

# Mesothelioma

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**CHESTRAD 2023**

A Case Review and Lecture Series  
Saturday 15<sup>th</sup> July - Sunday 16<sup>th</sup> July - Monday 17<sup>th</sup> July  
27 CPD Points

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# Introduction

- Mesothelioma is rare but is the most common primary malignancy of the pleura.
- >90% of pleural mesotheliomas result from asbestos exposure.
- 30-40 years latency between exposure and development of disease

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# Objectives

- Review imaging features of pleural mesothelioma
- Highlight key features of TNM staging system
- Illustrate mimics of pleural mesothelioma

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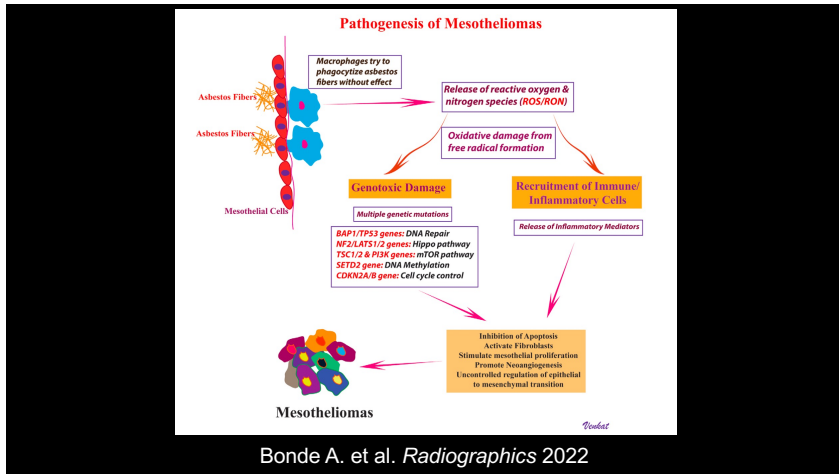
# Mesothelioma

- Malignant neoplasm arising from the mesothelial cells
  - Pleura
  - Peritoneal
  - Pericardium
  - Tunica vaginalis

