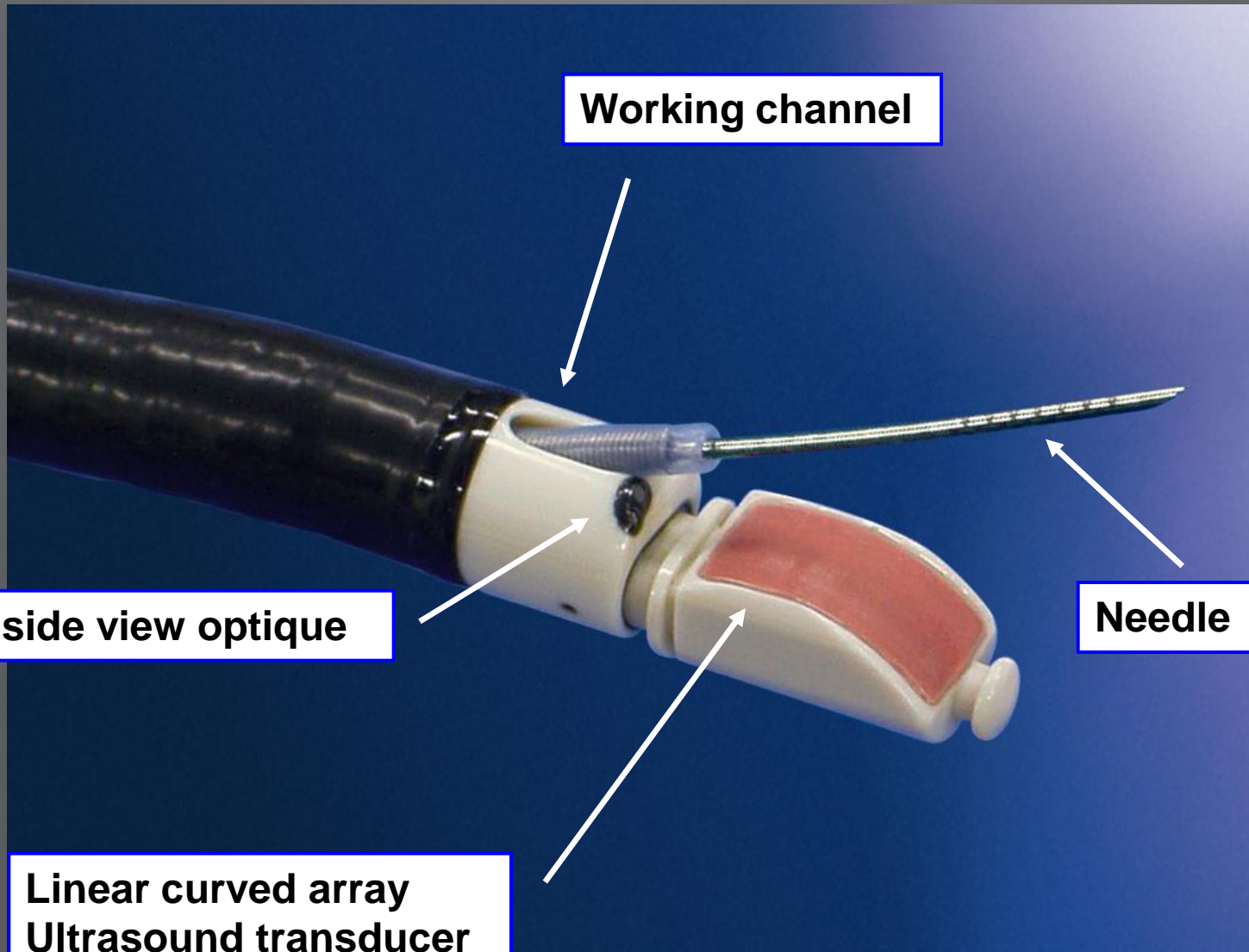
DGP 2010

LN > 1 cm

PET +







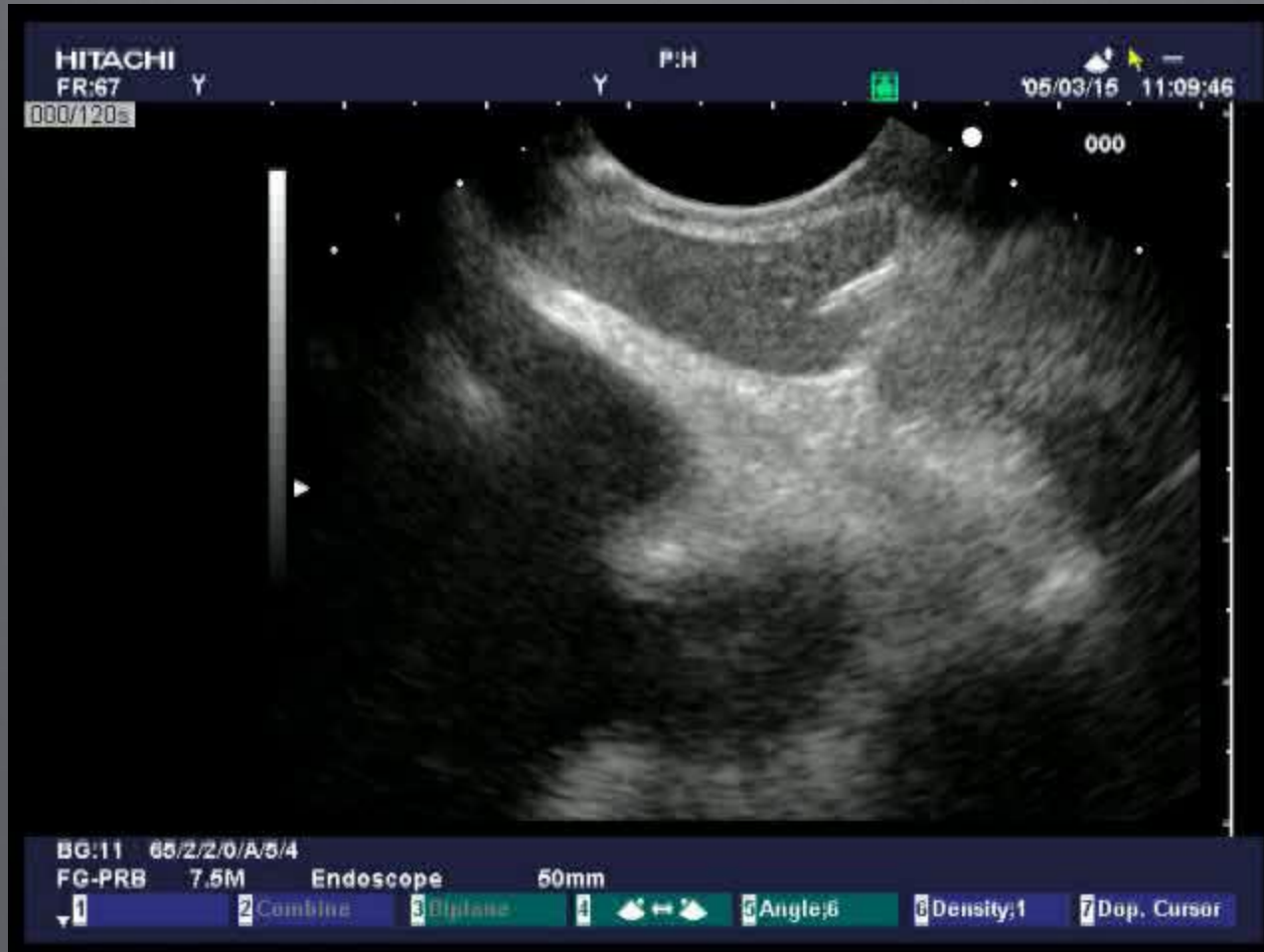
Working channel

Needle

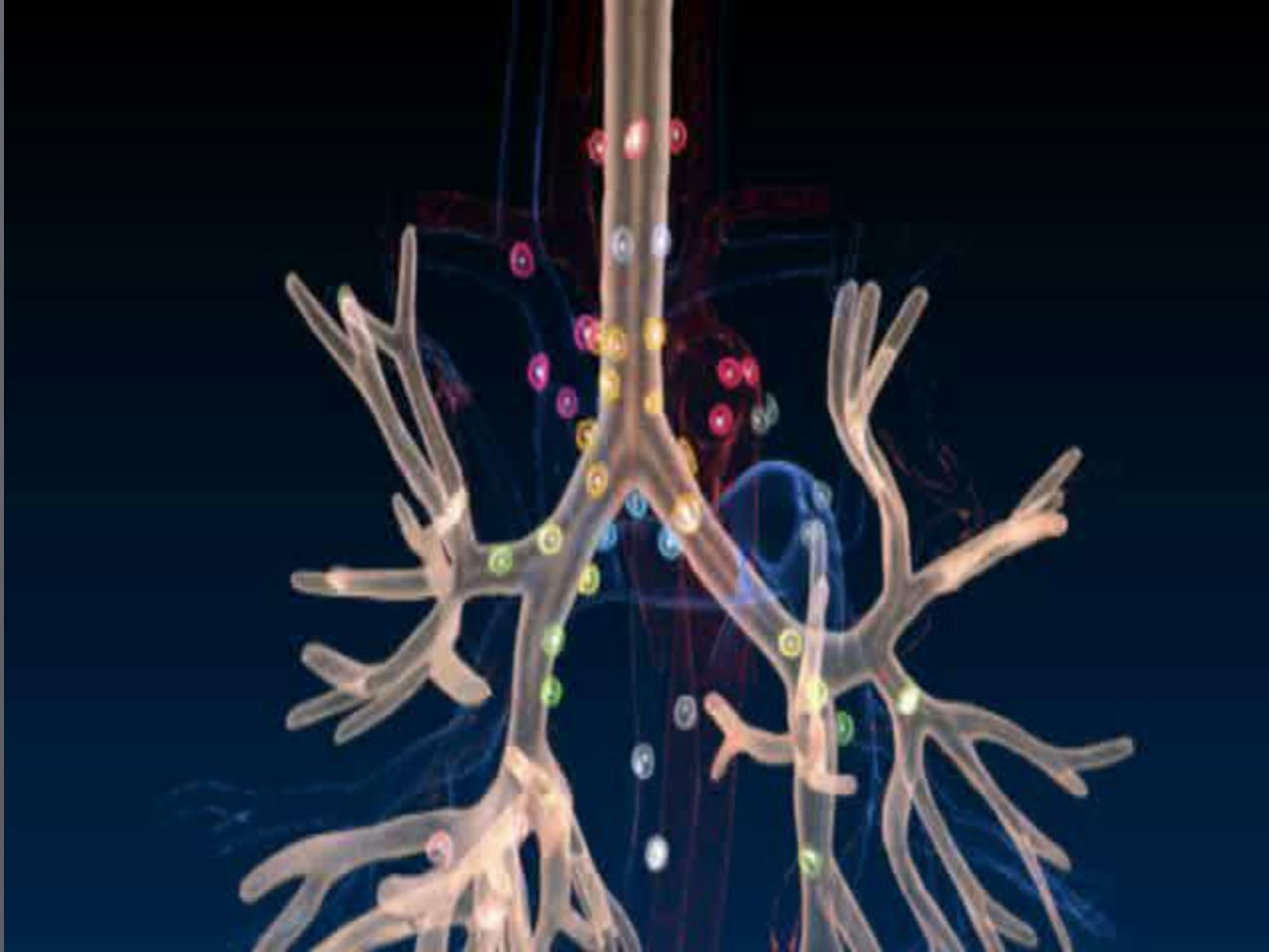
30° side view optique

**Linear curved array
Ultrasound transducer**

EUS

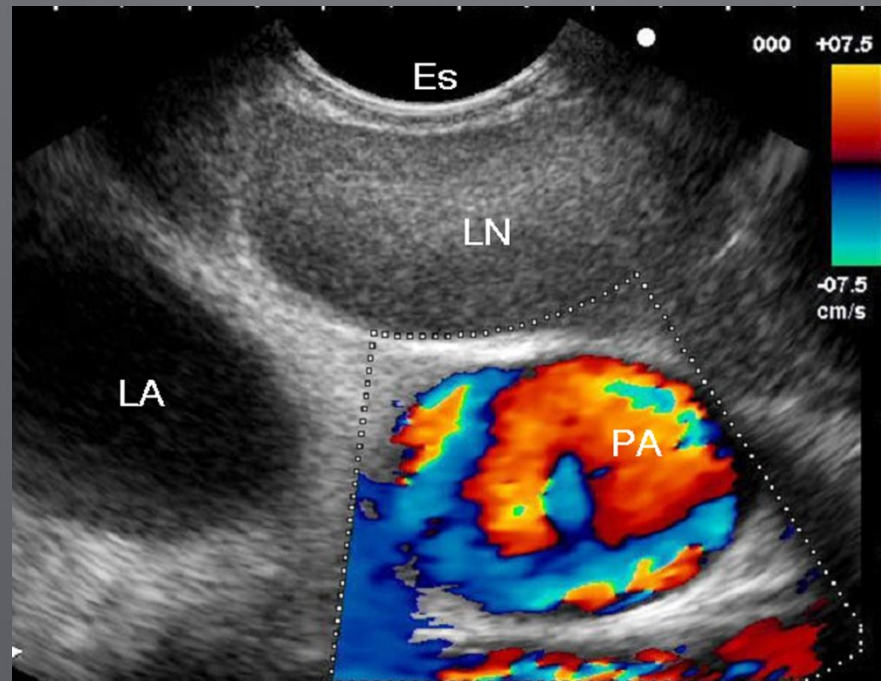


EBUS



