Training in thoracic endosonography in the era of competence and accreditation

28th Panhellenic Thoracic Congress 13th December 2019

Dr. Peter I. Bonta, pulmonologist Amsterdam University Medical Center, The Netherlands

p.i.bonta@amsterdamumc.nl

Disclosures

Boston Scientific research grant / institutional lectures

Mauna Kea research grant

St-Jude Medical research grant

Olympus research grant

Pentax / Hitcachi / Cook / Cobra course support

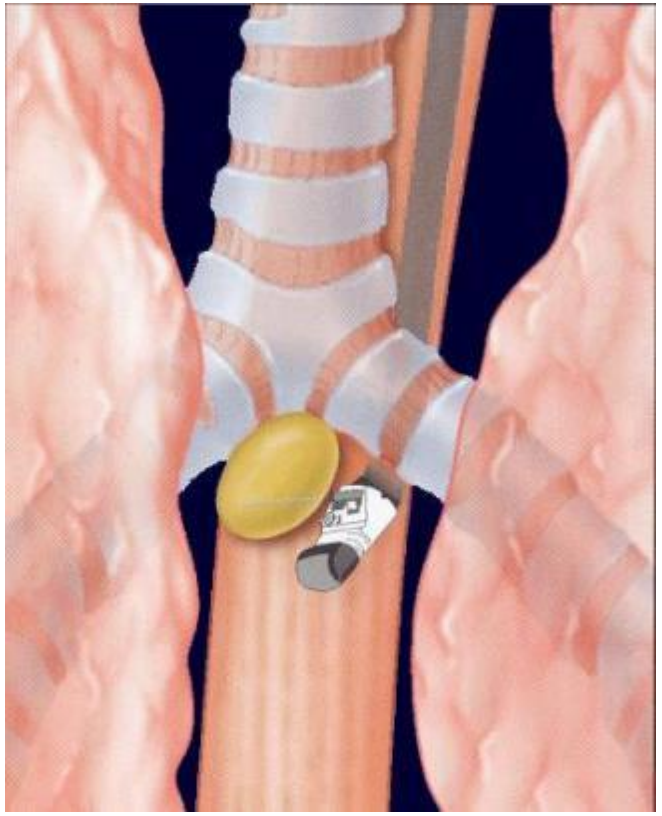
Nuvaira

Dutch National Research for Health ZonMw (grants)

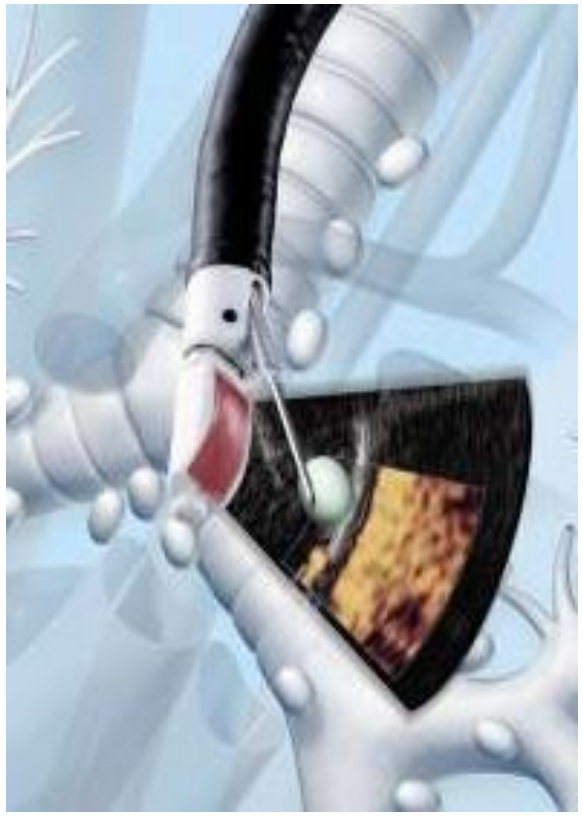
Dutch Lung Foundation (grant)

Skills are important for the pulmonologist

1966



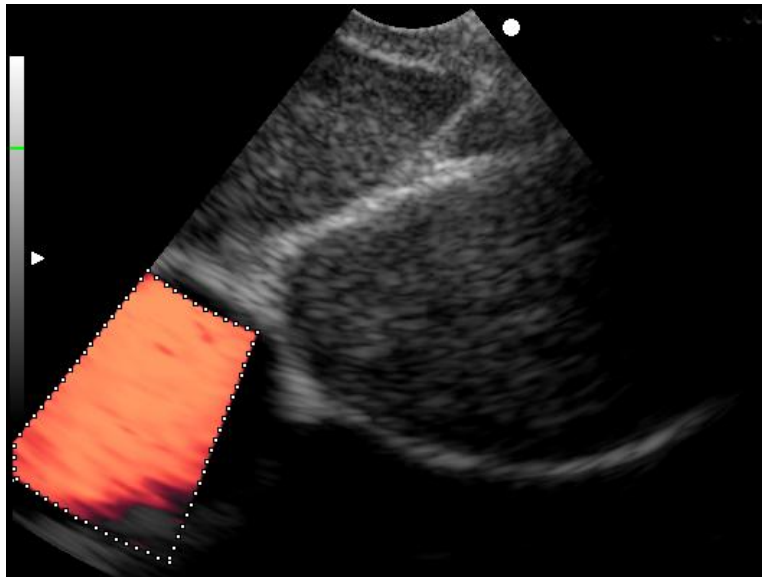
1993



2003

Minimal invasive endosonography practice changer

- Lung cancer
  - Tumor, lymph nodes, metastases incl LAG
- Sarcoidosis
- Tuberculosis
- Mediastinal metastases (extra)thoracic tumors
- Lymphoma
- Cysts

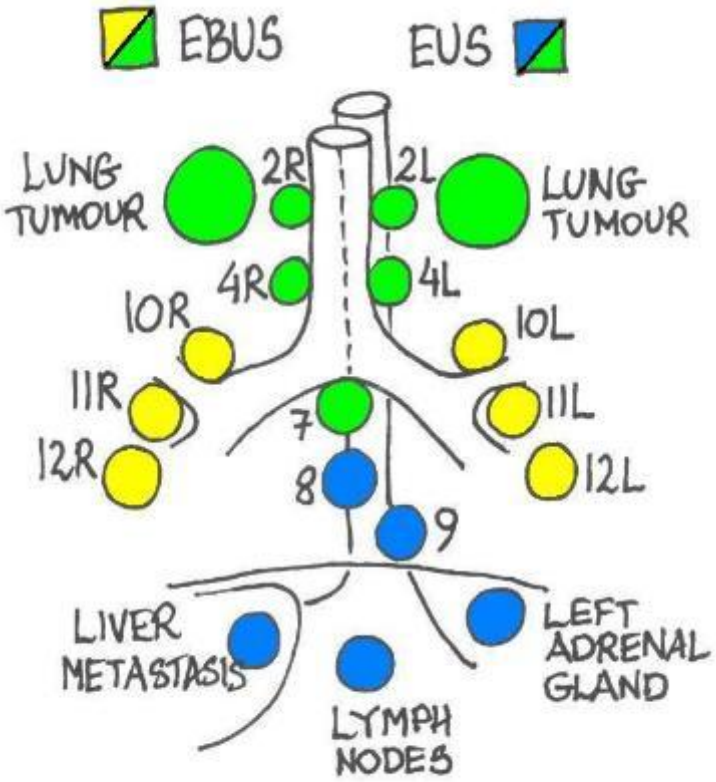


Endosonography in Lung Cancer: EBUS – EUS(B)

Endobronchial ultrasound (EBUS)

Esophageal ultrasound (EUS)
with EBUS scope (EUS-B)

Concept of "Complete E(B)US staging"



Courtesy P.F. Clementsen

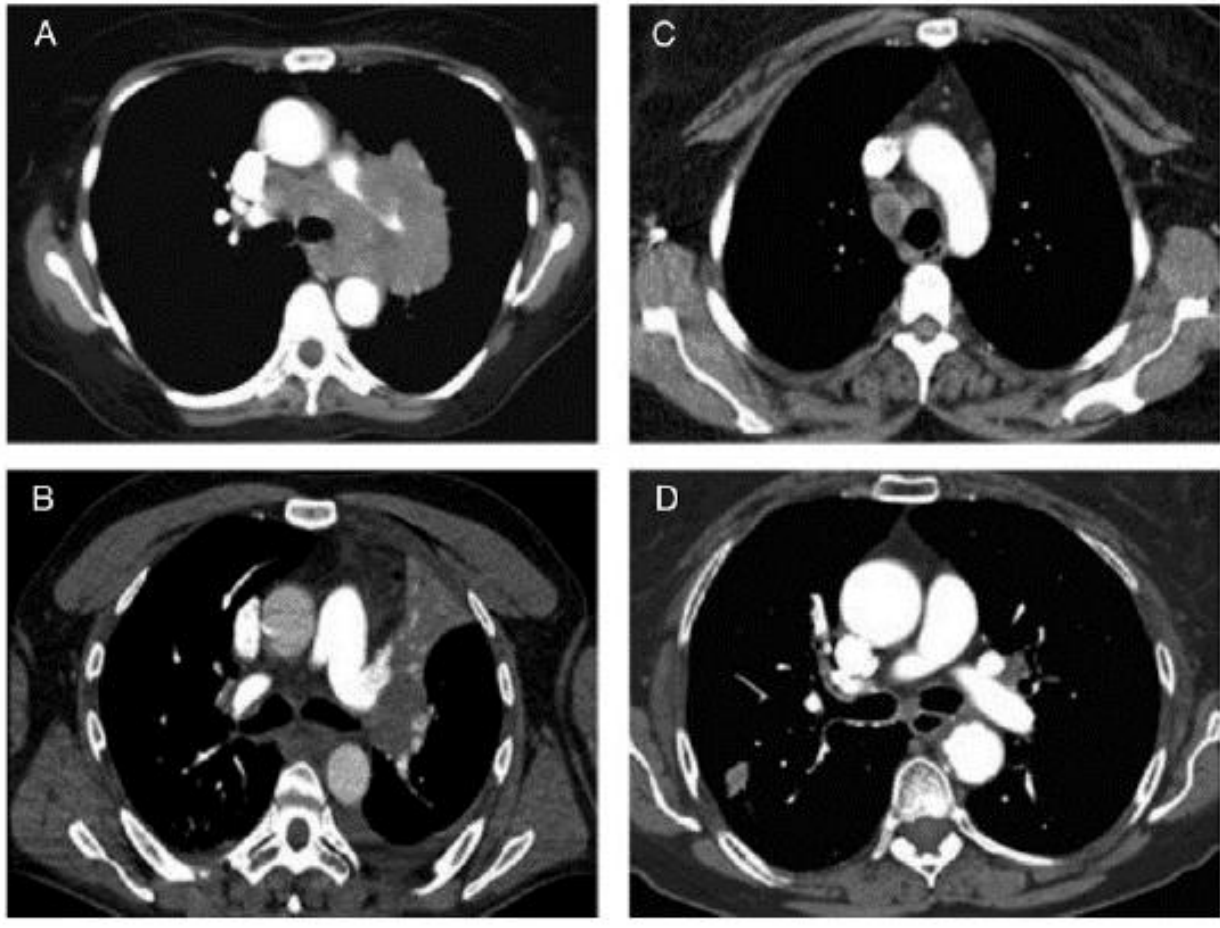
EBUS/EUS(B) in Lung Cancer

Correct diagnosis

(subtyping/ molecular diagnostics)

Optimal staging (correct cTNM)

Patients: single endoscopy session



JAMA®
Online article and related content current as of November 29, 2010.

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

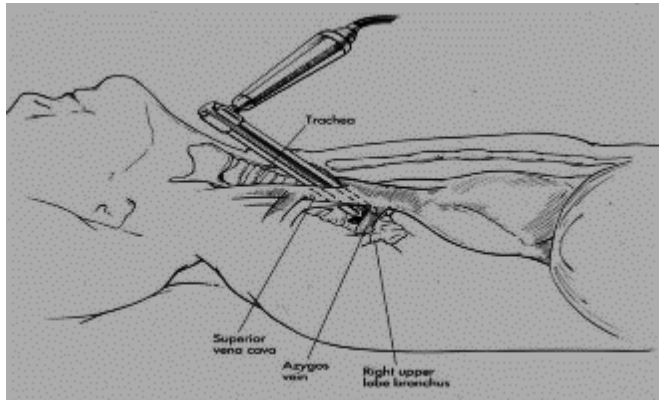
Jouke T. Annema; Jan P. van Meerbeeck; Robert C. Rintoul; et al.

