

Nonspecific Interstitial Pneumonia (NSIP)-Interstitial Lung Disease (ILD)

Ashley Tom

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RAD 4001 Diagnostic Radiology

Dr. Angel Su, PGY 2

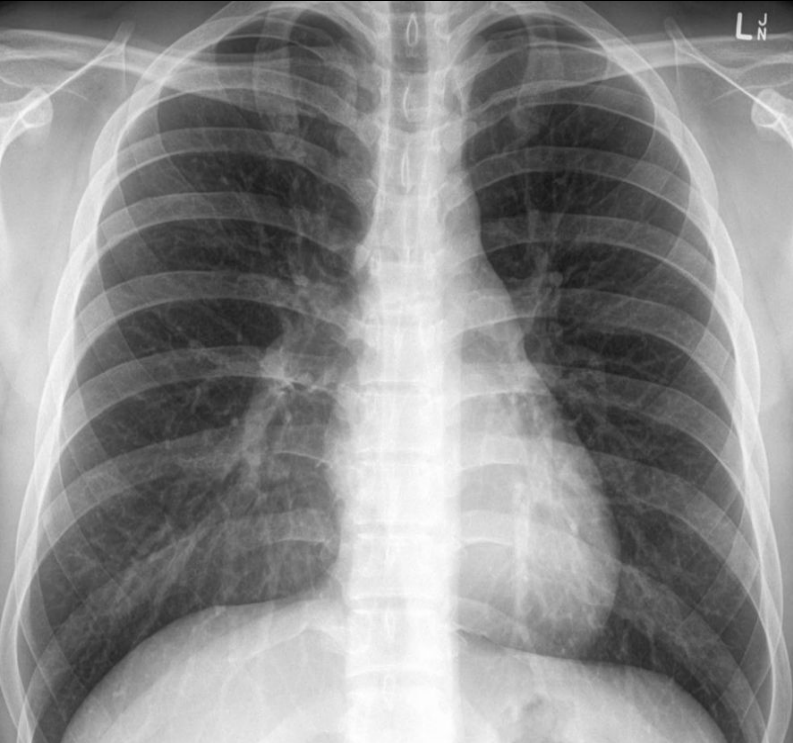
Clinical History

- 72 yo male with a recent diagnosis of NSIP presents to the ED with worsening SOB and hypoxia
 - In wheelchair due to severe SOB and DOE; (-)fever, chills, cough, chest pain
 - VS: afebrile, normotensive, tachypneic, hypoxic-O2% sat 70s on 8L of O2
- Prior History
 - Previous COVID 19, resulting in hospitalization at OSH
 - No notable PMH or respiratory illnesses prior to COVID 19 infection
 - ILD/Pulmonary Fibrosis diagnosed on CT Chest at OSH
 - Seen at MHH for further work-up of ILD
 - Cryo-biopsy of Lung-Histological Dx of cellular NSIP
- Admitted for ILD exacerbation

