

# Radiology Pathology AMSER Case of the Month

53 year old female with left lung mass

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Allegheny  
Health Network



# Patient Presentation

- CC/HPI: 53 year old female presents with left shoulder and chest pain.
- Past Medical Hx: Hypothyroidism, Anxiety, Thrombocytosis
- Past Surgical Hx: Cesarean section
- Social Hx: Current smoker, 0.5 pack/day for 20 years. 6+ beers per day.

What imaging should we order?

# ACR Appropriateness Criteria

This imaging modality was ordered by the PCP

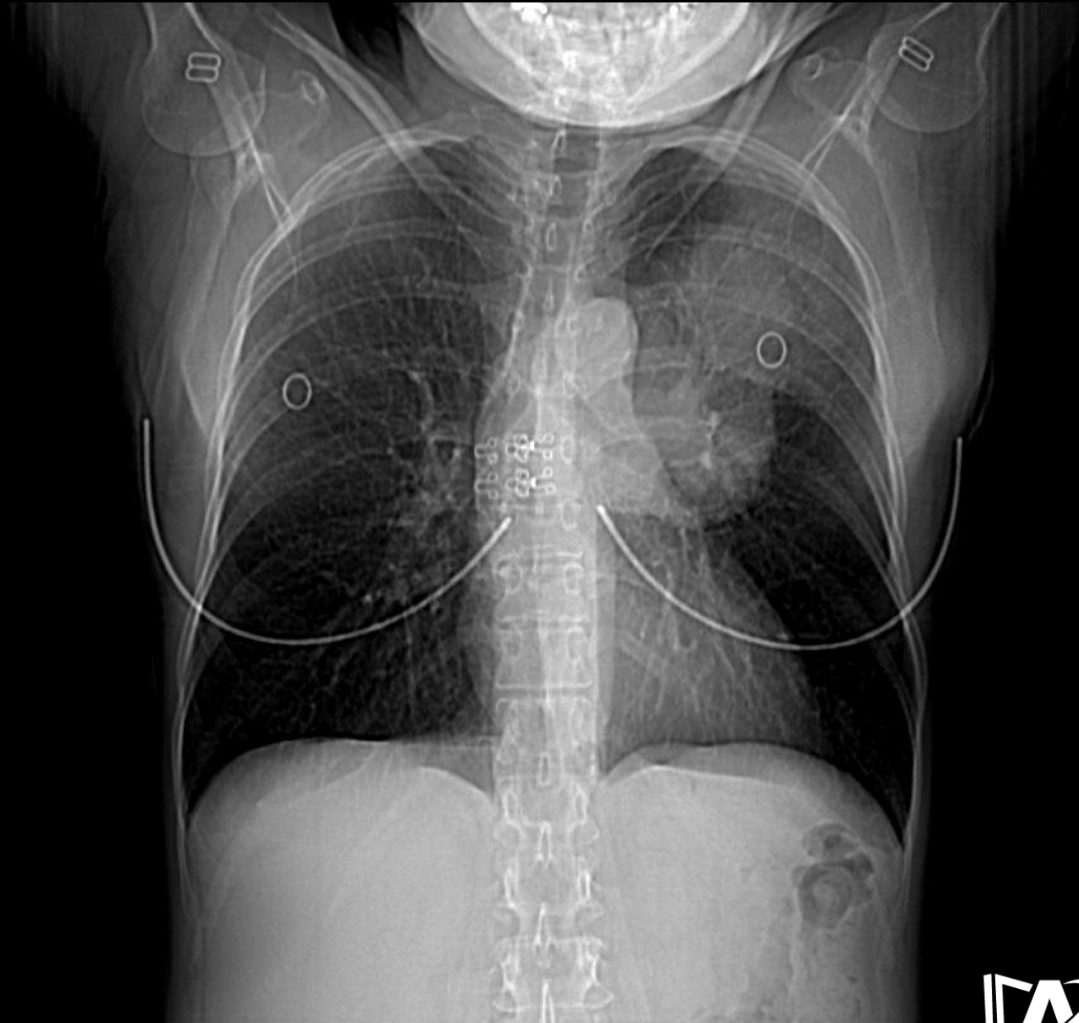


**Variant 1:** Acute nonspecific chest pain; low probability of coronary artery disease. Initial imaging.

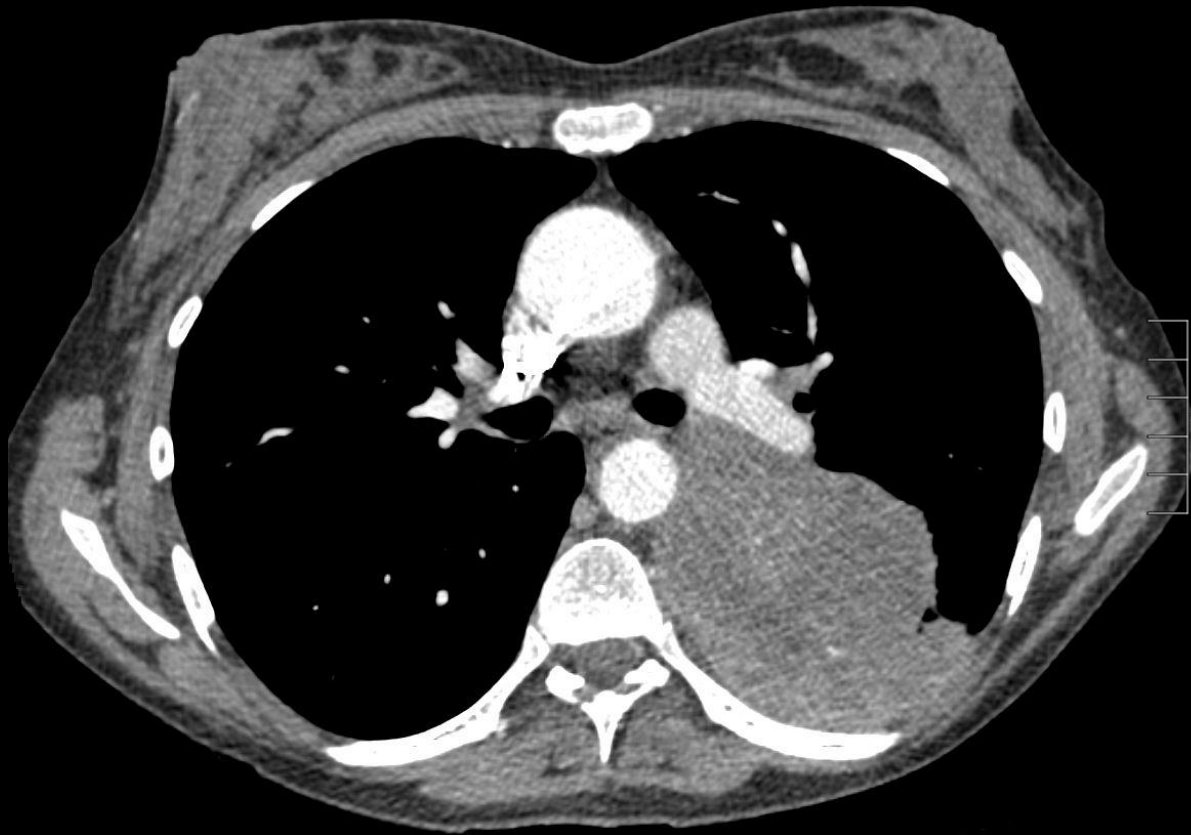
Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☼
CTA coronary arteries with IV contrast	Usually Appropriate	☼☼☼
US echocardiography transthoracic resting	May Be Appropriate (Disagreement)	○
Radiography ribs and thoracic spine	May Be Appropriate	☼☼
CT chest with IV contrast	May Be Appropriate	☼☼☼
CT chest without and with IV contrast	May Be Appropriate	☼☼☼
CT chest without IV contrast	May Be Appropriate	☼☼☼
CTA chest with IV contrast	May Be Appropriate	☼☼☼
V/Q scan lung	May Be Appropriate	☼☼☼
US echocardiography transesophageal	Usually Not Appropriate	○
