

# AMSER Case of the Month

## March 2024

63 y.o male presenting for annual lung cancer screening

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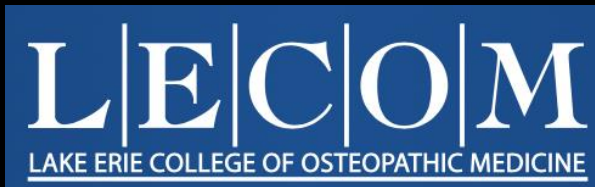
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# Patient Presentation:

63 y.o male presenting for annual lung cancer screening.

Past medical history include essential hypertension, COPD, ILD, pulmonary emphysema, hyperlipidemia, diabetes mellitus type 2, nonischemic cardiomyopathy EF 35%, iliac artery stenting and left superficial femoral to below-knee popliteal artery bypass, long term smoking, GERD.

Social history: active smoker with 44 pack-year smoking history, 12 standard drink of alcohol per week, prior cocaine use, exposure to mold and asbestos.

# USPSTF 2021 recommendation for Lung Cancer Screening

Annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 50-80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years.

Stop screening once a person has not smoked for 15 years or has a health problem that limits life expectancy or ability to have lung surgery.



Figure 1. Low dose CT scan performed for lung cancer screening.  
CDC. [https://www.cdc.gov/cancer/lung/basic\\_info/screening.htm](https://www.cdc.gov/cancer/lung/basic_info/screening.htm)

# Benefits of lung cancer screening

## **National Lung Screening Trial (NLST)**

- NLST showed a 20% decrease in lung cancer mortality in patients using low-dose CT screening compared to single view posteroanterior radiography.

## **Dutch-Belgian randomized lung cancer screening trial (NELSON)**

- NELSON showed a 24% reduction in lung cancer-related mortality with low-dose CT in men and 33% reduction in lung cancer-related mortality in women with low-dose CT screening

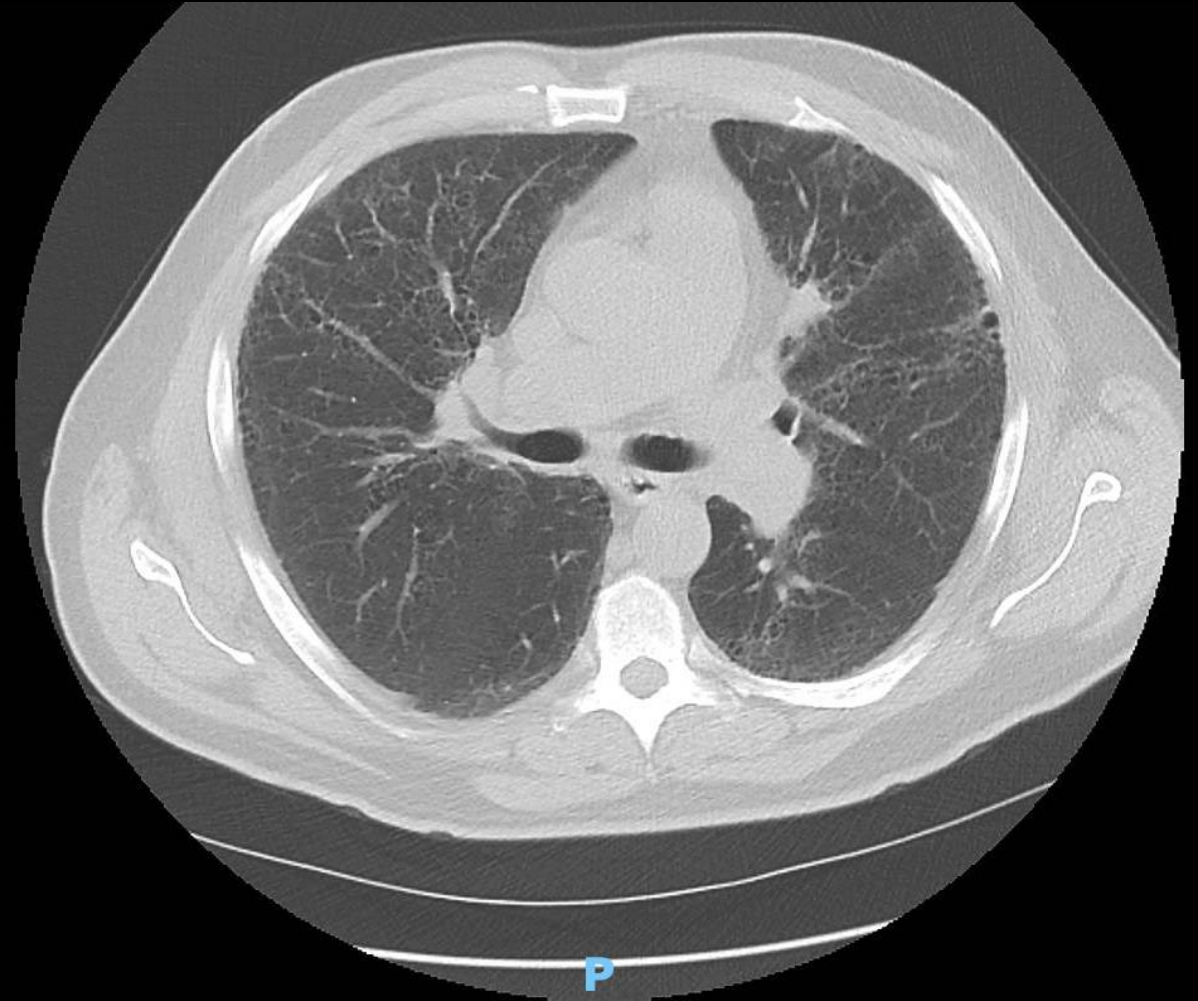
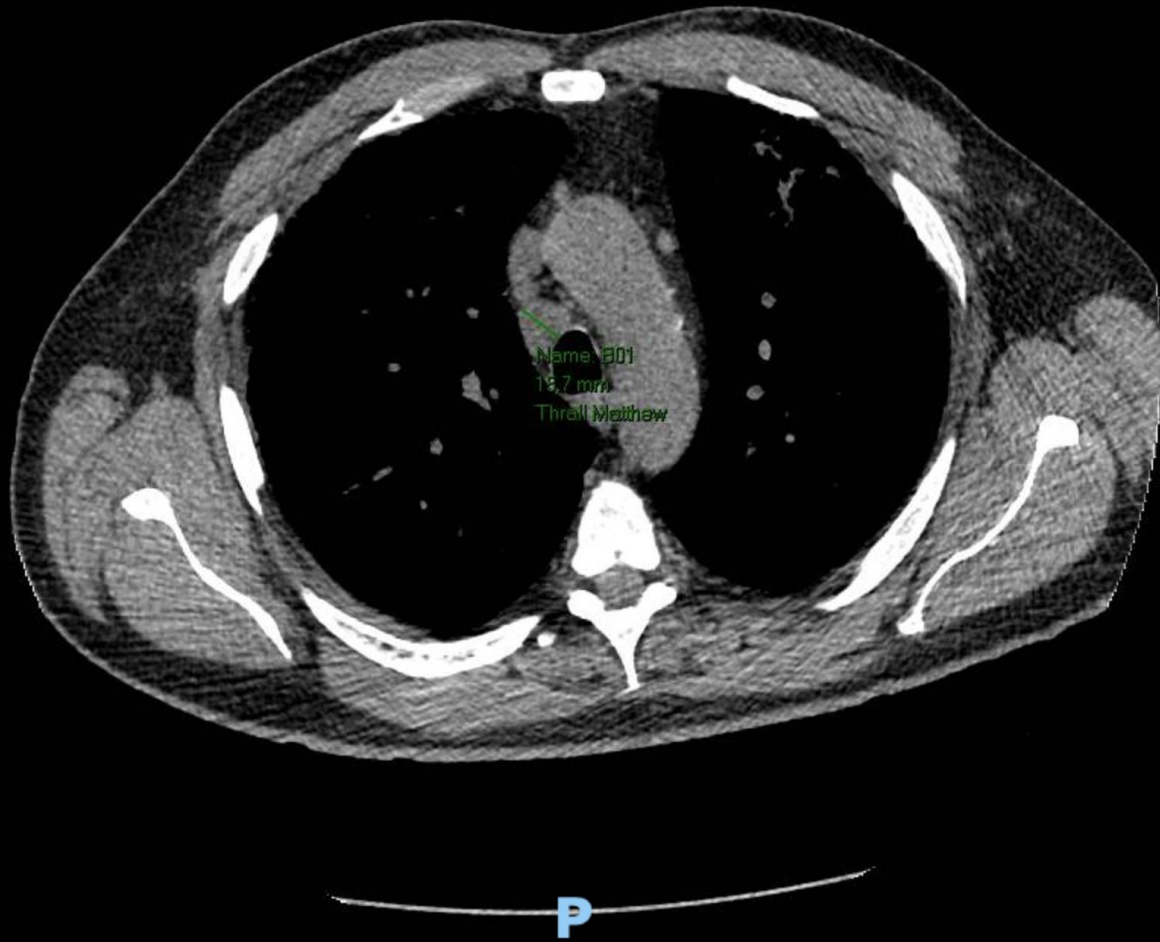


