5th European Lung Cancer Conference

Geneva 16-04-2015

Marien Hospital Düsseldorf VKKD

Diagnostic challenge of small nodules

Possibilities and limitations of transthoracic procedures

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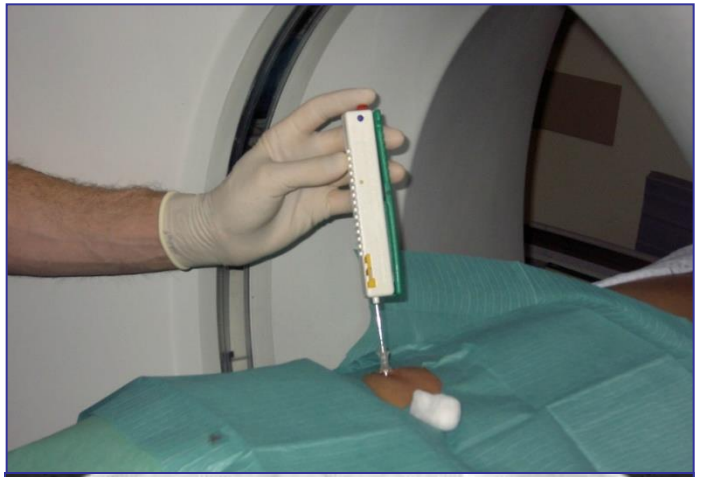
Diagnostic challenge of small nodules

Possibilities and limitations of transthoracic procedures

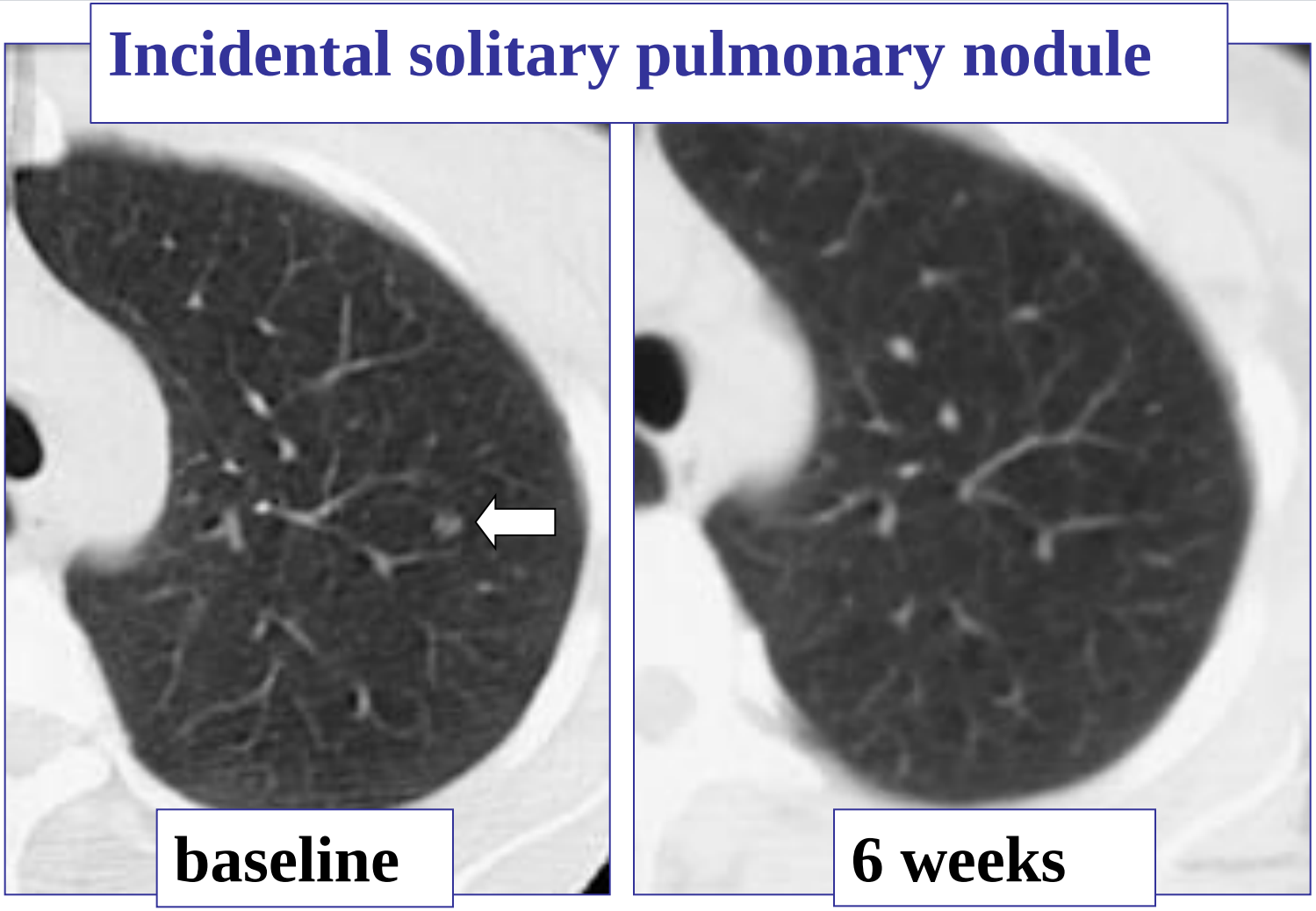
No disclosures

Percutaneous (CT-guided) biopsy of small incidental pulmonary nodule

- when ?
- how ?
- accuracy ?
- complications ?