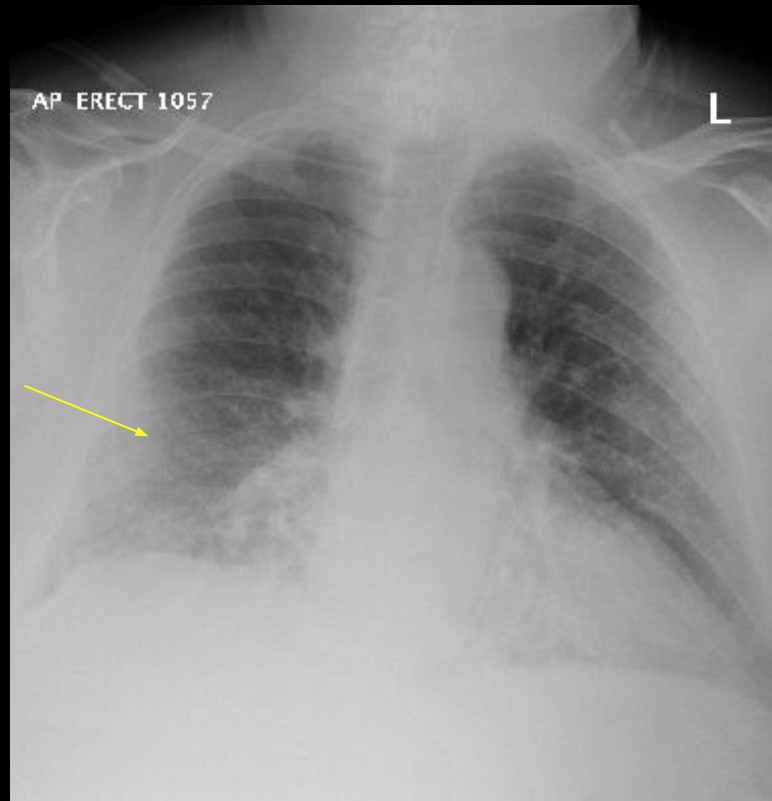
Relevant Imaging

- CXR Comparison
- CT Chest without Contrast

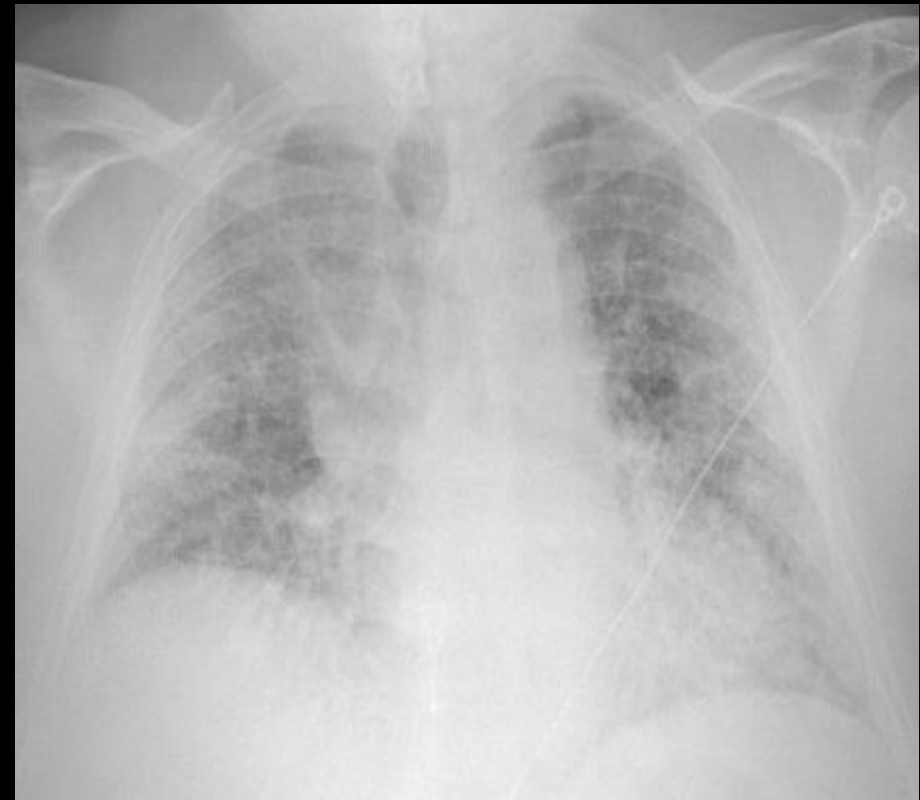
CXR Comparison



Normal



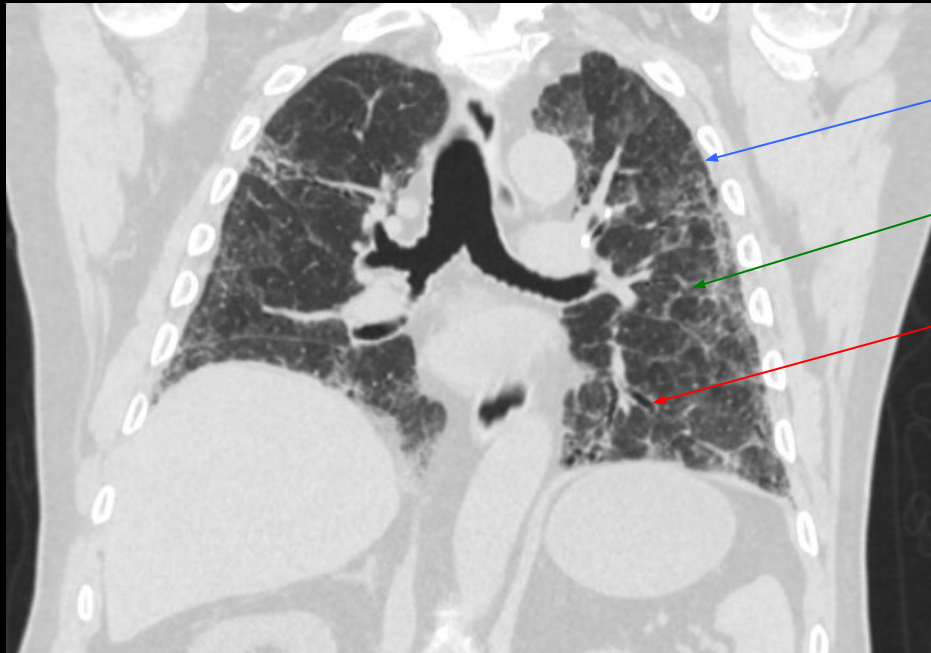