EUS – FNA & lymphnodes

- **> 1 cm** **Sensitivity** **90 %**
 Specificity **97 %**



EBUS - Reviews/Metaanalysis

Effectiveness and safety of endobronchial ultrasound–transbronchial needle aspiration: a systematic review

L. Varela-Lema*, A. Fernández-Villar# and A. Ruano-Ravina*,†,‡



available at www.sciencedirect.com



journal homepage: www.ejconline.com



Endobronchial ultrasound-guided transbronchial needle aspiration for staging of lung cancer: A systematic review and meta-analysis

*Ping Gu, Yi-Zhuo Zhao, Li-Yan Jiang, Wei Zhang, Yu Xin, Bao-Hui Han**

Endobronchial ultrasound and transbronchial needle aspiration biopsy for mediastinal staging in patients with lung cancer: systematic review and meta-analysis

Katie Adams, Pallav Shah, Lyn Edmonds and Eric Lim

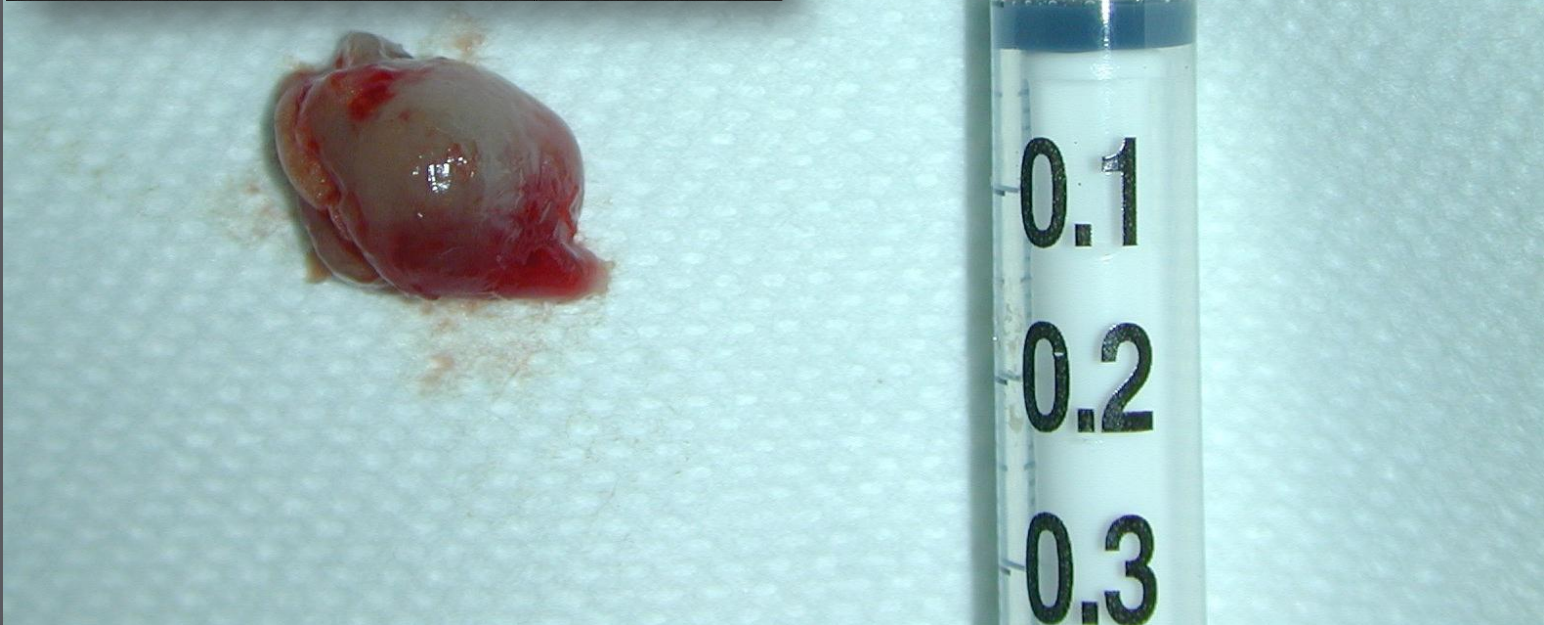
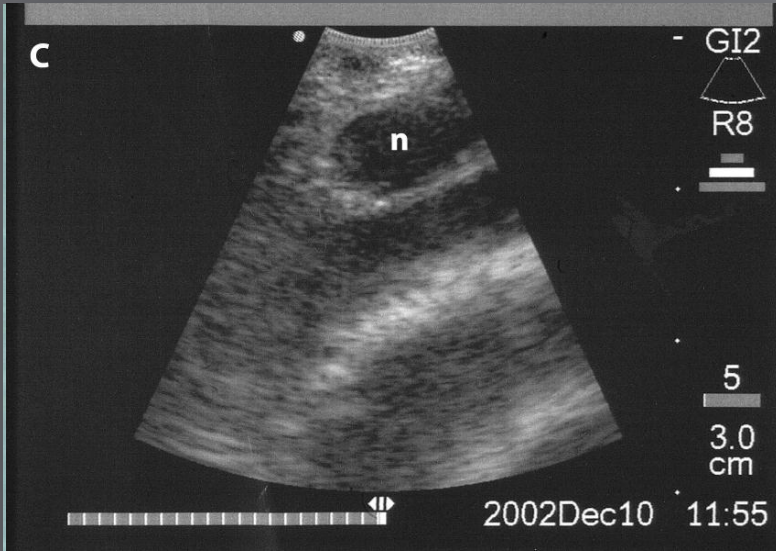
Thorax published online 18 May 2009;
doi:10.1136/thx.2008.109868