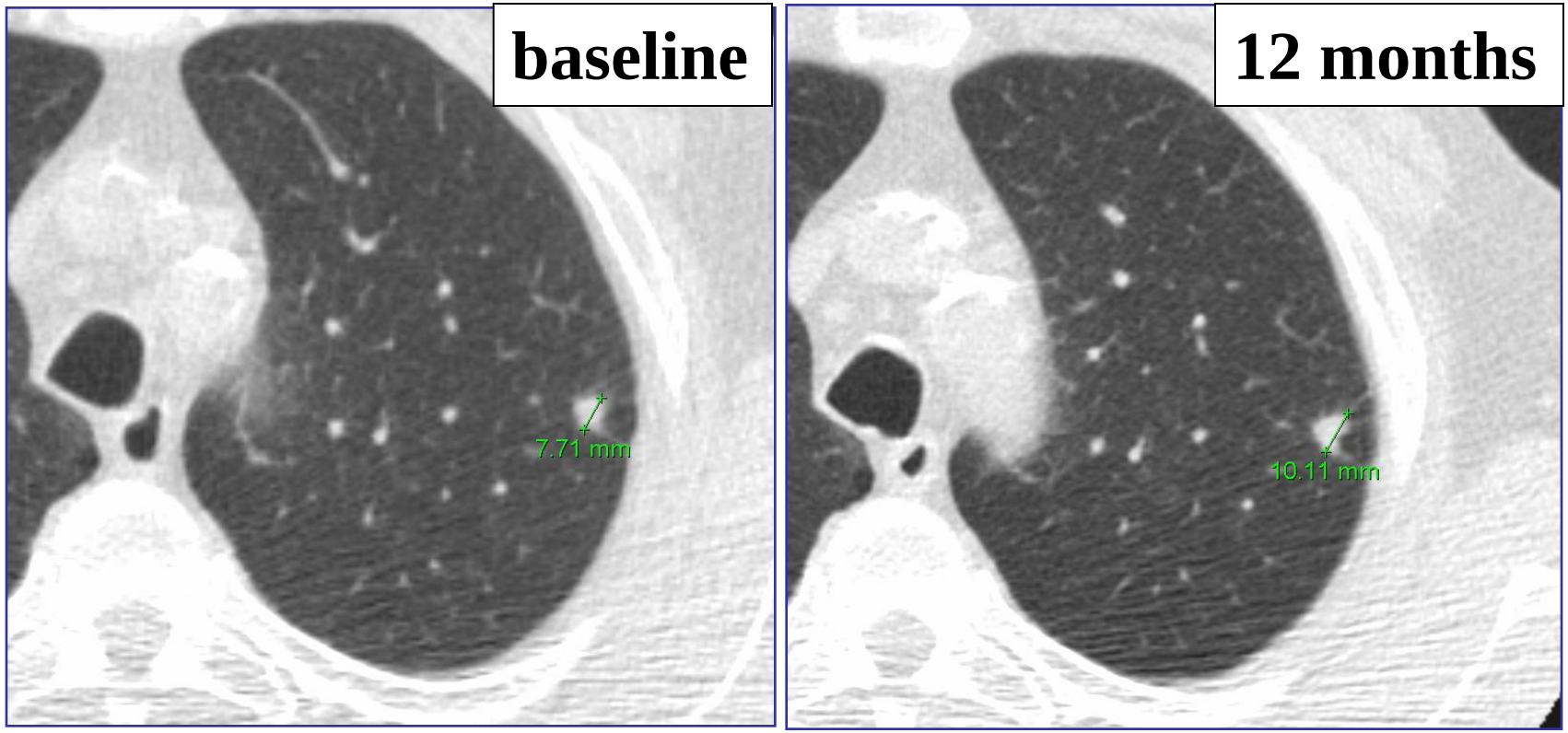


Should I perform a biopsy of this lesion ?



Should I perform a biopsy of this lesion ?

Incidental solitary pulmonary nodule



Percutaneous (CT-guided) biopsy of small incidental pulmonary nodule

- **Guidelines: no biopsy in nodules < 8 mm**
  (average diameter: maximum + short axis : 2)
- **→ follow-up with low-dose CT**
- **→ if growth: volume doubling time (VDT)**
- **if VDT suspicious of malignancy (30 - 400 days)**
  → resect if no contraindications
- **if nodule ≥ 8 mm suspicious of malignancy**
  → resect if no contraindications

Percutaneous (CT-guided) biopsy of small incidental pulmonary nodule

Biopsy of small incidental nodule if:

- **nodule ≥ 8 mm and**
- **nodule most likely benign or**
- **if likely malignant**
  - **patient no candidate for resection and**
  - **other options available if nodule malignant**
    - **radiation therapy**
    - **thermal ablation**
    - **medical therapy**

Percutaneous lung biopsy

contraindications

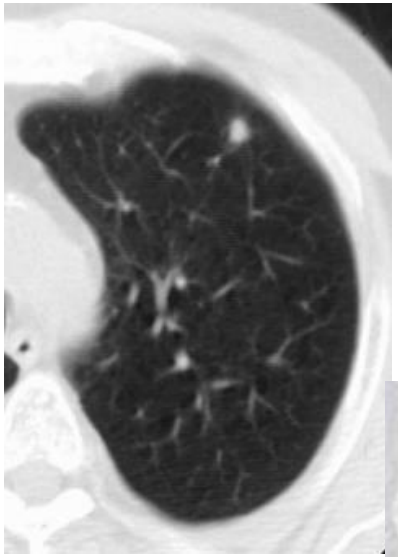
absolute: none

relative:

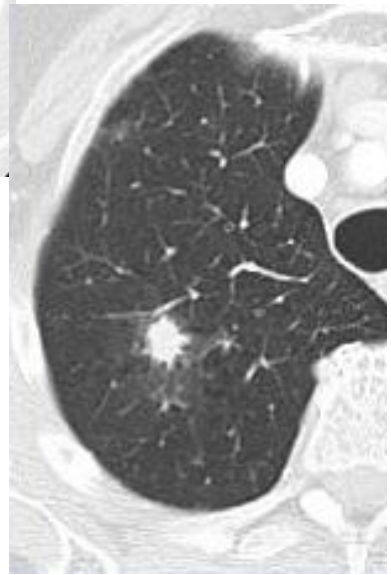
- **decreased LFT (O_2 < 60 mmHg)**
- **(functional) single lung**
- **pulm. art. hypertension**
- **coagulation disorders**
- **COPD, esp. bullous emphysema**

