Conceptual Approach to Diffuse Lung Disease – July 22nd, 2020

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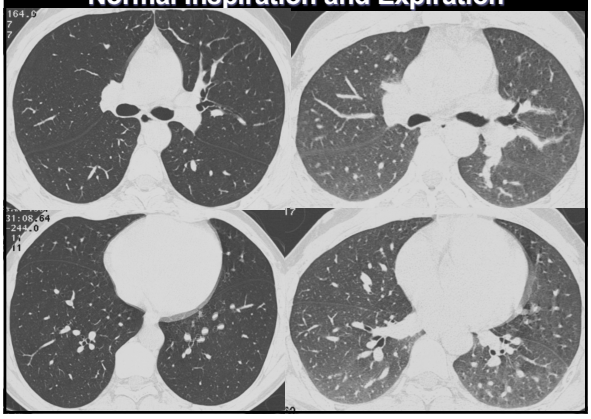
"**The Greatest Obstacle to Discovery is not Ignorance, but the Illusion of Knowledge.**"
- Daniel J. Boorstin

Diffuse Lung Disease Objectives

- Case-based format with a conceptual approach *based on the report Impressions*
- Review Importance of morphological abnormalities and Disease distribution
- Emphasize difference between *Pathology Differential* and *Etiology Differential*
- *Polling questions – have some fun!*

This session will expose an old propagated Myth as definitely false: 'Chest imaging is just long differentials'

Normal Inspiration and Expiration



Conceptual Imaging Approach

***2* Important Imaging Clues:**

1. **Morphology of disease:** 'Airspace', 'Interstitial' and 'Reticulonodular' often ***not*** helpful. ***Avoid*** the term 'Infiltrate'

2. **Distribution of disease:** location, location, location!

Duration of Symptoms is also very helpful
Rule of Thumb: < 1 week is considered Acute

Morphological Patterns

- **Increased Opacity**: Consolidation & Ground glass
- **Decreased Opacity**: Emphysema, Cysts Mosaic lung attenuation
- **Reticular Opacity**: Septal thickening and fibrosis
- **Nodular Opacity**: Solitary, Multiple and/or Cavitary
- **Airway Disease**: Tracheal, bronchiectasis and small airway patterns/Mosaic lung attenuation

Distribution of Disease

- Upper lobe: **"SET PARC"**
- Bronchovascular (Radiates from hilum)
- Peripheral
- Random/Perilymphatic/Centrilobular
- Diffuse distribution (Often Systemic cause)
- Focal or multifocal
- Dependent distribution ('Gravity' related)

Organization of Lung diseases is based on *Morphology*, *Distribution* and *duration of symptoms*

THORACIC DIFFERENTIAL DIAGNOSIS 1 (Marc Gosselin)

GROUND GLASS OPACITIES

ACUTE: Blood, Pus, Water
PNA: PCP, CMV, resolving Bacterial
Edema: hydrostatic & capillary leak
Hemorrhage: Pulmonary Hemorrhage
Hyd: Edema/ARDS
Dry: PCP, CMV, HSP, hemorrhage

CHRONIC (> 4 weeks)

No/Minimal Fibrosis
Hypersensitivity Pneumonitis [HSP]
(EAA vs Drug-Induced) *[non-smokers]*
DIP/RB-ILD, Pulm LCH/EG *[smokers]*
Cellular NSIP, Pulm Alveolar Proteinosis, Follicular Bronchiolitis/LIP (CVD, HIV), Pulmonary venoocclusive dz

Moderate/Severe Fibrosis
(+) **Honeycombing**:
UIP (CVD, Drug-tox, IPF, Asbestosis?)
(-) **Honeycombing**:
Fibrotic NSIP (CVD, Drug-Induced)
Chronic HSP (a/w air-trapping, spares costophrenic angles)

CRAZY PAVING *GGO + septal thickening*
Acute: hemorrhage, edema (both), AIP, ARDS, PCP, chronic eosinophilic PNA, drug toxicity
Chronic: Alv Prot, lipoid PNA, COP, BAC

UNILATERAL EDEMA
Dependent (R>L), reexpansion, asymmetric emphysema, venous/lymphatic obstruction, mitral regurgitation (→RUL)

CONSOLIDATION

ACUTE: Blood, Pus, Water
PNA: Bacterial; Aspiration
Edema: Hydrostatic & capillary leak
Hemorrhage: Pulmonary Hemorrhage

CHRONIC "ANGIO"
Alveolar Proteinosis
Neoplasm (Lymphoma, BAC)
Granulomatous (TB/Fungal, Alv Sarcoid)
Inflammatory (Eosinophilic PNA, COP)
Old (Chronic Aspiration, Lipoid Pneumonia)
Adenopathy favors Lymphoma or Granulomatous Dz

