



Especialización en  
**Ultrasonografía  
Endoscópica Avanzada**

Título propio



# ECOENDOSCOPIA CON PUNCIÓN: MEDIASTINO

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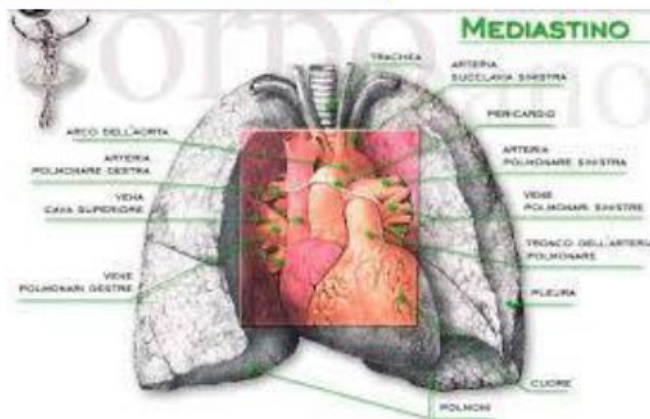
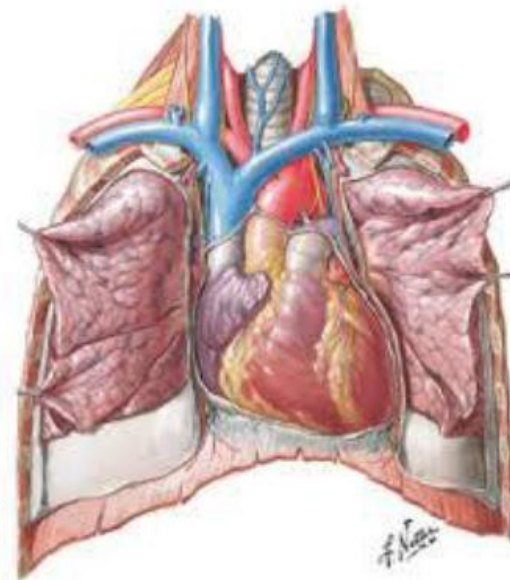
Hospital Universitario Ramón y Cajal. IRYCIS. Madrid.

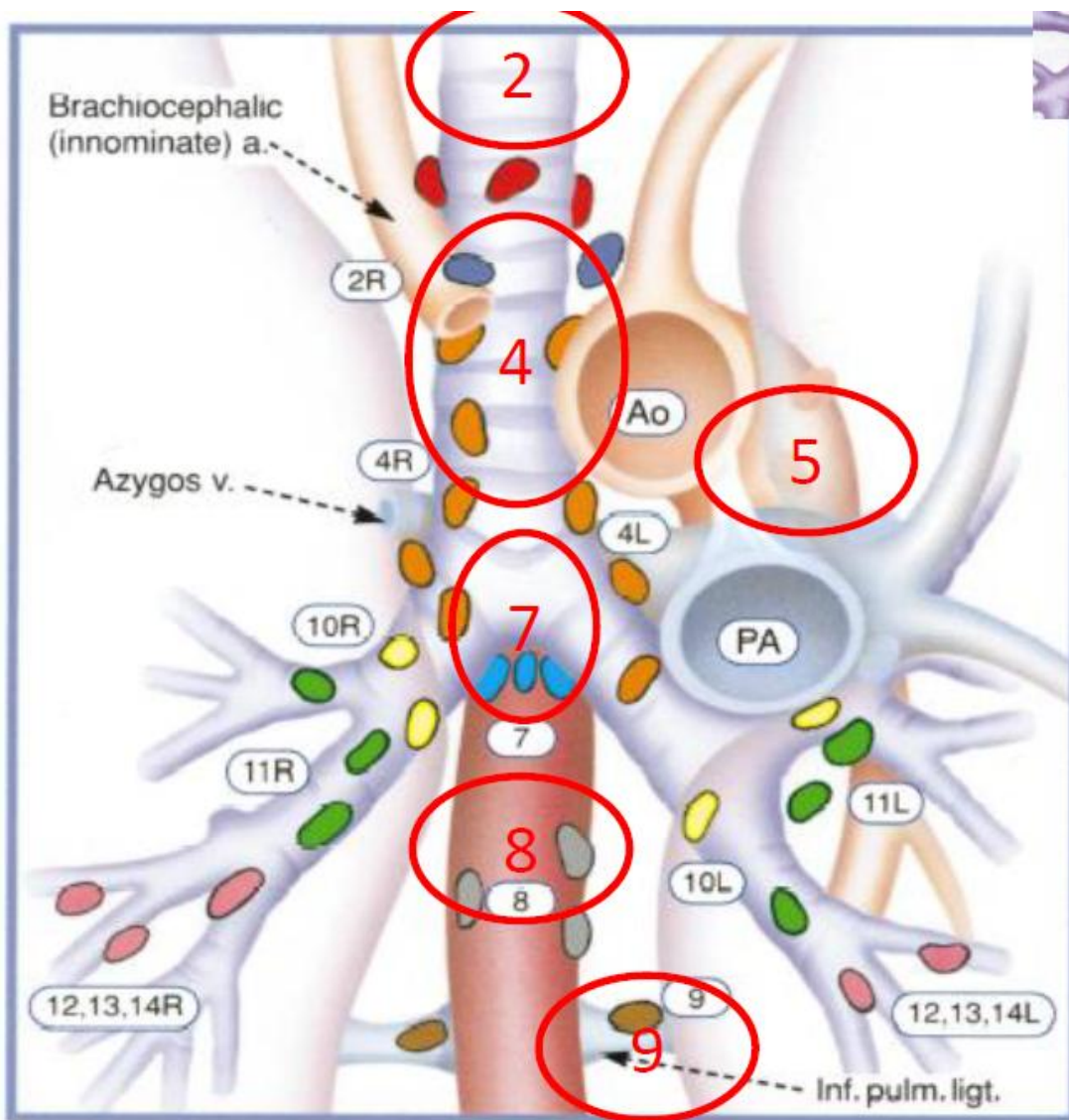
# Punción-Biopsia guiada por ecoendoscopia