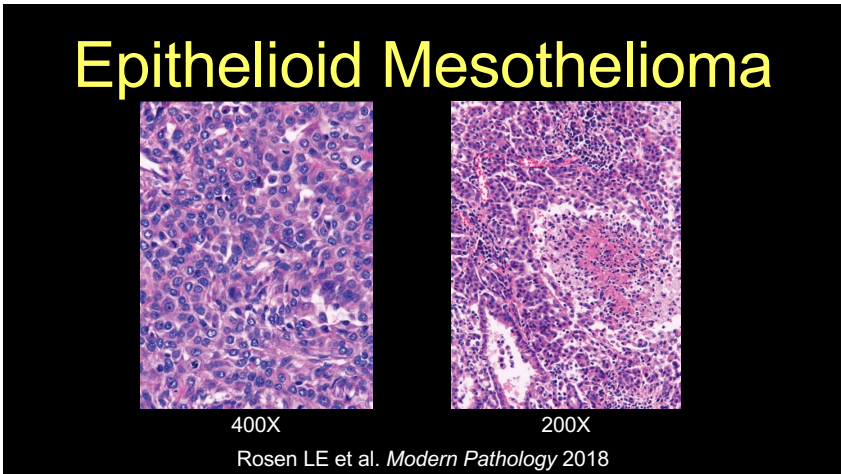


WebPath - University of Utah

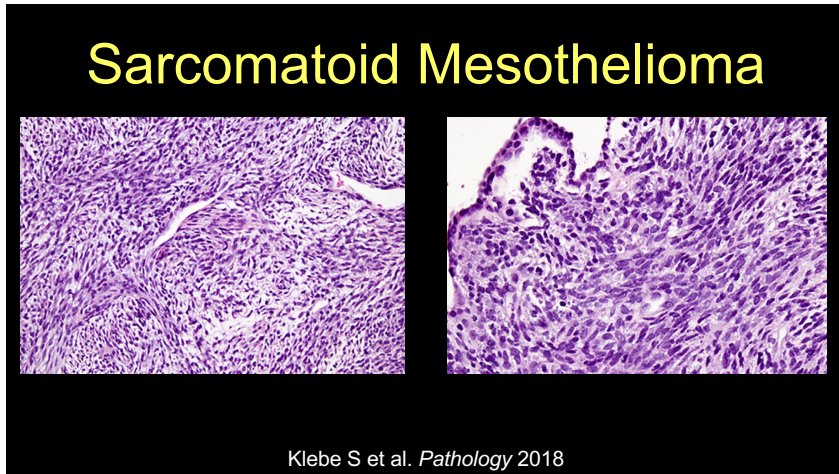
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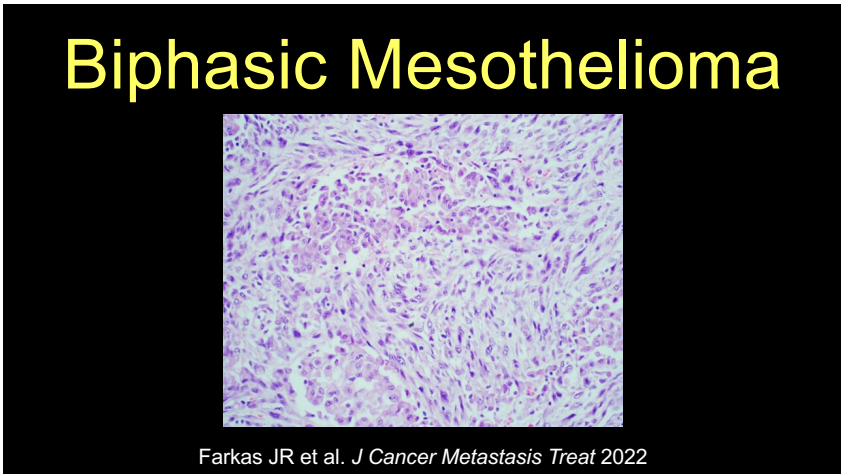
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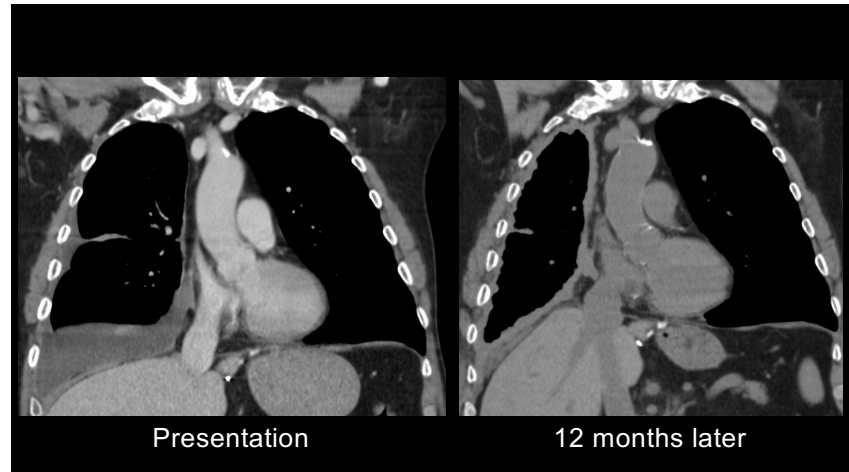


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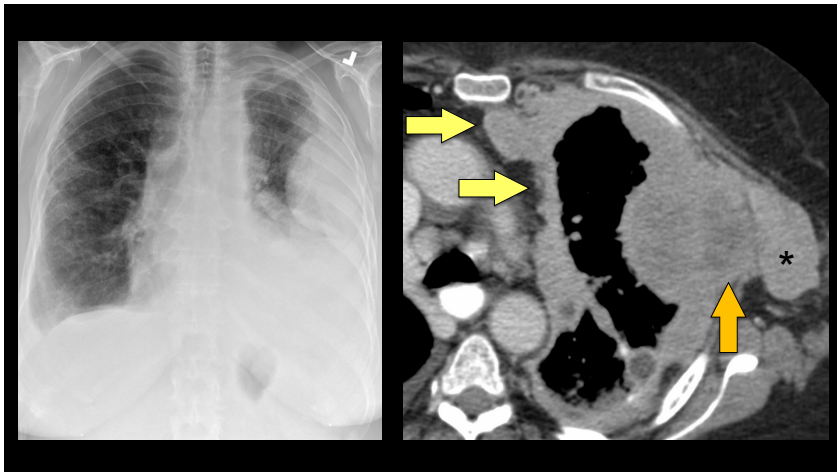
## Imaging

- Pleural effusion or mass is often initially detected on chest radiography
- CT
  - Pleural effusion, pleural soft tissue thickening, or nodules
  - Mediastinal pleural involvement
  - Pleural plaques (+/-)