Figure 2. Low-dose CT scan (LDCT).



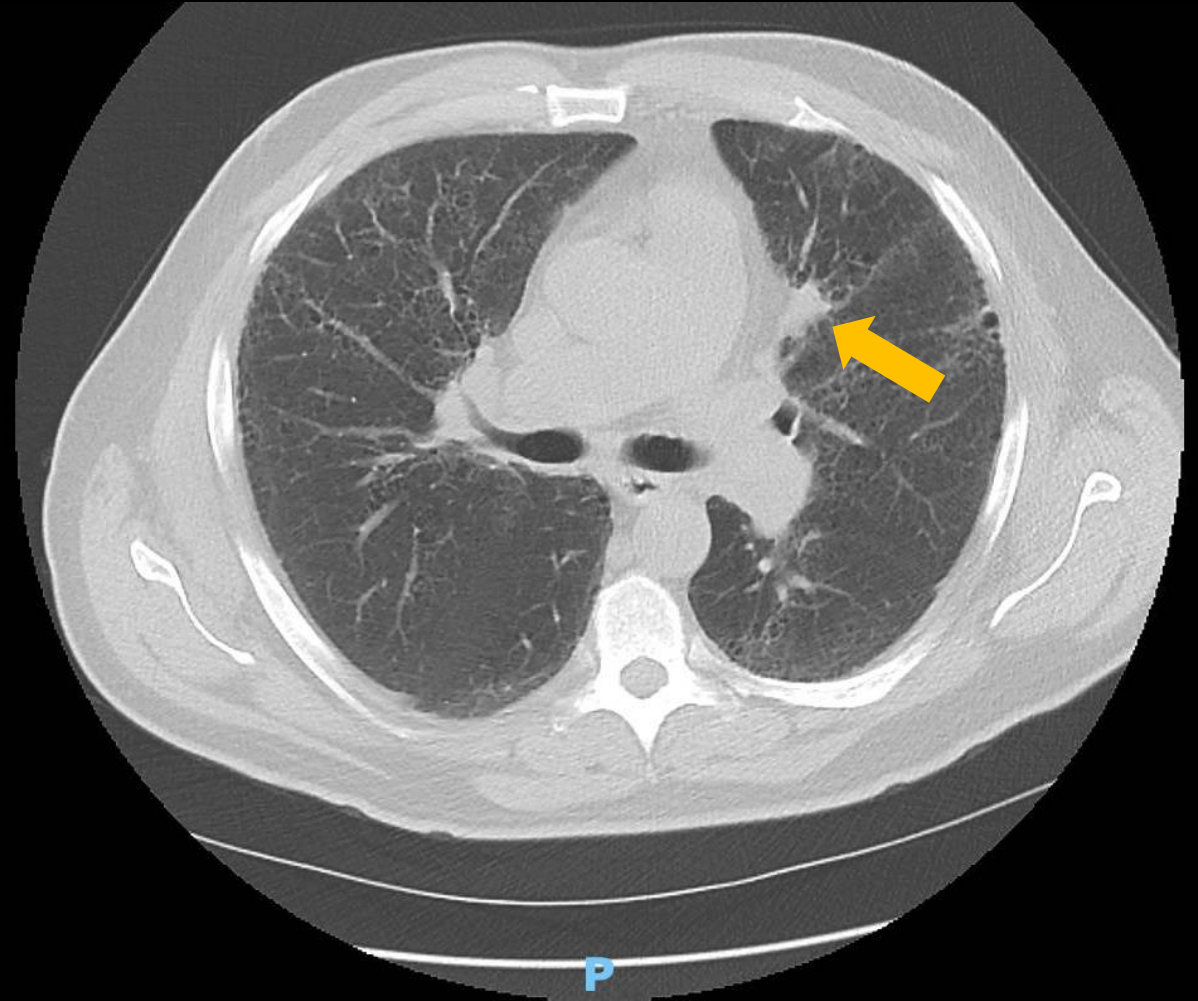
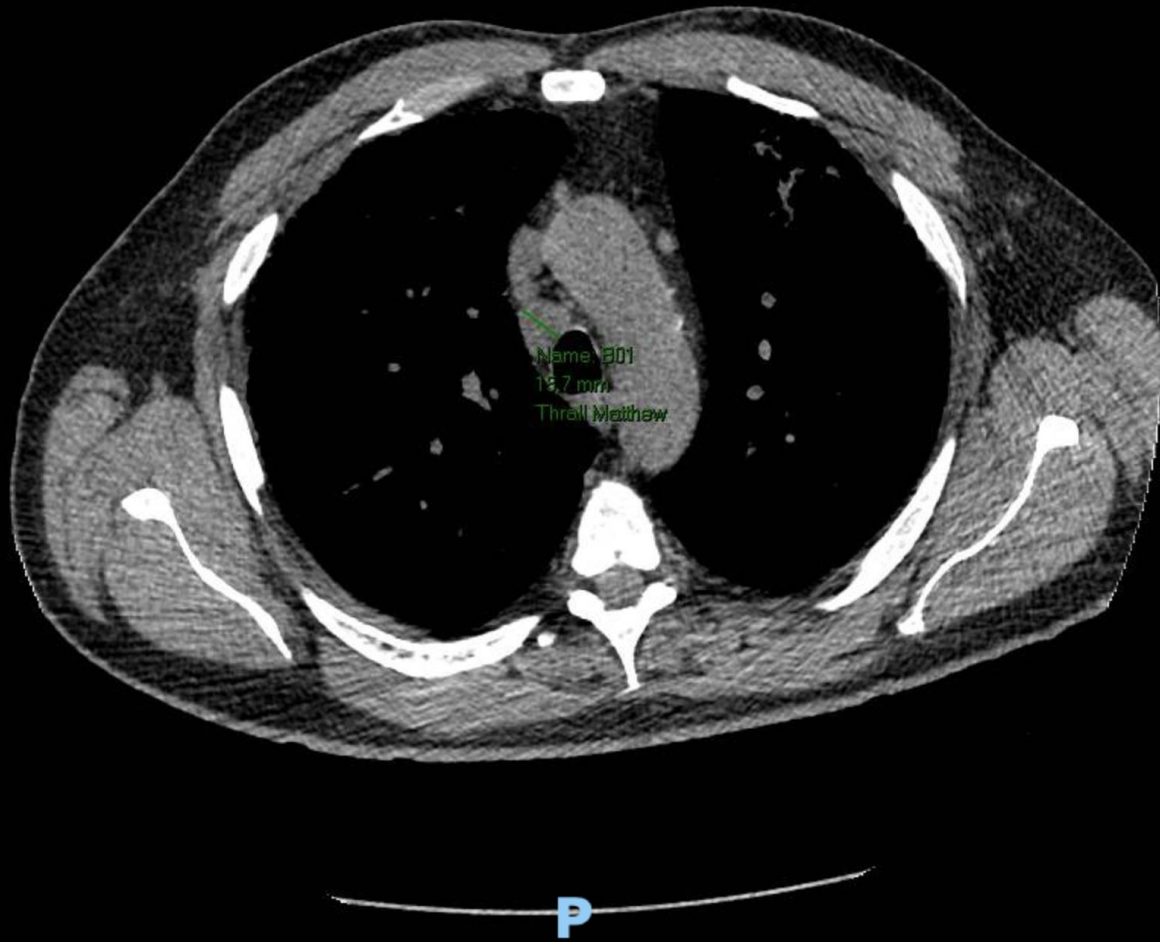


Figure 3. LDCT scan showing (A) mediastinal adenopathy and (B) a 1.9 cm solid nodular opacity in the left upper lobe medially (arrow).

# Lung-RADS® v2022 - American College of Radiology

Standardizes reporting and management recommendations for lung cancer screening low-dose CT.

0: Incomplete



Comparison to prior chest CT, additional lung cancer screening CT screening, or 1–3-month LDCT, depending on the reason the study is considered incomplete

1: Negative:

- no nodule
- nodule with benign features

2: Benign nodule:

- juxtapleural
- solid
- part solid
- nonsolid
- airway



12 month screening LDCT

# Lung-RADS® v2022 Category and Management

## 3: Probably Benign nodule:

- solid
- part solid
- non-solid
- atypical pulmonary cyst

→ 6-month LDCT

## 4A: Suspicious nodule:

- solid
- part solid
- airway
- atypical pulmonary cyst

→ 3-month LDCT;  
PET/CT if solid nodule or solid component  
≥ 8 mm (≥ 268 mm<sup>3</sup>)

S: Significant or potentially significant finding  
unrelated to lung cancer (added to 0-4)