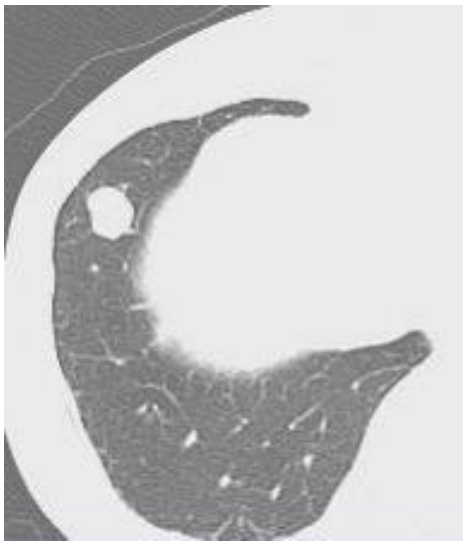
Feasibility of biopsy

large > small



apical > basal





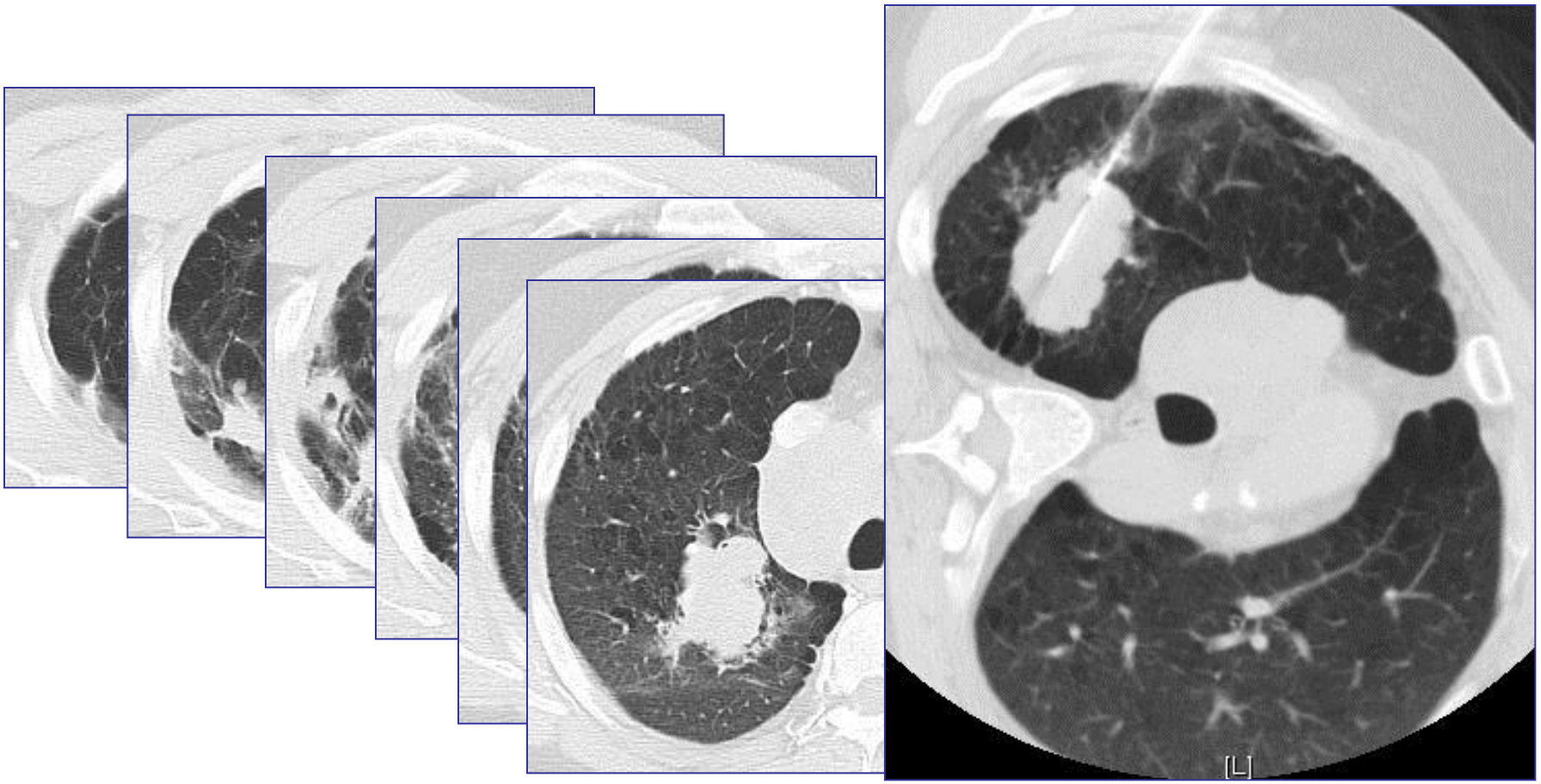
with good cooperation

(reproducible breathhold)

biopsy of nodules > 8 mm

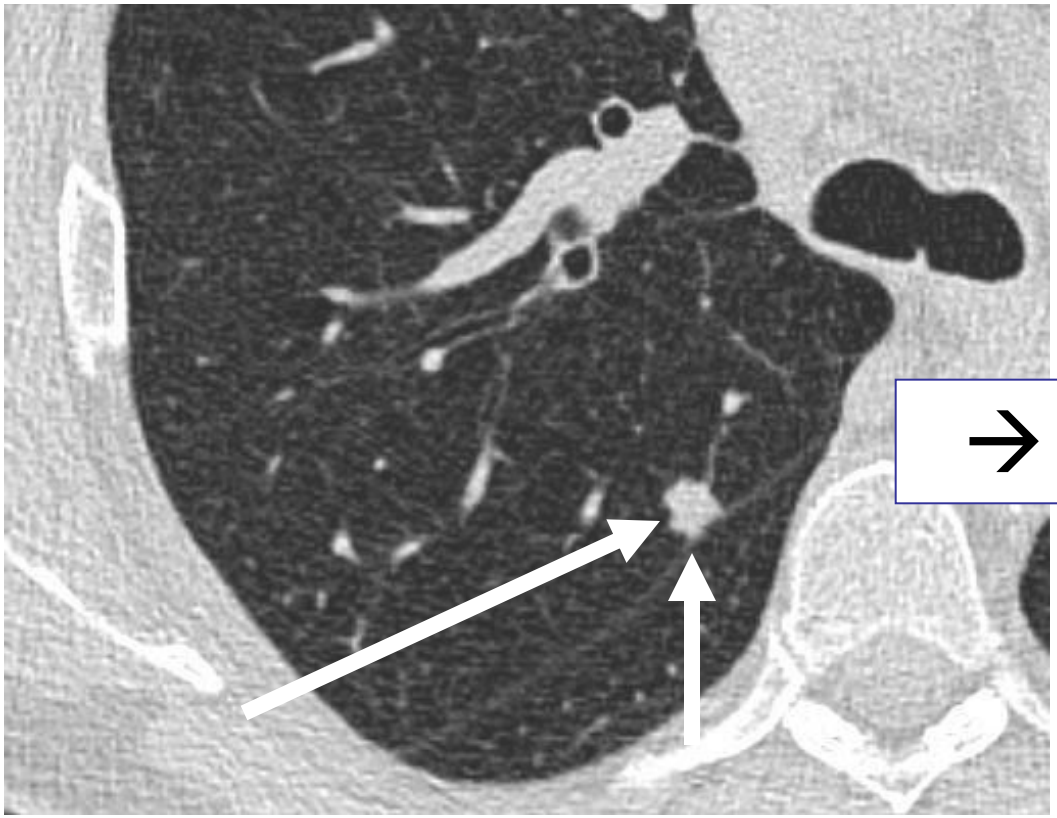
Selection of needle path

- not through areas of emphysema !



Selection of needle path

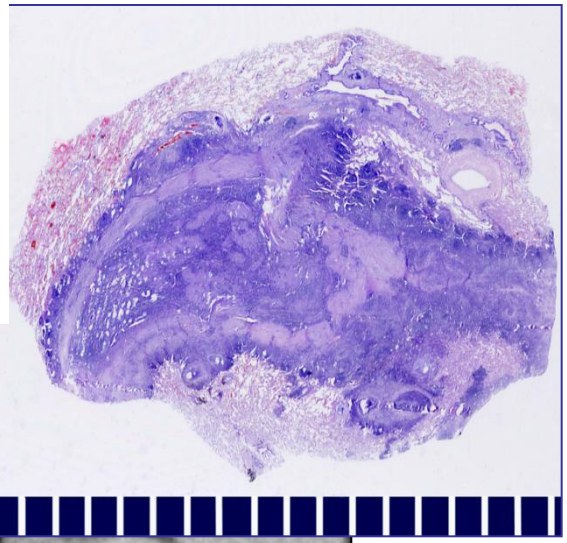
- not through areas of emphysema !
- not through fissures !