JAMA. 2010;304(20):2245-2252 (doi:10.1001/jama.2010.1705)

Diagnostic yield for mediastinoscopy ~79%

Combined endosonography + mediastinoscopy ~94%

11 patients need to undergo mediastinoscopy after negative EUS-EBUS to detect one patient with N2 disease



ASTER Trial. JAMA 2010

Guidelines: E(B)US impact on endoscopy practice

- 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


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)

ESGE

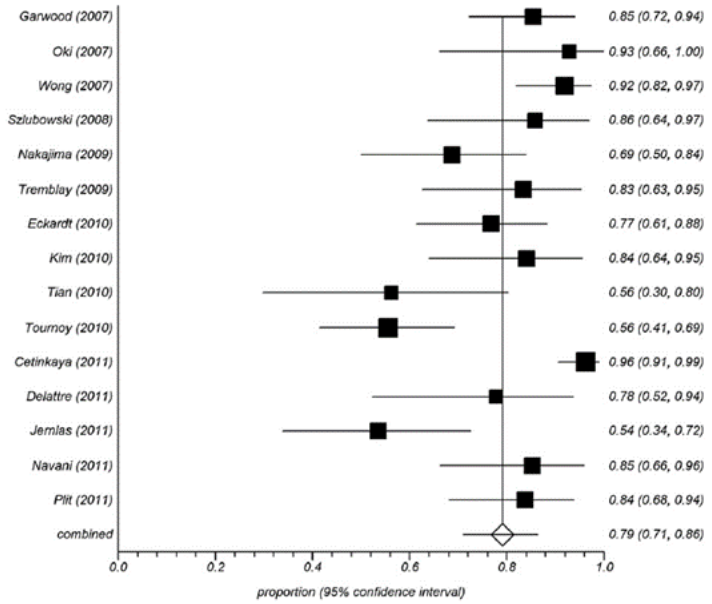
ERS EUROPEAN RESPIRATORY SOCIETY every breath counts

Authors

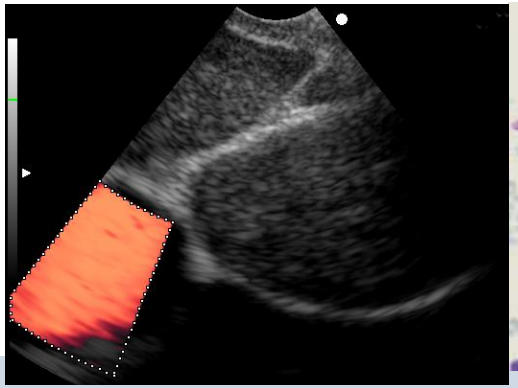
Peter Vilmann[1], Paul Frost Clementsen[2,11], Sara Colella[3], Mette Siemsen[3], Paul De Leyn[4], Jean-Marc Dumonceau[5], Felix J. Herth[6], Alberto Larghi[7], Enrique Vazquez-Sequeiros[8], Cesare Hassan[9], Laurence Crombag[9], Daniël A. Korevaar[10], Lars Konge[11], Jouke T. Annema[3]

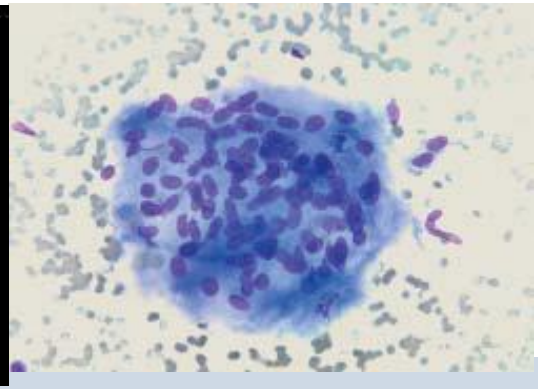
Vilmann P et al, Endoscopy/ ERJ/ ERJCS, June 1, 2015

Sarcoidosis



- Suspected sarcoidosis Stage I/II
- Granuloma detection: diagnostic yield ~ 80%
- Endosonography (EUS-FNA/ EBUS-TBNA) qualifies as the test of choice when granuloma detection is indicated





Agarwal R et al, Respir med 2012 / Granuloma Trial. JAMA 2013

Why endosonography training?

- Success depends on skill level of the endoscopist
- Significant learning curve
- Increasing society focus for medical procedure on
  - quality control
  - patients safety

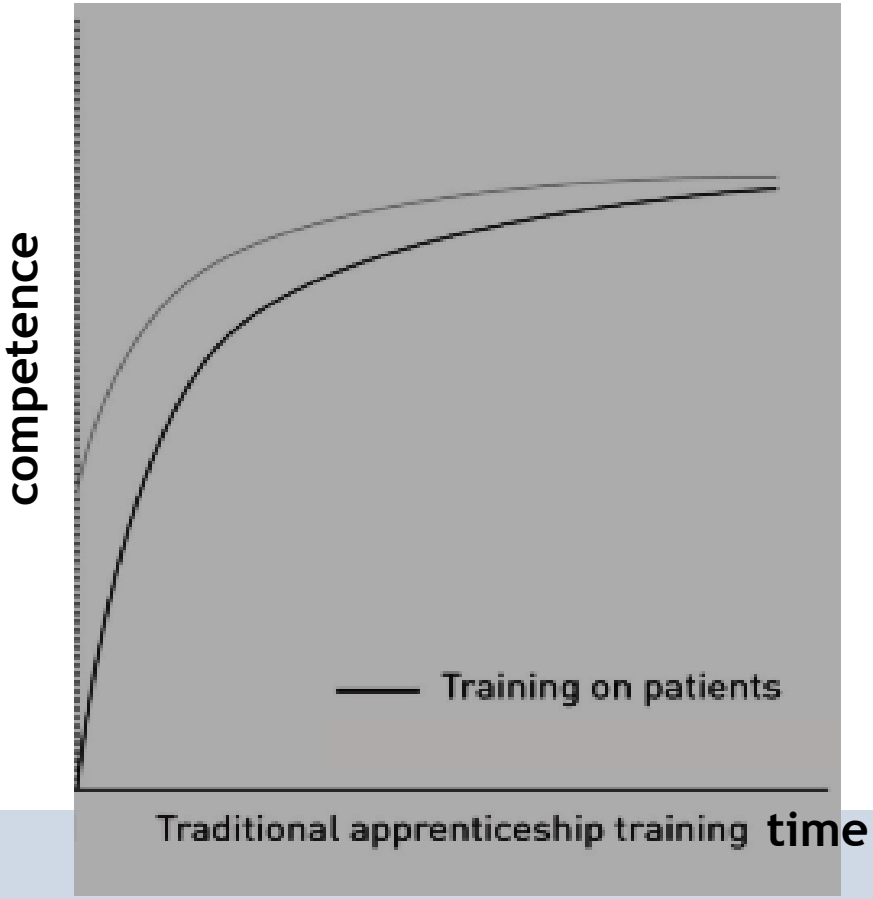
Endosonography Training 2019

- Many tools and possibilities
  - Simulation training
  - Assessment tools
  - E-learnings
  - Videos
  - Courses

- Focus on EBUS & ERS-EBUS training program

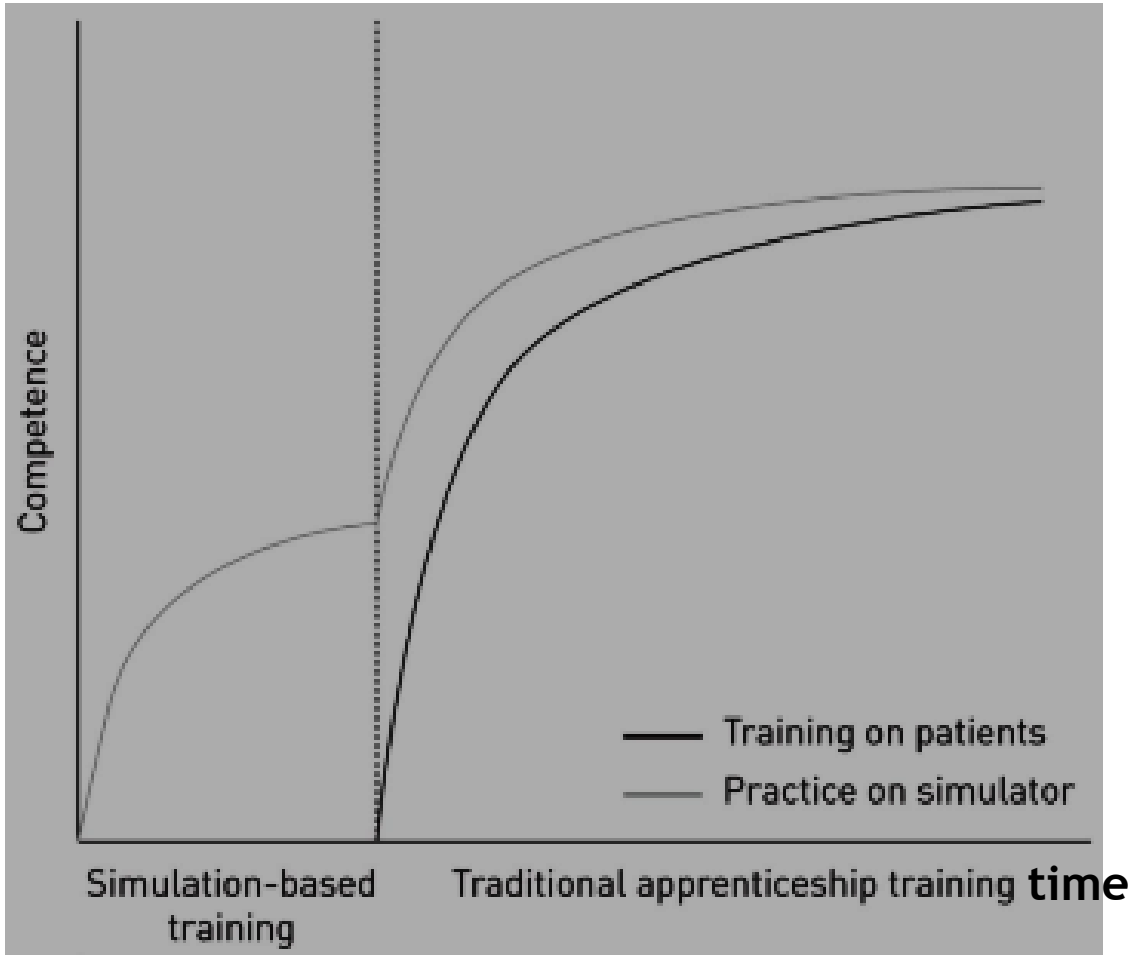
How should we train endoscopists? Apprenticeship model: see one-do one-teach one