INTERSTITIAL LUNG DISEASE

Diffuse Reticular Opacities
(Kerley A, B lines)
Pulmonary Edema (Hydrostatic>cap leak)
Lymphangitic tumor (AdenoCa/Lymphoma)
Viral or Mycoplasma PNA
Acute Eosinophilic PNA

Peripheral Reticular Opacities
(Lace-like network, "Honeycombing")
UIP (Complications: PHTN, Lung Ca, AIP)

Cystic Pattern (Curved Reticular)
Severe Honeycomb Lung (Fibrosis), Severe Emphysema, Diffuse/Central Bronchiectasis, EG/PLCH, PCP, LAM/TS, LIP, DIP.
Cystic Mets (sarcomas: leiomyo, synovial, stromal cell, epithelioid, osteogenic)

MULTIPLE NODULES

Random: Mets, granuloma dz, varicella, AVM

Miliary: *(1-2 mm, random but LL predom)*
Same size: TB/Fungal, sarcoid, alv mic;
Var size: mets (thyroid, melanoma, breast, adeno)

Upper lobe: HSP, EG/PLCH, Si & CW pneumoc

Perilymphatic: Lymphangitic tumor, Sarcoid

Subacute/chronic (Ill-defined nodules)
Inhalational/Lymphatic Dz: HSP, EG/PLCH, Silicosis & Coal workers pneumoconiosis

Centrilobular/Tree-in-Bud: Aspiration, Viral PNA (RSV, adenov, flu), BronchoPNA, Mycoplasma, MAI, Endobronchial TB Spread, Asthma, ABPA, CF, COP, DiffPanbronchilitis

Centrilobular/Ill-Defined Ground Glass
HSP (EAA), NSIP (Cellular), RB-ILD (smoker), Follicular Bronchiolitis (CVD, AIDS)

CAVITARY NODULES

Infection: Fungal: Cocci, Asperg, Crypto gattii
Bact: septic emb, abscess, TB, Nocard, Legionella
Neoplasm: SqCCa (nodular wall), Sarcoma
Vasculitis: Wegener's, Angiocentric Lymphoma, RA (Necrobiotic Nodules)
Trauma: Hemotoma, pneumatocele/cyst

SOLITARY PULM NODULE
AdenoCa, SqCC, LrgCC, SmCC, Carcinoid, Lymphoma, Met, Hamartoma, Granuloma, Infection, RA, Trauma, Congenital cyst, AVM

THORACIC DIFFERENTIAL DIAGNOSIS 2 (Marc Gosselin)

DISTRIBUTION OF DZ

UPPER LOBE: "SET PARC"
(↑V/Q, ↓lymphatic clearance)
Sarcoid, Silicosis
EG-PLCH (Smoker)
EAA (Nonsmoker)
TB/Fungal
PCP
Ankylosing Spondilitis
Radiation therapy
Cystic Fibrosis

LOWER LOBE/DEPENDENT:
(↓V/Q, gravity)
Hydrostatic edema, aspiration, ATX, CVD, UIP

BRONCHOVASCULAR:
(airways, lymphatics)
Sarcoid, Lymphoma/lympho prolif dz, COP, Kaposi's Sarcoma; aspiration PNA (acute sx's)

PERIPHERAL:
Chronic Eos PNA, pleural dz, infarct, COP, fungal infection, UIP, Wegener's

RANDOM: *(follows blood flow, incl pleura)*
Hematogenous spread of tumor or infection

DIFFUSE: *(usually systemic dz)*
Noncardiogenic edema, CF, Pulm-renal dz

FOCAL: *(usually local dz)*
Bacterial PNA, contusion, MAC, aspiration

UNILAT PLEURAL EFFUSION

Exudative: Hemotx (Trauma, Iatrogenic), Tumor, Infection/Inflam'n (Empyema), Chylotx
Transudative: Hepatohydrothorax

MEDIASTINAL MASSES

Anterior: Adenopathy, Lymphoma/Leukemia, Germ Cell Tumors, Thyroid (Goiter/Ca), Thymic Tumors, Vascular
Middle: LAD, EBV, Castleman's, Neoplastic (SmCC, Lymphoma/Leuk), Granulomatous, Congenital Cyst, Vascular/Arch Anomalies
Posterior: Adenopathy, Neurogenic tumor, Spine (Abscess, Tumor), Vascular (Aneurysm, Hematoma), Developmental (Lateral thoracic meningocele, Bochdalek hernia)