US echocardiography transthoracic stress	Usually Not Appropriate	○
Arteriography coronary	Usually Not Appropriate	☼☼☼
Fluoroscopy barium swallow and upper GI series	Usually Not Appropriate	☼☼☼
MRA chest without and with IV contrast	Usually Not Appropriate	○
MRA chest without IV contrast	Usually Not Appropriate	○
MRA coronary arteries without and with IV contrast	Usually Not Appropriate	○
MRA coronary arteries without IV contrast	Usually Not Appropriate	○
MRI heart function and morphology without and with IV contrast	Usually Not Appropriate	○
MRI heart function and morphology without IV contrast	Usually Not Appropriate	○
MRI heart with function and inotropic stress without and with IV contrast	Usually Not Appropriate	○
MRI heart with function and inotropic stress without IV contrast	Usually Not Appropriate	○
MRI heart with function and vasodilator stress perfusion without and with IV contrast	Usually Not Appropriate	○
Nuclear medicine scan gallbladder	Usually Not Appropriate	☼☼
CT heart function and morphology with IV contrast	Usually Not Appropriate	☼☼☼☼
SPECT or SPECT/CT MPI rest and stress	Usually Not Appropriate	☼☼☼☼

# Initial Workup:

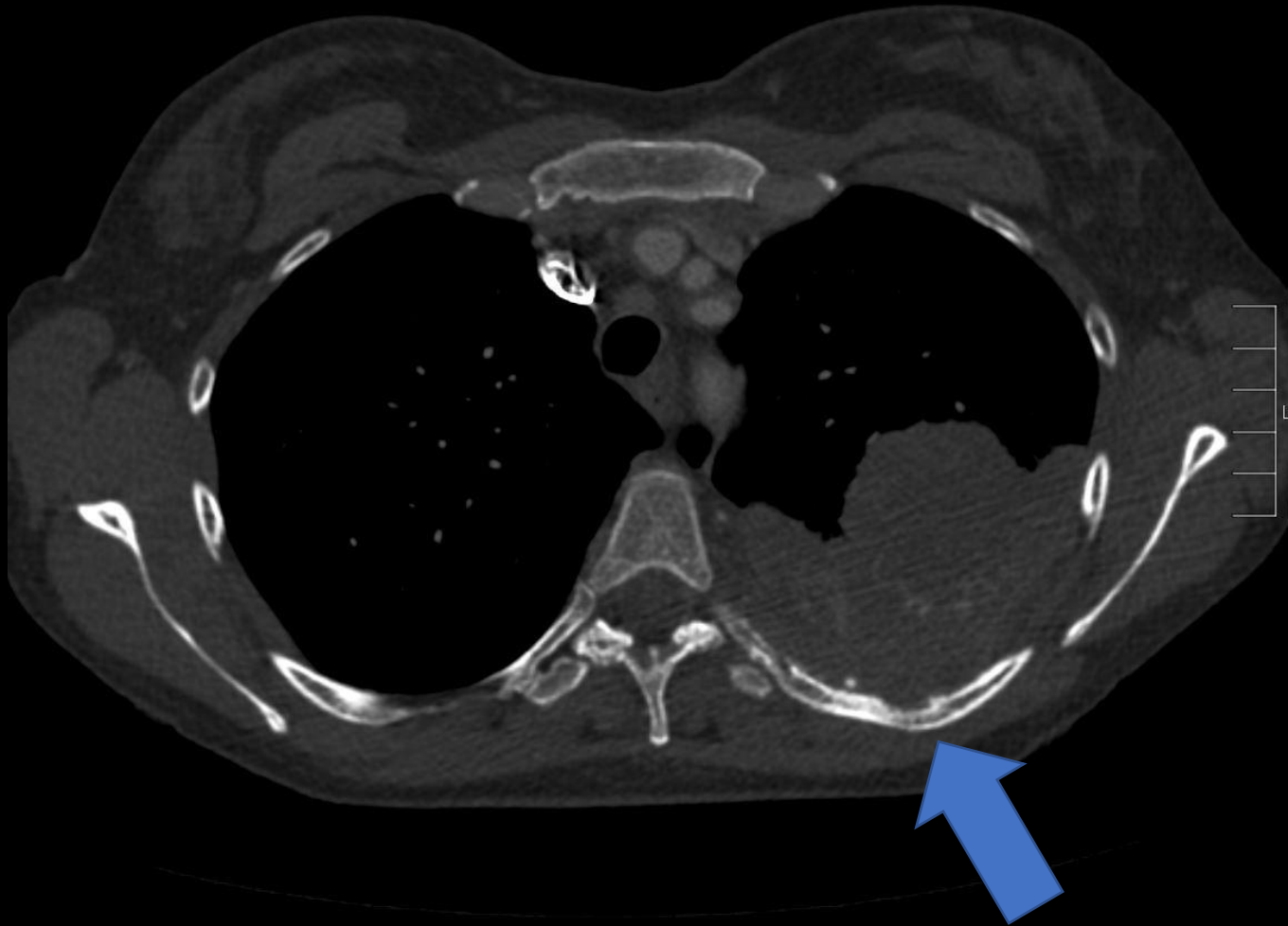
Imaging revealed  
a left sided  
chest mass:



# CT Findings:



## CT Findings:



CT showing  
invasion of the rib  
by the mass

# Work up:

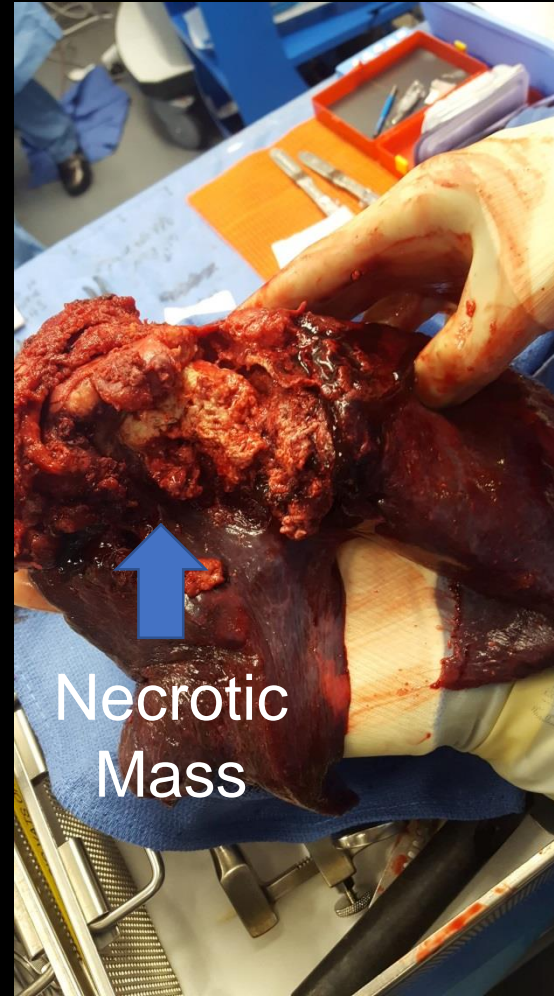
- CT on 4/15/18 – large mass like soft tissue density in the left lung that appeared to involve both lobes as well as sclerotic changes of the left 5<sup>th</sup> rib
- CT guided biopsy on 5/7 – showed necrotic tissue, scant fibrous tissue, small atypical cells. Results were non diagnostic
- PET scan 5/22 – demonstrated hyperactivity SUV of 10 in the left lung mass without hypermetabolic activity elsewhere in the body.
- Bronchoscopy on 5/31 – Seen by pulmonary medicine. Bronchoscopy showed no evidence of malignancy or infection in washings or brushings. Despite multiple non diagnostic biopsies the decision was made to have the mass resected due to concerns that it would become symptomatic due to its size even if it was benign. Others factors that raised the concern for this mass included the hypermetabolic ring on PET, large size, and bony erosion of the 5<sup>th</sup> rib which was seen on CT scan.