Not optimal to learn complex clinical procedures

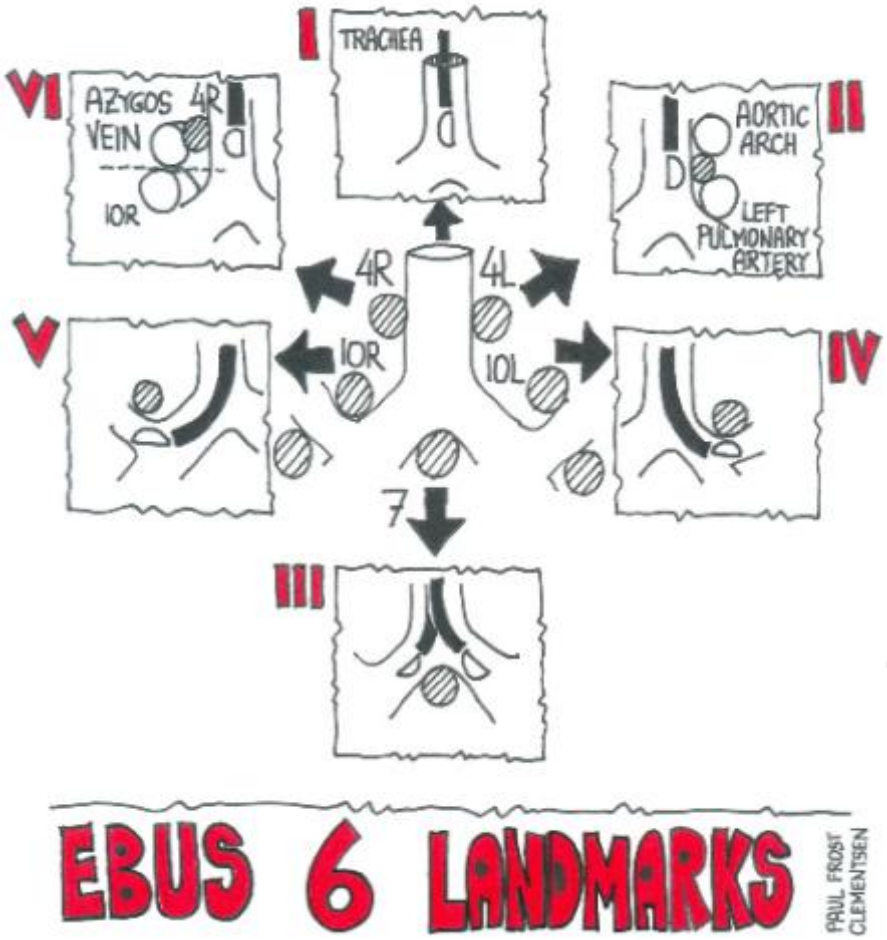


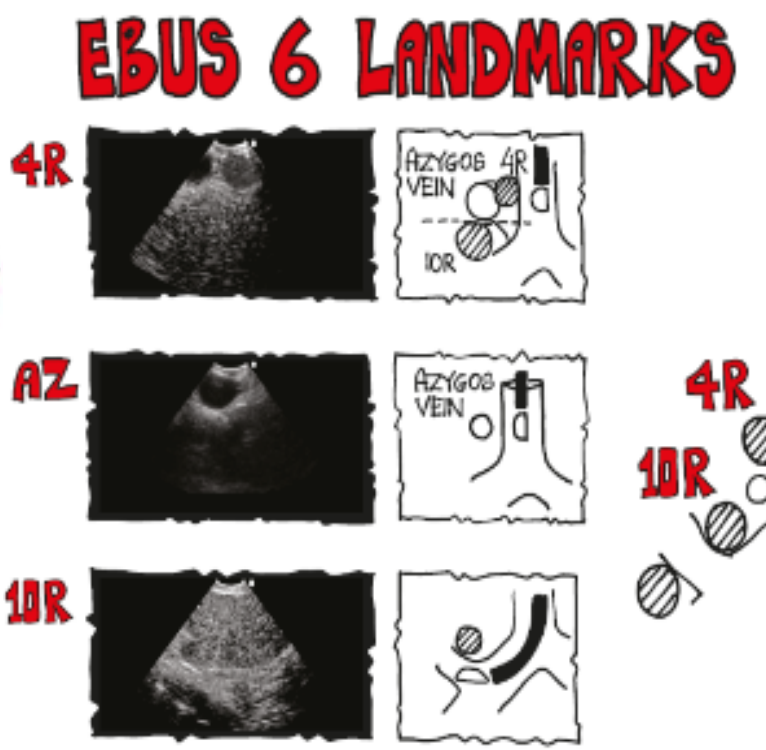
Simulation based training

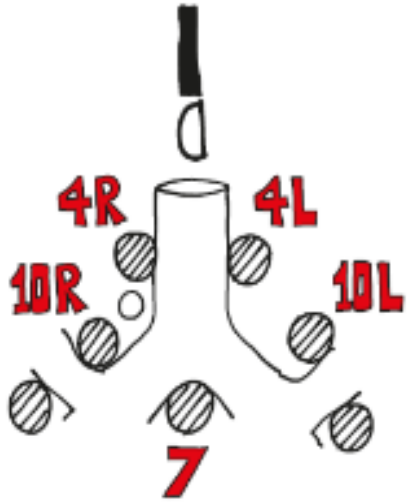
- Simulation training > traditional methods