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- **No** vamos a entrar en temas técnicos
  - Punto de vista del patólogo
  - Punto de vista el ecoendoscopista
- Que aportan y...cuando está indicada la USE con PAAF...BAAF

# Patología “Mediastínica”





**Accesible to stations:**

**2L, 4L, (5-6), 7, 8, 9**

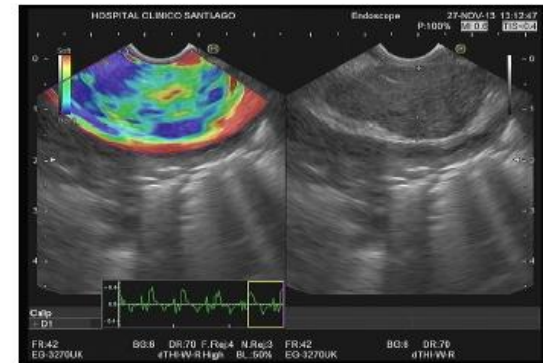
- + Left adrenal gland
- + Celiac trunk
- + Liver(LHL)

Mountain - Dressler 1997

# EUS-mediastinum

## Importance

- Periesophageal lesions
- Lymph nodes detection:
  - 3-4 mm
  - Sensitivity: 85-92%
- Allows histological evaluation
- Access to postero-inferior mediastinum:
  - Stations 2L, 4L, (5), (6), 7, 8, 9
- Low morbimortality : < 0.5%



Roberts et al; Thorax 2000  
Ferguson et al; Thorax 2002

# EUS in mediastinum

## Indications

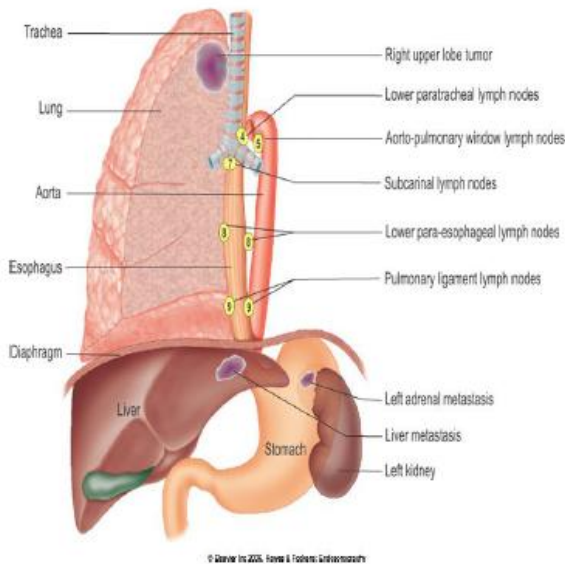
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- Diagnosis and staging of lung cancer
  - Non small cell lung cancer (NSCLC)
- Lymphoproliferative disorders
- Benign diseases
  - Sarcoidosis
  - Tuberculosis
  - Lymph nodes of unknown origin

Wildi et al. Thorax 2004

# Intrapulmonary tumors

## EUS-guided Biopsy



### PROSPECTIVE TRIAL (32 PATIENTS)

- PULMONARY MASSES WERE DETECTED IN 100%
- LUNG CANCER DIAGNOSIS → 97%

Anema, Lung Cancer 2005

# Intrapulmonary tumors

## EUS-guided Biopsy

### Mediastino. Literatura

[Diagn Ther Endosc.](#) 2013;2013:150492. doi: 10.1155/2013/150492. Epub 2013 May 30.

#### **Diagnostic yield and safety of endoscopic ultrasound guided fine needle aspiration of central mediastinal lung masses.**

[Vazquez-Sequeiros E<sup>1</sup>](#), [Lew MJ](#), [Van Domselaar M](#), [González-Panizo F](#), [Foruny-Olcina JR](#), [Boixeda-Miquel D](#), [Juzgado-Lucas D](#), [Albillos A](#).

#### **⊕ Author information**

#### **Abstract**

**Background and Aims.** EUS-FNA is an accurate and safe technique to biopsy mediastinal lymph nodes. However, there are few data pertaining to the role of EUS-FNA to biopsy central lung masses. The aim of the study was to assess the diagnostic yield and safety of EUS-FNA of indeterminate central mediastinal lung masses. **Methods.**

**DESIGN:** Retrospective review of a prospectively maintained database; noncomparative.

**SETTING:** Tertiary referral center. From 10/2004 to 12/2010, all patients with a lung mass located within proximity to the esophagus were referred for EUS-FNA.