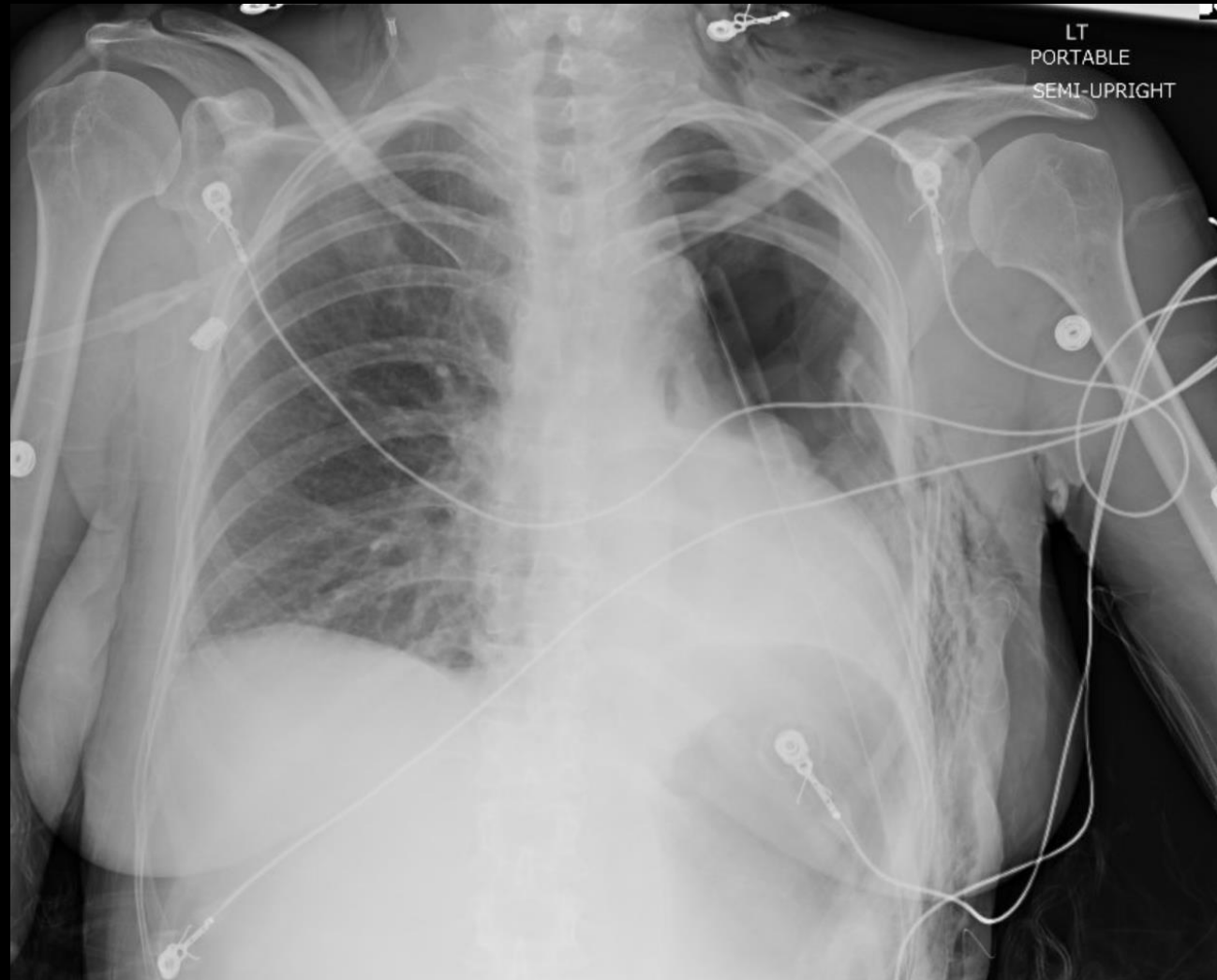
# Differential diagnosis based on imaging:

- Adenocarcinoma
- Large cell carcinoma
- Squamous cell carcinoma
- Pulmonary Pseudotumor
  - Lymphoma
  - Metastases

# Images from Left Pneumonectomy

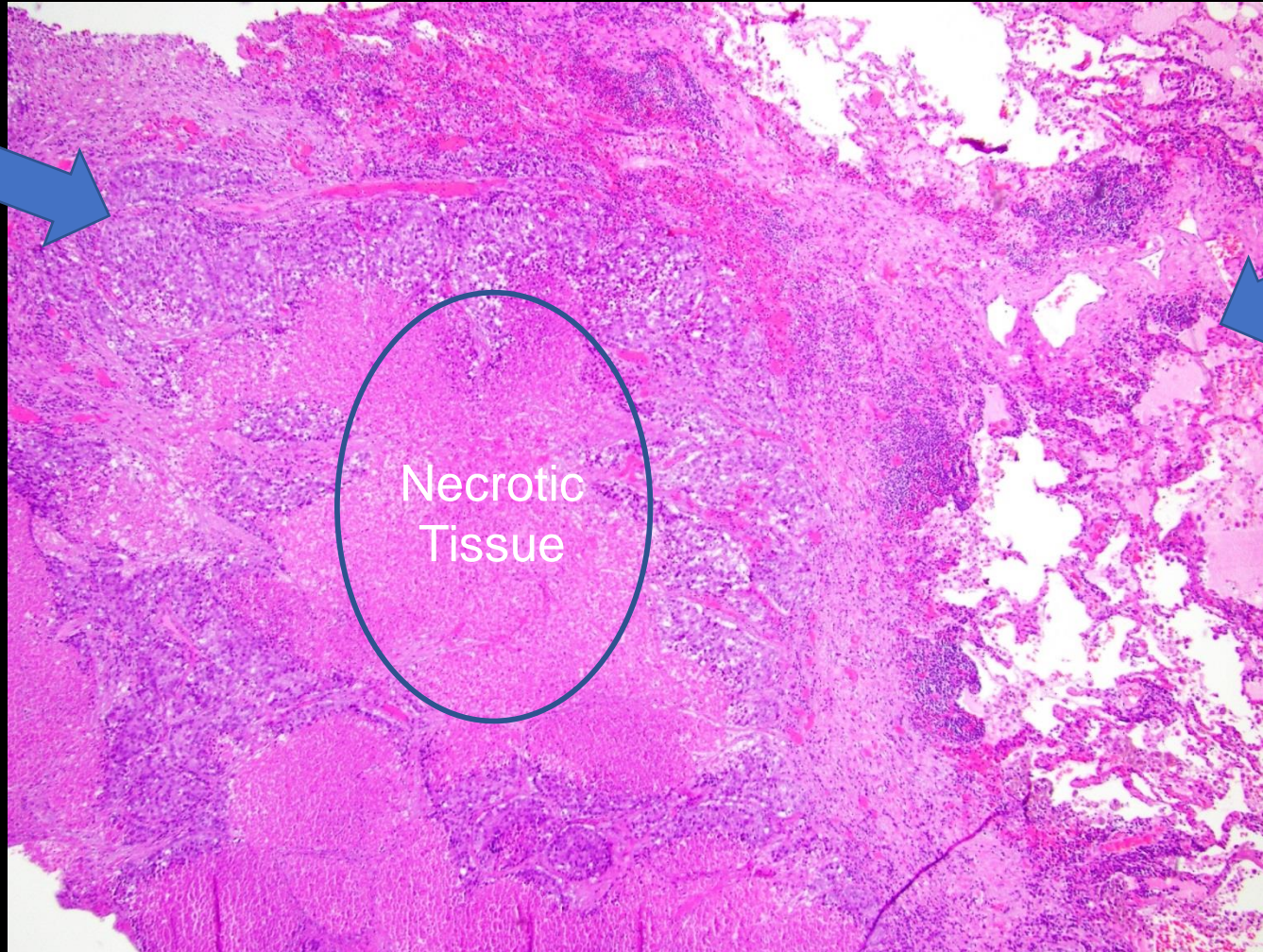
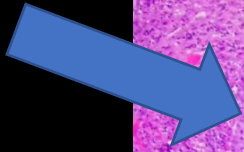