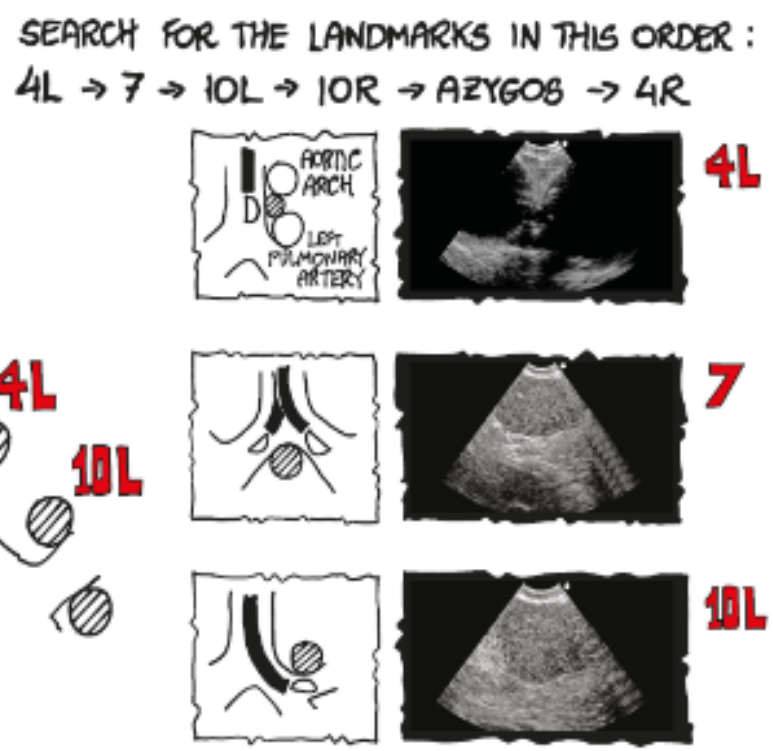


Systematic EBUS in Lung cancer



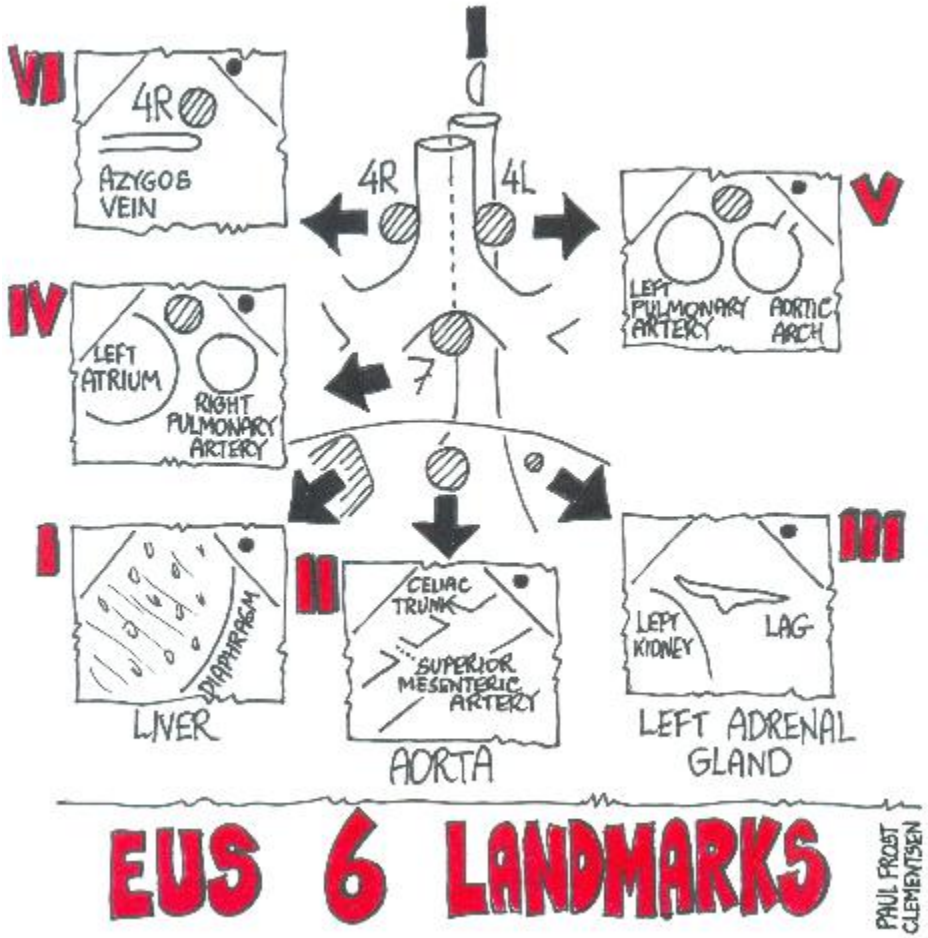


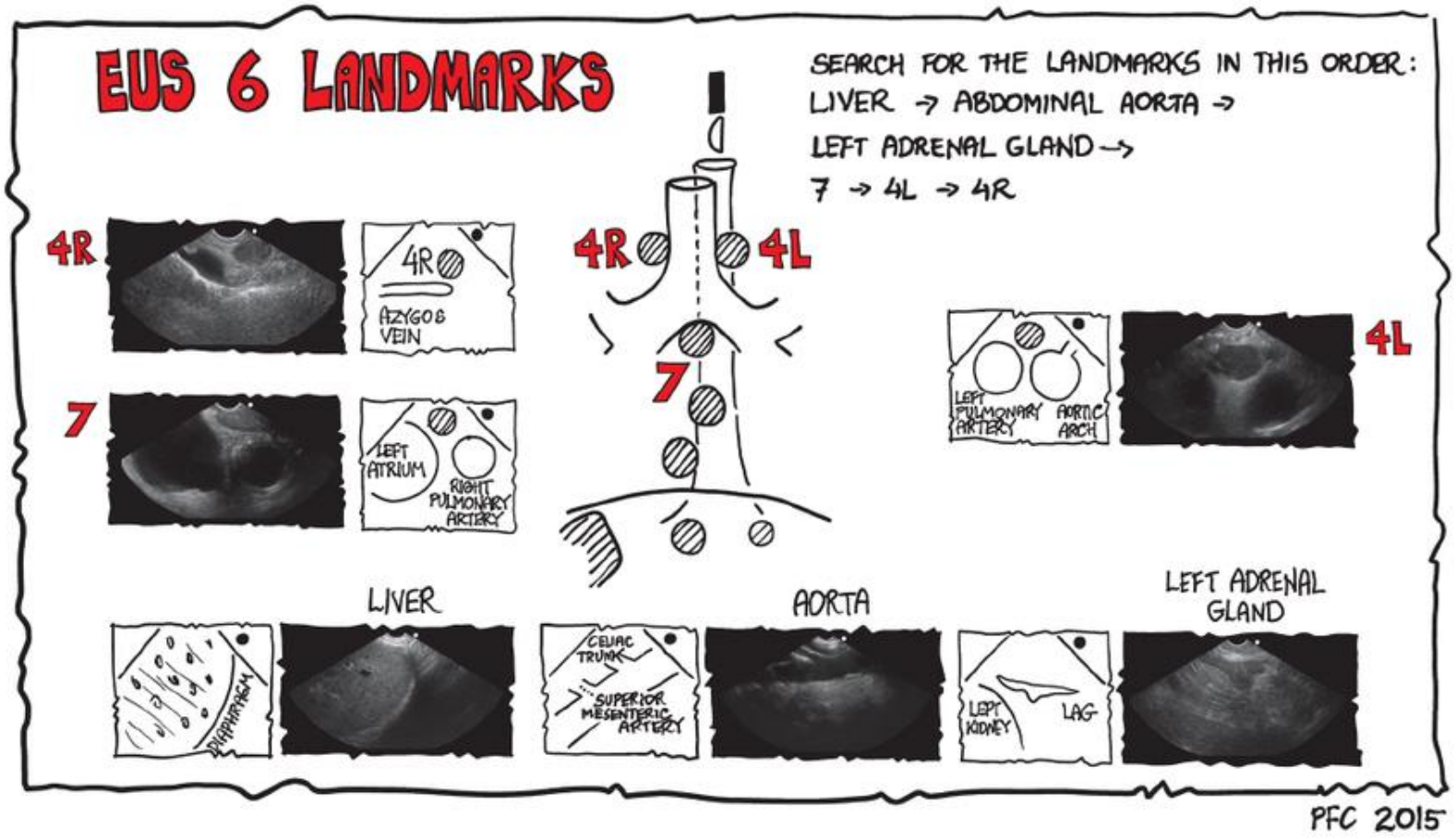




Courtesy P.F. Clementsen

Systematic EUS in Lung cancer

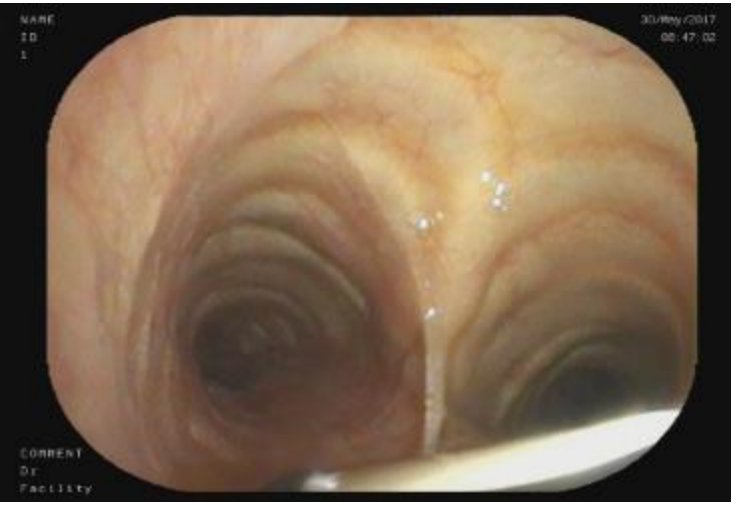


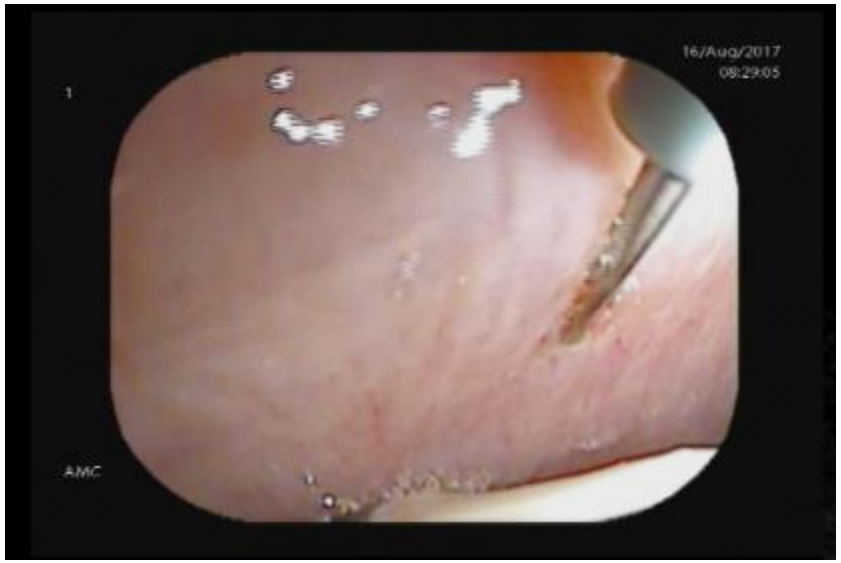


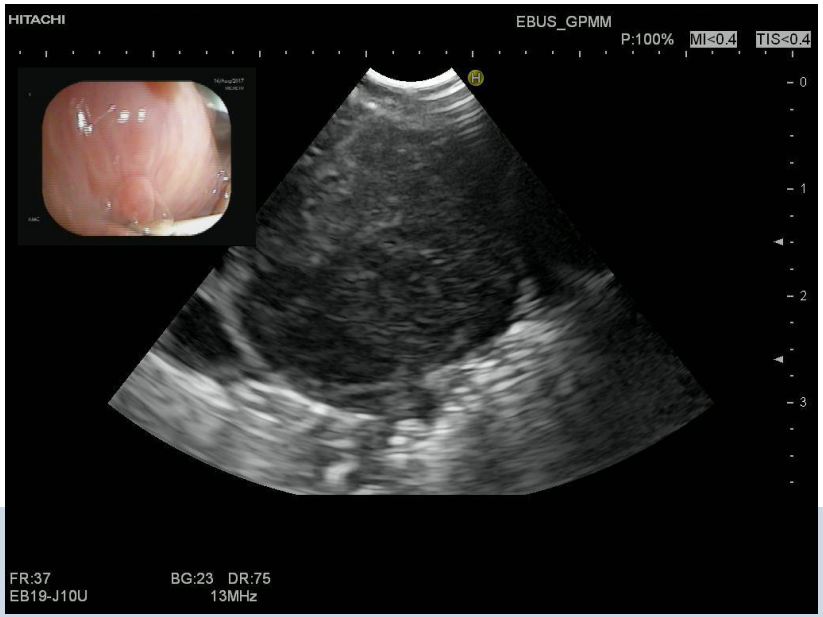
Courtesy P.F. Clementsen

Systematic EBUS

Biopsy technique

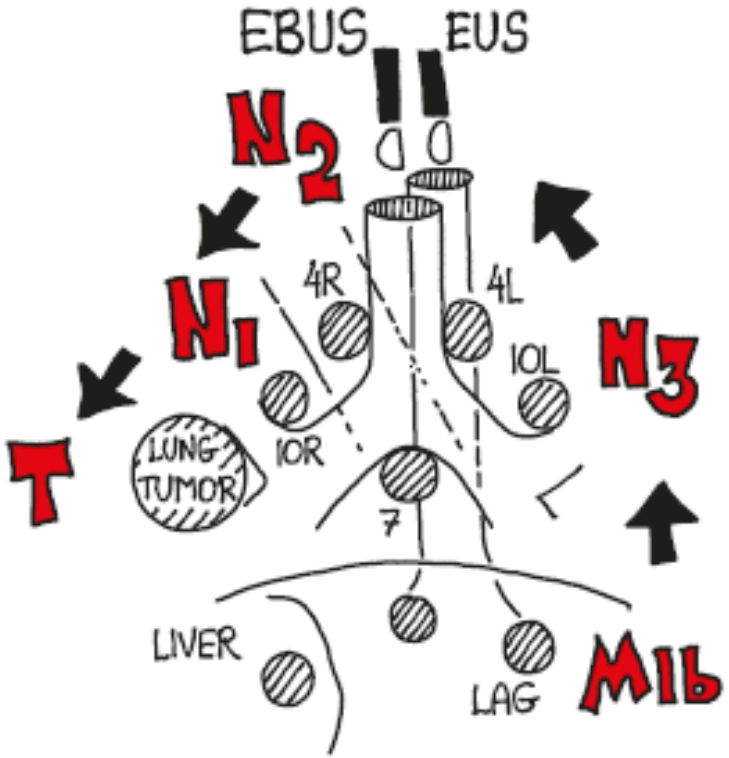






Systematic EBUS

Biopsy technique ….and order



BIOPSY ORDER

Courtesy P.F. Clementsen

Assessing competency

11 We suggest that competency in EBUS-TBNA and EUS-(B)-FNA for staging lung cancer be assessed using available validated assessment tools (Recommendation Grade D).

EBUSAT – Direct Observation

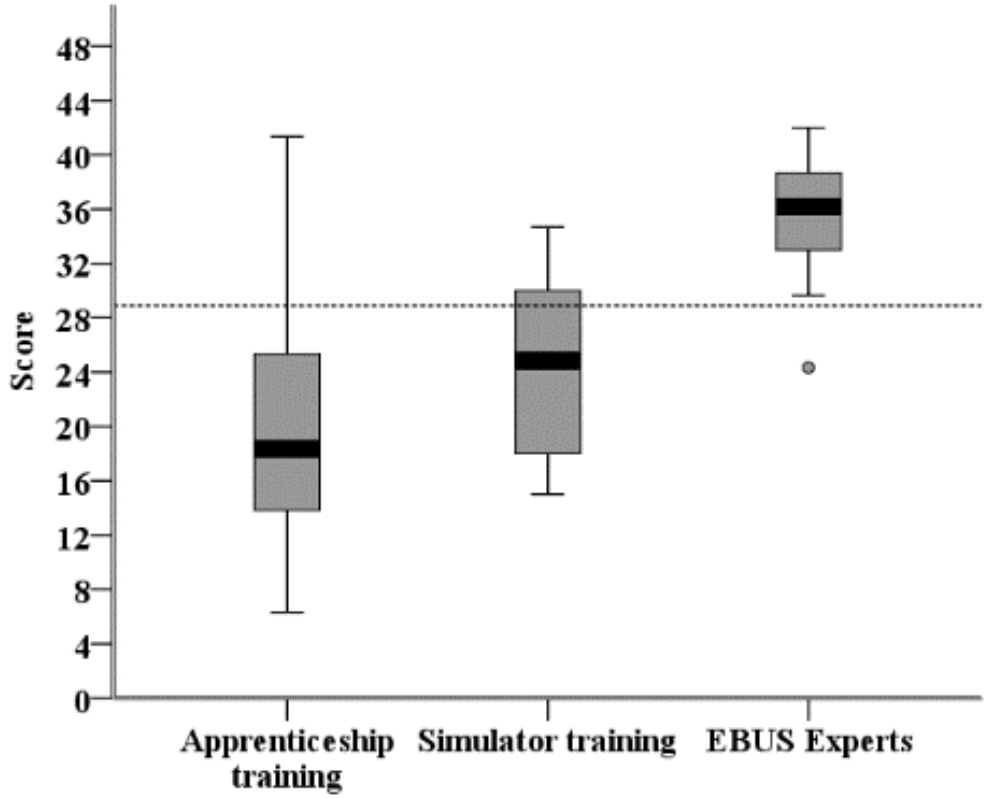
	Done by supervisor	Done with guidance	Done by trainee with no or minimal guidance				
Insertion of the endoscope (incl. passage of vocal cords)	☐	☐	1 Unable to insert endoscope	2	3 Needs several attemps to insert endoscope	4	5 Perfect insertion of endoscope at first attempt
Presentation of region 4 L (including aorta & a.pulm)	☐	☐	Not visualized 1	2	Visualized with difficulty or badly presented 3	4	Perfectly visualized with apparent ease 5
region 7	☐	☐	1	2	3	4	5
region 10/11 L	☐	☐	1	2	3	4	5
region 10/11 R	☐	☐	1	2	3	4	5
Azygos vein	☐	☐	1	2	3	4	5
region 4 R	☐	☐	1	2	3	4	5
Orientation overall	☐	☐	1 Totally unacceptable investigation	2	3 Acceptable but unsystematic investigation	4	5 Systematic and thorough investigation demonstrating perfect knowledge of the anatomy
Biopsy sampling: Positioning of transducer	☐	☐	1 Major flaws in positioning	2	3 Some problems with positioning	4	5 Perfect positioning of transducer every time
Biopsy sampling: Use of sheath	☐	☐	1 Sheath is used in a wrong way with great risk of scope damage	2	3 Insecure localization of the sheath during the procedure	4	5 Perfect use of sheath
Biopsy sampling: Use of Needle	☐	☐	1 Targeted sites are missed and/or important structures are damaged	2	3 Insecure use of needle with a few errors	4	5 Perfect use of needle in every procedure
Biopsy sampling overall	☐	☐	1 Biopsies performed with major risk to the patient / equipment	2	3 Possibility of inadequate biopsies due to insufficient technique	4	5 Perfect sampling using excellent technique

How should residents be trained ?

Simulator training for endobronchial ultrasound: a randomised controlled trial

Lars Konge[1], Paul Frost Clementsen[2], Charlotte Ringsted[3], Valentina Minddal[2], Klaus Richter Larsen[4] and Jouke T. Annema[5,6]

Affiliations: [1]Centre for Clinical Education, University of Copenhagen and The Capital Region of Denmark, Copenhagen, Denmark. [2]Dept of Pulmonology, Gentofte Hospital, University of Copenhagen, Hellerup, Denmark. [3]The Wilson Centre and Dept of Anesthesiology, University of Toronto and University Health Network, Toronto, ON, Canada. [4]Dept of Pulmonology, Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark. [5]Dept of Pulmonology, Leiden University Medical Center, Leiden, The Netherlands. [6]Dept of Pulmonology, Academic Medical Centre, University of Amsterdam, Amsterdam, The Netherlands.