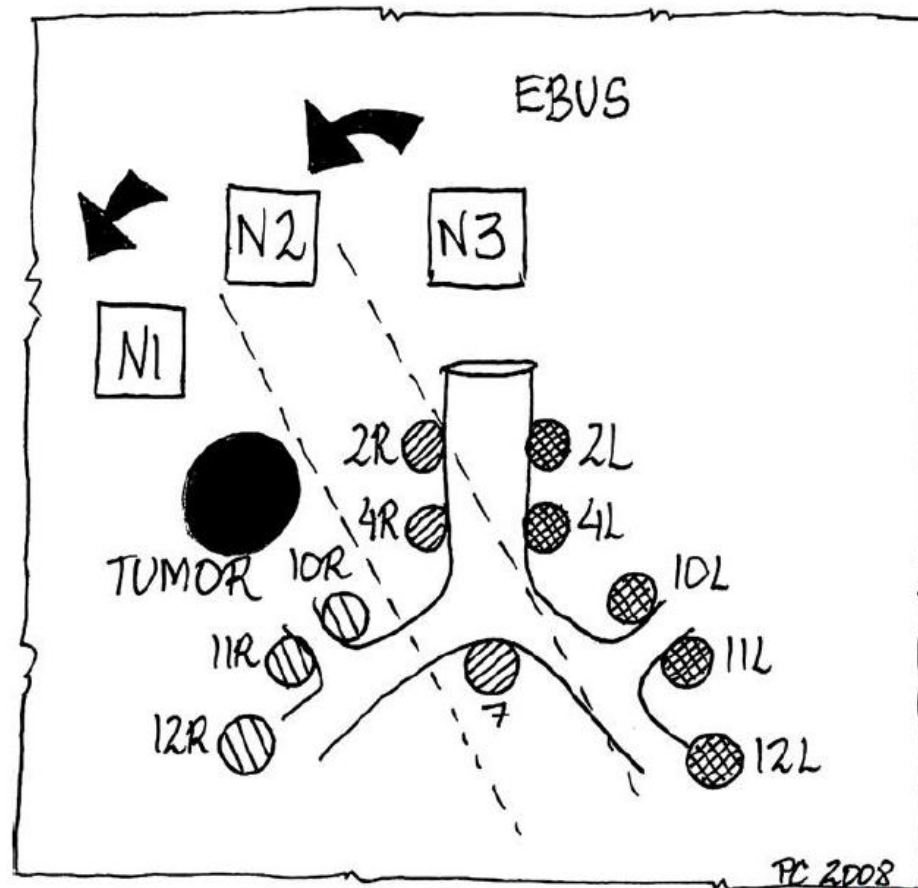
**MAIN OUTCOME MEASUREMENT:** EUS-FNA diagnostic accuracy and safety. **Results.** 73 consecutive patients were included. EUS allowed detection in 62 (85%) patients with lack of visualization prohibiting FNA in 11 patients. Among sampled lesions, one patient (1/62 = 1.6%) had a benign lung mass (hamartoma), while the remaining 61 patients (61/62 = 98.4%) had a malignant mass (primary lung cancer: 55/61 = 90%; lung metastasis: 6/61 = 10%). The sensitivity, specificity, and accuracy of EUS-FNA were 96.7%, 100%, and 96.7%, respectively. The sensitivity was 80.8% when considering nonvisualized masses. One patient developed a pneumothorax (1/62 = 1.6%). **Conclusions.** EUS-FNA appears to be an accurate and safe technique for tissue diagnosis of central mediastinal lung masses.