# Post Op CXR

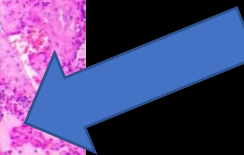


# Pathology Results

Tumor  
Cells



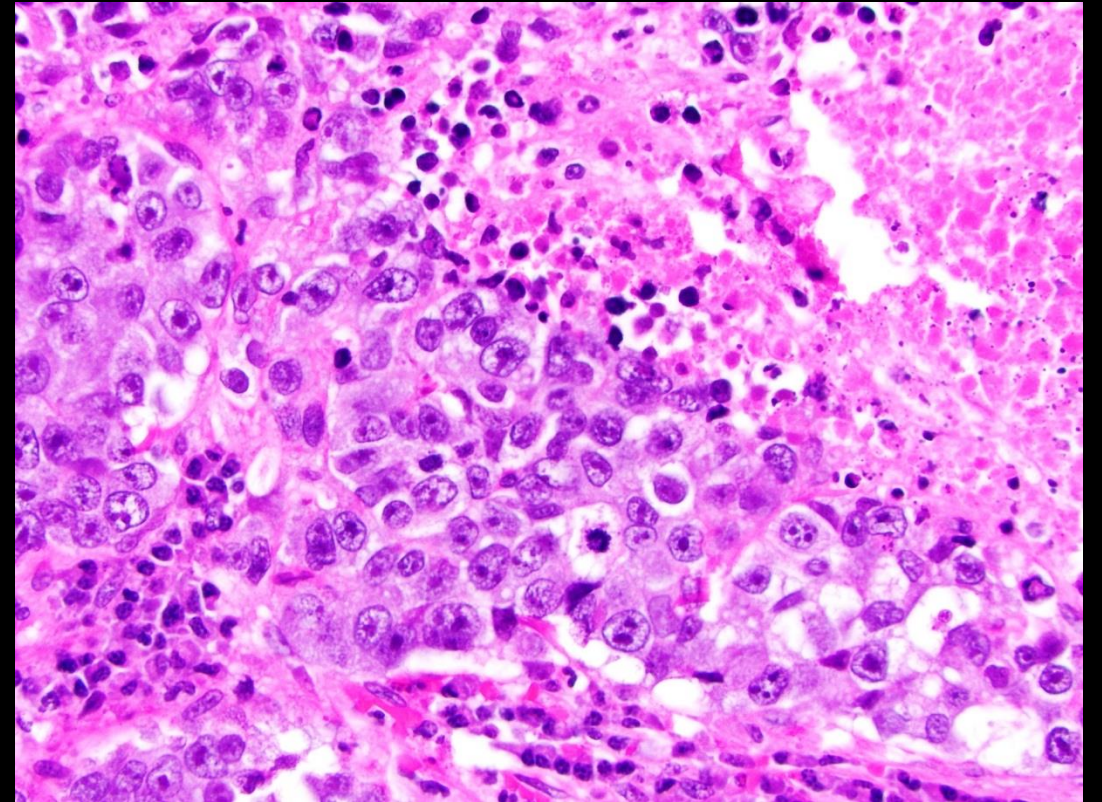
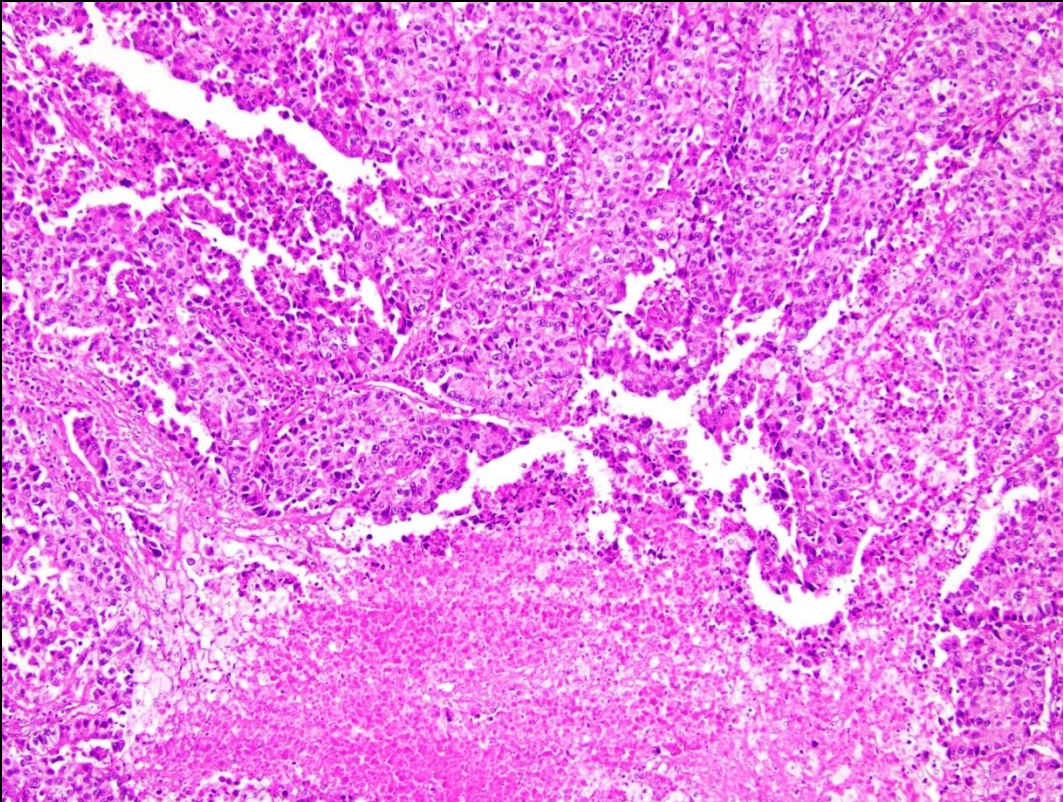
Normal  
Lung  
Tissue