Konge et al; Eur Respir J. 2015

Guideline EBUS + EUS (-B)

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[1], Paul Frost Clementsen[2,11], Sara Colella[2], Mette Siemsen[3], Paul De Leyn[4], Jean-Marc Dumonceau[5], Felix J. Herth[6], Alberto Larghi[7], Enrique Vazquez-Sequeiros[8], Cesare Hassan[7], Laurence Crombag[9], Daniël A. Korevaar[10], Lars Konge[11], Jouke T. Annema[9]

10 We suggest that new trainees in endosonography should follow a structured training curriculum consisting of simulation-based training followed by supervised practice on patients (Recommendation grade D).

Endobronchial ultrasound: launch of an ERS structured training programme

Amy Farr[1], Paul Clementsen[2,4], Felix Herth[3], Lars Konge[4], Gernot Rohde[5], Sarah Dowsland[1], Maren Schuhmann[3], Jouke Annema[6]

amy.farr@ersnet.org

[1]Educational Activities, European Respiratory Society, Lausanne, Switzerland. [2]Dept of Pulmonology, Gentofte Hospital, University of Copenhagen, Copenhagen, Denmark. [3]Dept of Pneumology and Critical Care Medicine, Thoraxklinik, University of Heidelberg, Heidelberg, Germany. [4]Copenhagen University and the Capital Region of Denmark Centre for Clinical Education, University of Copenhagen, Copenhagen, Denmark. [5]Dept of Respiratory Medicine, Maastricht University Medical Center, Maastricht, The Netherlands. [6]Dept of Respiratory Medicine, Academic Medical Centre, University of Amsterdam, Amsterdam, The Netherlands.

ERS EUROPEAN RESPIRATORY SOCIETY

Aims ERS EBUS training program

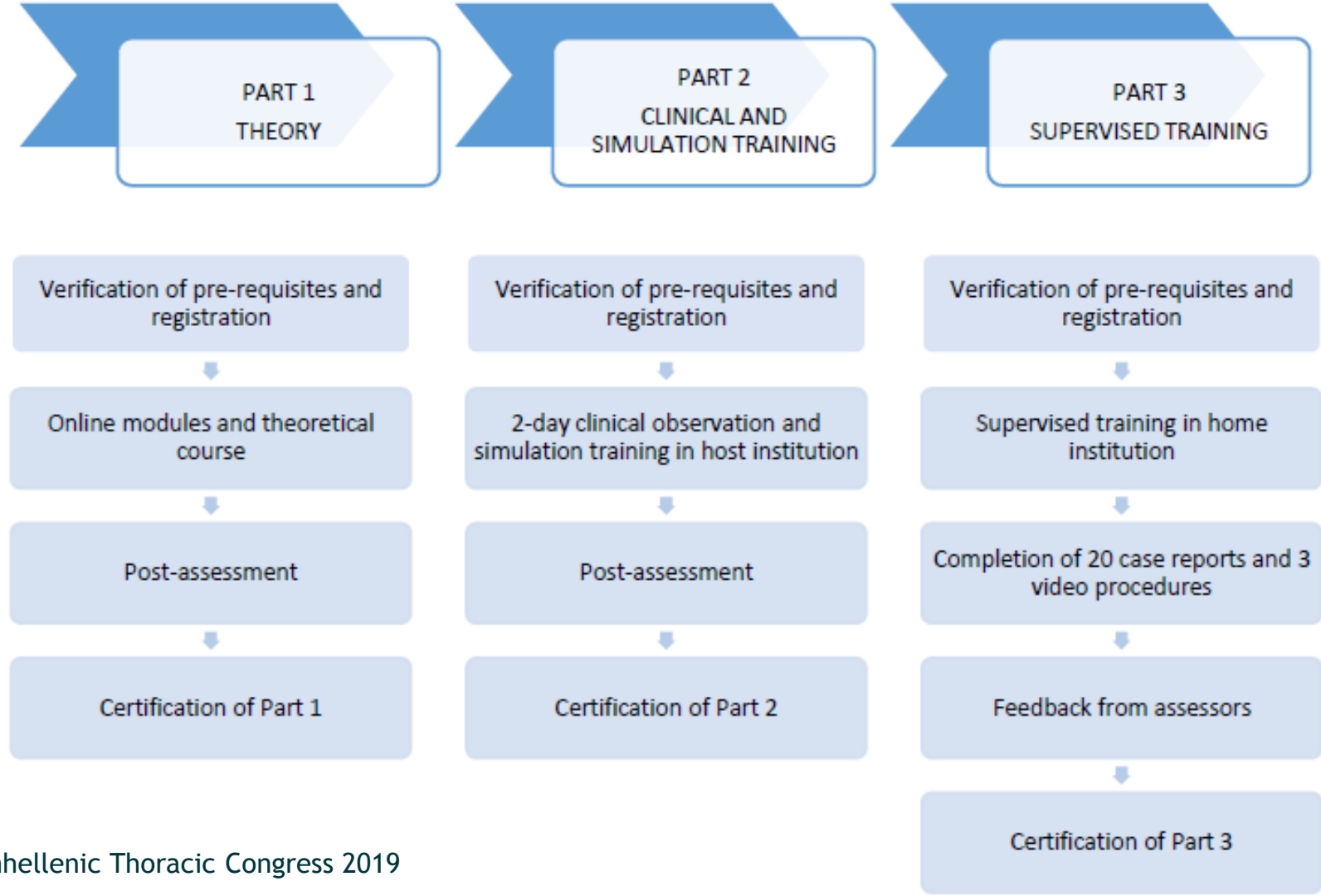
To train qualified doctors to be able to independently perform EBUS

To ensure knowledge and skills required to obtain ERS certification in EBUS

Target audience

- Qualified MDs with previous experience in:
    - Bronchoscopy
    - Diagnosis and staging of pulmonary oncology patients and other conditions

ERS EBUS certified training programme



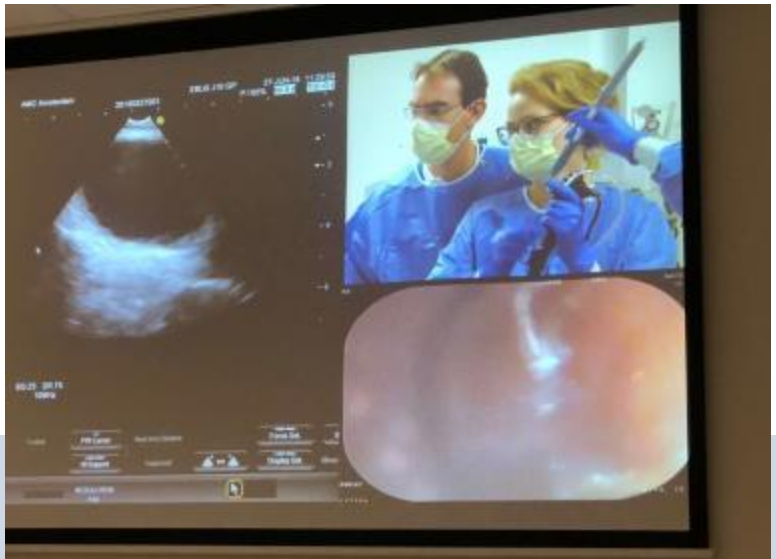
EBUS Part 1 Theory

- Provides relevant EBUS theoretical knowledge
- 7 online modules
  - anatomy - landmarks
  - (contra) indications
  - imaging modalities
  - basic ultrasound
  - complications

- These online activities must be completed before attending the on site course

EBUS Part 1
Theory - on site course

- 2-day course (Heidelberg, Copenhagen, Amsterdam, Ancona, Athens)
  - Theoretical content revised
  - Hands on session
  - Live procedures



Certification EBUS Part 1

- Online MC question assessment

  → Certification of part 1

Respiration

Interventional Pulmonology

Respiration
DOI: 10.1159/000362884

Received: January 6, 2014
Accepted after revision: April 4, 2014
Published online: May 21, 2014

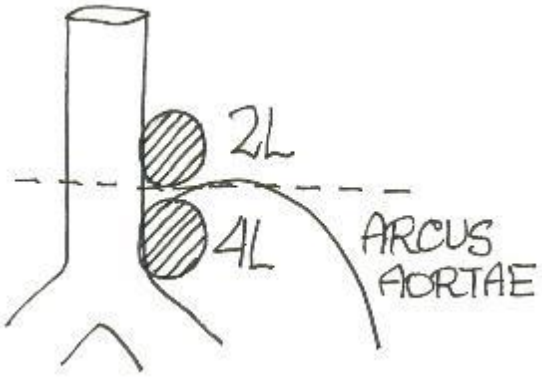
Development and Validation of a Theoretical Test in Endosonography for Pulmonary Diseases

Mona M. Savran[a] Paul Frost Clementsen[b] Jouke T. Annema[c]
Valentina Minddal[b] Klaus R. Larsen[d] Yoon Soo Park[e] Lars Konge[a]

[a]Centre for Clinical Education, University of Copenhagen and the Capital Region of Denmark, Copenhagen, and
[b]Department of Pulmonology, Gentofte Hospital, University of Copenhagen, Hellerup, Denmark;
[c]Department of Pulmonology, Academic Medical Centre, University of Amsterdam, Amsterdam, The Netherlands;
[d]Department of Pulmonology, Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark;
[e]Department of Medical Education, University of Illinois Chicago, Chicago, Ill., USA

What is the border between station 2L and 4L

1. The superior margin of the left pulmonary artery
2. The inferior margin of the arch of the aorta
3. The superior margin of the arch of the aorta



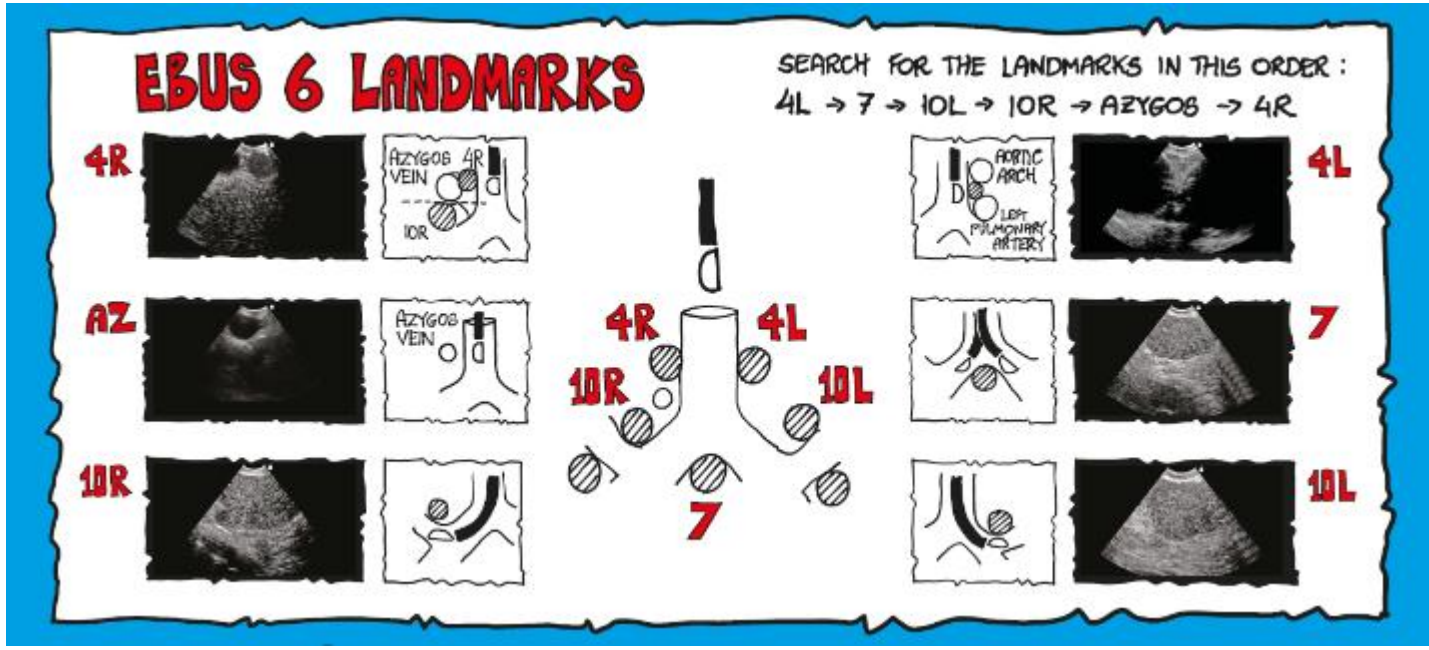
EBUS Part 2
2 day clinical observation and simulation training