→ Finding specific



# Lung-RADS® v2022 Category and Management



<b>4B</b>	<b>Very Suspicious</b> Estimated Population Prevalence: 2%	Airway nodule, segmental or more proximal - stable or growing (see note 11)	Referral for further clinical evaluation
		<b>Solid nodule:</b> • $\geq 15$ mm ( $\geq 1767$ mm <sup>3</sup> ) at baseline <b>OR</b> • New or growing $\geq 8$ mm ( $\geq 268$ mm <sup>3</sup> )	Diagnostic chest CT with or without contrast;  PET/CT may be considered if there is a $\geq 8$ mm ( $\geq 268$ mm <sup>3</sup> ) solid nodule or solid component;  tissue sampling;  and/or referral for further clinical evaluation  Management depends on clinical evaluation, patient preference, and the probability of malignancy (see note 13)
		<b>Part solid nodule:</b> • Solid component $\geq 8$ mm ( $\geq 268$ mm <sup>3</sup> ) at baseline <b>OR</b> • New or growing $\geq 4$ mm ( $\geq 34$ mm <sup>3</sup> ) solid component	
		<b>Atypical pulmonary cyst:</b> (see note 12) • Thick-walled cyst with growing wall thickness/nodularity <b>OR</b> • Growing multilocular cyst (mean diameter) <b>OR</b> • Multilocular cyst with increased loculation or new/increased opacity (nodular, ground glass, or consolidation)	
<b>Slow growing solid or part solid nodule</b> that demonstrates growth over multiple screening exams (see note 8)			
<b>4X</b>	Estimated Population Prevalence: < 1%	Category 3 or 4 nodules with additional features or imaging findings that increase suspicion for lung cancer (see note 14)	

Lung-RADS 4B

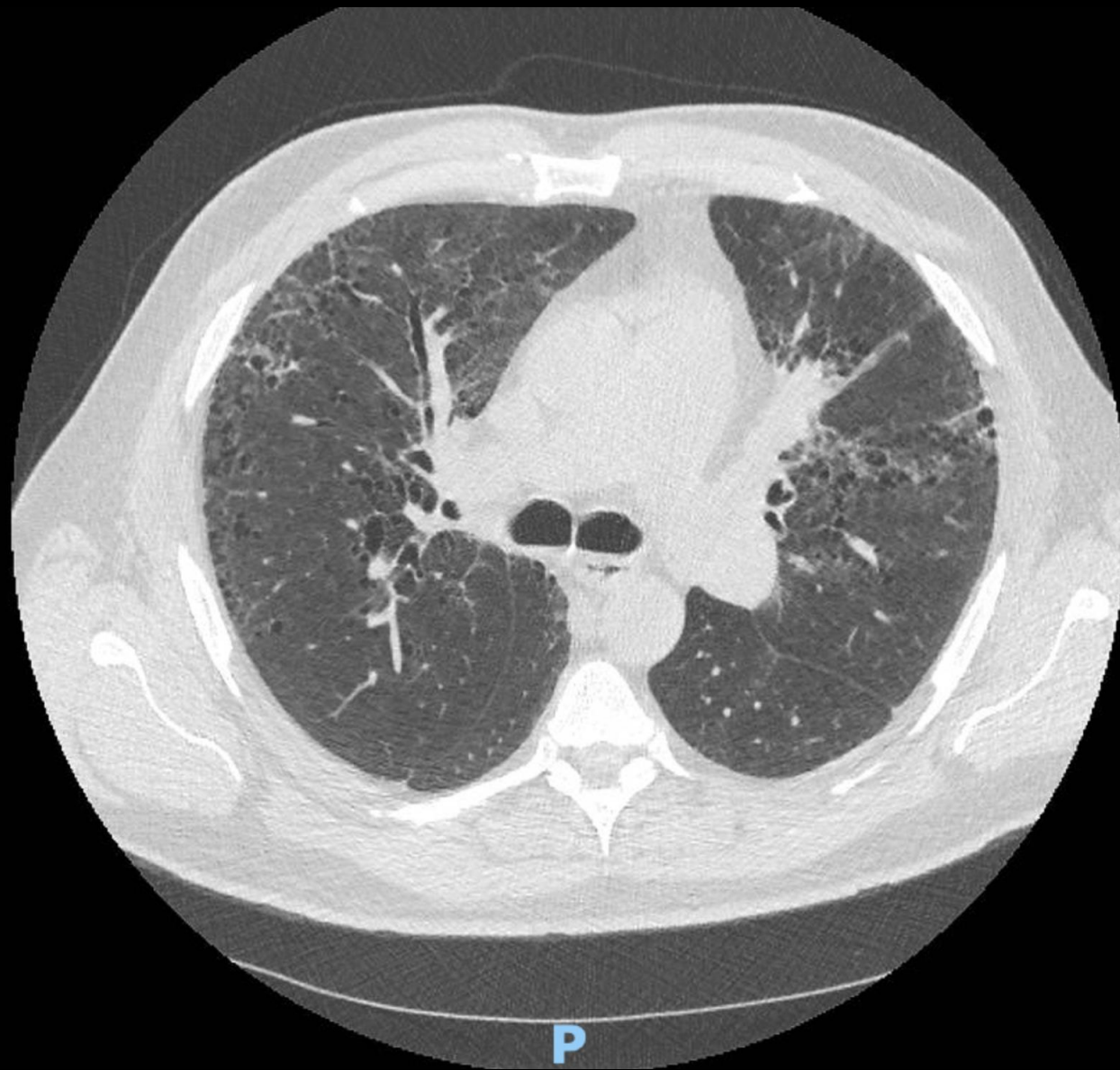


Figure 4. Follow-up LDCT scan 2 months later.