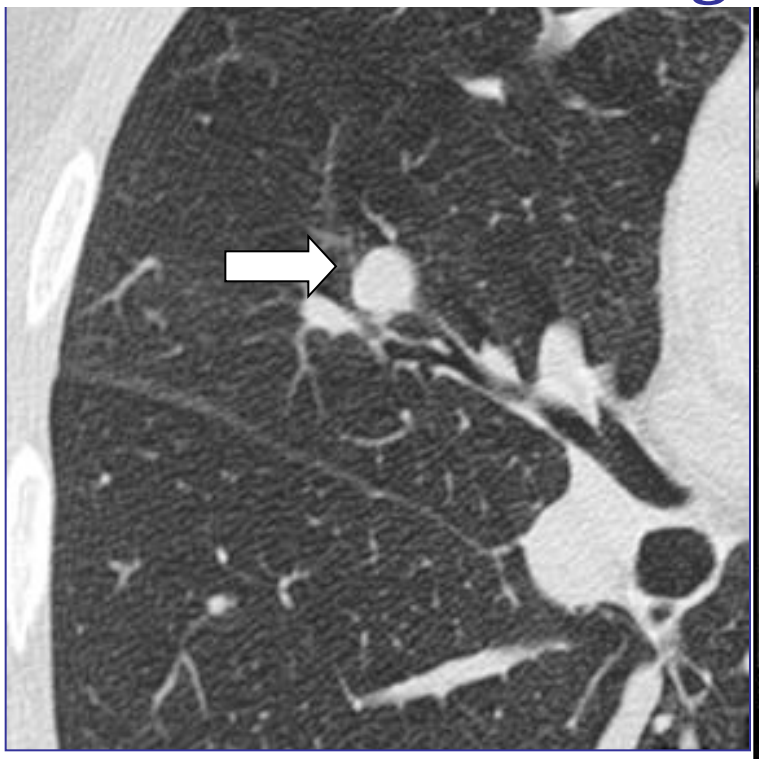


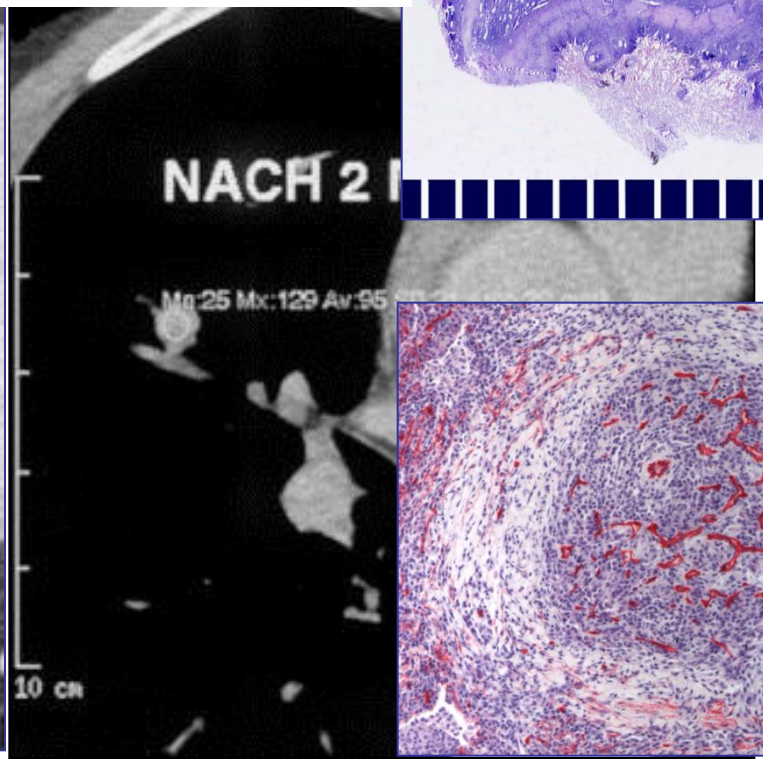
→ VATS

VATS : Inflammatory pseudotumor

- not through areas of emphysema !
- not through fissures !
- not if too close to large vessels !







Selection of needle

Automatic core biopsy

pro

- cytopathologist presence not required
- true positive benign diagnoses possible

contra

- potentially higher complication rate in central lesions (haemorrhage)

McLoud (1998) Radiology 208: 569 - 570

Percutaneous lung biopsy

Technique

- aseptic procedure
- local anaesthesia (no GA required)
- CT-guidance (if possible CT-fluoroscopy)
- control CT-scans for complications
- bed rest 4 hours, pulse & blood pressure x 2 / hour
- after 2-4 hours: CXR a.p./p.a.
- In-/ outpatient

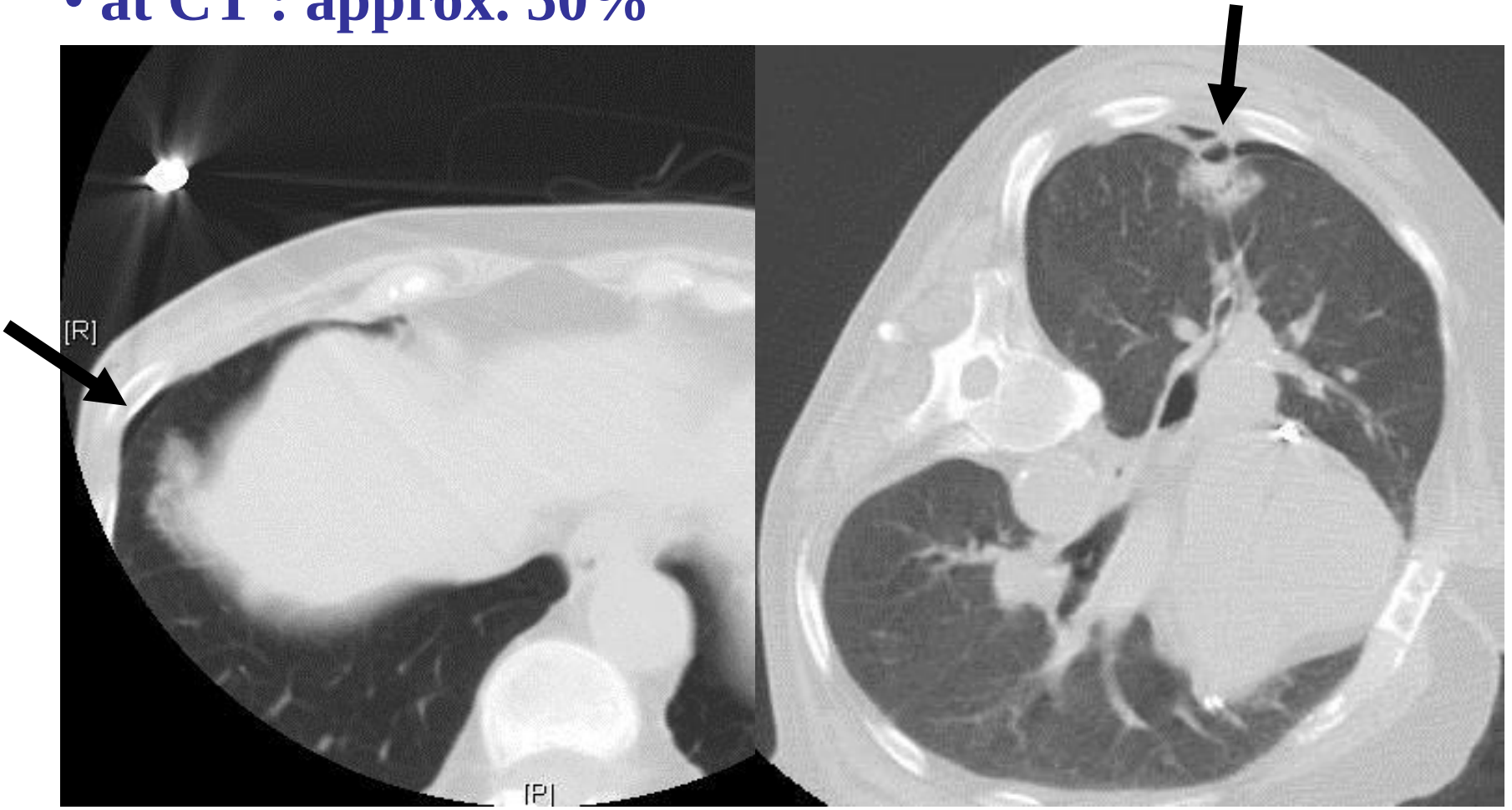
Complications of lung biopsy

No statistically proven difference between:

- Direct puncture / coaxial technique
- Single / multiple pleural punctures
- Depth of lesion
- Needle diameter

complications: pneumothorax

- **at CT : approx. 50%**



complications: pneumothorax

- at CT : approx. 50%
- therapy required: 5-15% ?
  - every symptomatic pneumothorax
  - > 30% of hemithorax, > 1 cm width