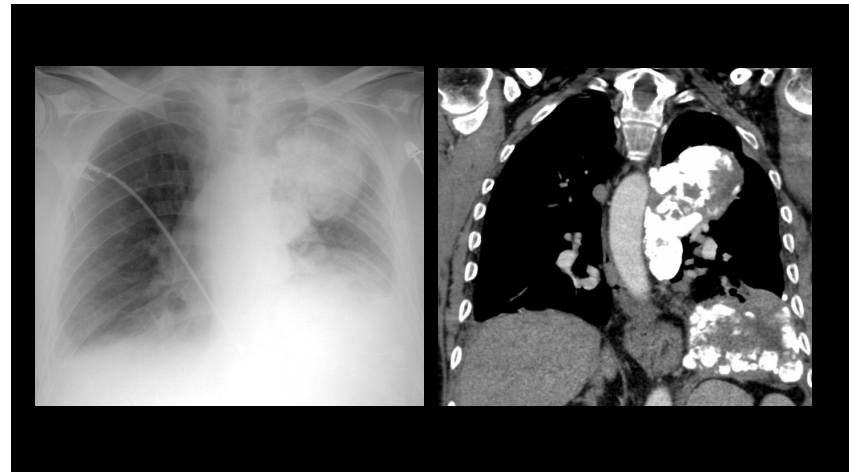
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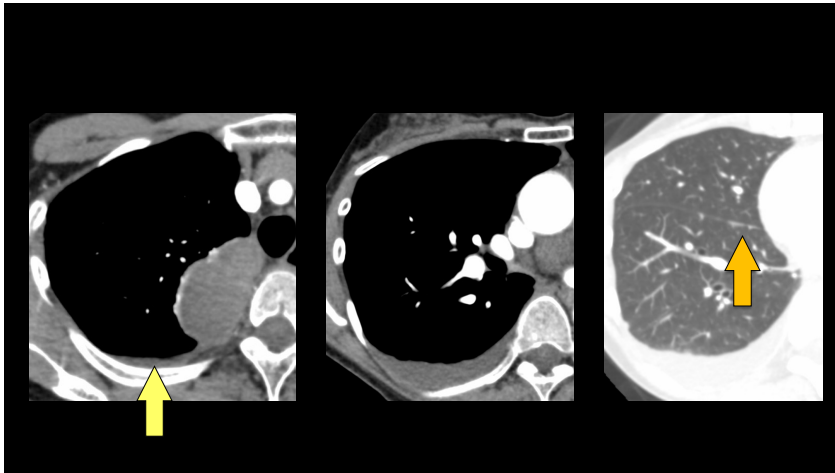
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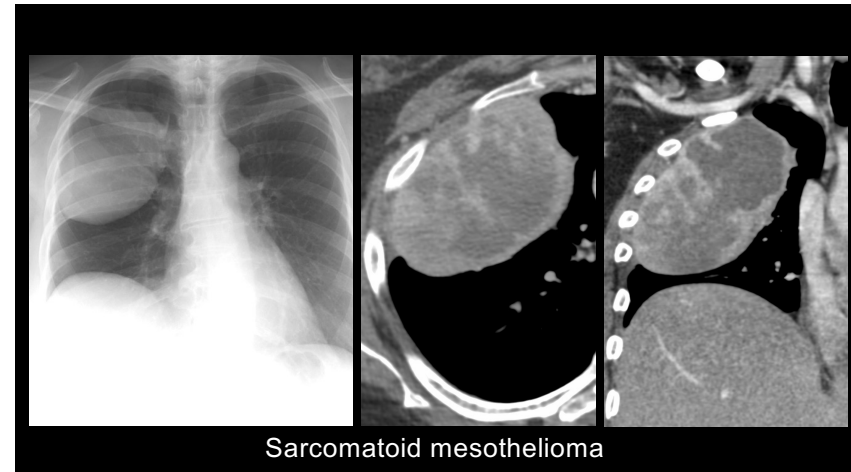
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## Diagnosis

- Tissue diagnosis usually required
  - US- or CT-guided core needle biopsy
- Invasion into subserosal fat on H&E
- ICC – loss of *BAP1* and *MTAP*
- FISH – loss of *CDKN2A*
- NGS – *BAP1*, *CDKN2A*, *NF2* mutations

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## Staging

- Chest CT with IV contrast
- FDG PET/CT
- Chest MRI for selected cases
- Brain MRI for suspected brain metastases

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## TNM Staging (8<sup>th</sup> ed.)

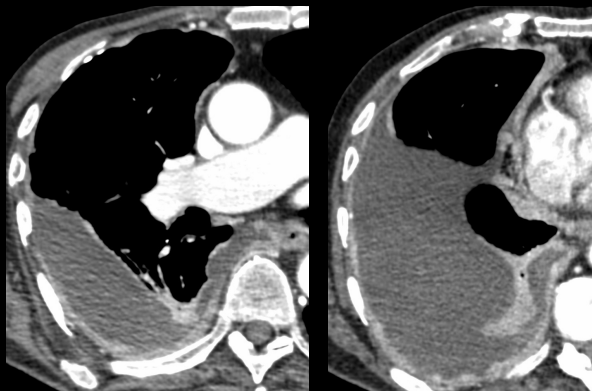
- T staging is challenging because of the growth pattern of most mesotheliomas
- N and M straightforward
- N for mesothelioma slightly different than for lung cancer

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## T Staging (8<sup>th</sup> ed.)