- Training centers
  - Amsterdam
  - Copenhagen
  - Heidelberg
  - Athens
- 2 participants per session

EBUS Part 2: clinical and simulation training

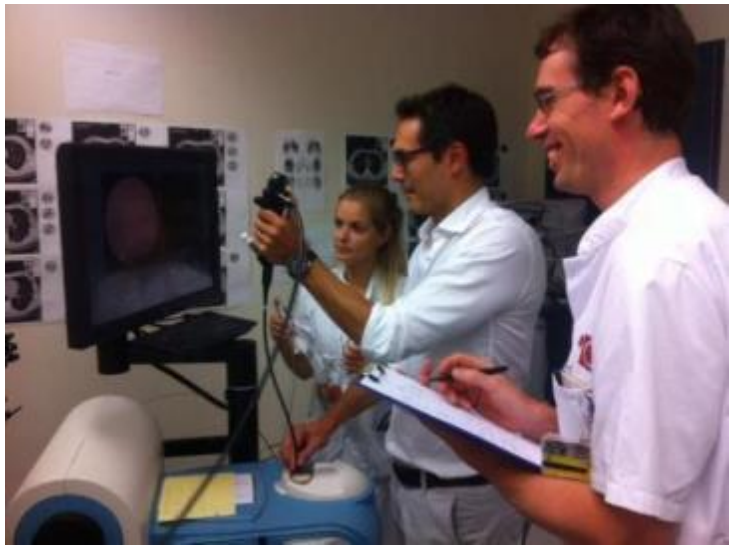
- Safe handling of EBUS scope
- 6 EBUS landmarks:

  pattern recognition
- TBNA
- Using EBUS-AT
- Exam on the simulator



Courtesy P.F. Clementsen

EBUS Part 2 Simulation
What to expect in Amsterdam?

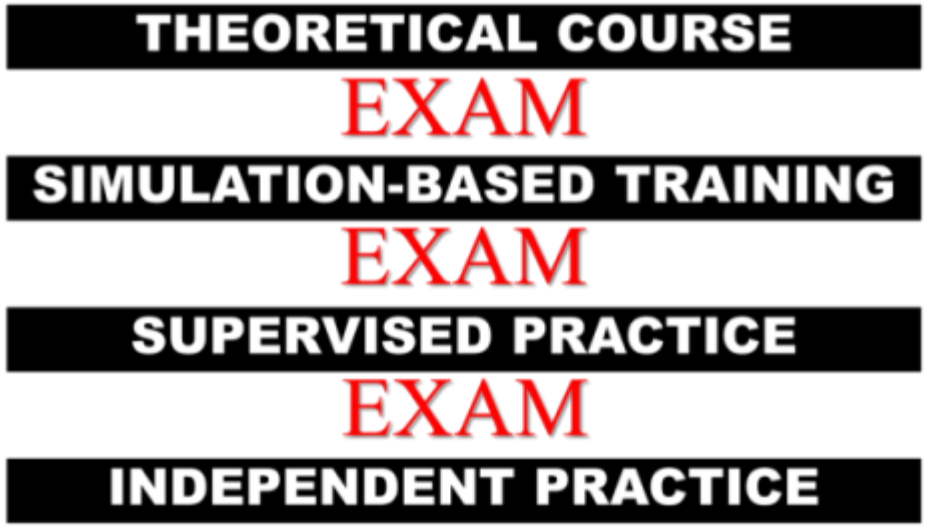


EBUS Part 3 supervised training

- Simulator ≠ 100% realistic
- Supervised training in home institution
- Online portfolio of 20 EBUS procedures + record 3 videos
- Grading and reviewing videos (AT)

Summary ERS EBUS training program

- Part 1: Learn the theory → exam
- Part 2: Simulation training → exam
- Part 3: Supervised training + video's → exam
- ERS EBUS certification



ERS EUROPEAN RESPIRATORY SOCIETY

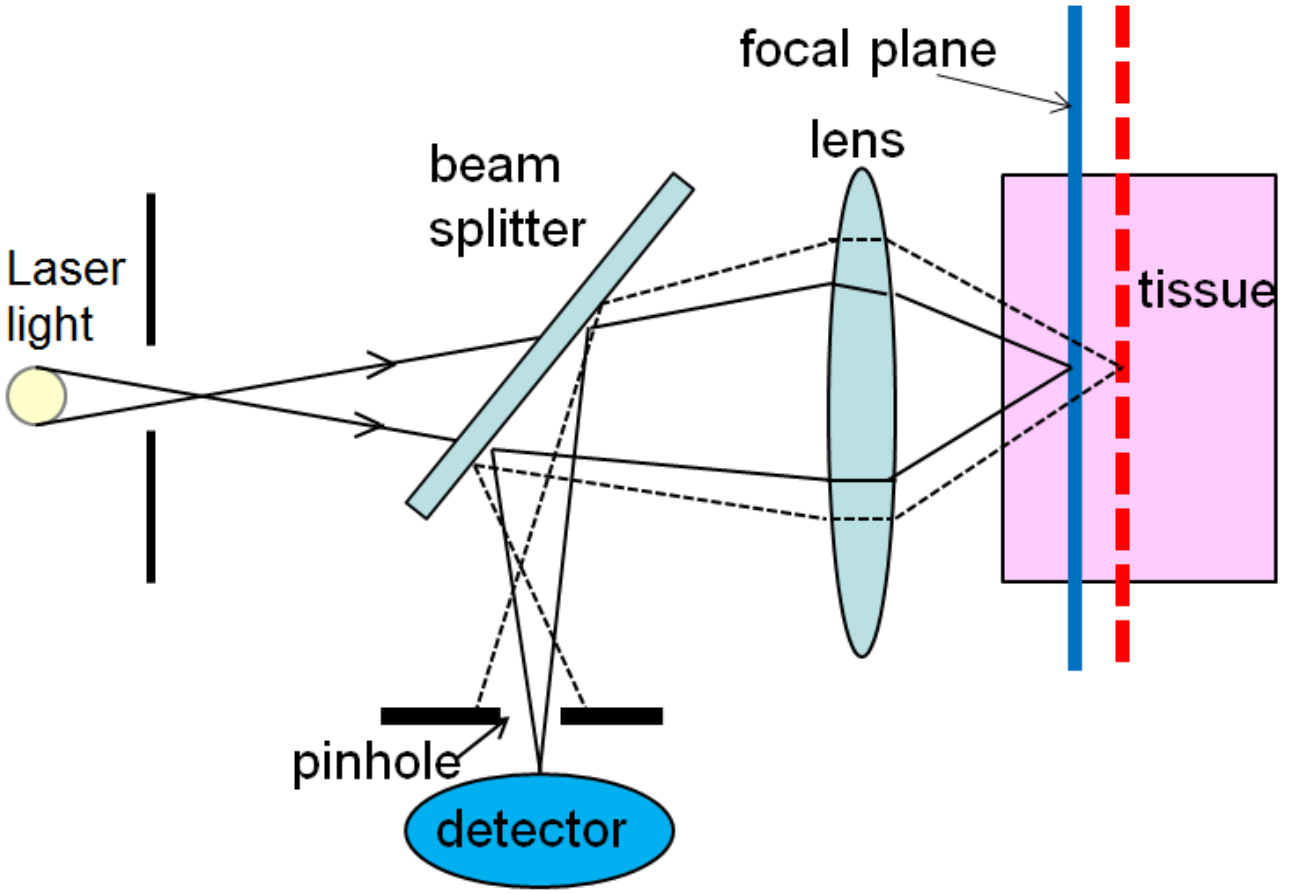
Amsterdam UMC
Universitair Medische Centra

Needle-based Confocal Laser Endomicroscopy (nCLE) for real-time diagnosing and staging lung cancer

L.Wijmans, J.Yared, D.M. de Bruin, S.L. Meijer, P. Baas, P.I. Bonta, J.T. Annema

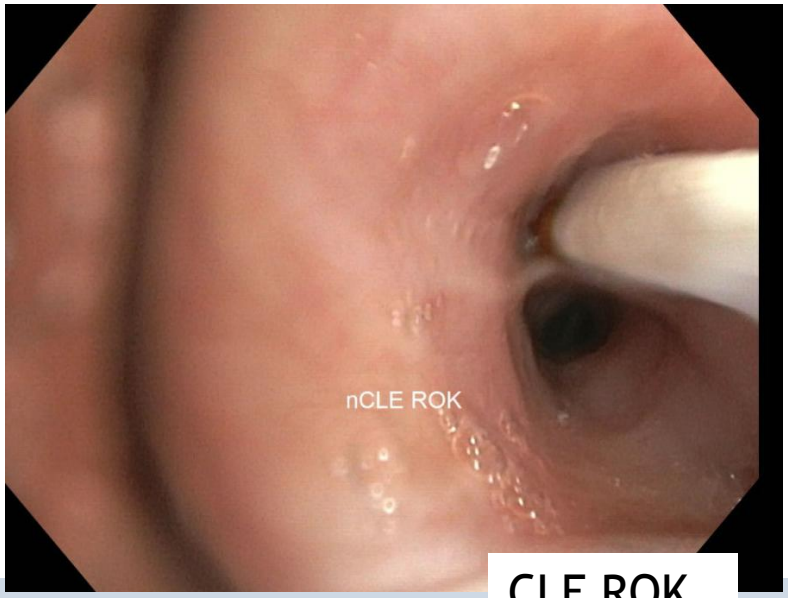
European Respiratory Journal, June 2019

Confocal laser endomicroscopy (CLE)

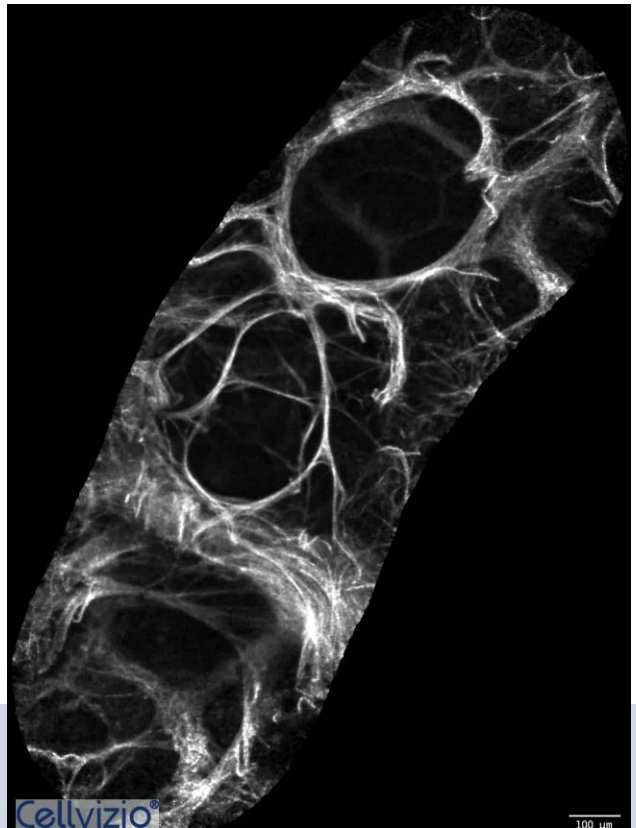


Bronchoscopic Confocal Laser Endomicroscopy/CLE

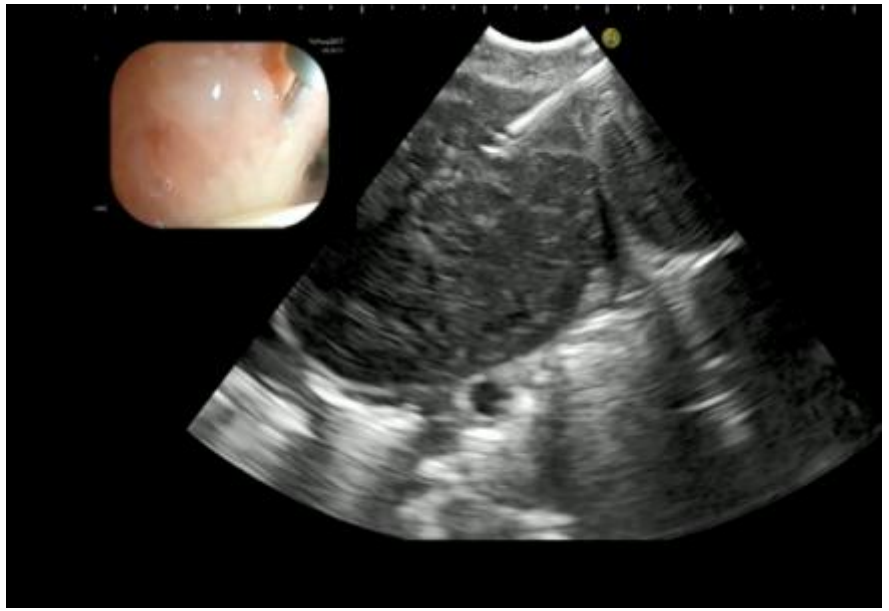
Visualization of peripheral lung areas (alveolar compartment)