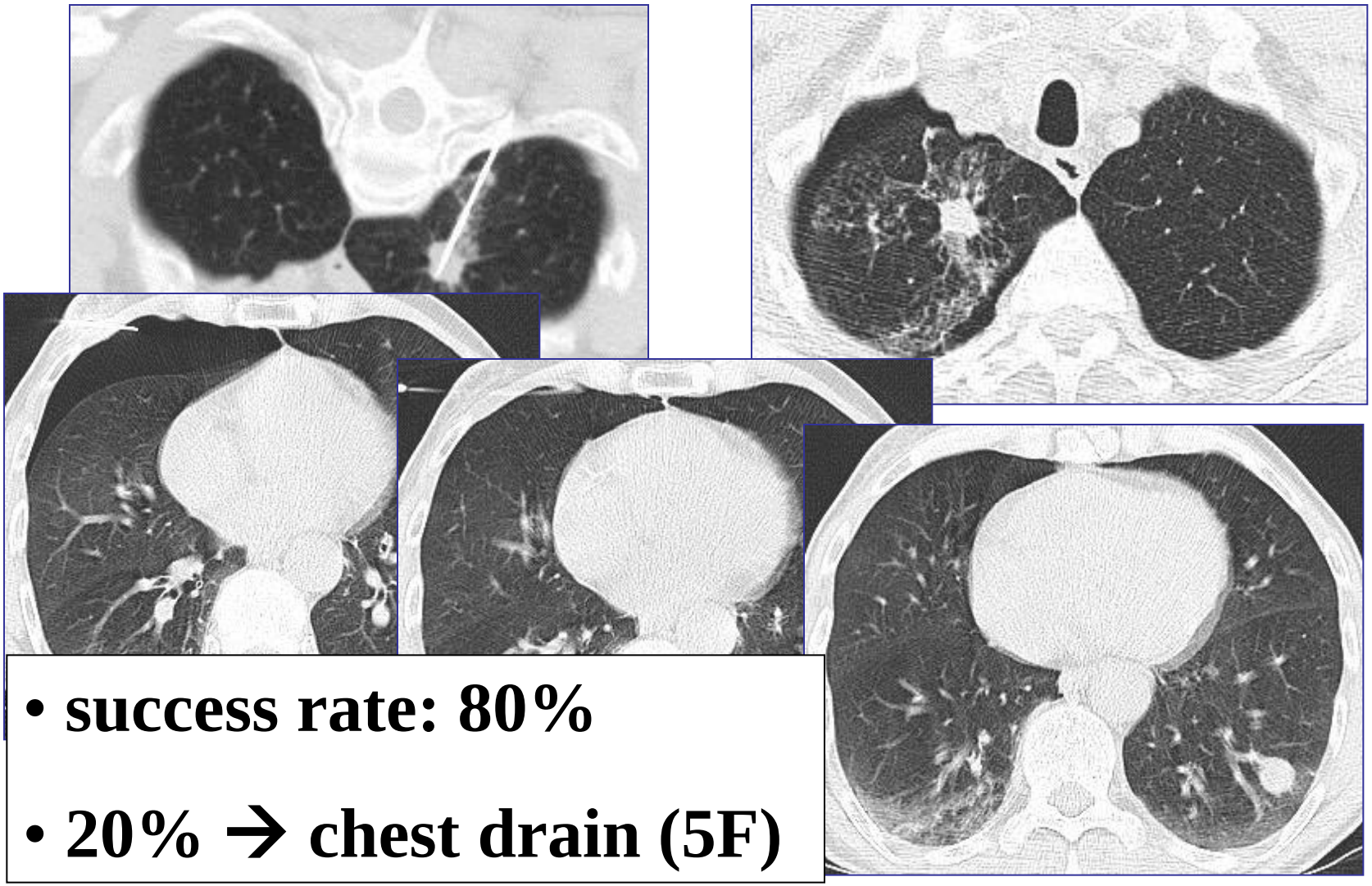
Yankelevitz (1996) Radiology

complications: pneumothorax

- at CT : approx. 50%
- therapy required : 5-15% ?
  - every symptomatic pneumothorax
  - > 30% of hemithorax, > 1 cm width
- **therapy by radiologist !**
  - **aspiration (16 - 18 G needle): immediately vs. after 4 h**
  - **catheter drainage (5 F-catheter !)**
  - **optional oxygen**

