AMSER Case of the Month December 2022

41-year-old male with past medical history of Stage IV recurrent papillary thyroid carcinoma, anxiety, and depression

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Patient Presentation

- S/p thyroidectomy and bilateral selective neck dissection in 2015 with repeated dissection in 2016
- Patient has not received treatment for his recurrent papillary thyroid carcinoma since 8/2/17
- Today presents with worsening lymphedema in his neck
- Currently smokes 0.5 packs/day
- Otherwise patient is asymptomatic

Pertinent Labs

- Most recent labs 4/15/22
  - TSH <0.005 (L)
  - Free T4 1.92 (H)

What Imaging Should We Order?

Patient has history of resistant metastatic disease. To monitor progression of disease a CT neck and chest with IV contrast was ordered.

ACR Appropriateness Criteria

Variant 7: **Suspected recurrence of differentiated thyroid cancer.**

Procedure	Appropriateness Category	Relative Radiation Level
CT neck with IV contrast	Usually Appropriate	☢☢☢
US thyroid	Usually Appropriate	O
I-123 scan whole body	Usually Appropriate	☢☢☢
MRI neck without and with IV contrast	Usually Appropriate	O
CT chest with IV contrast	May Be Appropriate	☢☢☢
CT chest without IV contrast	May Be Appropriate	☢☢☢
FDG-PET/CT whole body	May Be Appropriate	☢☢☢☢
I-131 scan whole body	May Be Appropriate	☢☢☢☢
CT neck without IV contrast	May Be Appropriate	☢☢☢
MRI neck without IV contrast	May Be Appropriate	O
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
CT neck without and with IV contrast	Usually Not Appropriate	☢☢☢
Octreotide scan whole body	Usually Not Appropriate	☢☢☢☢

CT neck and chest with IV contrast were ordered by the Hematology and Oncology team

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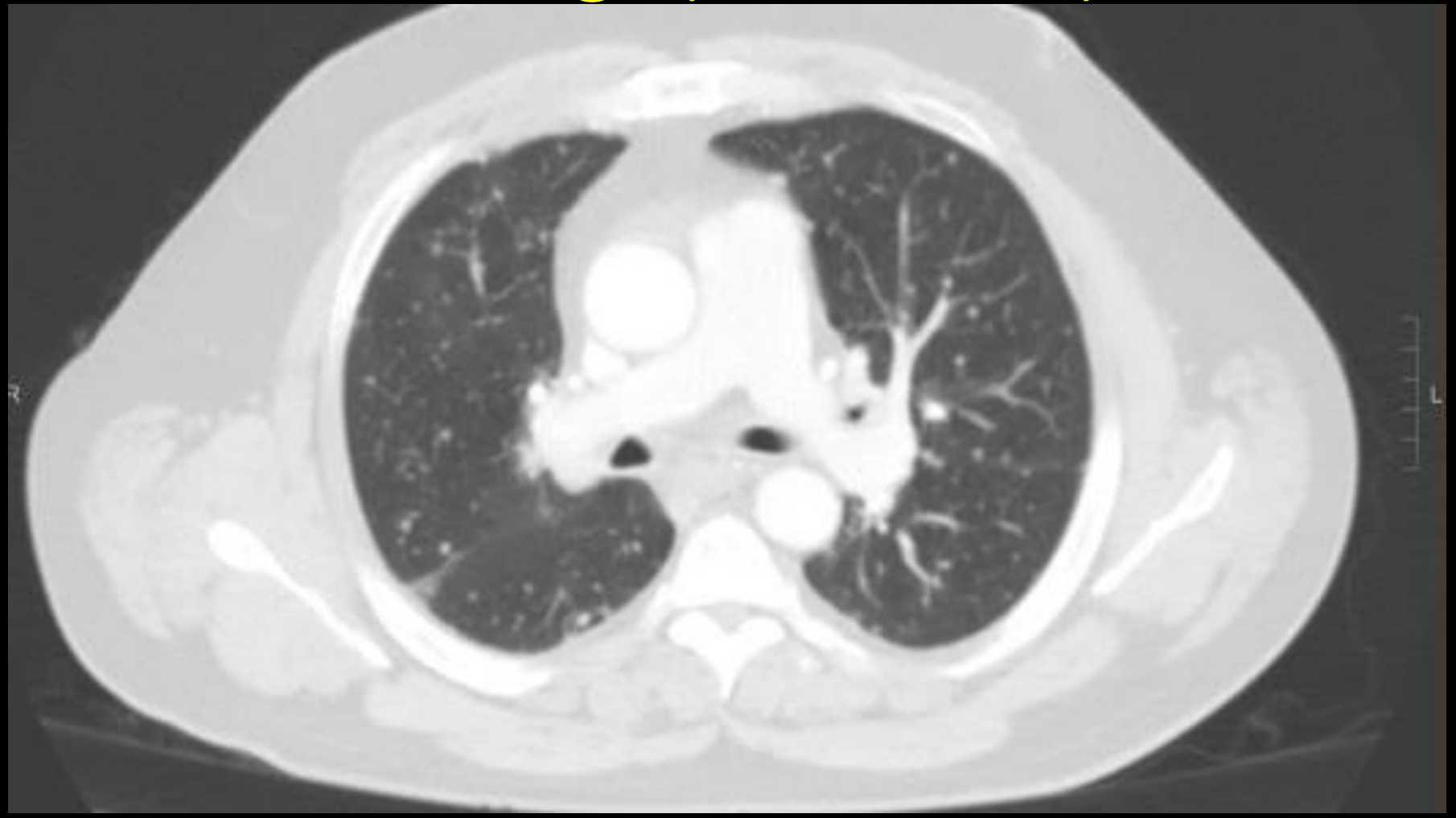
Findings (unlabeled)