HILAR ENLARGEMENT

PULMONARY HTN
Hyperdynamic (L→R shunt): ASD, VSD, PDA, Endocardial cushion defect
Obliterative: Chronic PE, Emphysema, PPHTN, Drug Vasculitis, Schistomsomiasis
Hypoxic: Chronic Bronchitis, CF, BO, Sleep Apnea, Fibrosis, Chronic High Altitude
Pulmonary Venous HTN: Mitral Stenosis, CHF, Pulmonary Venoocclusive Disease

HILAR ADENOPATHY
Neoplastic: Primary lung, Mets, Lymphoma, Leukemia (CLL)
Granulomatous: Sarcoid, TB/Fungal
Infectious: EBV, AIDS
Castleman's Disease

MOSAIC LUNG ATTENUATION
Lucent Regions Normal:
Vessels same size in all areas → GGO ddx
Lucent Regions Abnormal:
Vessels are smaller in lucent areas:
Air trapping (+): BO, Asthma, CF
Air trapping (-): Pulm HTN ddx

CHANGES IN LUNG VOLUME
Look for: deviated fissures, vascular crowding, hilar retraction, mediastinal shift, flattened diaphragm, sternum-diaphragm angle >90°
Volume Loss: ATX, surgery, post infectious/inflammatory scarring, fibrosis, decreased compliance (ARDS, lymphangitic tumor)
Hyperexpansion: Emphysema, CF, BO, Chronic Bronchitis, Asthma, TBM

ACQUIRED HEART DISEASE
PC (pericardium), MC (myocardium), VD (valve dz)
NML or SMALL HEART
(Restrictive, Pressure Overload)
PC: Constrictive Pericarditis
MC: Acute MI, Restrictive/Hypertrophic CM
VD: Stenosis (→ cephalization or big SVC)
LARGE HEART
(MC failure, Volume Overload)
PC: Pericardial Effusion
MC: Dilated/Ischemic CM, RVF
VD: Regurgitation (asym chamber enlargement)
PC & MC dz → Global enlargement

Approach: What We Try To Diagnose

A Pathology or Pathological Differential

- **Pathology:** We look at Imaging Patterns of Injury: **Morphology** *and* **Distribution**
- A ***pathological process*** is suggested
- Importance to the Clinician: **Prognosis** *and* **Therapeutic Options**

What We Can Help With: *Etiology*

- **Etiology**: It is *NOT* the same as Pathology
- The Same etiology can have a ***Variety of Pathological effects*** in Patients – "*PEOPLE ARE LIKE SNOWFLAKES*"
- What are the common causes for the pathological injury likely present?
- **For example**: Fibrotic NSIP is a *Pathological Injury*. Drug Toxicity is an *Etiology*.

Report Impression:

Examples *Will Evolve* With Radiologist's Experience

- 5 ***generalized options*** for the radiologist:
- **Imaging is Normal!**
- **Imaging findings questionable or of uncertain significance**: Consider a follow up exam, Expiratory images or laboratory investigation? (i.e. Hypoxic? **DLCO**)
- **Imaging is characteristic** for a diagnosis

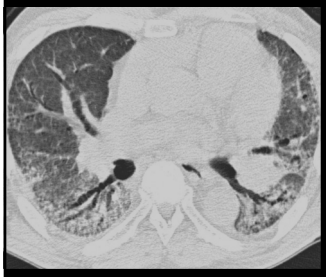
Report Impressions

- **A short differential diagnosis** that clinical history and laboratory tests can help sort out: Smoking history? Connective tissue disease? Fever? Medications? Pulmonary consultation is helpful.
- **Diagnosis not known/Indeterminate**: Is tissue or bronchial secretion sampling required?
  * If so, How? Sputum, Bronchoscopy, CT guided lung biopsy, Open lung biopsy or EUS.

***Avoid terms like* 'Infiltrate' 'Nonspecific' or 'Clinical correlation'**

Images → Report Conclusions

Depends on Your Referring Clinician

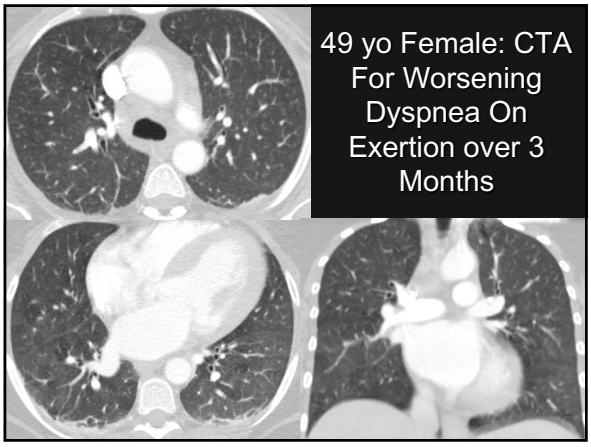


- "Moderately advanced pulmonary fibrosis, most likely Fibrotic NSIP *pathology*. UIP is possible, but less likely. Consider an Autoimmune disease or Drug Toxicity as *possible etiologies*. If tissue sampling is considered, suggest a VATS procedure."