Necrotic  
Tissue

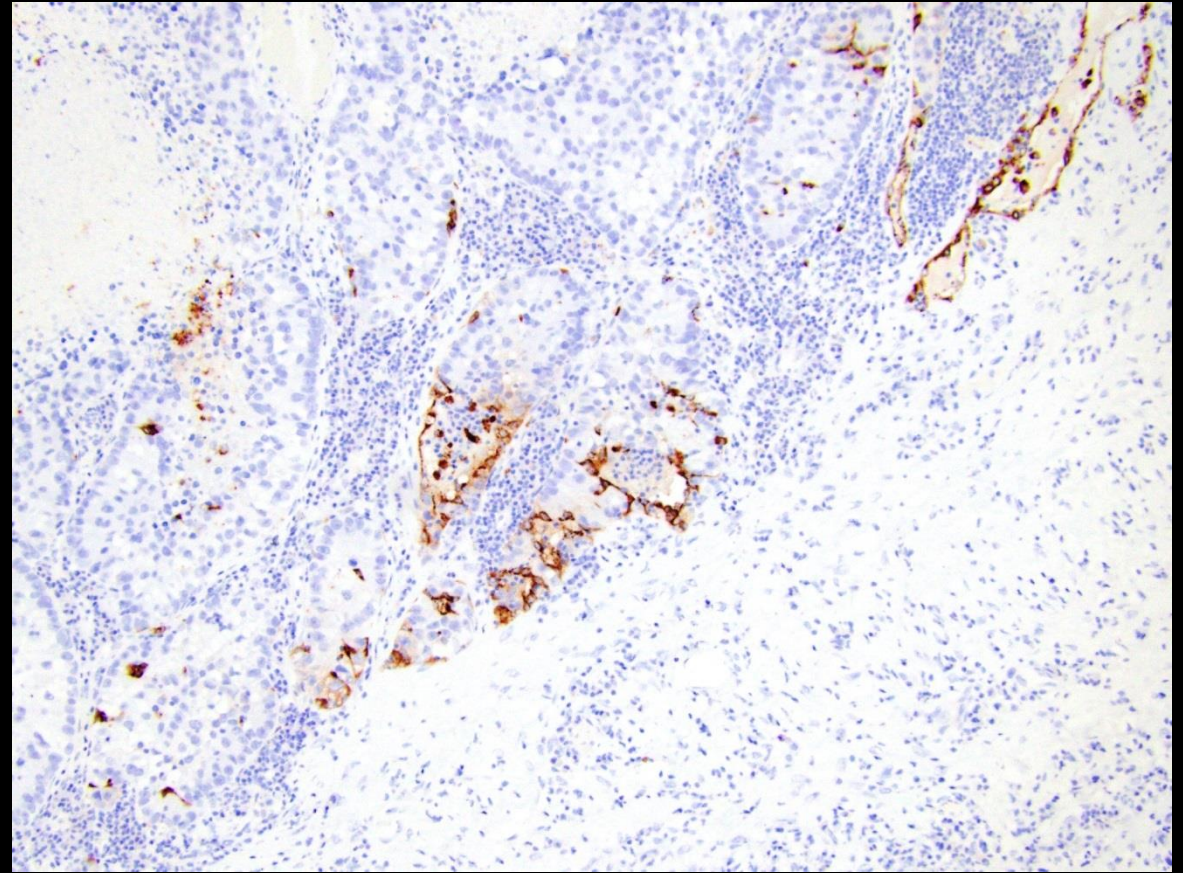
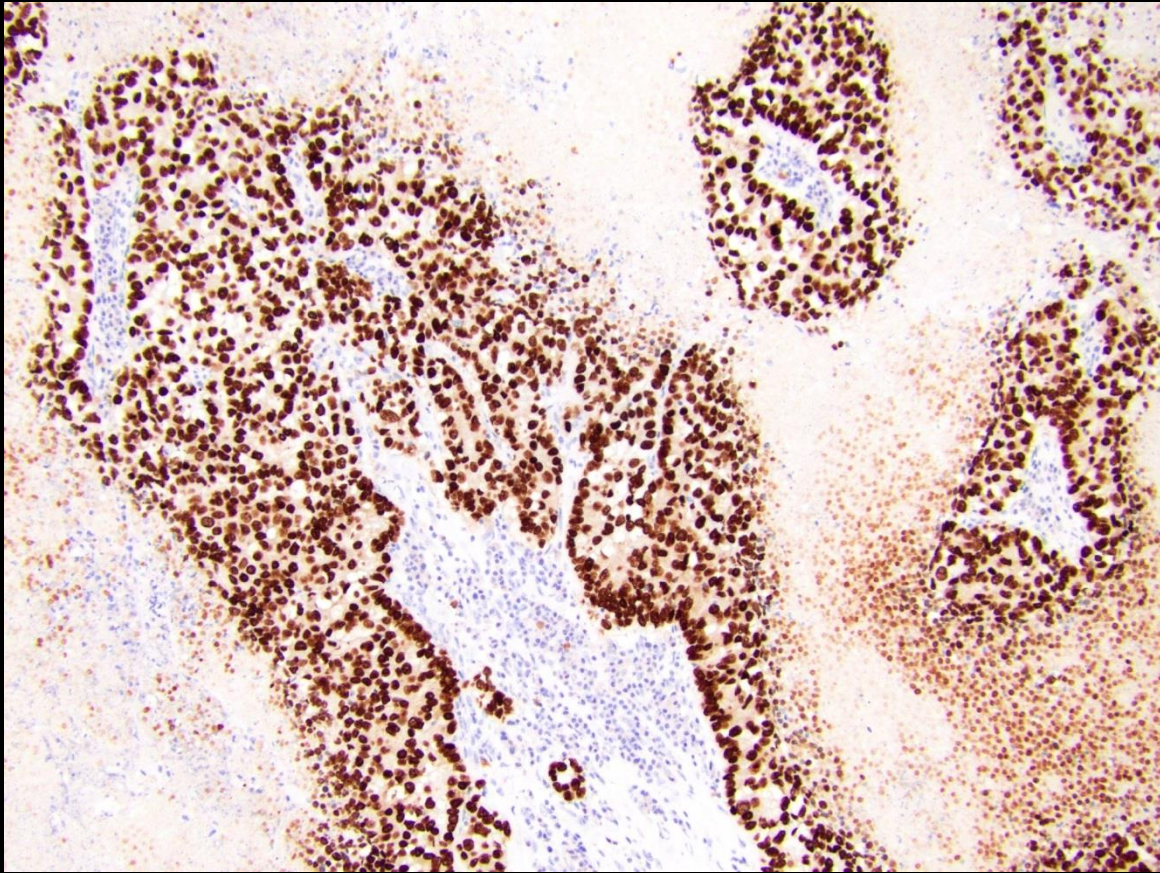
H&E, low power magnification