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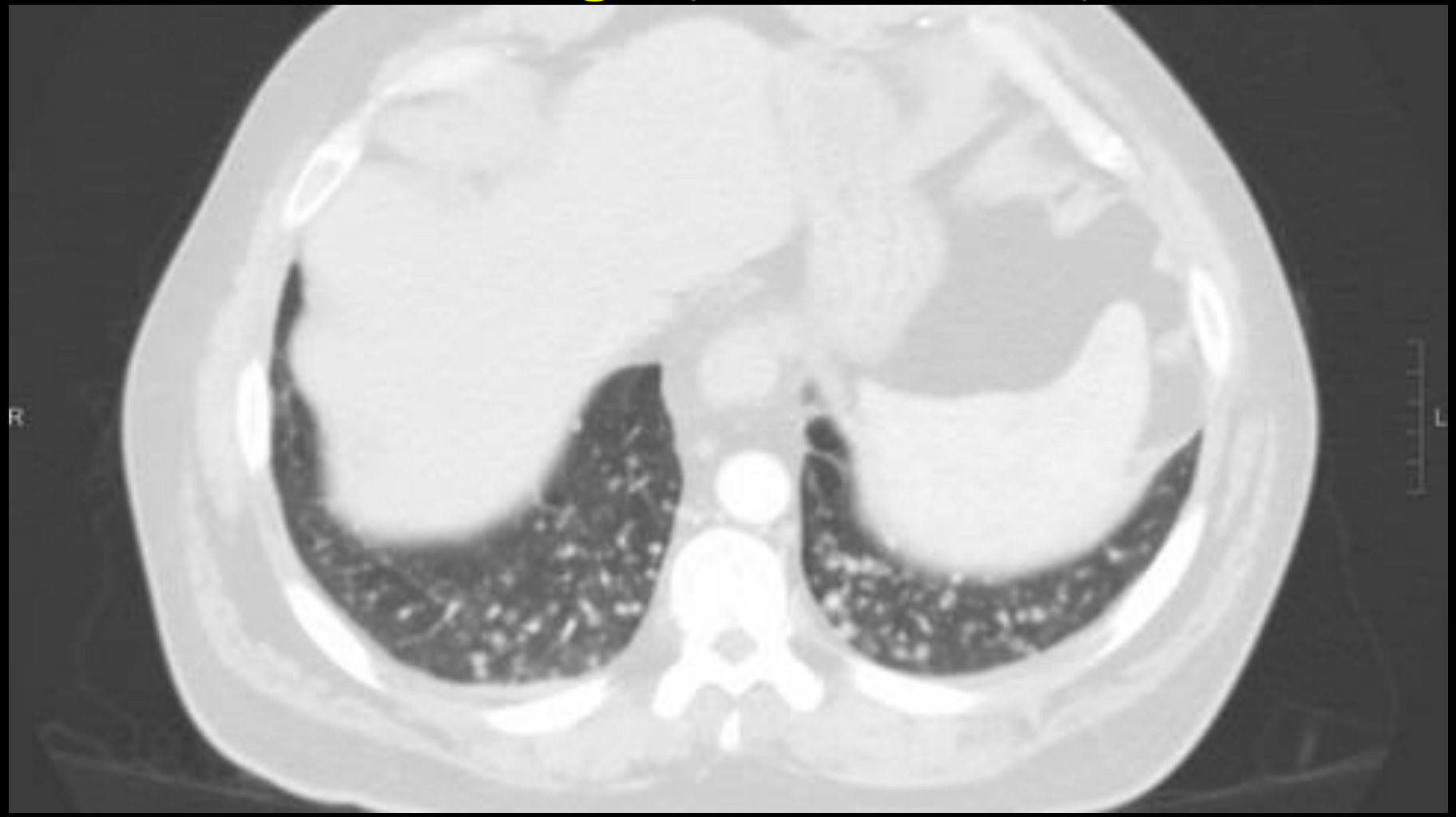