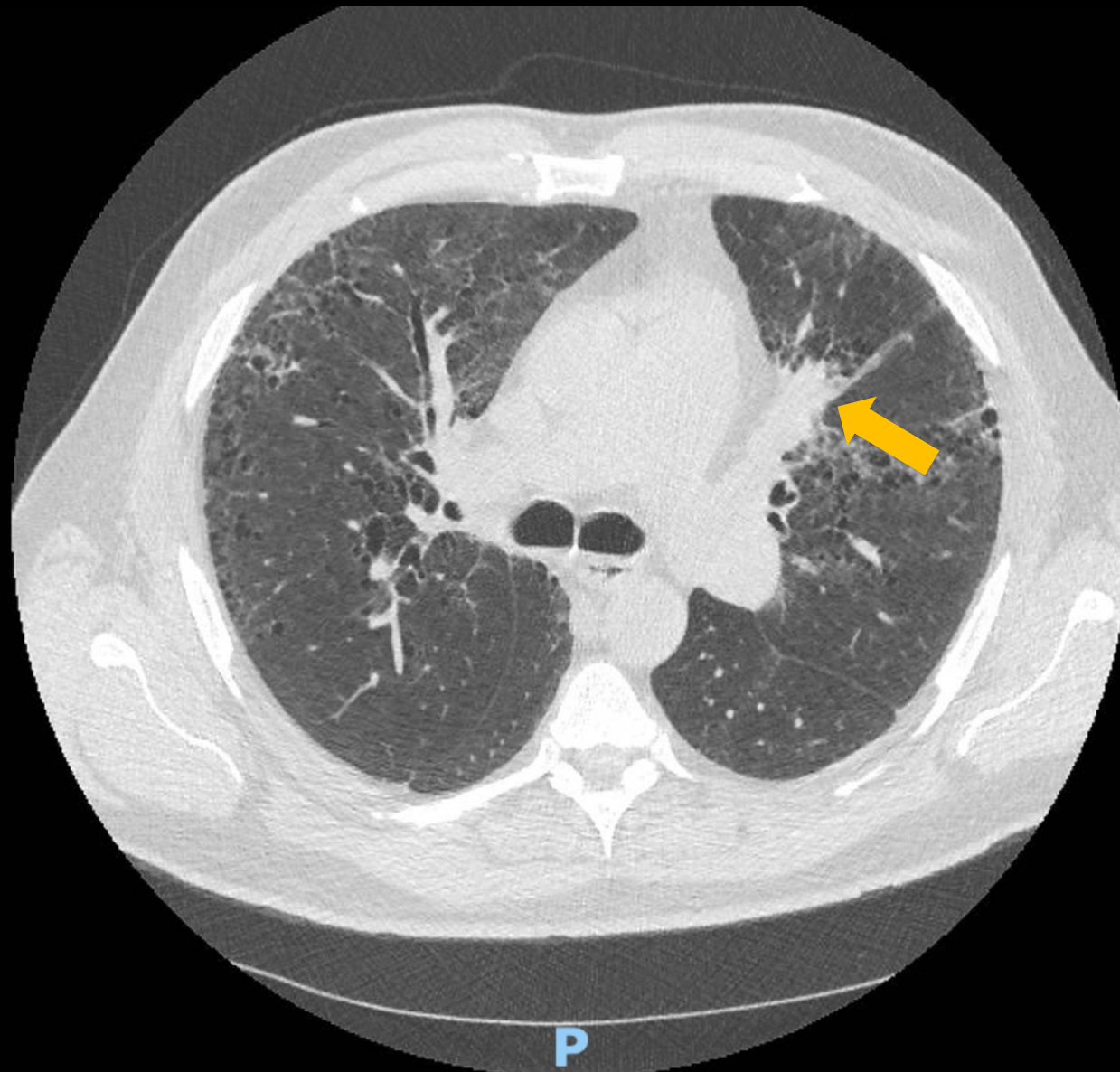
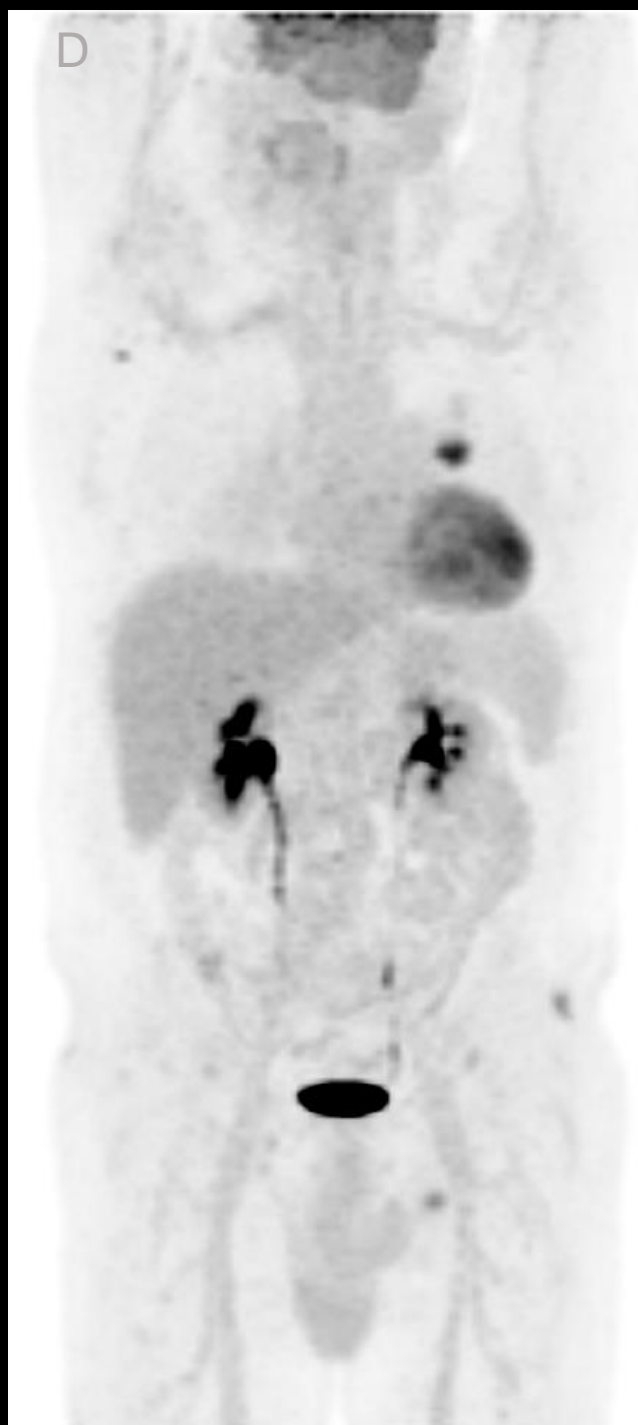
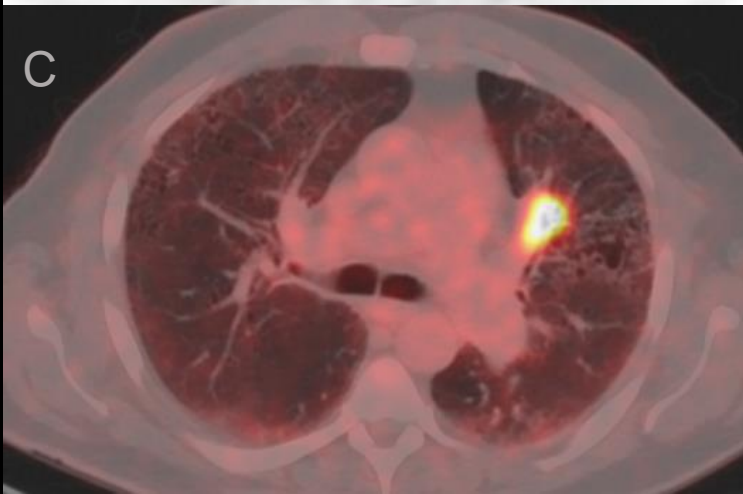
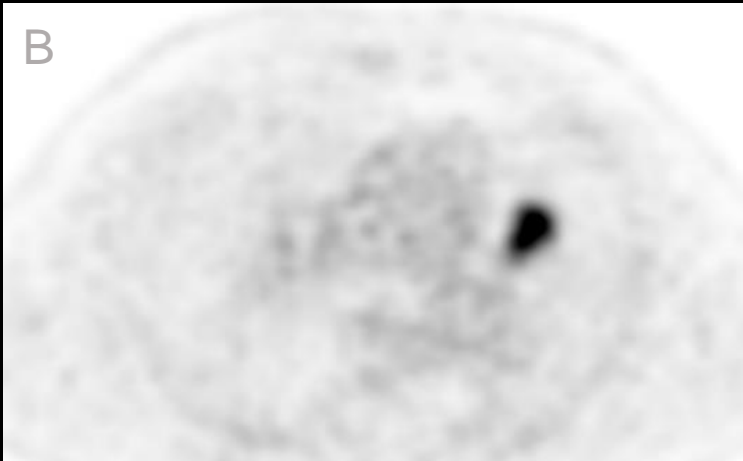