- T1
  - Ipsilateral parietal pleura
  - +/- visceral pleura
  - Includes diaphragmatic and mediastinal pleura

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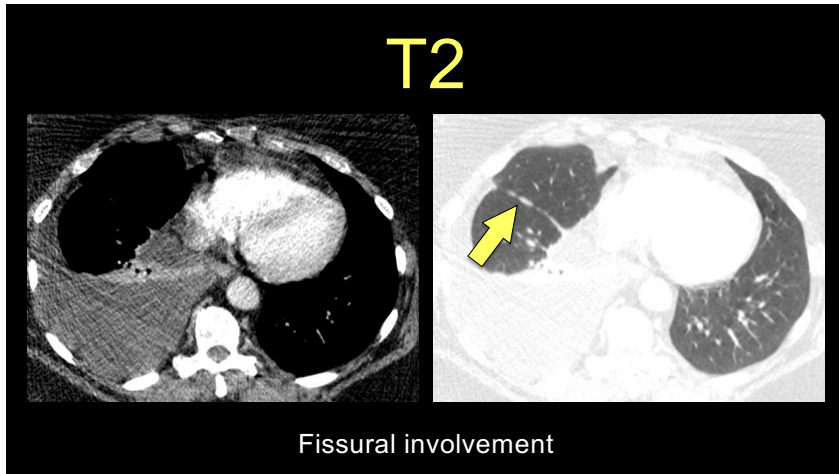
Sarcomatoid mesothelioma

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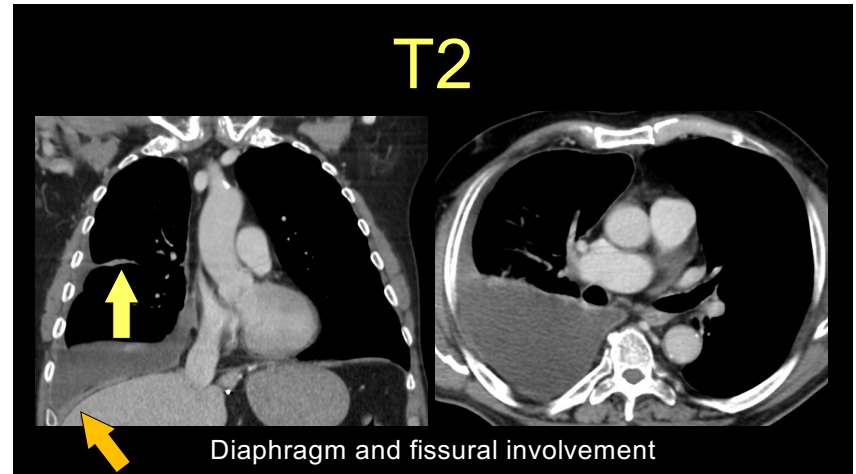
## T Staging (8<sup>th</sup> ed.)

- T2
  - Confluent visceral pleura (fissures)
  - Diaphragmatic involvement
  - Lung invasion

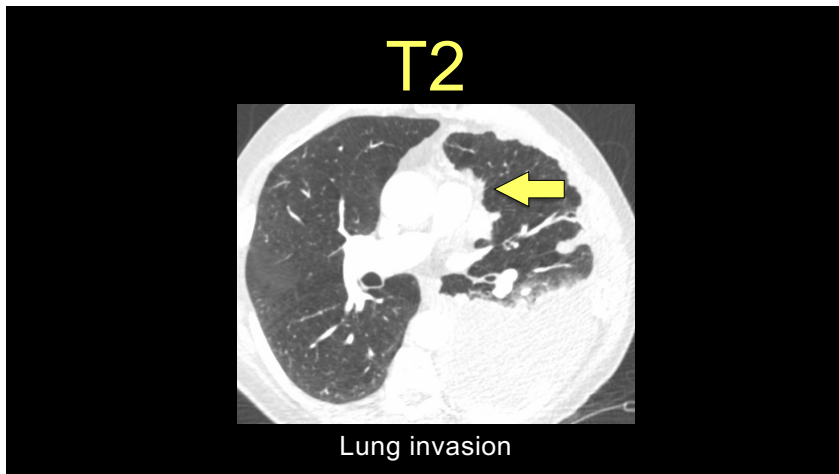
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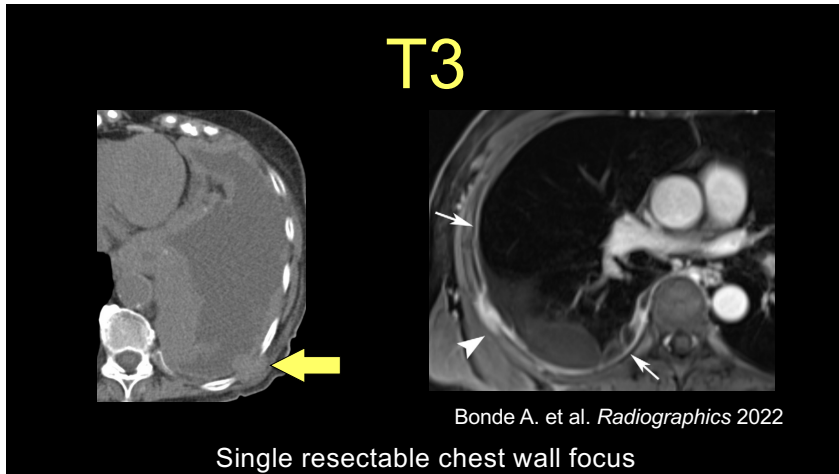