# Pathology Results



Left: H&E, medium power magnification. There is necrotic tissue at the bottom, surround by tumor cells.  
Right: H&E, high power magnification. Mitotic cells are visible with large nuclei.

# Pathology Results

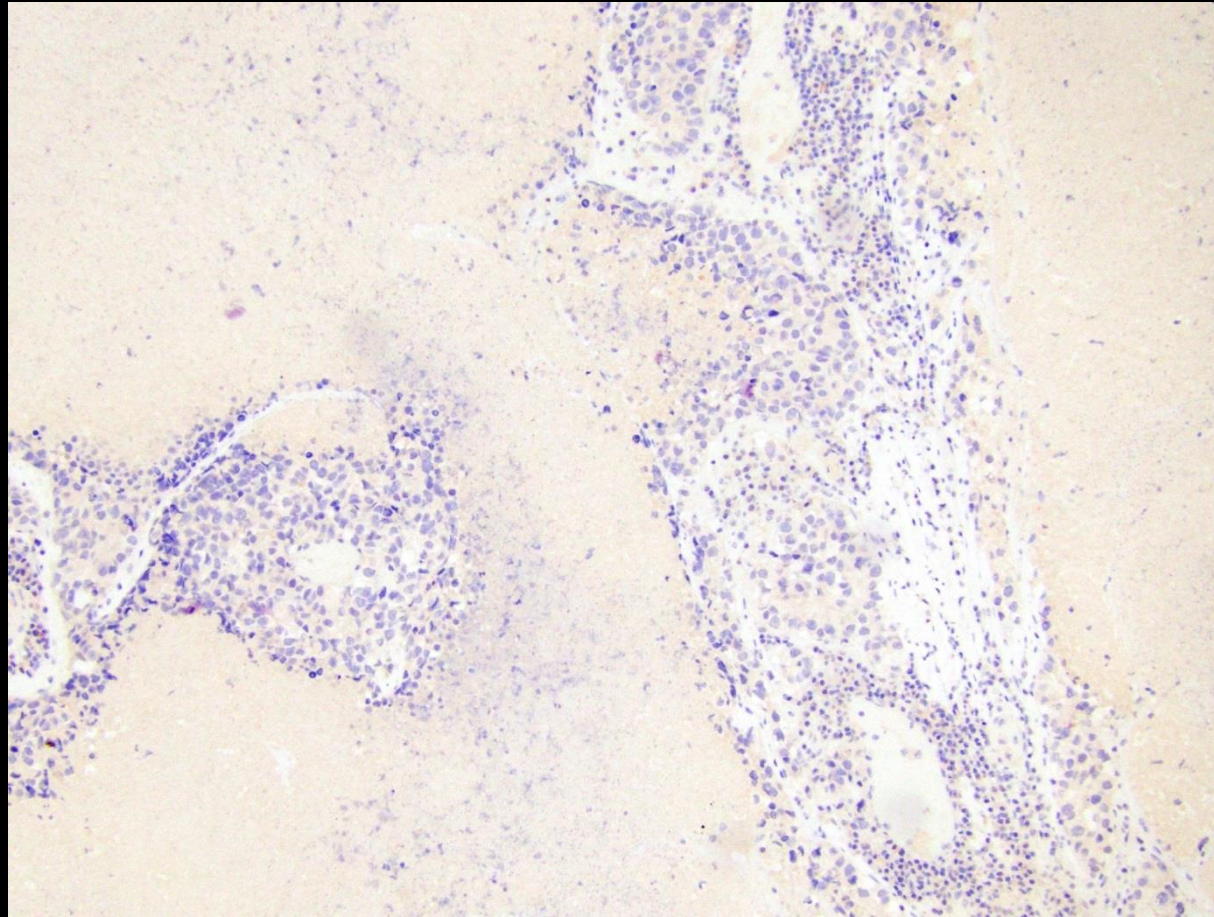


Adenocarcinoma can be identified used TTF1 and NapsinA stains.

Left: Diffusely positive TTF1 staining.

Right: Focally positive NapsinA staining.

# Pathology Results



Squamous cell carcinoma can be identified using P40 staining. This image shows negative staining of P40, supporting the diagnosis of Adenocarcinoma.