# EUS - Mediastinal staging

## Clinical routine use

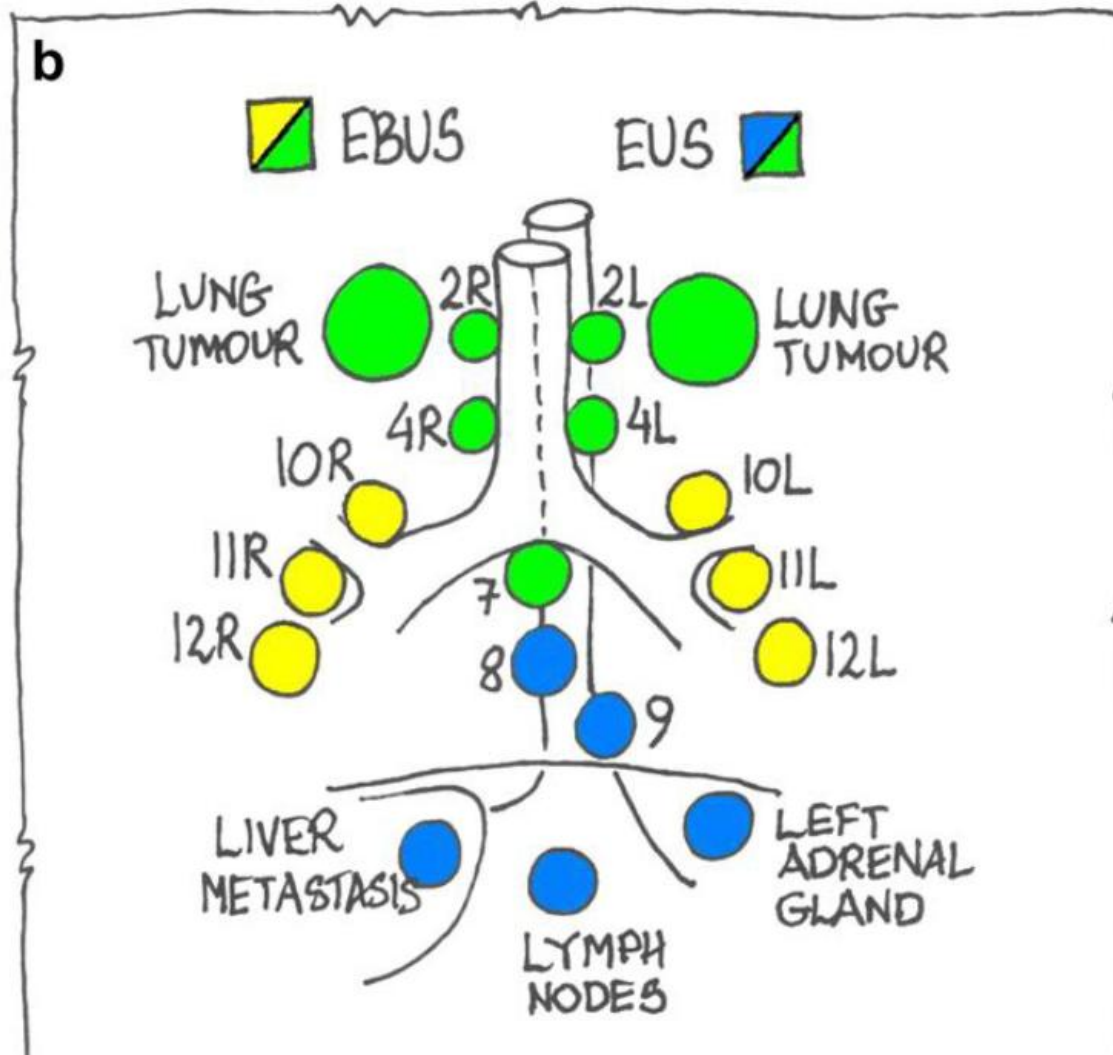
N pulmón y adp



Vilman P, Best Pract 2009

# EUS - Mediastinal staging

## Clinical routine use



### Combinación EUS y EBUS –FNA.



The distal ends of the ultrasound bronchoscope (Olympus XBF-UC40P) and the ultrasound gastroscop (Olympus GF-UCT160-OL5)

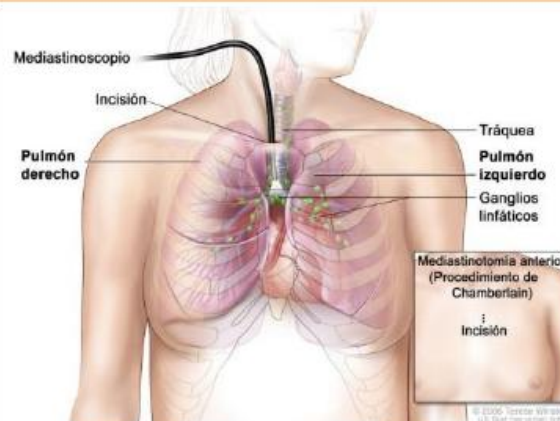
Vilmann, Best Pract Res  
Clin Gastro, 2009

# EUS - Mediastinal staging

## Clinical routine use

### OUTCOMES:

- Sensitivity, PNV and diagnostic accuracy
  - ✓ Lymph node metastasis accesible to EUS-FNA
  - ✓ EUS-FNA + mediastinoscopy
  - ✓ EUS-FNA as the unique method performed
- Surgery procedures avoided



# EUS–FNA for mediastinal staging in lung cancer as routine

## ✓ 152 PATIENTS WITH RESECTABLE LUNG CANCER

- EUS-FNA as first procedure
- Independently of the presence of lymph nodes in CT scan
- In negative N2/N3 cases

|                                | SENSITIVITY | PNV | DIAGNOSTIC ACCURACY |
|--------------------------------|-------------|-----|---------------------|
| Overall                        | 74%         | 73% | 85%                 |
| EUS-FNA in accessible stations | 80%         | 78% | 88%                 |
| EUS-FNA + mediastinoscopy      | 92%         | 85% | 95%                 |