CLE ROK

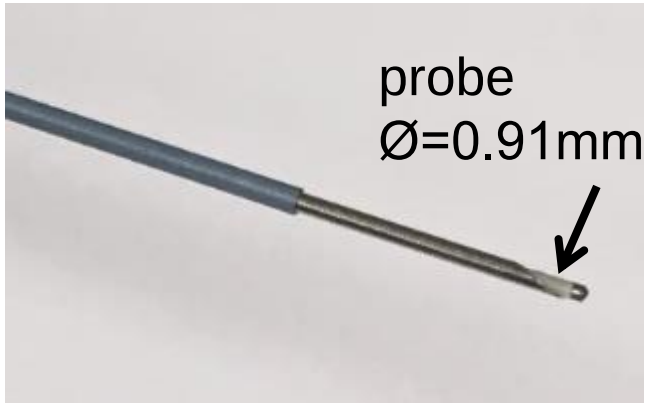


E(B)US and needle based CLE



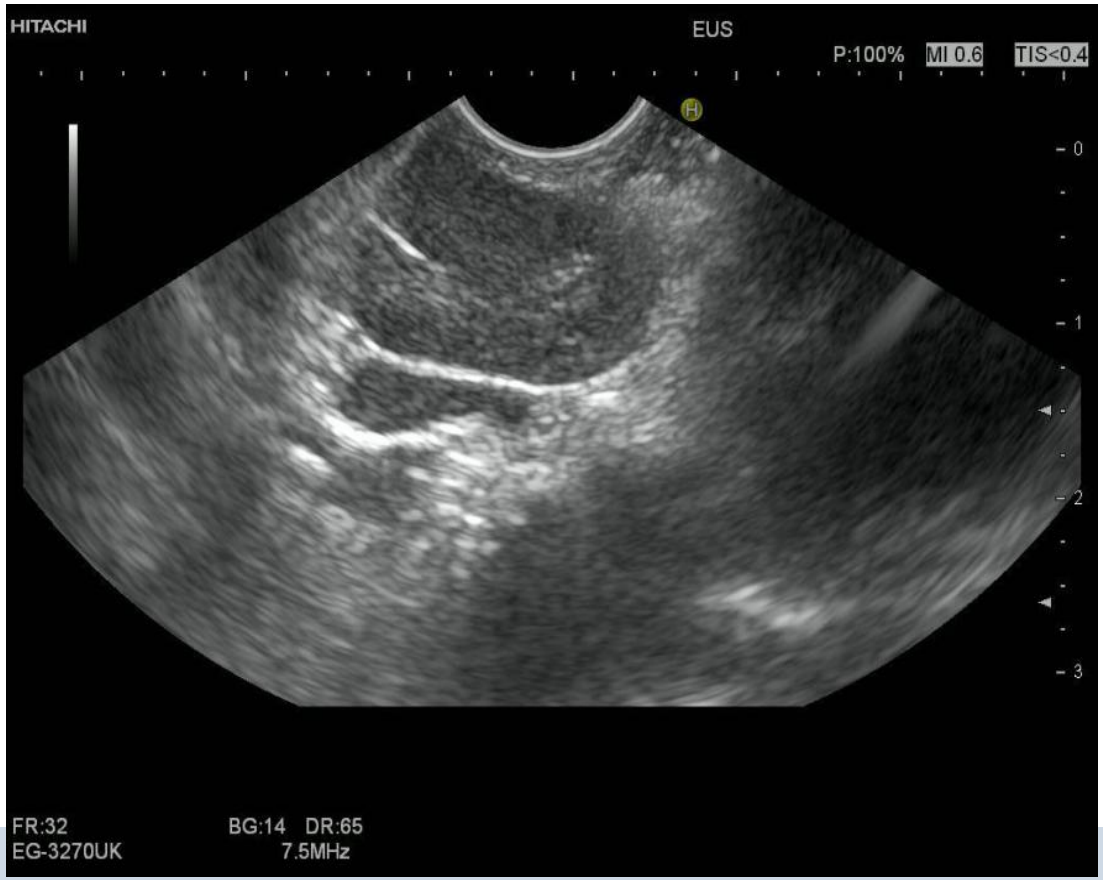
Fluorescine

19G-Needle

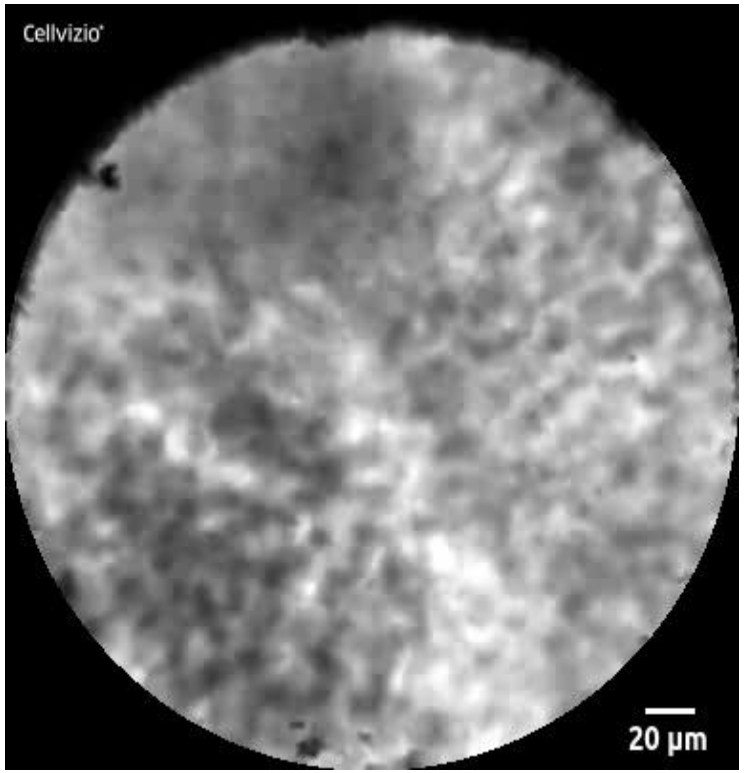


nCLE in nodal staging

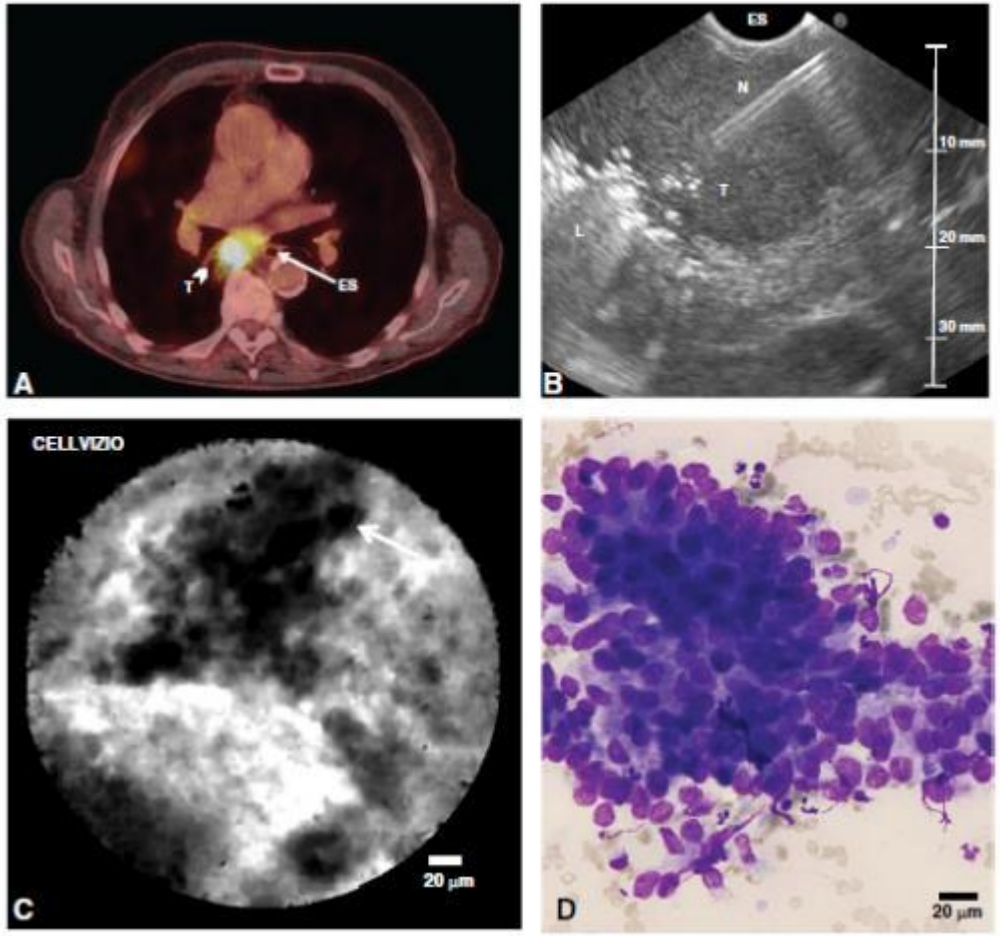
EUS-FNA

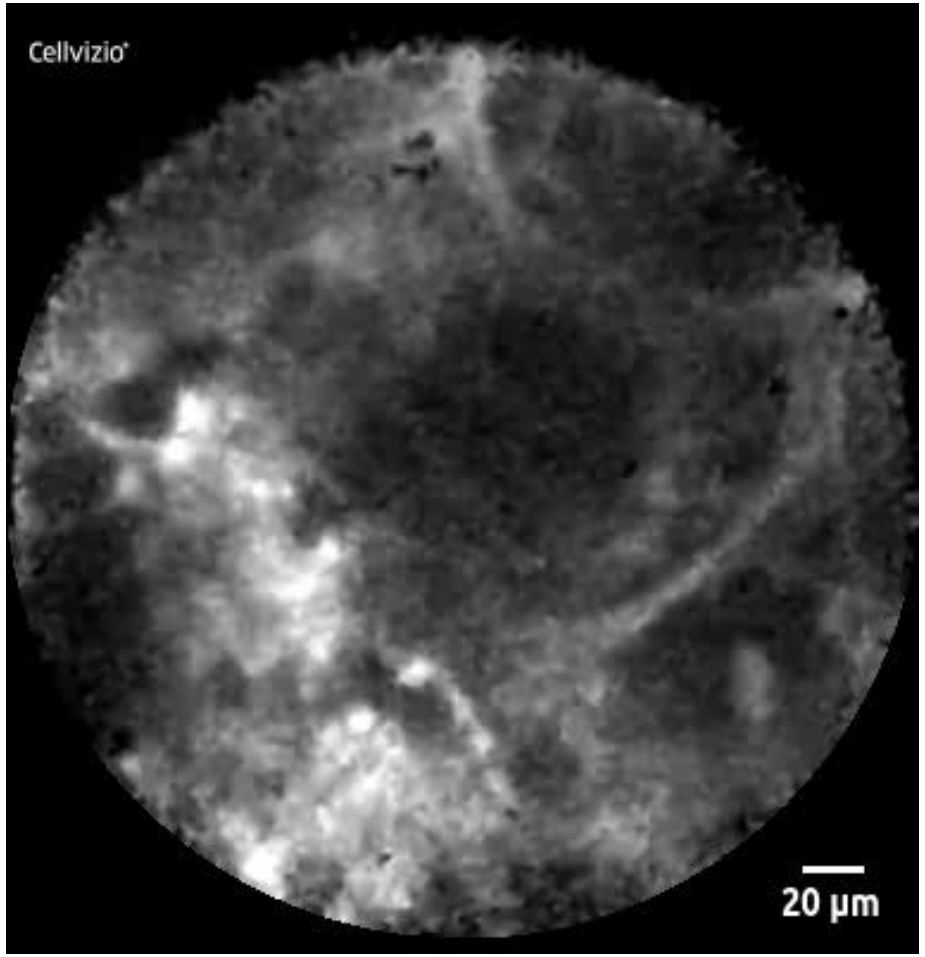


nCLE



nCLE in pulmonary tumor

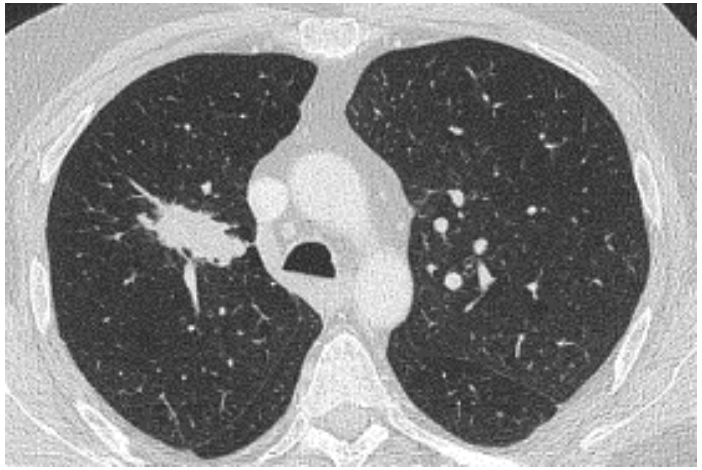




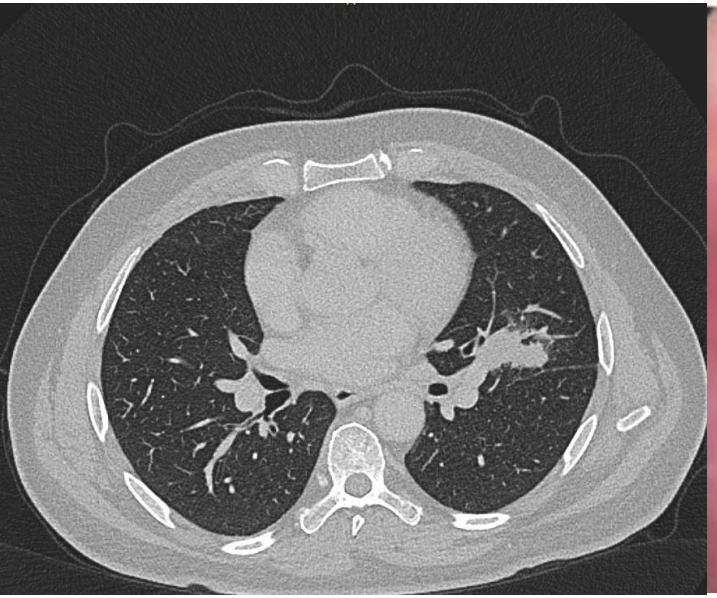
Wijmans L, Bonta PI, Annema JT, Blue Journal 2017

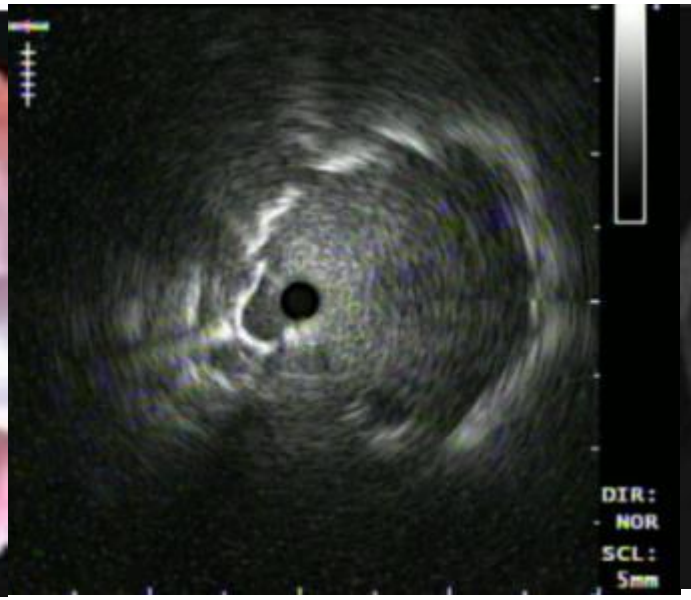
rEBUS: Peripherally located lung cancer