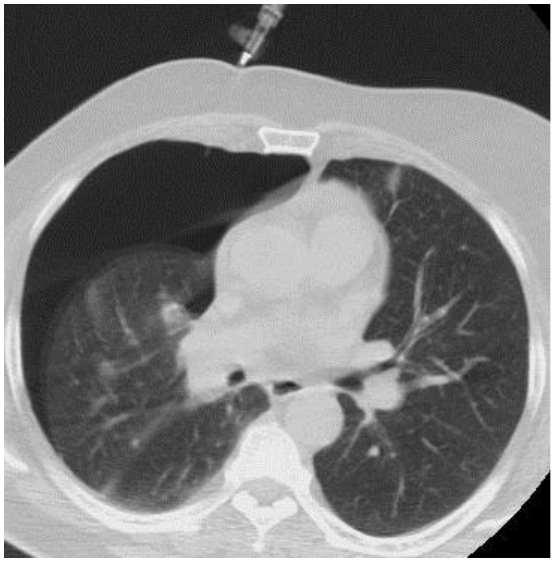
Yankelevitz (1996) Radiology

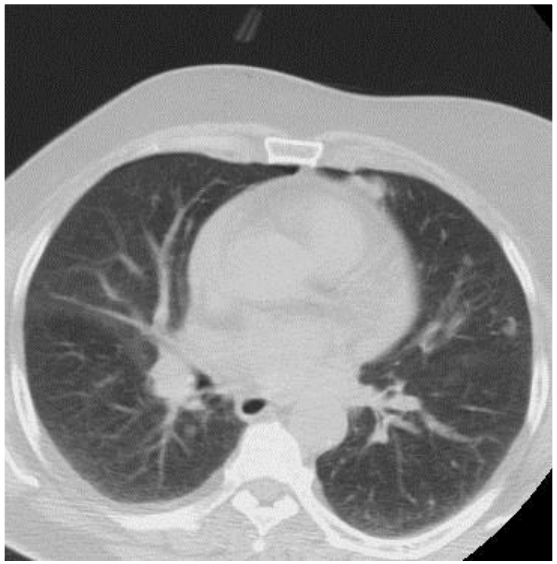
complications: pneumothorax



- **success rate: 80%**
- **20% → chest drain (5F)**

Post biopsy pneumothorax

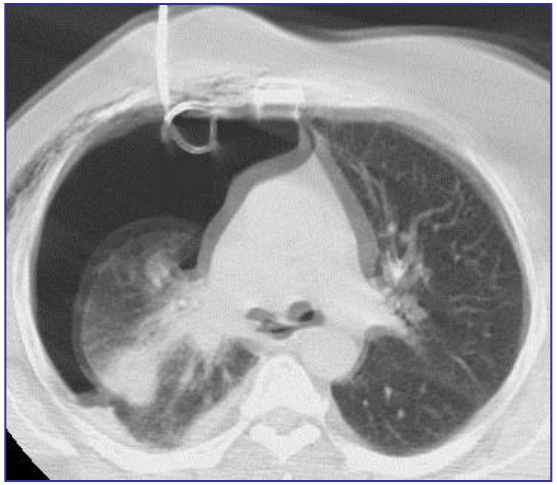


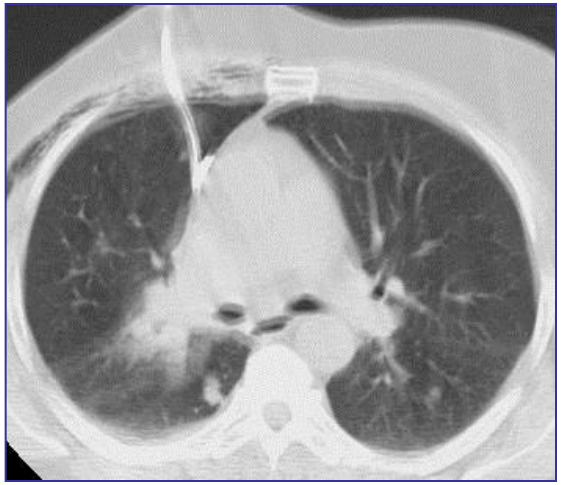


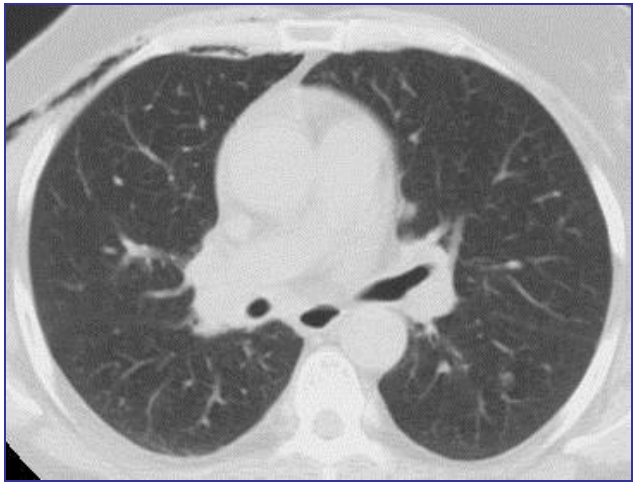
aspiration

recurrence at 4 h

→ catheter

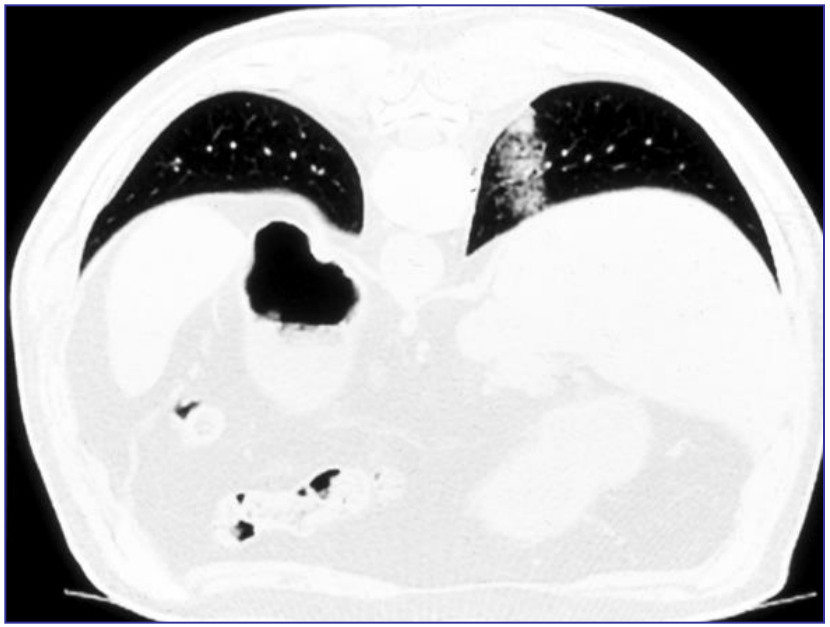


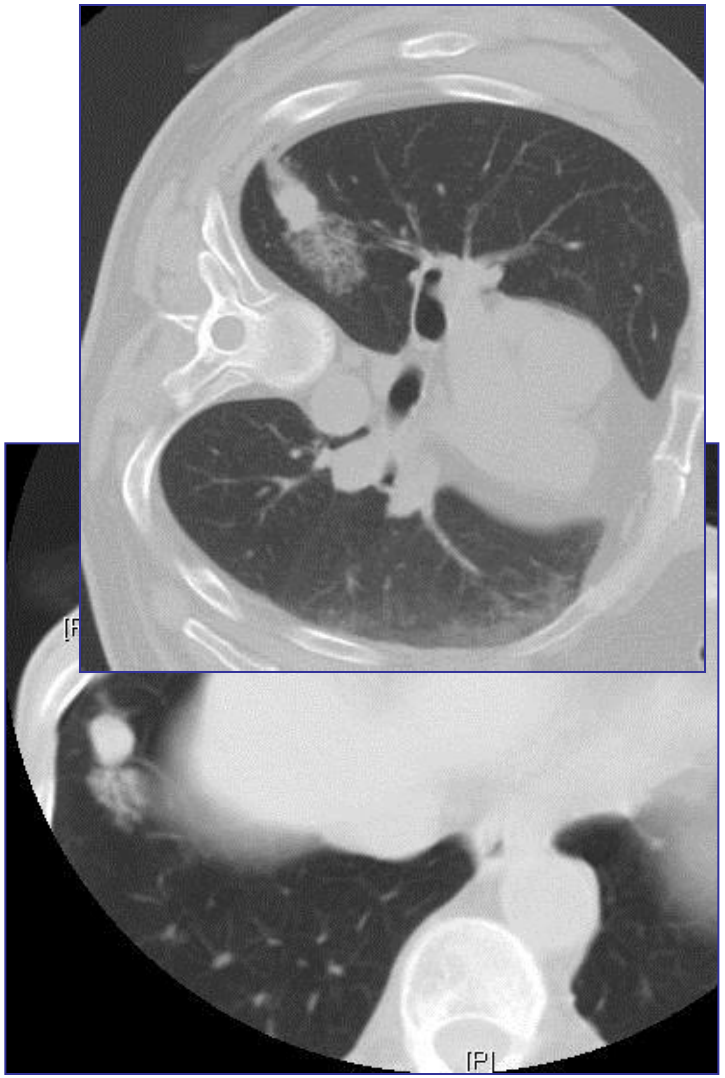




complications: haemorrhage

- very common at CT (core bx)
- haemoptysis 2-4%
- therapy required < 1% ?





complications: air embolism

occurs when needle in pulmonary vein branch

- coaxial >>> direct puncture ?
- central >>> peripheral ?
- < 0,1%, however, potentially lethal
  - myocardial infarction
  - stroke