Surgical procedures avoided in 39% cases

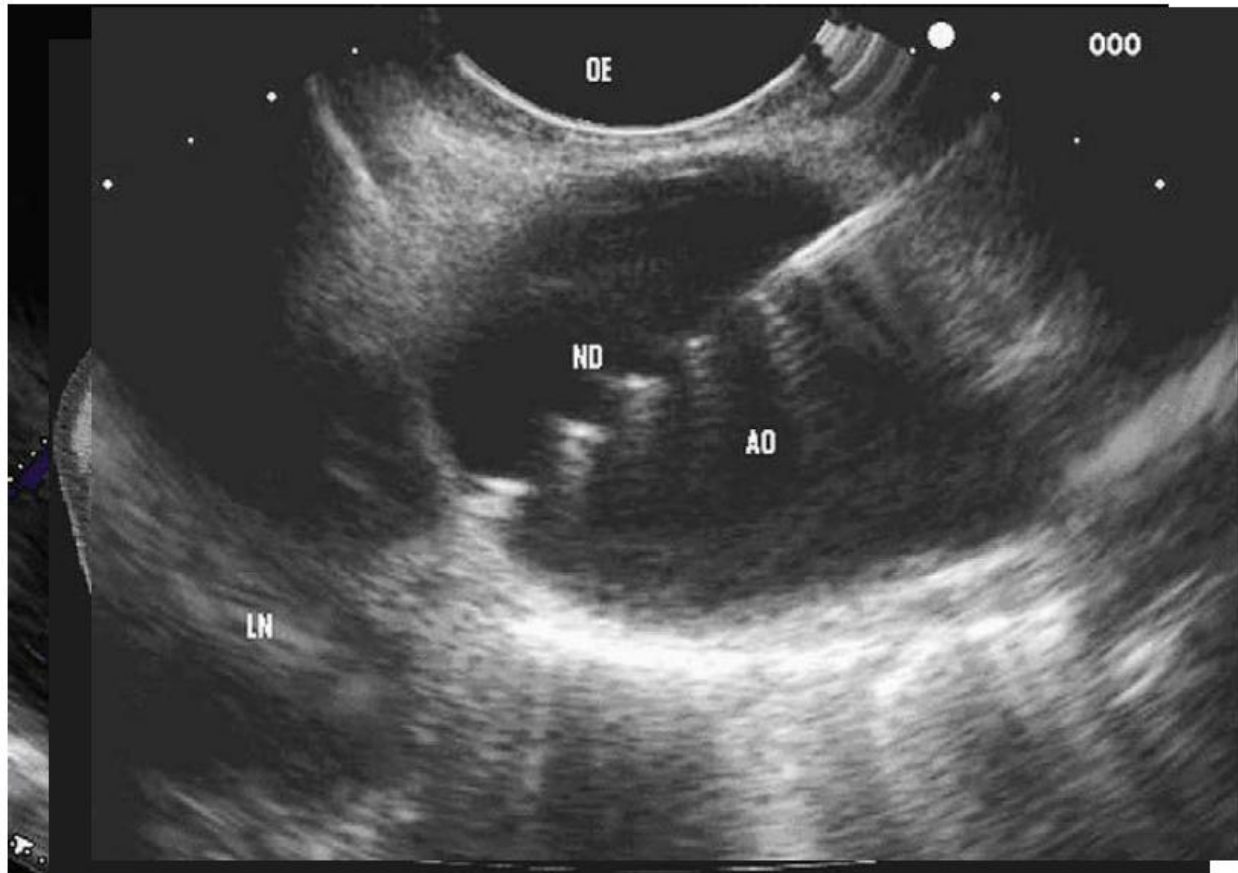
Annema et al; Lung Cancer 2010

## USE en pacientes TC negativos

- **Detección de ganglios por USE en**
  - 10 de 24 TC-negativos (**42%**). [Fritscher-Ravens. AmJ RepirCritCare 2003](#)
  - 4 de 18 TC-negativos (**22%**). [Fritscher-Ravens. Chest 2003](#)
  - 4 (N2) de 47 TC negativos (**11%**). [Fernandez-Esparrach. Lung Cancer 2006](#)
- **Estudio USE- PAAF en 69 NSCLC y ganglios < 1 cm tamaño por TC**
  - **S 61% y 98%** en la detección de cáncer pulmón avanzado por USE-PAAF
  - Detección de un **25%** de enfermedad avanzada con TC negativo (17 de 69: 9/N2-3 i 1/T4)

[Wallace. Ann Thorac Surg 2004](#)

# Transaortic EUS-FNA in diagnosis of lung tumors and LN: *V Bartheld, GIE 2009*



EUS image from the esophagus, lymph node station 6 located lateral to the aorta. Doppler flow is seen in the aorta

# Transaortic EUS-FNA in diagnosis of lung tumors and LN: V Bartheld, GIE 2009

von Bartheld et al

Transaortic EUS-guided FNA

**TABLE 1. Patient characteristics, EUS-FNA findings, and follow-up**

| Case no. | Sex/age (y) | Mass    | EUS cytology of mass      | Short axis of mass (mm) | Final diagnosis of the mass |
|----------|-------------|---------|---------------------------|-------------------------|-----------------------------|
| 1        | F/52        | LLL     | NSCLC                     | 20                      | NSCLC*                      |
| 2        | M/77        | Node 6  | Reactive nodal tissue     | 10                      | NSCLC†                      |
| 3        | F/49        | LUL     | Adenocarcinoma            | 20                      | Adenocarcinoma†             |
| 4        | M/72        | Node 6  | Erythrocytes              | 20                      | Information not available   |
| 5        | F/66        | Node 5  | NSCLC                     | 15                      | NSCLC*                      |
| 6        | M/75        | LUL     | NSCLC                     | 46                      | NSCLC*                      |
| 7        | M/71        | LLL     | NSCLC                     | 40                      | Squamous carcinoma†         |
| 8        | F/51        | LLL     | Lytic material            | 26                      | Adenocarcinoma†             |
| 9        | F/65        | LUL     | SCLC                      | 13                      | SCLC*                       |
| 10       | F/52        | Node 6  | Squamous epithelial cells | 14                      | Information not available   |
| 11       | F/63        | LLL     | NSCLC                     | 35                      | Adenocarcinoma†             |
| 12       | F/49        | LUL     | Erythrocytes              | 15                      | Renal-cell carcinoma†       |
| 13       | F/51        | Lingula | NSCLC                     | 25                      | NSCLC*                      |
| 14       | M/57        | Node 5  | NSCLC                     | 20                      | NSCLC*                      |