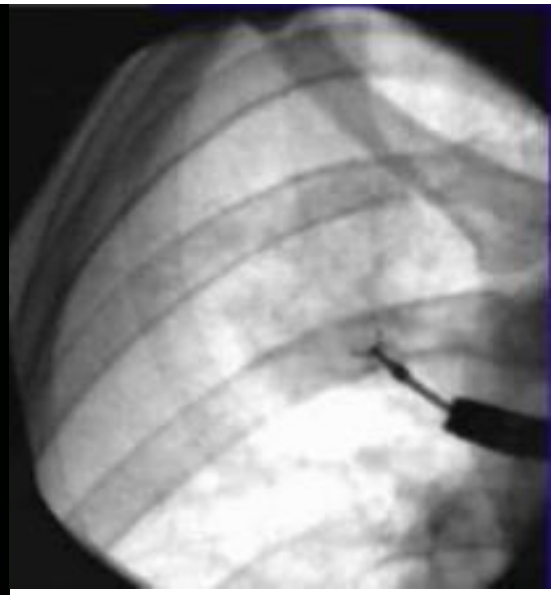
- Expected upcoming lung cancer screening
- Not visible by conventional bronchoscopy
- Need for bronchoscopic guidance and
- Real-time cancer detection



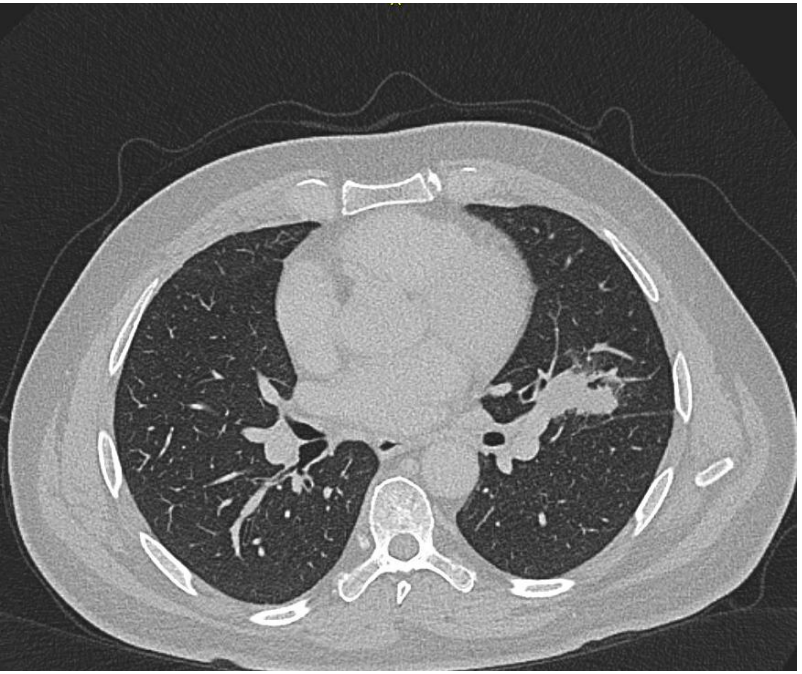
rEBUS Case

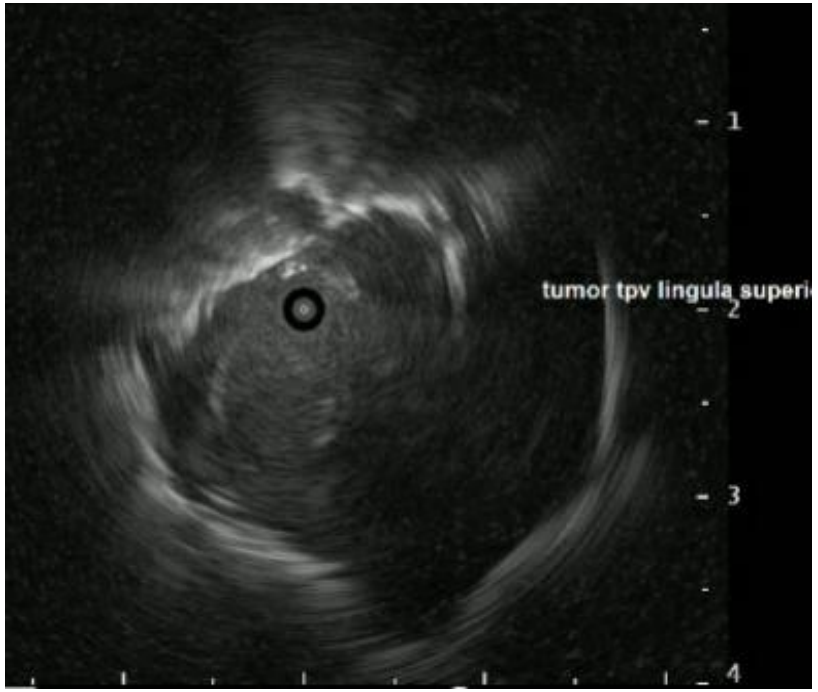


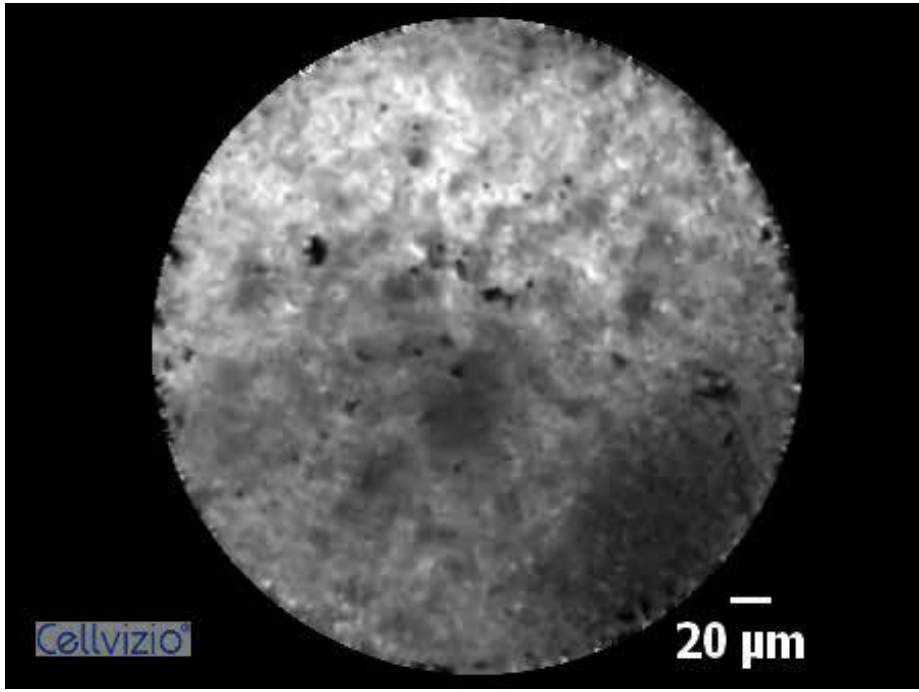




Radial EBUS - nCLE







- Endosonography as a practice changer
  - Lung cancer – complete staging
  - Sarcoidoisis
- Novel developments in endosonography
  - nCLE
  - rEBUS
- Next level in EBUS / endoscopy training
- Overview of programme www.ersnet.org/ebus