EBUS - TBNA & lymphnodes

Series	n	Prevalence of malignancy in the mediastinum (%)	Number of lymph nodes sampled	Lymph node size mm (range)	Diagnostic Yield (%)
Lee HS et al. ²⁰	102	32/102 (31)	163	(5-20)	100/102 (98)
Ernst A et al. ²³	66	59/66 (89)	120	15 ± 2.6	109/120 (91)
Herth F et al. ²⁶	100	21/100 (21)	119	8.1 ± 0.7 (4–10)	117/119 (98)
Herth F et al. ²⁷	100	9/100 (9)	156	7.9 ± 0.7 (5-10)	99/100 (99)
Kennedy MP et al. ³¹	25	11/25 (44)	49	(7-40)	24/25 (96)
Herth F et al. ⁴⁶	502	493/502 (98)	572	16 ± 3.6 (8–32)	470/502 (94)
Krasnik M et al. ⁵⁴	11	10/11 (91)	15	(7–80)	15/15 (100)
Yasufuku K et al. ⁵⁵ †	70	47/70 (67)	70	(≤ 30)	68/70 (97)
Rintoul RC et al. ⁵⁶	19	11/19 (58)	26	(6–20)	15/17 (88)
Yasufuku K et al. ⁵⁷	108	68/108 (63)	163	13 (8–30)	104/108 (96)
†35 overlap patients					
Yasufuku K et al. ⁵⁸	102	26/102 (25)	200	8.7 (5–22)	100/102 (98)
Szlubowski A et al. ⁵⁹	226	145/226 (64)	320	13.8 ± 9	210/226 (93)
Hwangbo B et al. ⁶⁰	117	30/117 (26)	223	(5-20)	114/117 (97)
Rintoul RC et al. ⁶¹	109	86/109 (77)	127	-	102/109 (95)
Vincent BD et al. ⁶²	113	100	167	-	112/113 (99)
Nakajima T et al. ⁶³	43	25/43 (58)	60	13.1 (3-35)	41/43 (95)





Inclusion: N 0 (CT)