70 y/o female, endometrial ca

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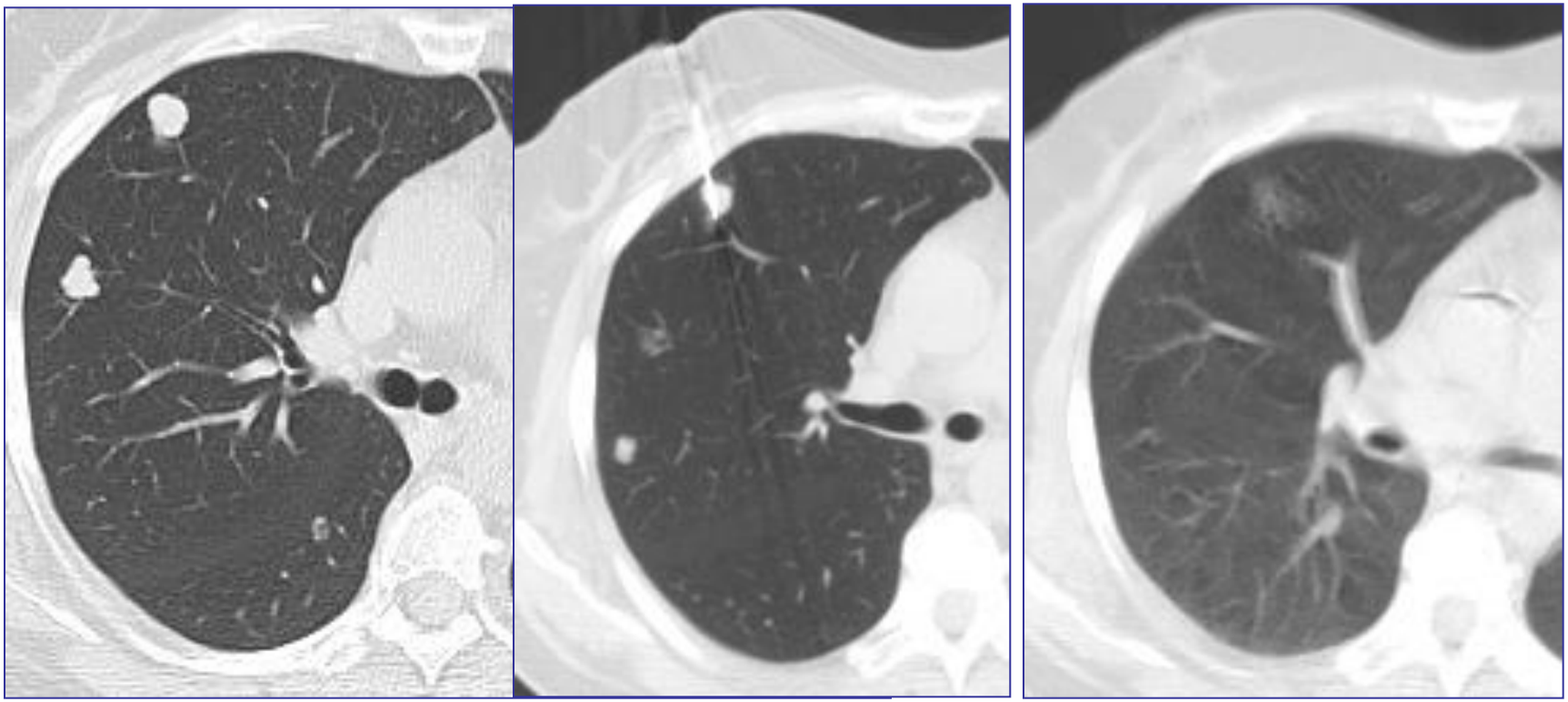
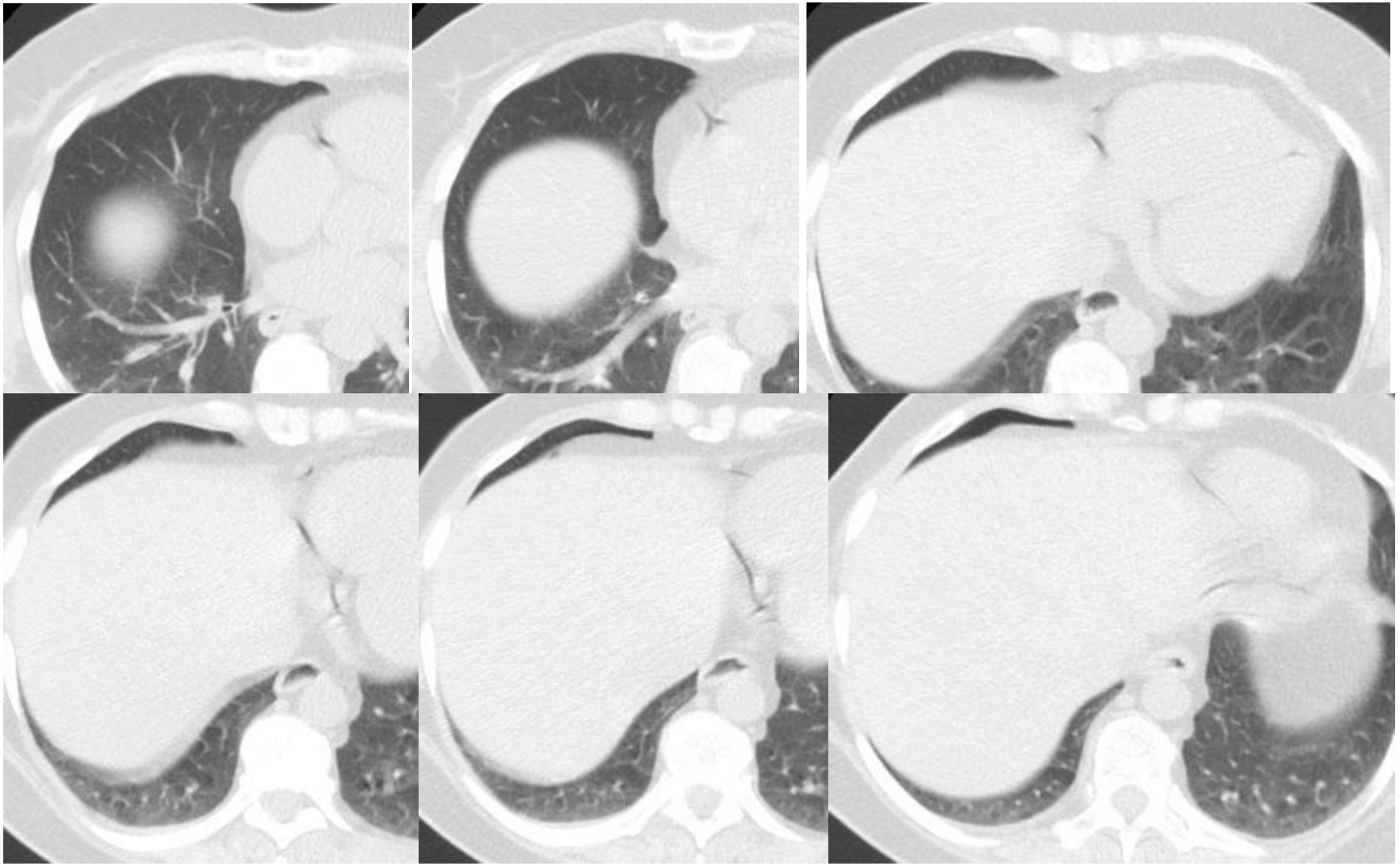
pT1, pN1, G1

- 18 G direct puncture (no coaxial technique)
- immediate coma, bradycardia, hypotension