Figure 5. Follow-up LDCT scan 2 months later showing increased size of the solid, spiculated mass-like opacity measuring 3.5 x1.5 cm in the LUL. Additional findings include emphysematous changes and 9 mm groundglass nodule in the right upper lobe (not shown).

**Lung-RADS 4B**



## Herder model

Predicts the risk of malignancy in solid pulmonary nodules with FDG uptake. Based on British Thoracic Society the FDG uptake is categorized as:

- no uptake
- faint uptake, less than or equal to mediastinal blood pool
- moderate uptake, greater than mediastinal blood pool
- intense uptake, uptake 3x mediastinal blood pool

Figure 6A-C. PET/CT showing left upper lobe nodule is hypermetabolic with SUVmax 6.0; Herder calculation of 95.3% probability of malignancy.

Figure 6D. PET/CT MIP image demonstrating no hypermetabolic regional adenopathy or distant metastases.



# Robotic Bronchoscopy Procedure and Findings

## **Cytology:**

LUL nodule FNA: squamous cell carcinoma

LUL nodule mini-BAL: squamous cell carcinoma

Bronchial brushings: suspicious of squamous cell carcinoma

Lymph nodes at stations 11R, 4R, 7, 4L and 11L: negative for malignancy

Bronchial washings: negative for malignancy

## **Pathology:**

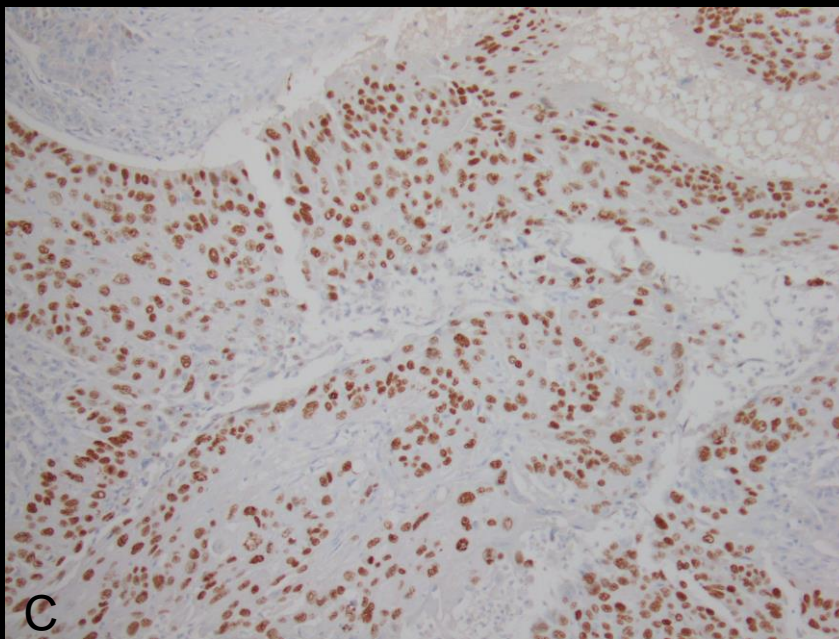
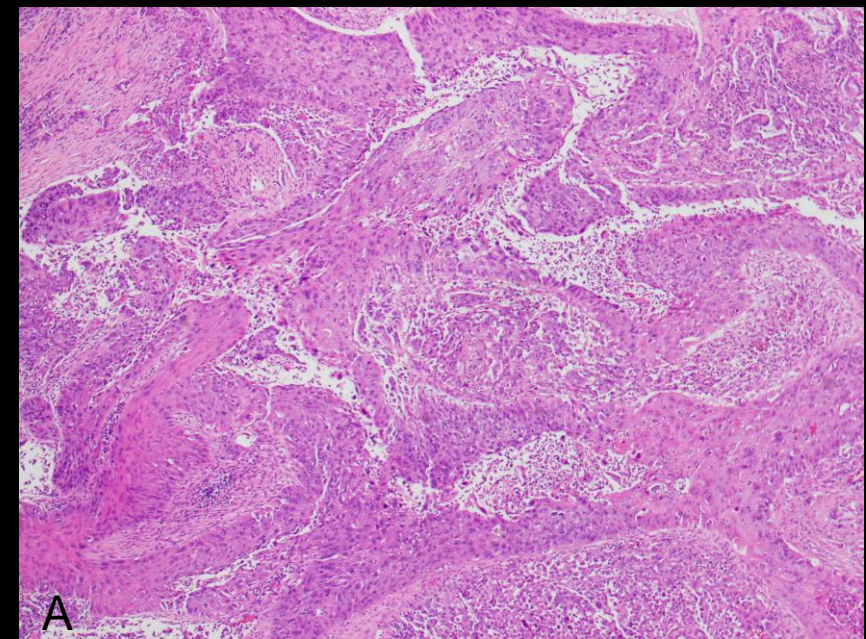
Transbronchial biopsies LUL nodule: squamous cell carcinoma, moderately differentiated



# Left Upper Lobe Lobectomy Procedure and Findings

**Procedure:** flexible bronchoscopy, robotic assisted left VATS, left upper lobe lobectomy, mediastinal lymph node dissection (left).