Reticular



Reticulonodular

Case courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 8090

Coronal

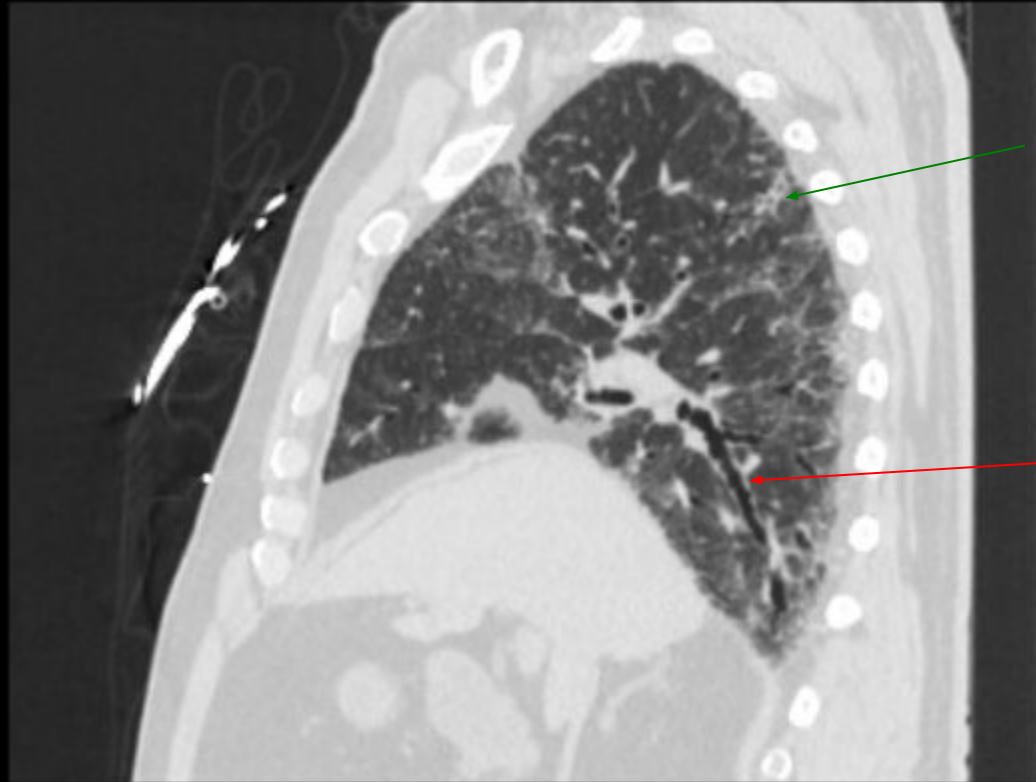


Subpleural sparing

Septal thickening