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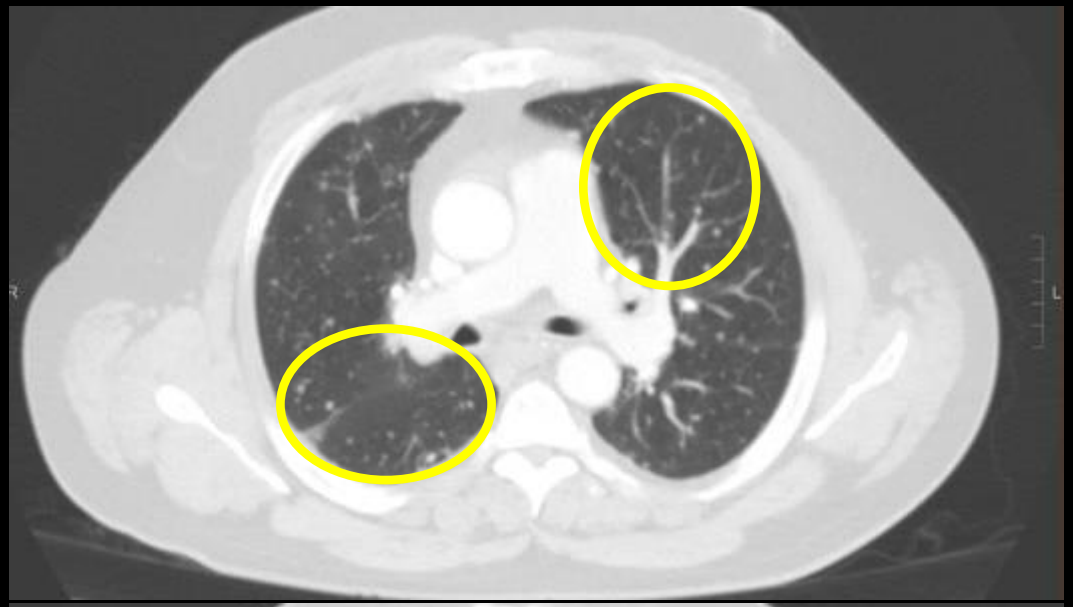