**Findings:** LUL lung mass, enlarged lymph nodes



Immunohistochemical marker P40  
positive for squamous carcinoma

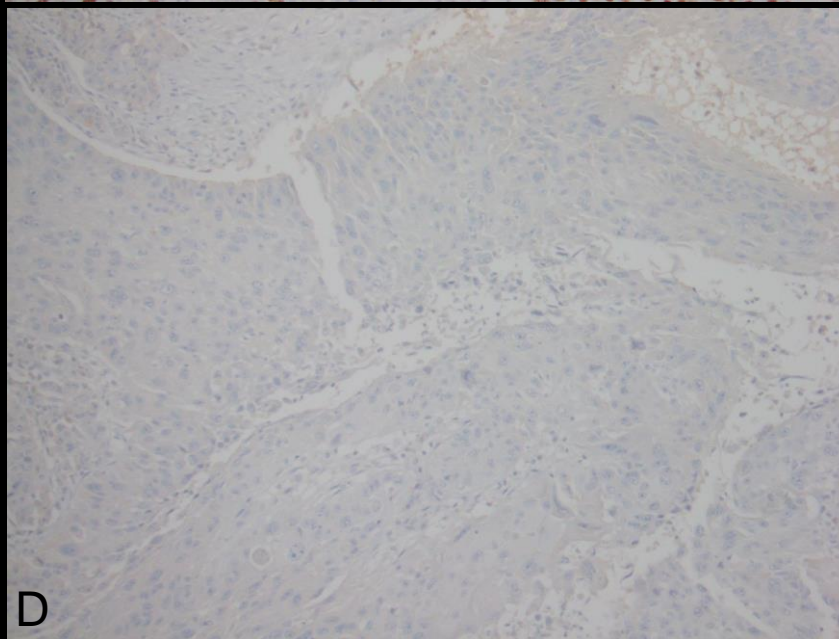
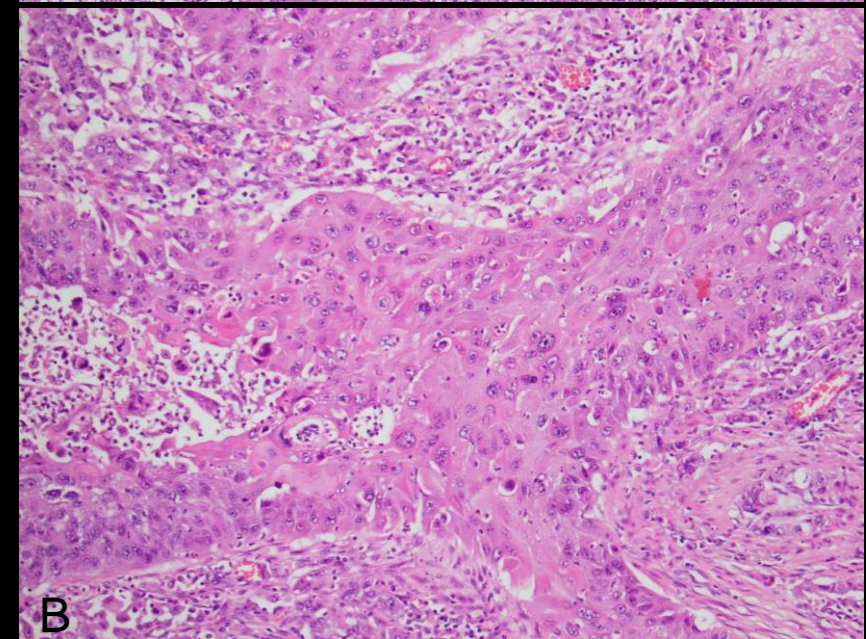
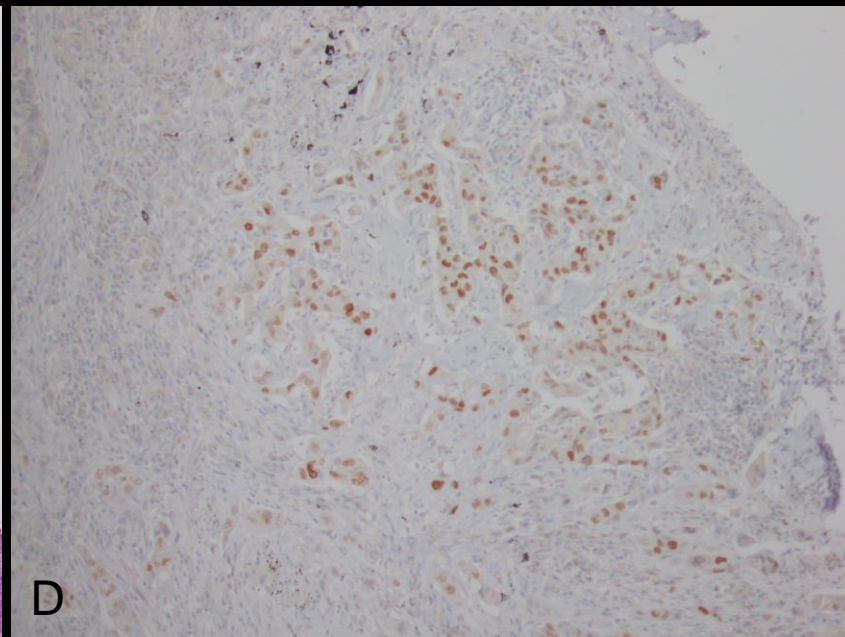
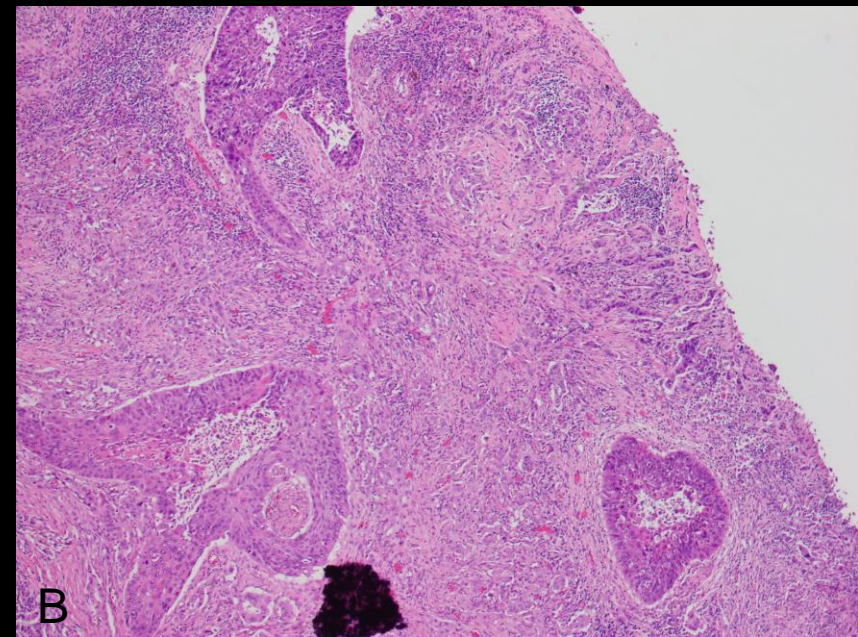
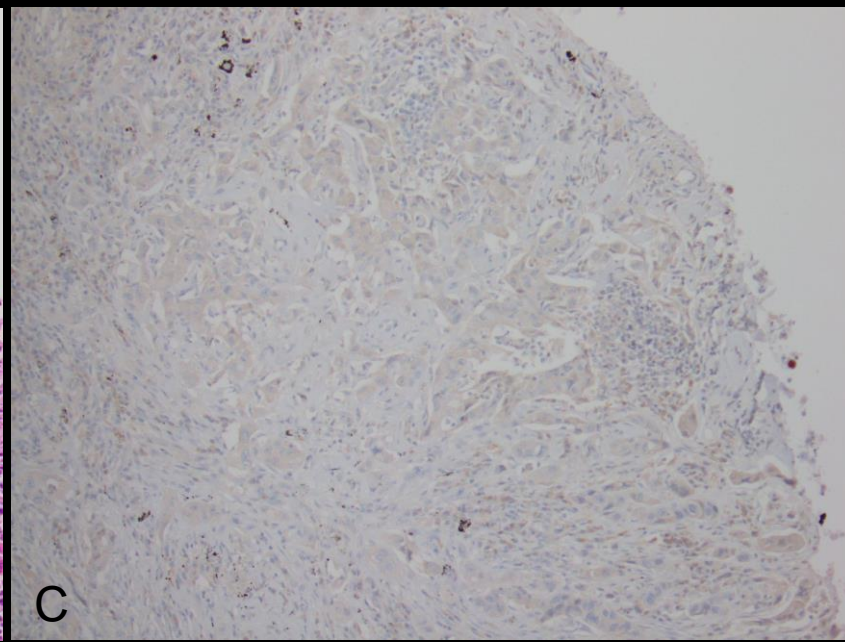
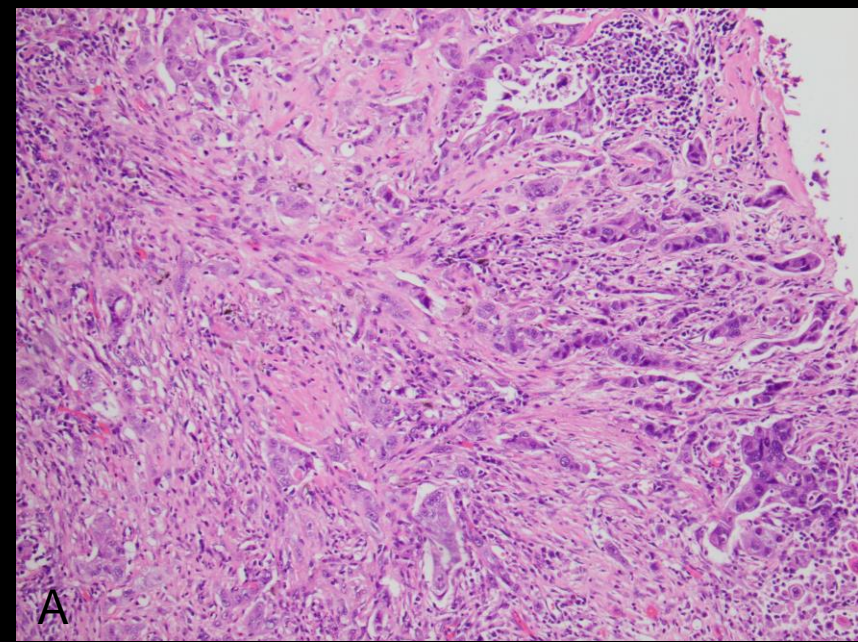


Figure 7. Squamous carcinoma of the lung low view (A), high view (B), p40 marker (C), TTF-1 marker (D).





Immunohistochemical marker TTF-1 positive for adenocarcinoma



Figure 8. Adenocarcinoma of the lung (A), adenosquamous carcinoma interphase (B), p40 marker (C), TTF-1 marker (D).

# Diagnosis

## Adenosquamous Carcinoma pT Category: pT2a and pN Category: pN2

- Diagnosis of adenosquamous carcinoma is made based on WHO 2015 Classification when both components are  $\geq 10\%$ .
- Staging is made accordingly to 8<sup>th</sup> edition of the tumor-node-metastasis (TNM) criteria.
- Lung adenosquamous carcinoma is a rare malignant tumor detected in 0.4%-4% of patients with lung cancer.



# Treatment Plan

Follow up with Radiation Oncology and Hematology & Medical Oncology.

Treatment according to NCCN Guidelines and Lung ART trial:

- Chemotherapy and adjuvant chemotherapy consisting of 4 cycles of carboplatin and paclitaxel.
- No pemetrexed due to squamous component.
- Molecular testing and PD-L1 status testing for EGFR targeted therapy vs immunotherapy.
- Radiation therapy to the left aortopulmonary area.



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