Traction Bronchiectasis

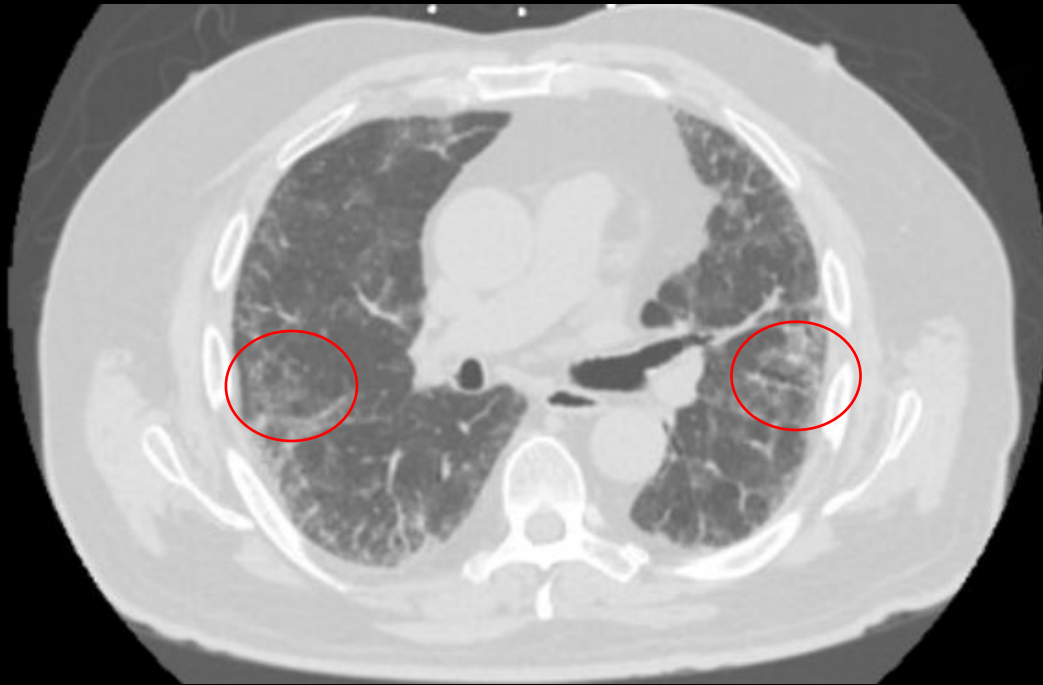
Sagittal



Septal thickening

Traction Bronchiectasis

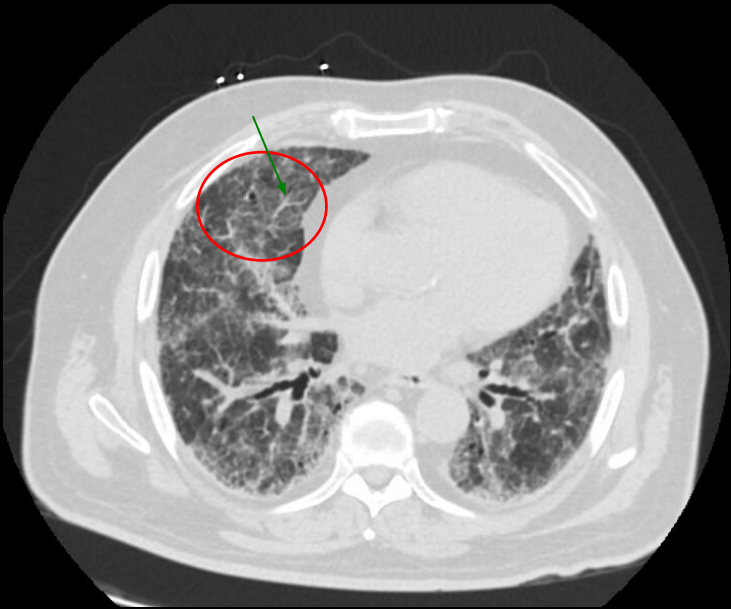
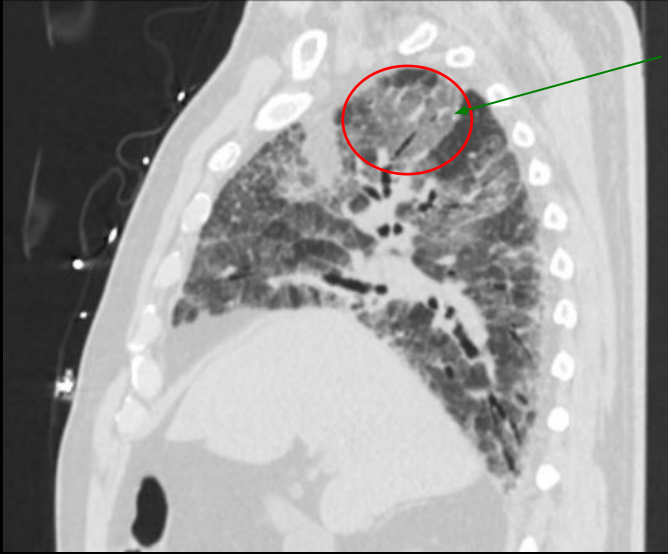
Axial