Coronary air embolism



CT-guided lung biopsy

Accuracy

Sensitivity: 84 - 98%

Specificity: 88 - 98%

Complications

pneumothorax: - 50%

requiring therapy: -15%

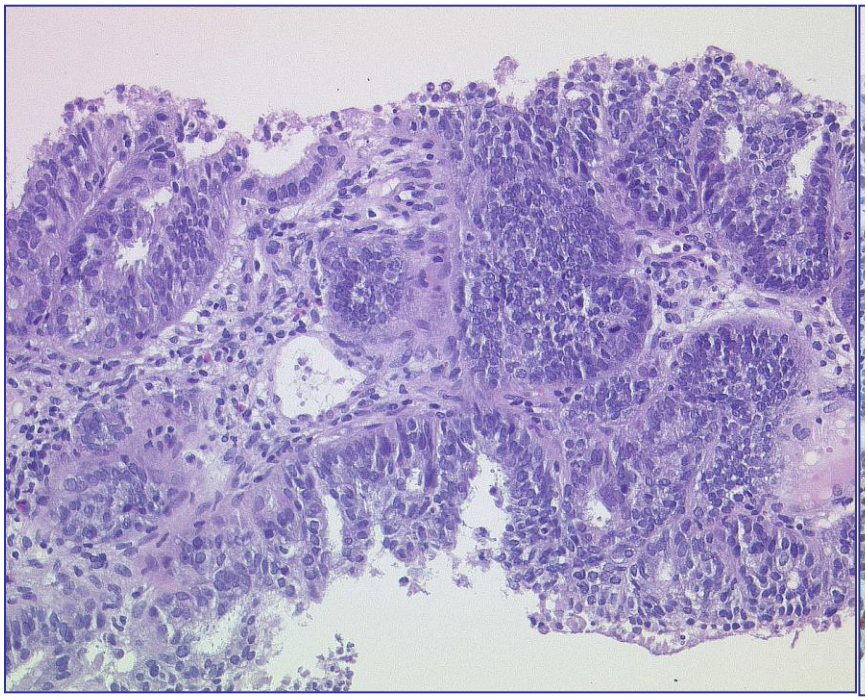
haemorrhage: - 70%

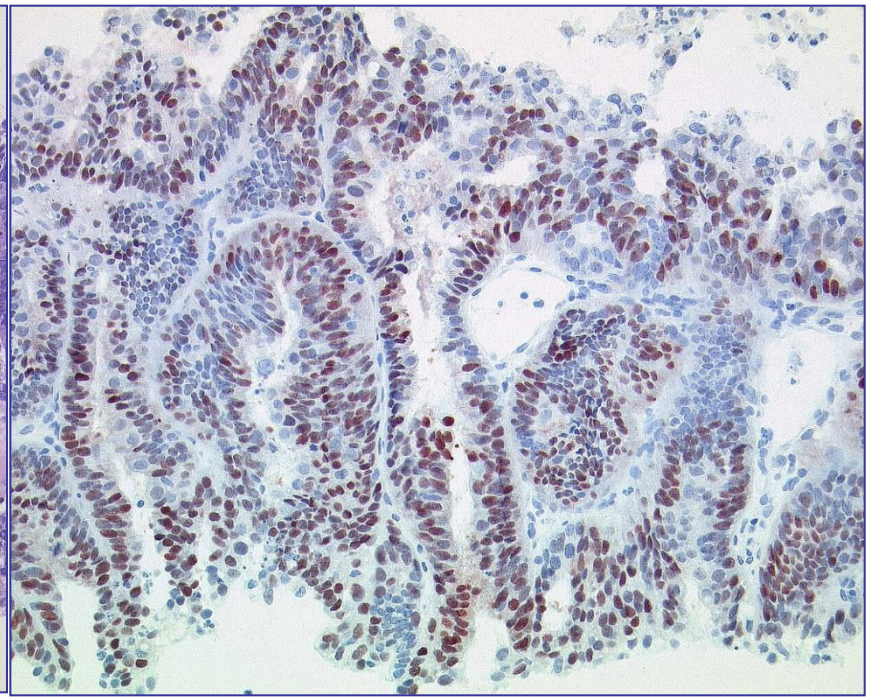
haemoptysis: 2 - 4%

air embolism: < 0.1%

female smoker, history of ca uterus
new solitary pulmonary nodule

18 G core biopsy → immunohistology, molecular pathology





Metastasis from endometrial cancer, not primary lung cancer

Percutaneous wire localization

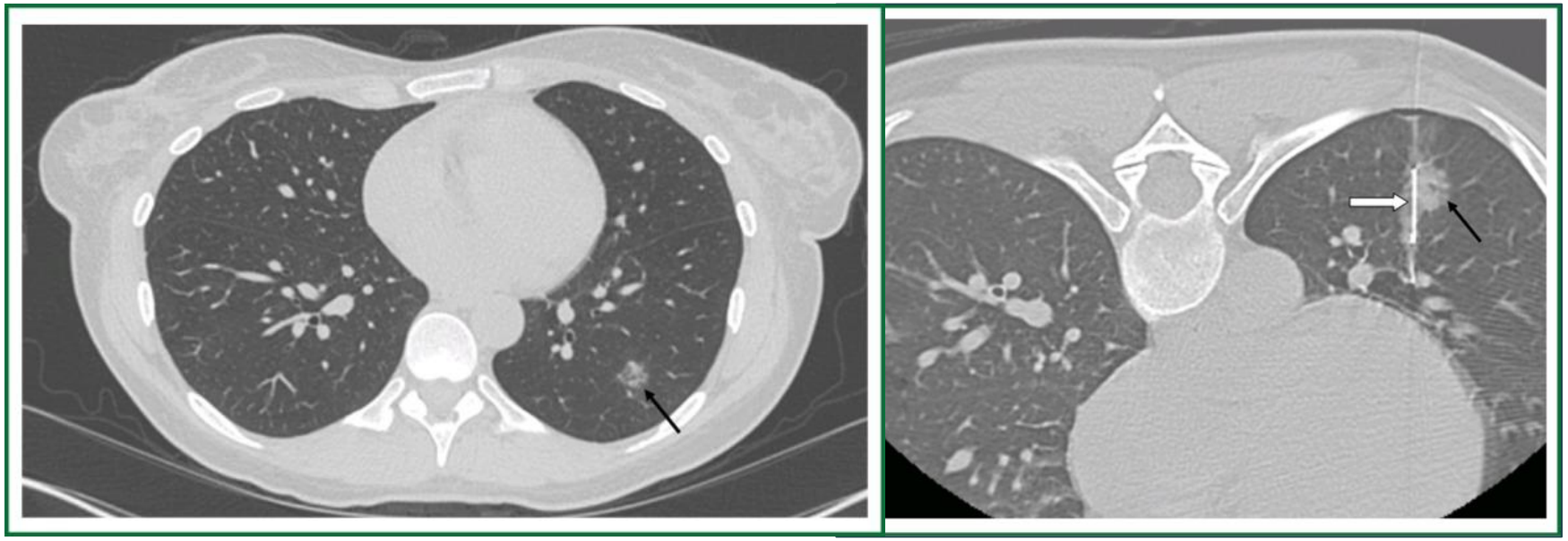
Indication:

- localization of a peripheral nodule for video-assisted thoracoscopic resection
- nodule only “palpable“ at VATS if distance to pleura < nodule diameter

Technique:

- CT-guided placement of wire with hook / spiral close to the nodule (centrally of nodule)

Percutaneous wire localization



Kohi MP et al. (2013) J Thorac Dis

Take-home message I

Biopsy in nodules < 8 mm

- rarely indicated
- rarely feasible

Biopsy in nodules ≥ 8 mm

- size
- location (lung apex/base, lung centre/periphery)
- patient cooperation

Take-home message II

Percutaneous lung biopsy

- high accuracy
- low complication rate
- potentially fatal complications (air embolism)

Percutaneous wire localization

- pre VATS resection, if nodule not palpable

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Thank you for your attention !

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