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### T Staging (8<sup>th</sup> ed.)

- T3
  - Endothoracic fascia
  - Invasion of mediastinal fat
  - Single resectable focus of chest wall invasion
  - Non-transmural pericardial invasion

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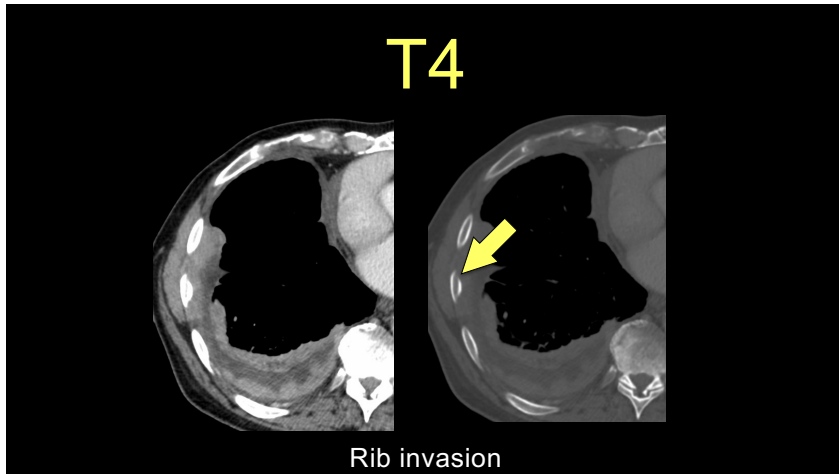


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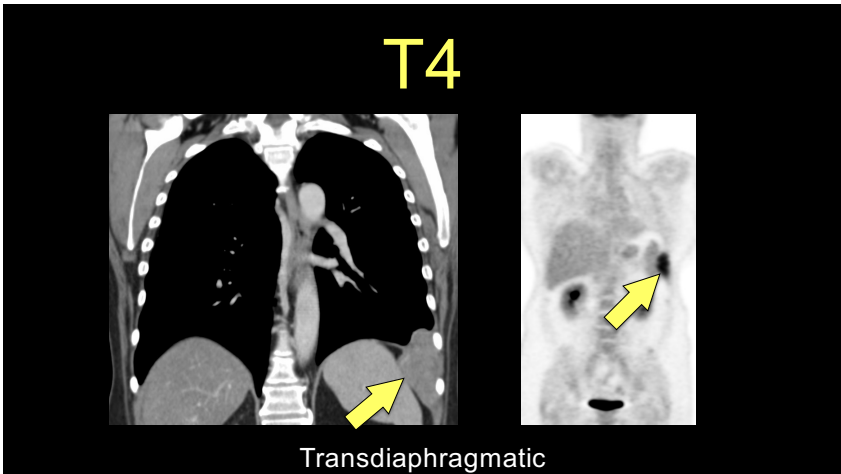
### T Staging (8<sup>th</sup> ed.)

- T4
  - Rib
  - Peritoneum through diaphragm
  - Mediastinal organ
  - Contralateral pleura
  - Spine or brachial plexus
  - Transpericardial

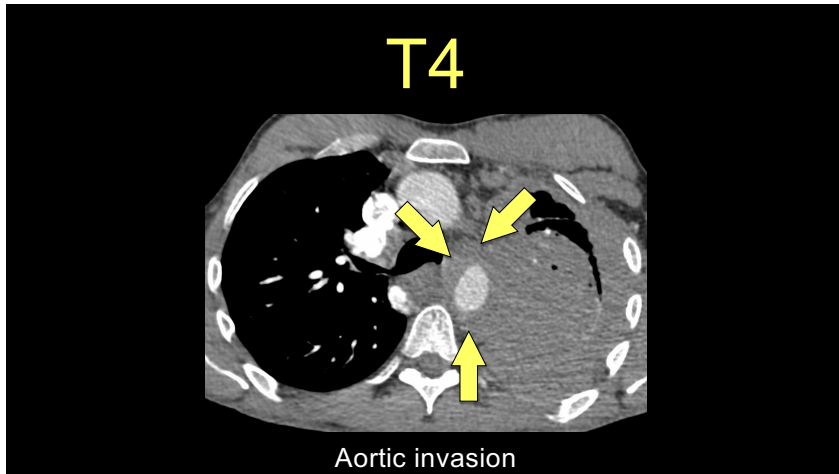
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## N Staging (8<sup>th</sup> ed.)