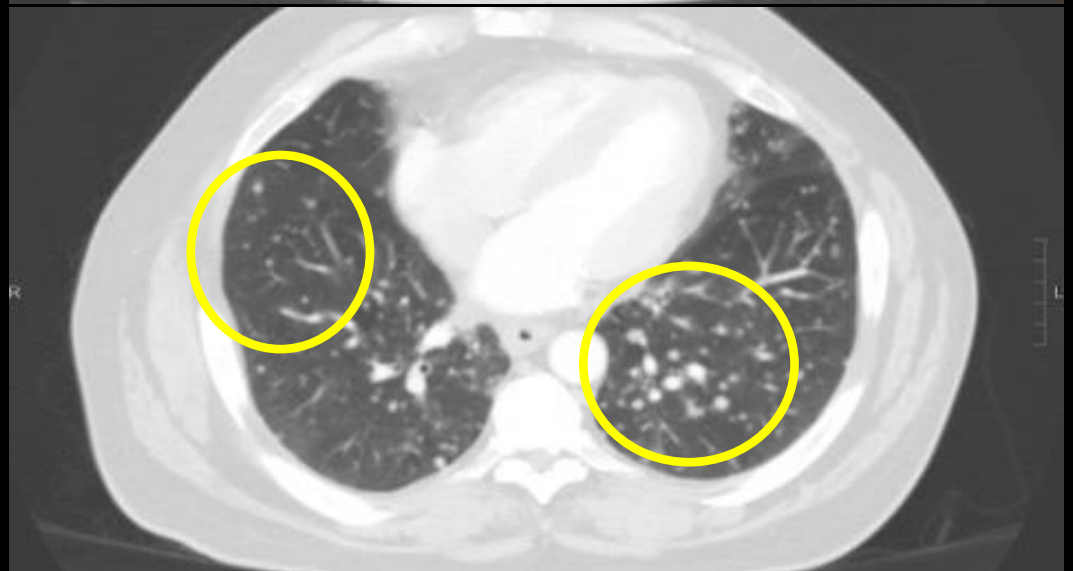

- Innumerable scattered small pulmonary nodules, some punctate, diffusely in all 5 lobes
- No sparing of the pleural surfaces
- No pericardial or pleural effusion
- Background of mosaic attenuation with patent central airways