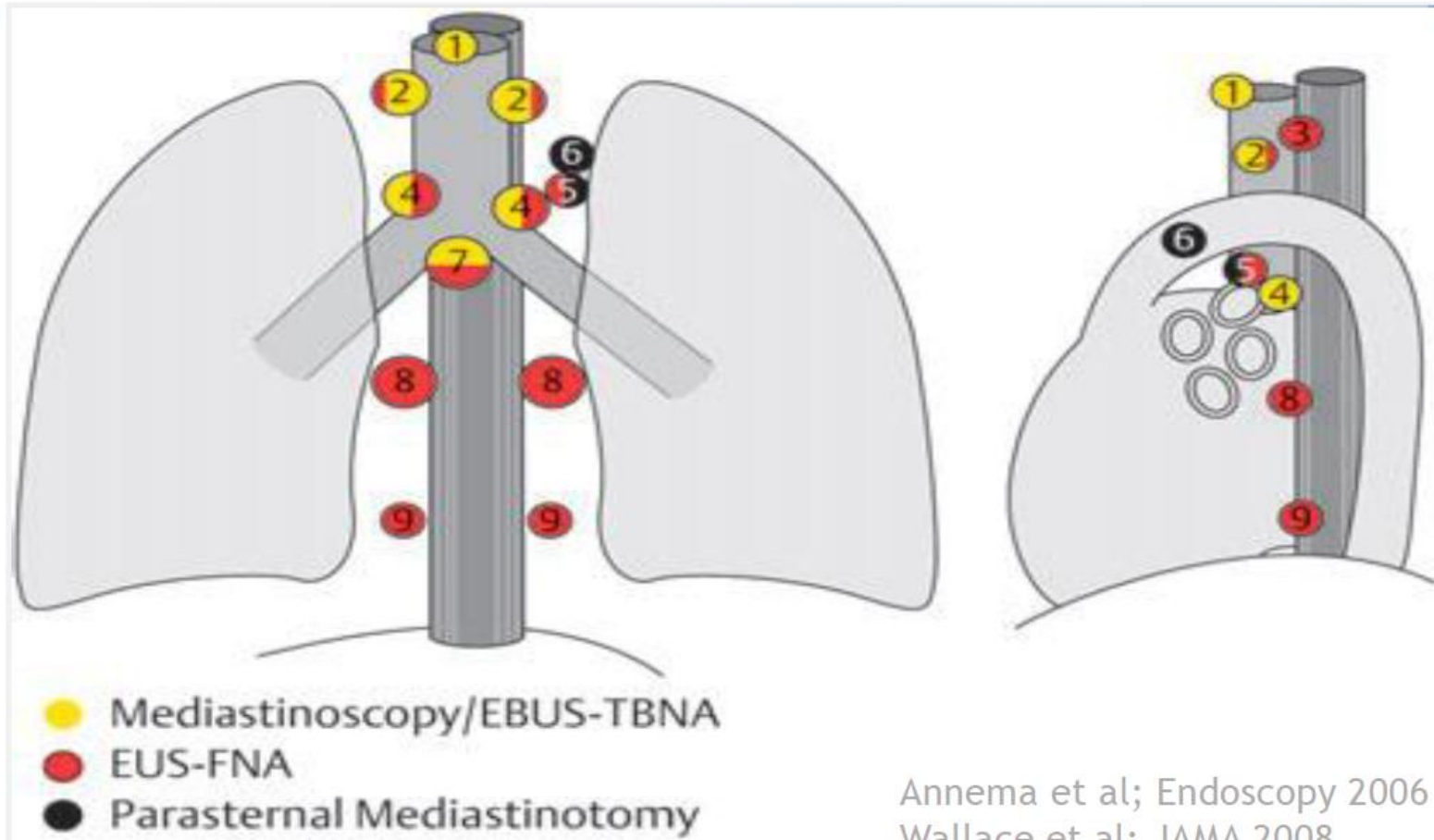
LLL, Left lower lobe; LUL, left upper lobe.

\*Based on cytology EUS, no further surgical confirmation.

†Confirmative surgical pathology of mass biopsied on EUS.

# Mediastinal staging in lung cancer

## Combined approach

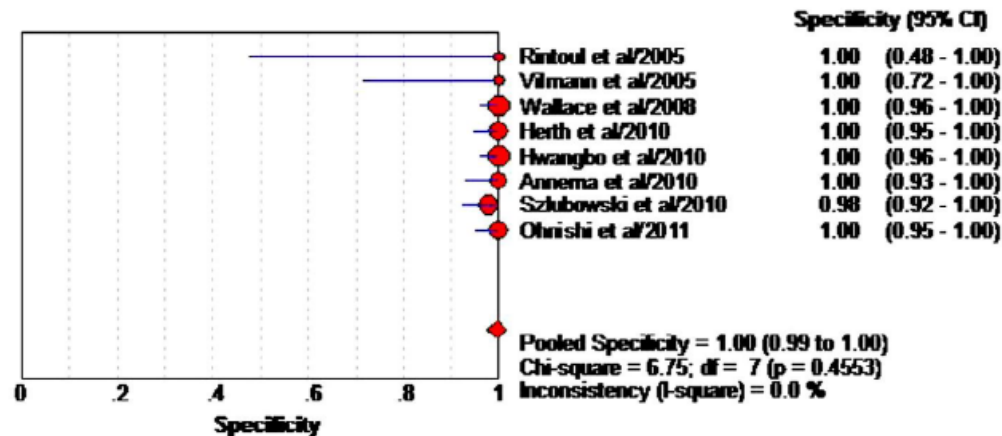
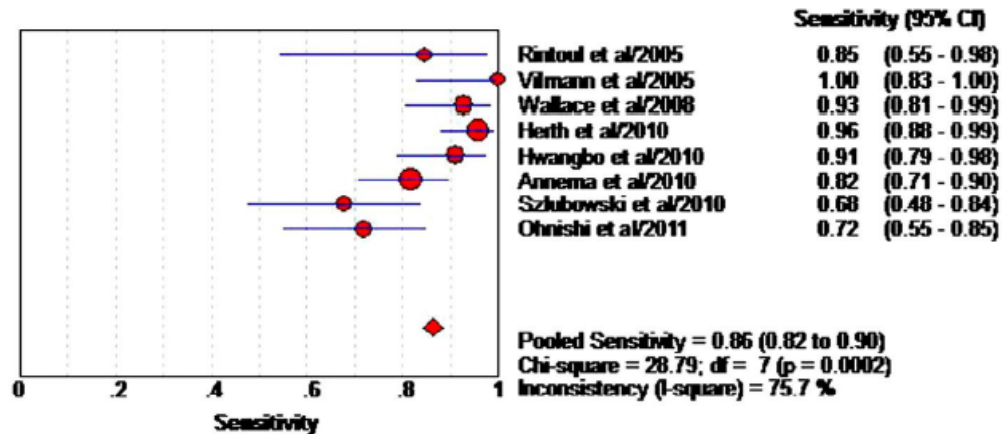