- N0
  - No lymph node metastases

Superior Mediastinal Nodes	
1	Highest Mediastinal
2	Upper Paratracheal
3	Pre-vascular and Retrotracheal
4	Lower Paratracheal (including Azygos Nodes)
*N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, N23, N24, N25, N26, N27, N28, N29, N30, N31, N32, N33, N34, N35, N36, N37, N38, N39, N40, N41, N42, N43, N44, N45, N46, N47, N48, N49, N50, N51, N52, N53, N54, N55, N56, N57, N58, N59, N60, N61, N62, N63, N64, N65, N66, N67, N68, N69, N70, N71, N72, N73, N74, N75, N76, N77, N78, N79, N80, N81, N82, N83, N84, N85, N86, N87, N88, N89, N90, N91, N92, N93, N94, N95, N96, N97, N98, N99, N100	

Aortic Nodes	
5	Subaortic (A-P window)
6	Para-aortic (ascending aorta or phrenic)

Inferior Mediastinal Nodes	
7	Subcarinal
8	Parasophageal (below carina)
9	Pulmonary Ligament

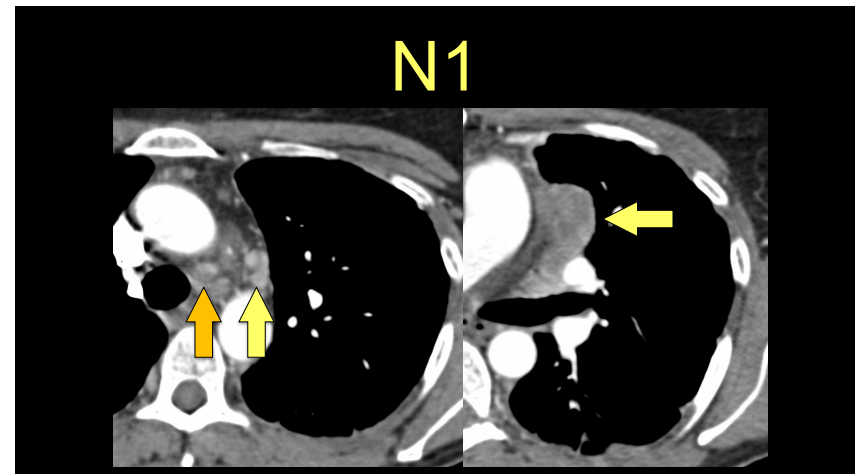
H <sub>1</sub> Nodes	
10	Hilar
11	Interlobar
12	Lobar
13	Segmental
14	Subsegmental

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## N Staging (8<sup>th</sup> ed.)

- N1
  - Ipsilateral lung, hilar, mediastinum
    - Includes internal mammary, cardiophrenic, intercostal

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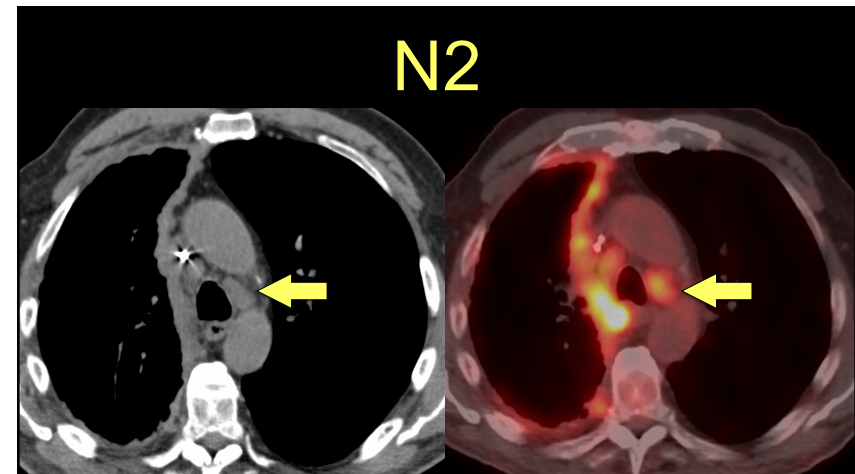