Ground Glass Opacities

- Bilateral
- Peripheral

Crazy Paving Pattern



CT Non-Contrast Comparison Coronal View



Key Imaging Findings - CT

- Septal Thickening
- Ground Glass Opacities
- Traction Bronchiectasis
- Subpleural Sparing

Differential Diagnosis-Interstitial Lung Disease

- Interstitial Pneumonia
 - Usual Interstitial Pneumonia
 - Nonspecific Interstitial Pneumonia
 - Cellular
 - Fibrotic
- Hypersensitivity Pneumonitis
- Connective Tissue Related ILD
- COVID Pneumonia

Discussion-Interstitial Pneumonia

- Usual Interstitial Pneumonia (UIP)
 - Interstitial Pulmonary Fibrosis
 - Idiopathic or 2nd to Underlying Systemic Disease
 - Diagnostic HRCT Pattern for UIP
 - Imaging Findings
 - Subpleural Reticular Opacities
 - Honeycombing
 - Traction Bronchiectasis

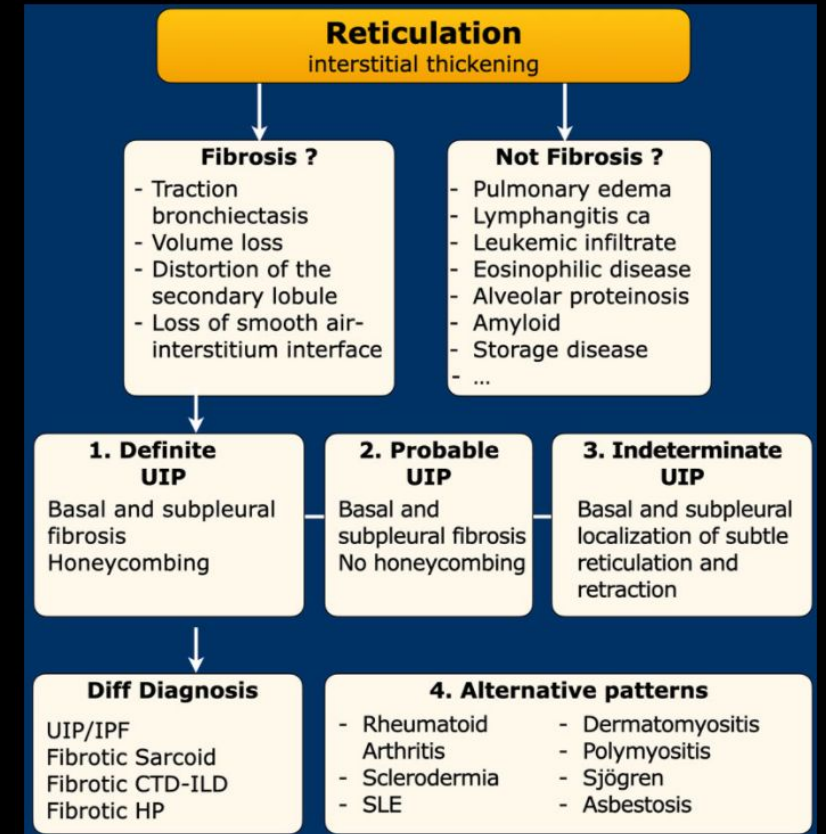


Image from Radiology Assistant

Discussion-Interstitial Pneumonia

- Nonspecific Interstitial Pneumonia
 - Associated with connective tissue disorders but many cases are idiopathic
 - Subtypes-histologic diagnosis
 - Cellular-inflammation
 - Fibrotic-fibrosis and scarring
 - Imaging Findings
 - Ground Glass Opacities (bilateral, lower lobe, peripherally predominant)
 - Reticular Abnormalities
 - Traction Bronchiectasis
 - Subpleural Sparing