Annema et al; Endoscopy 2006  
Wallace et al; JAMA 2008



# Mediastinal staging in lung cancer

## Combined approach



Zhang et al; Eur J Cancer 2013

**Combined endobronchial and esophageal endosonography for the diagnosis and staging of lung cancer: European Society of Gastrointestinal Endoscopy (ESGE) Guideline, in cooperation with the European Respiratory Society (ERS) and the European Society of Thoracic Surgeons (ESTS)**



**Authors**

Peter Vilmann<sup>1</sup>, Paul Frost Clementsen<sup>2,11</sup>, Sara Colella<sup>2</sup>, Mette Siemsen<sup>3</sup>, Paul De Leyn<sup>4</sup>, Jean-Marc Dumouceau<sup>5</sup>, Felix J. Herth<sup>6</sup>, Alberto Larghi<sup>7</sup>, Enrique Vazquez-Sequeiros<sup>8</sup>, Cesare Hassan<sup>9</sup>, Laurence Crombag<sup>9</sup>, Daniel A. Korevaar<sup>10</sup>, Lars Konge<sup>11</sup>, Jouke T. Annema<sup>9</sup>

**Institutions**

Institutions are listed at end of article.

**1.** For mediastinal nodal staging in patients with suspected or proven non-small-cell lung cancer (NSCLC) with abnormal mediastinal and/or hilar nodes at computed tomography (CT) and/or positron emission tomography (PET), endosonography is recommended over surgical staging as the initial procedure (Recommendation grade A).

The combination of endobronchial ultrasound with real-time guided trans-bronchial needle aspiration (EBUS-TBNA) and endoscopic (esophageal) ultrasound with fine needle aspiration, with use of a gastrointestinal (EUS-FNA) or EBUS (EUS-B-FNA) scope is preferred over either test alone (Recommendation grade C). If the combination of EBUS and EUS-(B) is not available, we suggest that EBUS alone is acceptable (Recommendation grade C).

Subsequent surgical staging is recommended, when endosonography does not show malignant nodal involvement (Recommendation grade B).

# EUS – lung cancer metastasis Left adrenal gland



# EUS – lung cancer metastasis

## Left adrenal gland

|         | SENSITIVITY | PNV |
|---------|-------------|-----|
| EUS-FNA | 86%         | 70% |

EUS-FNA is an accurate, safe and of choice technique for the evaluation of adrenal nodules/masses in the context of a lung cancer

Schuurbiers et al; Lung Cancer 2011

POINT OF VIEW

## The role of endoscopic ultrasound guided fine needle aspiration (EUS-FNA) in non small cell lung cancer (NSCLC) patients: SEED-SEPD-AEG Joint Guideline

Enrique Vázquez-Sequeiros<sup>1</sup>, Fernando González-Panizo Tamargo<sup>2</sup>, Ángel Barturen<sup>3</sup>, Ángel Calderón<sup>4</sup>, José Miguel Esteban<sup>5</sup>, Gloria Fernández-Esparrach<sup>6</sup>, Antonio Gimeno-García<sup>7</sup>, Angels Ginés<sup>6</sup>, José Lariño<sup>8</sup>, Mercedes Pérez-Carreras<sup>9</sup>, Rafael Romero<sup>10</sup>, José Carlos Subtil<sup>11</sup> and Juan Vila<sup>12</sup>

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# EUS-FNA in mediastinum

## Lymphoproliferative diseases

**Table 1.** Final diagnoses of 240 patients suspected with lymphoma who underwent EUS-FNAB at our institution between June 2005 and December 2010

|                          | Final diagnoses (n) |
|--------------------------|---------------------|
| Lymphoma                 | 152                 |
| Metastasis               | 11                  |
| <i>Benign/others</i>     | 77                  |
| Sarcoidosis              | 40                  |
| Tuberculosis             | 2                   |
| Non-specific             | 31                  |
| Retroperitoneal fibrosis | 2                   |
| Neurogenic tumor         | 1                   |
| Paraganglioma            | 1                   |

EUS-FNAB, endoscopic ultrasound-guided fine needle aspiration biopsy.

19-G

Yasuda et al; Am J Gastroenterol 2012

# EUS-FNA in mediastinum Lymphoproliferative diseases

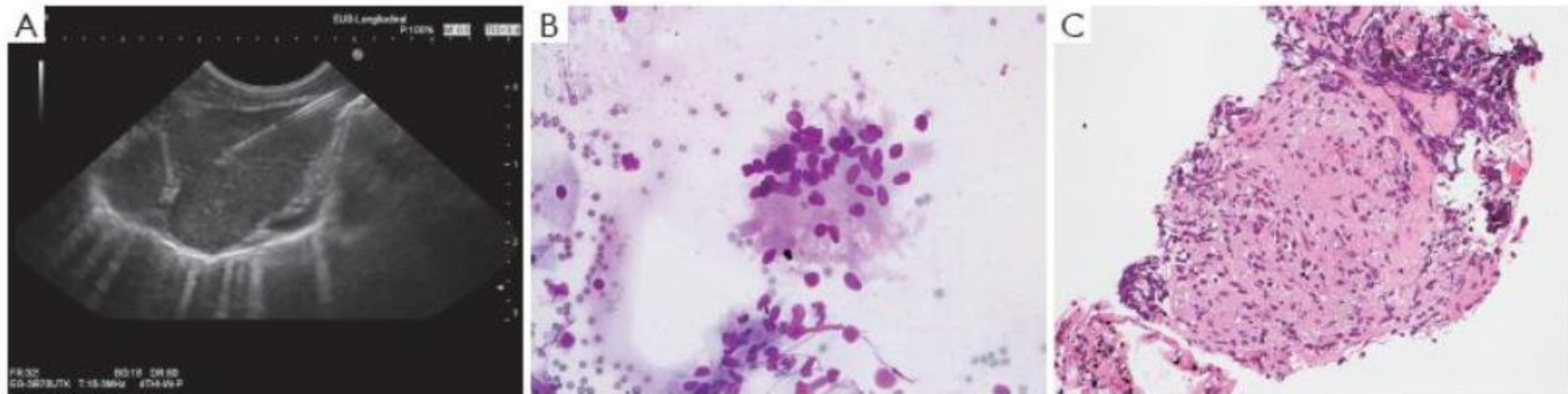
| DIAGNOSTIC SENSITIVITY |        |
|------------------------|--------|
| CITOLOGY               | 52 %   |
| HISTOLOGY              | 93.4 % |
| FLOW CYTOMETRY         | 79.6 % |
| CYTOGENETIC            | 13.8 % |