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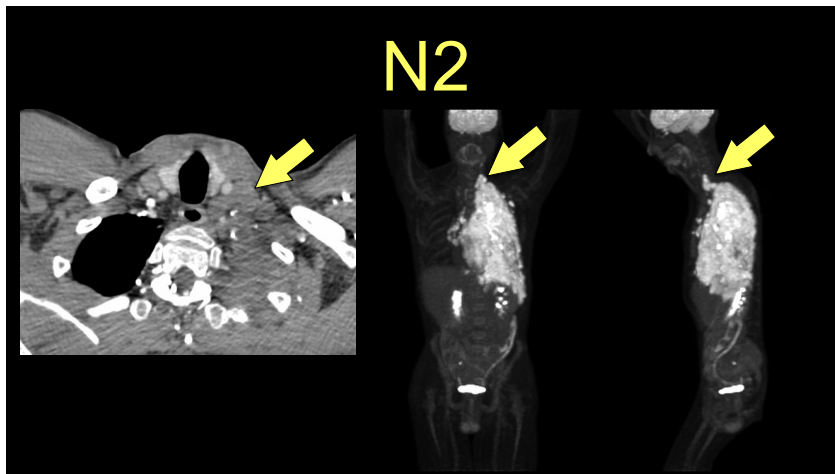
## N Staging (8<sup>th</sup> ed.)

- N2
  - Contralateral lung, hilar, mediastinum
    - Includes internal mammary, cardiophrenic, intercostal
  - Any supraclavicular or scalene node

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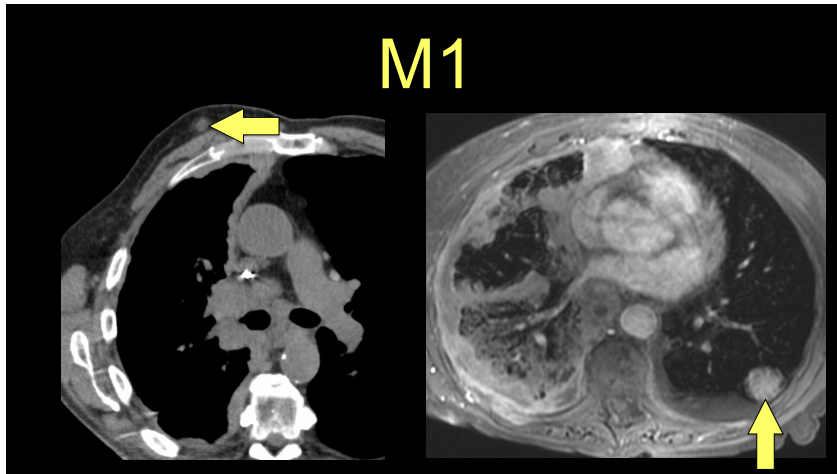
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## M Staging (8<sup>th</sup> ed.)

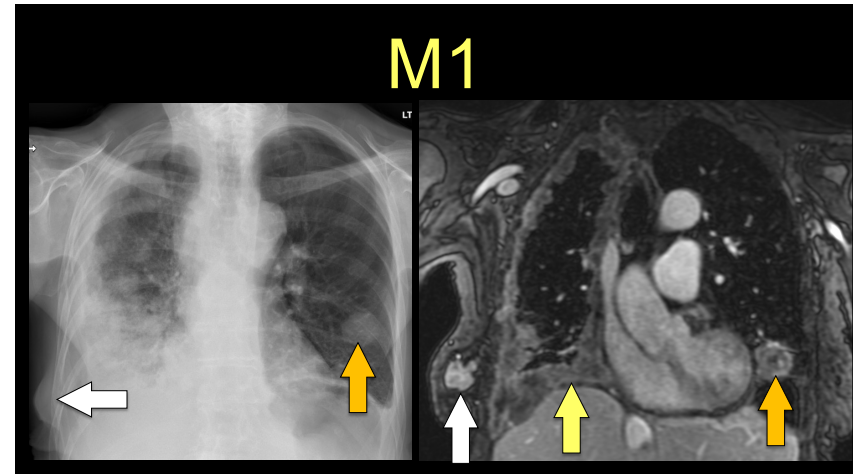
- M0
  - No metastases
- M1
  - Any distant metastasis

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## TNM Staging (8<sup>th</sup> ed.)

- Stage IA
  - T1 N0 M0
- Stage IB
  - T2 or T3 N0 M0
- Stage II
  - T1 or T2 N1 M0
- Stage IIIA
  - T3 N1 M0
- Stage IIIB
  - T1-3 N2 M0 or
  - T4 N0-2 M0
- Stage IV
  - Any T, any N, M1