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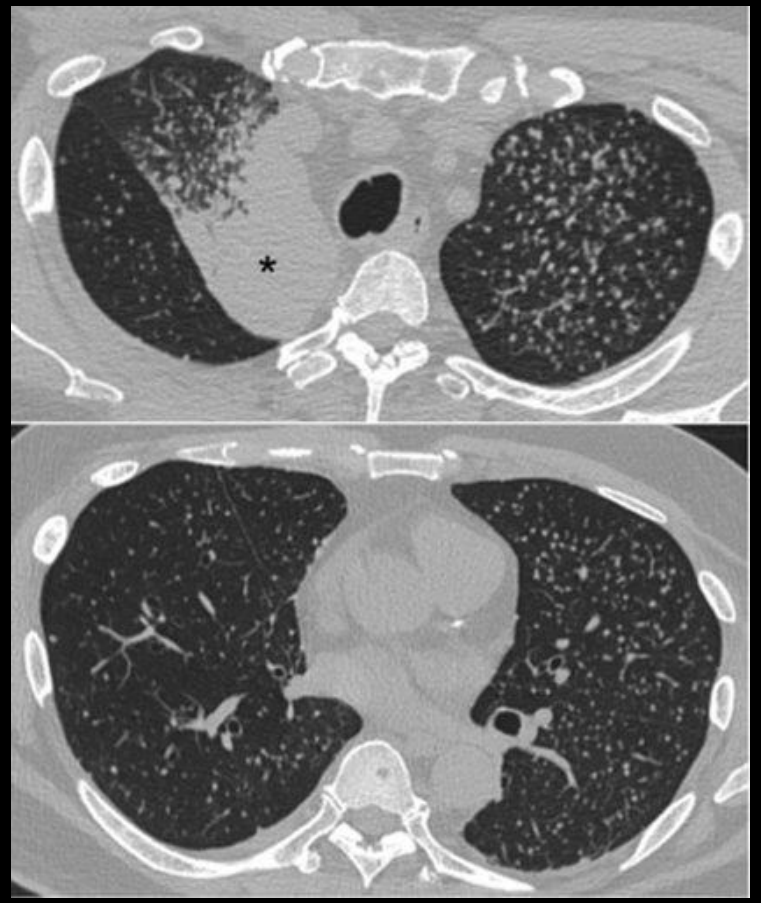
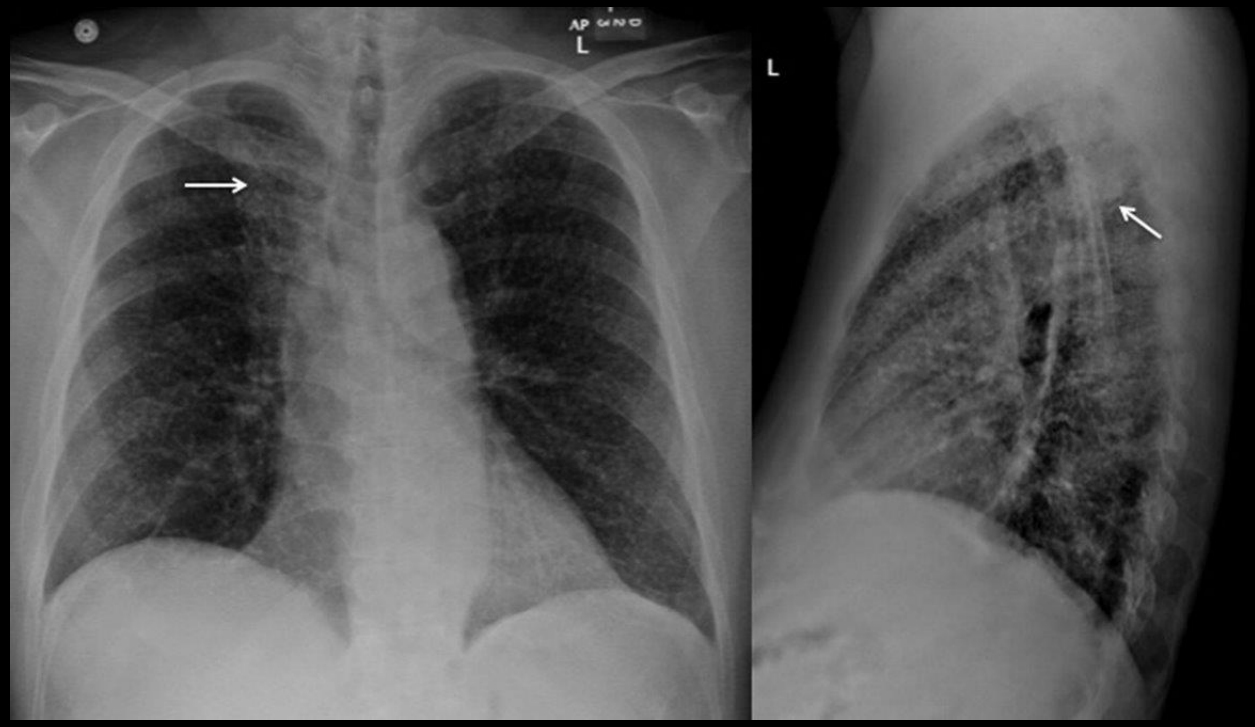
Final Dx:

Recurrent Papillary Thyroid Carcinoma with metastatic miliary pulmonary nodules



https://www.atsjournals.org/doi/10.1513/AnnalsATS.201706-436CC

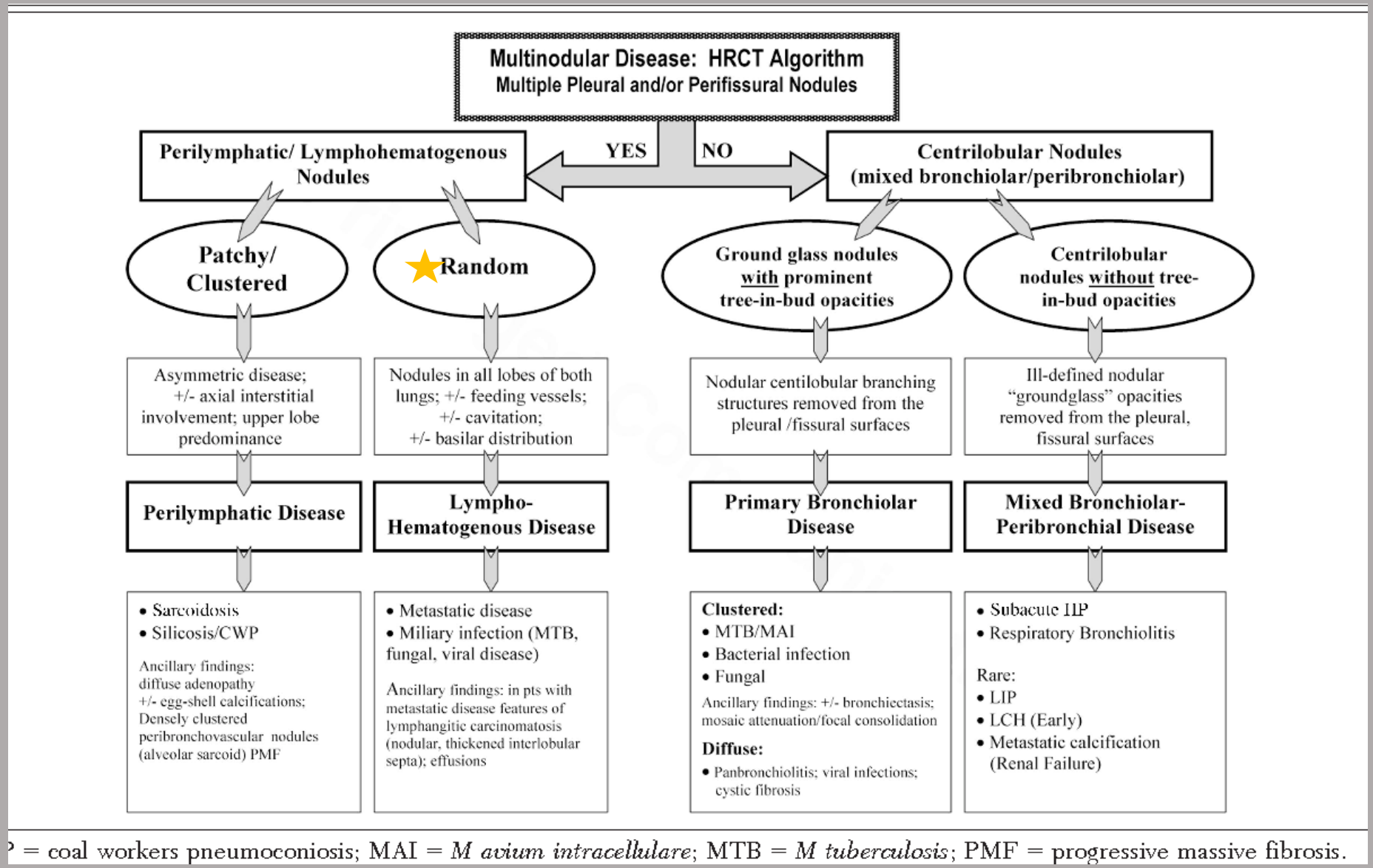


Miliary Lung Opacities

- Describes innumerable, < 4mm pulmonary nodules diffusely scattered throughout the lungs
- Diffuse and symmetric involvement of all 5 lobes
- Result of hematogenous spread of infection or malignancy most commonly

Algorithm for Multinodular Disease

- Major differentiating factor is presence of multiple pleural and/or perifissural nodules
- Presence of multiple nodules in a random pattern: Lympho-Hematogenous spread
  - Metastatic Disease
  - Miliary Infection



? = coal workers pneumoconiosis; MAI = *M avium intracellulare*; MTB = *M tuberculosis*; PMF = progressive massive fibrosis.

Raoof, Suhail, et al. "Pictorial essay: multinodular disease." *Chest* 129.3 (2006): 805-815.

Miliary Nodules from Metastatic Disease

- Uncommon presentation of hematogenous spread to the lungs

- Most common primary malignancies resulting in this pattern:
  - Thyroid carcinoma★
  - Renal cell carcinoma
  - Melanoma
  - Osteosarcoma
  - Colorectal carcinoma
  - Testicular tumors
  - Rarely lung tumors

References:

- “Miliary Lung Opacities .” *Annals of the American Thoracic Society*, 2017, https://www.atsjournals.org/doi/10.1513/AnnalsATS.201706-436CC.
- Pillai, Saran, et al. “Adenocarcinoma of the Lung Presenting with Intrapulmonary Miliary Metastasis.” *Cureus*, Cureus, 19 Aug. 2019, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6797010/%E2%80%8B.
- Raoof, Suhail, et al. "Pictorial essay: multinodular disease." *Chest* 129.3 (2006): 805-815 129.3