**HISTOLOGY + FLOW CYTOMETRY 96.7%**

**SUBCLASSIFICATION (WHO) 88.8%**

Yasuda et al; Am J Gastroenterol 2012

## Mediastino: imágenes



**Figure 8** EUS-FNA using a 22 Gauge-aspiration needle of large hypo-echoic mediastinal lymph nodes (station 7) in 50-year-old women with dry cough (A). Smear cytology (May-Gruenwald-Giemsa,  $\times 200$ ) shows groups of epithelioid cells (B), histology (hematoxylin-eosin,  $\times 200$ ) demonstrates typical epithelioid granuloma without necrosis and with some multinuclear giant cells (C). Clinical diagnosis was sarcoidosis. Cytological and histologic images: courtesy Dr. S. Wagner, Königs Wusterhausen, Germany. EUS-FNA, endoscopic ultrasound fine needle aspiration.

## Sarcoidosis

Jenssen C, J Thor Dis 2015



# EUS-FNA in mediastinum Sarcoidosis

| DIAGNOSTIC ACCURACY OF EUS-FNA FOR SARCOIDOSIS |      |          |                 |                 |
|------------------------------------------------|------|----------|-----------------|-----------------|
| Reference                                      | Year | <i>n</i> | Sensitivity (%) | Specificity (%) |
| Fritscher-Ravens et al. <sup>31</sup>          | 2000 | 19       | 100             | 94              |
| Wildi et al. <sup>33</sup>                     | 2004 | 28       | 89              | 96              |
| Annema et al. <sup>32</sup>                    | 2005 | 50       | 82              | –               |
| Overall                                        |      |          | 90              | 95              |

©Elsevier Inc 2006. Hawas & Fockens: Endosonography

EUS-FNA is useful for the diagnosis of sarcoidosis

Fritscher-Ravens et al. Chest 2000  
Wildi et al. Thorax 2004

# EUS-FNA (22G) in mediastinum

## Diagnosis of Sarcoidosis

| Needle passes | Patients receiving this needles passes (n) | Patient in whom this needle passes showed granulomas | Cumulative sensitivity in detecting granulomas |
|---------------|--------------------------------------------|------------------------------------------------------|------------------------------------------------|
| 1st           | 91                                         | 50                                                   | 55%                                            |
| 2nd           | 91                                         | 20                                                   | 77%                                            |
| 3rd           | 79                                         | 3                                                    | 80%                                            |
| 4th           | 54                                         | 5                                                    | 86%                                            |
| 5th           | 26                                         | 0                                                    | 86%                                            |
| 6th           | 9                                          | 0                                                    | 86%                                            |
| 7th           | 4                                          | 1                                                    | 87%                                            |

For an optimal yield 4 needle passes are required

Von Bartheld et al; Endoscopy 2010

# EUS-FNA in mediastinum

## Sarcoidosis....careful!!

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- 252 patients with sarcoidosis
  - 5 developed mediastinal abscess (2%)
- Suggestions
  - Antibiotic prophylaxis should be considered
  - Avoid hypoechoic areas within the node
  - Rinsing the oral cavity with antiseptic

**BE AWARE AFTER DOING EUS-FNA!!**

Von Bartheld et al. Endoscopy 2012

# EUS-FNA in granulomatous disease

## Tuberculosis vs sarcoidosis

|                         | SENSITIVITY | SPECIFICITY | PPV  | NPV  |
|-------------------------|-------------|-------------|------|------|
| TUBERCULOSIS            | 86%         | 100%        | 100% | 91%  |
| SARCOIDOSIS             | 100%        | 93%         | 91%  | 100% |
| CULTURE<br>TUBERCULOSIS | 71%         | 100%        | 100% | 84%  |

EUS-FNA provided definitive diagnosis in 89%

- ✓ Non caseating granulomas not enough for diagnosis sarcoidosis
- ✓ If tuberculosis is suspected: send for culture

Fritscher-Ravens et al; Endoscopy 2011

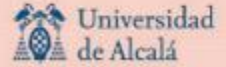
# Take-home messages EUS-guided FNA "Thorax"

- Increasing role (with EBUS) in lung cancer
  - Cytohistological diagnosis of pulmonary central tumors
  - Mediastinal staging
  - Distant metastasis
- Diagnosis and characterization of lymphomas
  - (19 G needles... histological needles...)
- Granulomatous disease (sarcoidosis Vs TB) and in diagnosis lymph node of unknown origin



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