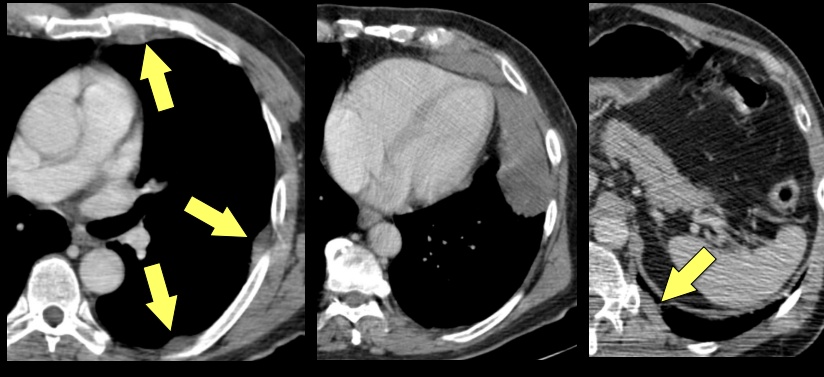
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## Mimics

- Other neoplasms
  - Metastases >> mesothelioma
  - Lymphoma
- Infection
  - Tuberculosis
  - Fungus

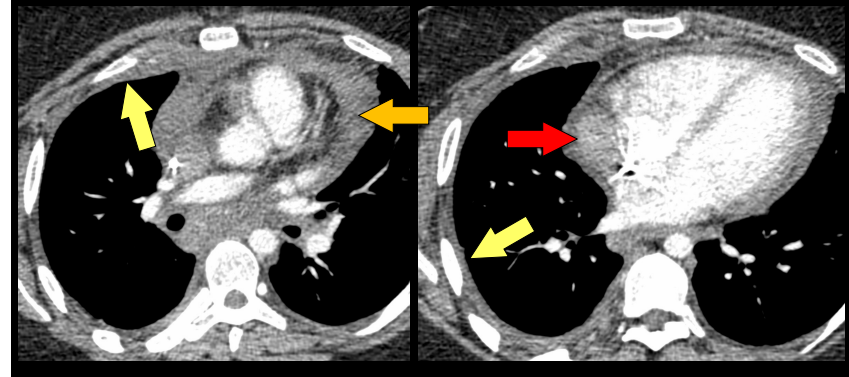
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### Pleural non-Hodgkin Lymphoma



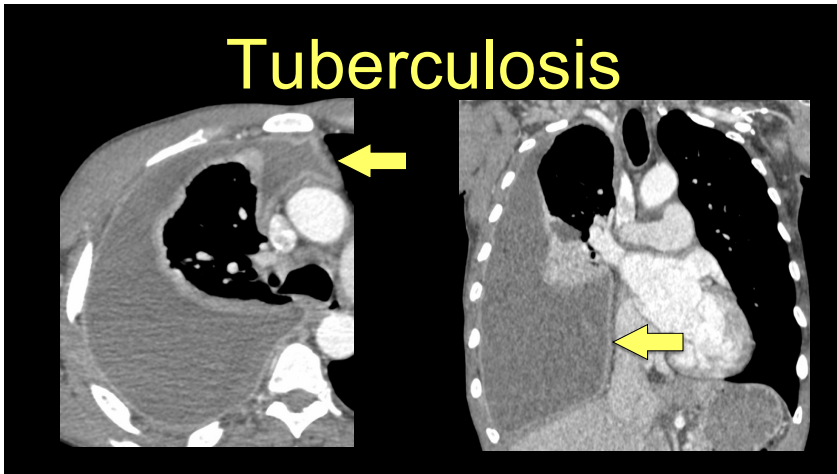
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### Pleural Hodgkin Lymphoma



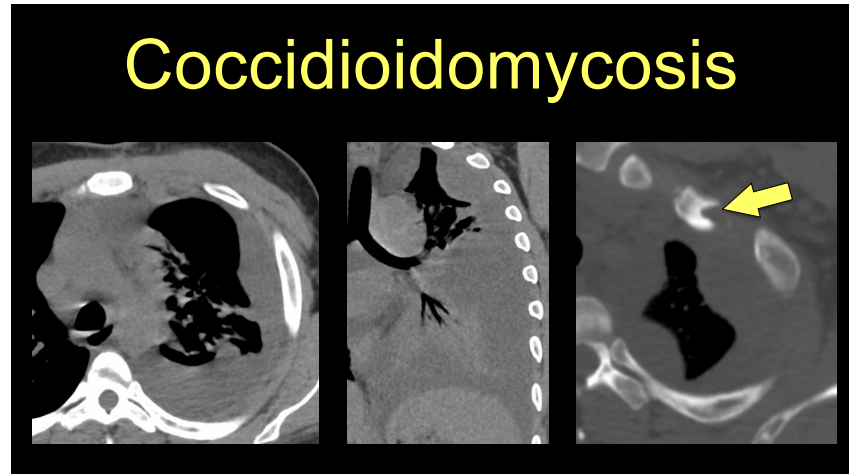
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### Tuberculosis



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### Coccidioidomycosis



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# Summary

- Imaging is central to diagnosis and staging of mesotheliomas
- Careful attention to tumor extent is important for proper staging and thus management
- Multimodality imaging often required to reach accurate stage

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Comments or Questions?  
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