- **13 % N2/N3**

Wallace et al., Ann Thorac Surg, 2004

- **19 % N2/N3**

LeBlanc et al., AJRCCM, 2005

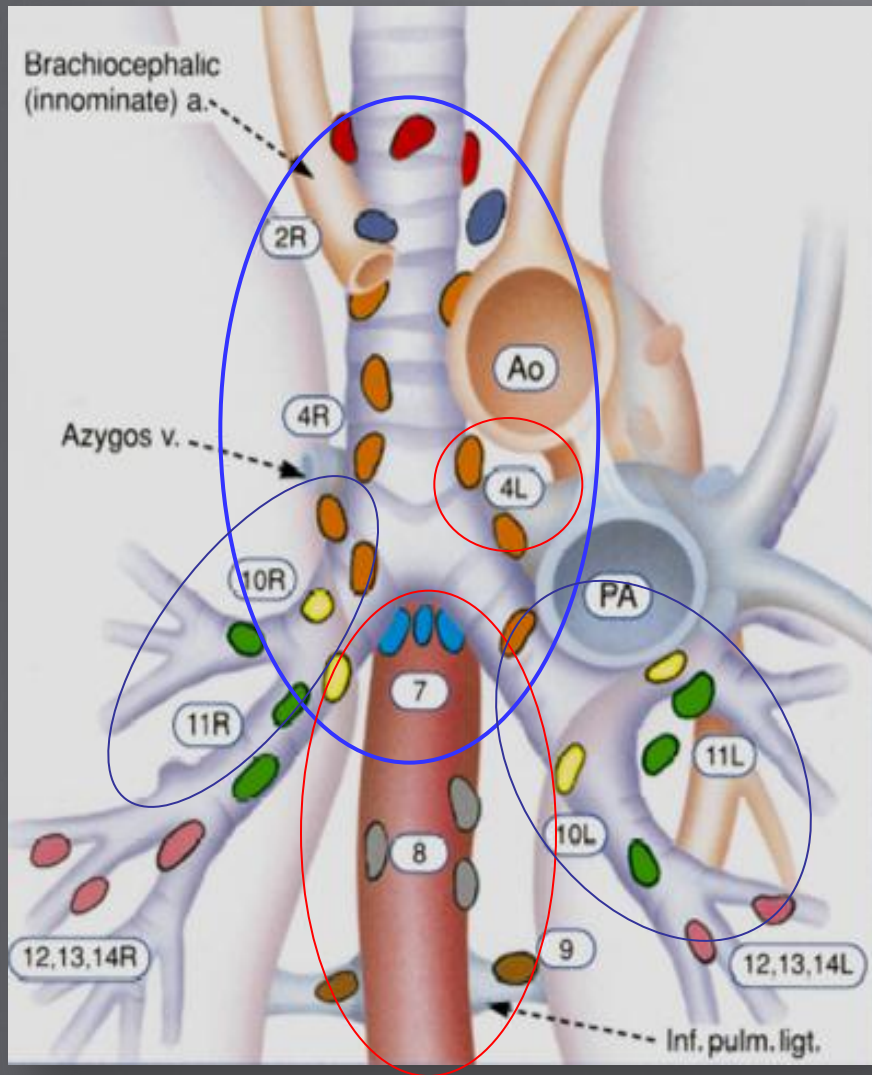
- **16 % N2/N3**

Herth et al, Eur Respir J, 2006

- **9 % N2/N3 (PET -)**

Herth et al, Chest, 2008





- Provide access to different areas of the mediastinum. In combination most mediastinal LNs can be sampled
- In six series the accuracy of EUS-FNA and EBUS-TBNA in combination for the diagnosis of mediastinal cancer was > 95%

EUS and EBUS – one scope

Sampling Approach	n=nodes sampled, (%)	Sensitivity for cancer detection (%)	Specificity for cancer detection (%)	Negative predictive value (%)
Esophageal	229 (37)	89	100	82
Endobronchial	390 (63)	91	100	92
Combined	619 (100)	96	100	96



EBUS – NPV

author	year	patients	Negative predictive value (%)
Nakajima	2008	35	94
Herth	2008	75	94
Groth	2008	46	94
Hwangbo	2009	117	96
Szlubowski	2009	226	92
Herth	2010	150	96
Hwangbo	2010	150	94



method	n	Sensitivity (%)	Specificity (%)	NPV (%)	Prevalence (%)
PET-CT	2865	74	85	94	29
MES	6505	78	100	89	39
EUS	1305	90	97	92	45
EBUS	2347	91	100	88	54
EUS/EBUS	621	96	100	95	51



EUS-FNA / EBUS-TBNA: Limitations

- **Center of excellence**
- **Needle size**
- **Training/ competence**
- **Reimbursement**
- **Implementation**
- **Data for molecular staging**



- **Safe and effective techniques**
- **minimal invasive**
- **Reduced numbers of invasive staging procedures**
- **increased use**
- **“First techniques into the mediastinum”**