Discussion

- CT related ILD (i.e Scleroderma)
 - Clinical Presentation
 - Imaging Findings
 - UIP or NSIP Pattern
 - Patulous (dilated) esophagus not uncommon
- Hypersensitivity Pneumonitis
 - Clinical Presentation
 - Allergen exposure leading to inflammation and lung fibrosis
 - Imaging Findings
 - Ground Glass Opacities
 - Head Cheese Sign:
 - Juxtaposition of high, low, and normal attenuations on CT

Discussion

- COVID Pneumonia
 - Clinical Presentation
 - Imaging Findings
 - Ground Glass Opacities
 - Crazy Paving
 - Vascular Dilation
 - Traction Bronchiectasis
 - Subpleural Bands and Architectural Distortion
- Interstitial Lung Disease and COVID-19 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7534789/>)
 - COVID 19 pathologic imaging findings overlap with idiopathic interstitial pneumonia and interstitial pneumonia-collagen vascular disease
 - Steroid Therapy

Final Diagnosis

- NSIP
 - Clinical: Idiopathic or 2nd to Underlying Systemic Disease
 - Radiologic:
 - Ground Glass Opacities
 - Reticular Pattern
 - Traction Bronchiectasis
 - Histologic: cellular

Prognosis and Treatment

- Prognosis
 - NSIP has a better prognosis than UIP
 - Cellular>Fibrotic due to less scarring and fibrosis
- Treatment
 - Mild: close follow-up and observation
 - Moderate to Severe: systemic steroid +/- immunosuppression
 - Refractory: cyclophosphamide, rituximab, or calcineurin inhibitors
 - non-responsive: lung transplantation
 - Treat Underlying Disease (for secondary causes)
 - Close Follow-Up in the Setting of Previous COVID 19 Infection
 - <https://pubmed.ncbi.nlm.nih.gov/32894907/>
 - Post inflammatory Pulmonary Fibrosis at discharge
 - Follow-up: UIP and NSIP pattern on CT

ACR appropriateness Criteria

Initial Presentation of Symptoms

Variant 2:

Acute respiratory illnesses in immunocompetent patients with positive physical examination, abnormal vital signs, organic brain disease, or other risk factors. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☼
US chest	May Be Appropriate	○
CT chest with IV contrast	Usually Not Appropriate	☼☼☼
CT chest without and with IV contrast	Usually Not Appropriate	☼☼☼
CT chest without IV contrast	Usually Not Appropriate	☼☼☼
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○

Variant 2:

Confirmed diffuse lung disease. Suspected acute exacerbation or acute deterioration. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☼
CT chest without IV contrast	Usually Appropriate	☼☼☼
CT chest with IV contrast	May Be Appropriate	☼☼☼
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○
CT chest without and with IV contrast	Usually Not Appropriate	☼☼☼
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☼☼☼☼

ED Presentation

Cost of Imaging

- Imaging at MHH
- CT Chest without Contrast
 - \$5,886.50
- CXR 1 view
 - \$1,337.75
- CXR 2 views
 - \$830.25

<https://memorialhermann.org/patients-visitors/patient-services/financial-care/financial-resources/memorial-hermann-charge-master>

Take Home Points

- NSIP is a complex diagnosis and requires clinical, radiologic, and histologic correlation.
- Ground Glass Opacities are nonspecific findings on chest radiograph for interstitial lung disease.
- There are specific patterns and distributions of imaging findings that differentiate the different interstitial lung diseases.
- Follow up is important in patients with previous COVID 19 infection.

Take Home Points

- Herring, William. **Learning Radiology: Recognizing the Basics**. 4th ed. Philadelphia: Elsevier [Imprint], 2019.
- Kligerman SJ, Groshong S, Brown KK, Lynch DA. Nonspecific interstitial pneumonia: radiologic, clinical, and pathologic considerations. **RadioGraphics** 2009;29(1):73–87. <https://doi.org/10.1148/rg.291085096>
- Nayfeh AS, Chippa V, Moore DR. Nonspecific Interstitial Pneumonitis. [Updated 2021 Mar 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK518974/>
- <https://radiopaedia.org/?lang=us>
- <https://radiologyassistant.nl/chest/hrct/fibrosis-of-the-lung-on-hrct-imaging>
- https://acsearch.acr.org/list?_ga=2.2774963.2059389033.1621912266-1876153060.1619668536



Questions?