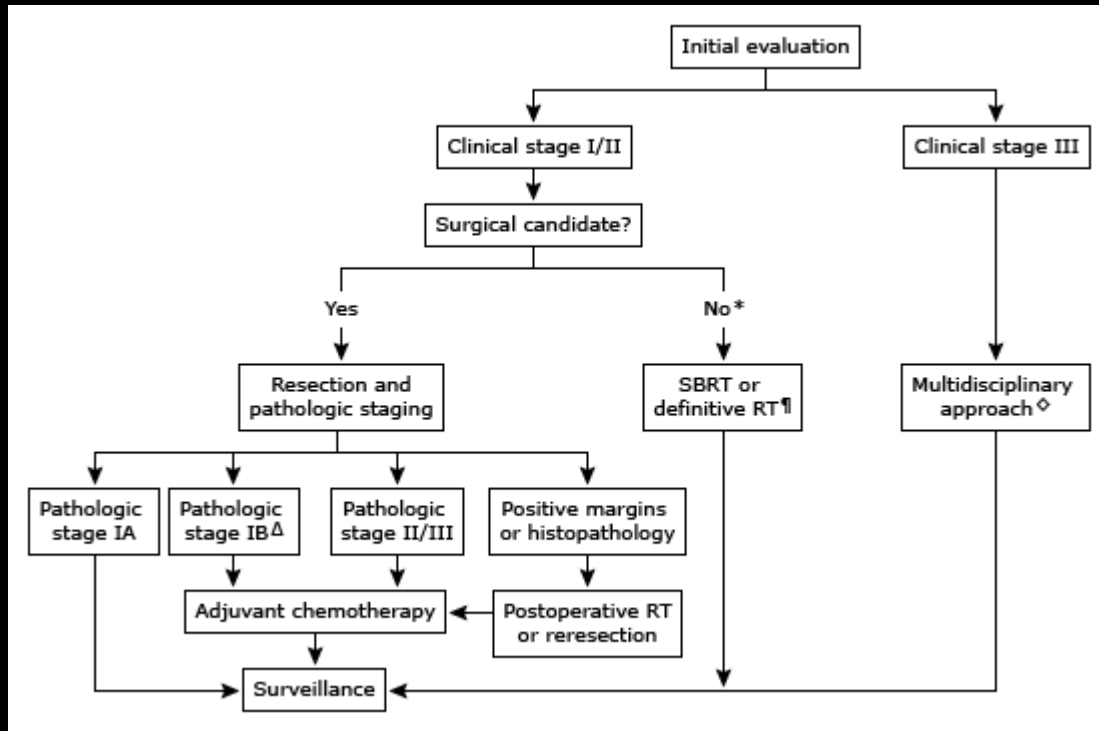
# Adenocarcinoma

- Adenocarcinoma is a non-small cell carcinoma of the lung.
- It is the most common type of lung cancer, accounting for approximately one half of lung cases.
- Most commonly presents as a peripheral lung mass but can be central.
- Low Dose screening CT is used in current and former smokers.
- Patient's may be asymptomatic or may have some of the following symptoms:
  - Cough
  - Hemoptysis
  - Recurrent pneumonias
  - Chest/Back/shoulder pains
  - Difficulty breathing



# Adenocarcinoma

- Treatment depends heavily on TNM staging
  - Staging for this case was T4N2 due to size and node metastases
- For Non-Small cell lung carcinomas surgical resection offers the best opportunity for long-term survival and cure in patients with resectable NSCLC



TNM 8 <sup>th</sup> - Primary tumor characteristics	
T <sub>x</sub>	Tumor in sputum/bronchial washings but not be assessed in imaging or bronchoscopy
T <sub>0</sub>	No evidence of tumor
T <sub>is</sub>	Carcinoma in situ
T <sub>1</sub>	≤ 3 cm surrounded by lung/visceral pleura, not involving main bronchus
T <sub>1a(mi)</sub>	Minimally invasive carcinoma
T <sub>1a</sub>	≤ 1 cm
T <sub>1b</sub>	> 1 to ≤ 2 cm
T <sub>1c</sub>	> 2 to ≤ 3 cm
T <sub>2</sub>	> 3 to ≤ 5 cm or involvement of main bronchus without carina, regardless of distance from carina or invasion visceral pleural or atelectasis or post obstructive pneumonitis extending to hilum
T <sub>2a</sub>	>3 to ≤4cm
T <sub>2b</sub>	>4 to ≤5cm
T <sub>3</sub>	>5 to ≤7cm in greatest dimension or tumor of any size that involves chest wall, pericardium, phrenic nerve or satellite nodules in the same lobe
T <sub>4</sub>	> 7cm in greatest dimension or any tumor with invasion of mediastinum, diaphragm, heart, great vessels, recurrent laryngeal nerve, carina, trachea, oesophagus, spine or separate tumor in different lobe of ipsilateral lung
N <sub>1</sub>	Ipsilateral peribronchial and/or hilar nodes and intrapulmonary nodes
N <sub>2</sub>	Ipsilateral mediastinal and/or subcarinal nodes
N <sub>3</sub>	Contralateral mediastinal or hilar; ipsilateral/contralateral scalene/supraclavicular
M <sub>1</sub>	Distant metastasis
M <sub>1a</sub>	Tumor in contralateral lung or pleural/pericardial nodule/malignant effusion
M <sub>1b</sub>	Single extrathoracic metastasis, including single non-regional lymphnode
M <sub>1c</sub>	Multiple extrathoracic metastases in one or more organs

# References:

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<https://www.sciencedirect.com/science/article/pii/S1556086415319304>
- Pathology Outlines:  
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- Radiology Assistant: <http://www.radiologyassistant.nl/en/p58ef5eeb172c8/lung-cancer-tnm-8th-edition.html>
- RSNA: [https://pubs.rsna.org/doi/10.1148/radiol.12120240?url\\_ver=Z39.88-2003&rfr\\_id=ori%3Arid%3Acrossref.org&rfr\\_dat=cr\\_pub++0pubmed&](https://pubs.rsna.org/doi/10.1148/radiol.12120240?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed&)
- Uptodate: [https://www.uptodate.com/contents/overview-of-the-initial-evaluation-treatment-and-prognosis-of-lung-cancer?search=adenocarcinoma%20lung&source=search\\_result&selectedTitle=6~150&usage\\_type=default&display\\_rank=6#H4](https://www.uptodate.com/contents/overview-of-the-initial-evaluation-treatment-and-prognosis-of-lung-cancer?search=adenocarcinoma%20lung&source=search_result&selectedTitle=6~150&usage_type=default&display_rank=6#H4)