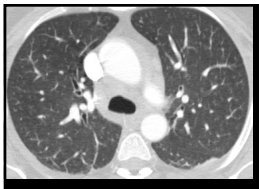
Southern Puget Sound, WA: October

Imaging of Questionable Significance
Common Examples

- Ground Glass versus expiration image?
  (Progressive Increase dependent density?)
- Centrilobular Ground Glass Nodules
- Small airway disease/Mosaic Perfusion
- Airway Thickening
- Bronchiectasis
- Dependent atelectasis versus early fibrosis – Does it extend laterally?

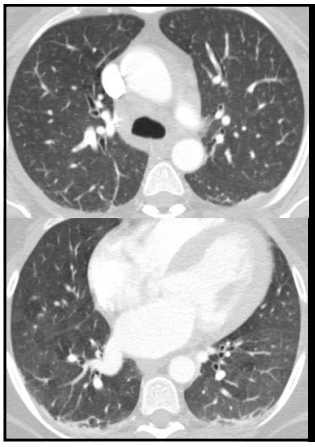


49 yo Female: CTA For Worsening Dyspnea On Exertion over 3 Months



#1: Which report Impression would you use?

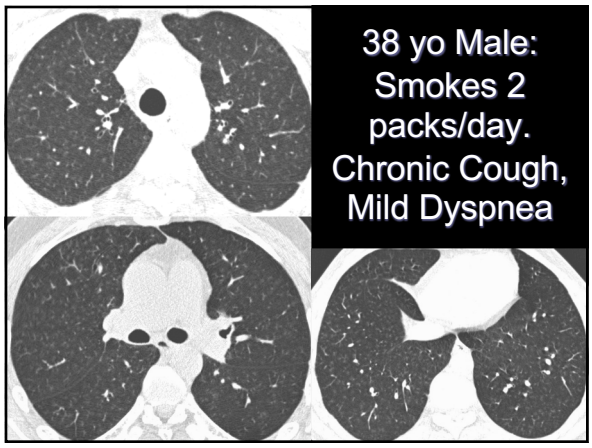
- 1. Nonspecific imaging, Clinically correlate
- 2. Suggest Pulmonary Consult and Dlco measurement or repeat CT full inspiration
- 3. Negative examination
- 4. Diffuse ground glass lung disease, suspected Cellular NSIP pathology/HSP



Answers: 2 or 4 are both helpful

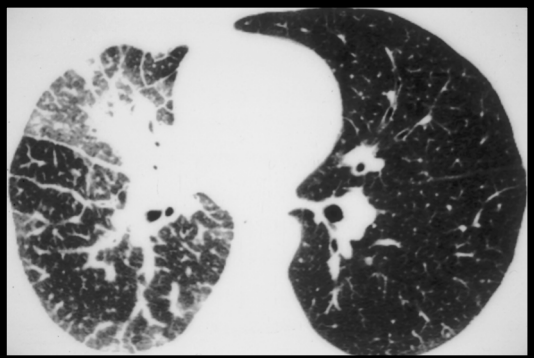
Follow up: Dlco was 76% of predicted and patient's pulse O2 decreased into the mid 80's with exertion

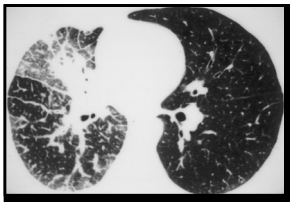
Bx: **NSIP from HSP**
Likely secondary to Medication



38 yo Male:
Smokes 2 packs/day.
Chronic Cough,
Mild Dyspnea

65 yo old with progressive shortness of breath





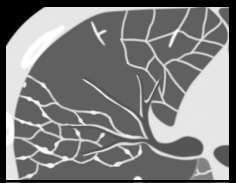
#2: Which report impression would you use?

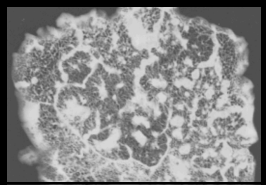
- Findings consistent with asymmetric Congestive heart failure
- Findings suspect for Influenza/viral infection, clinical correlation suggested
- Suspected Aspiration involving right lung
- Findings characteristic for Lymphangitic spread of tumor

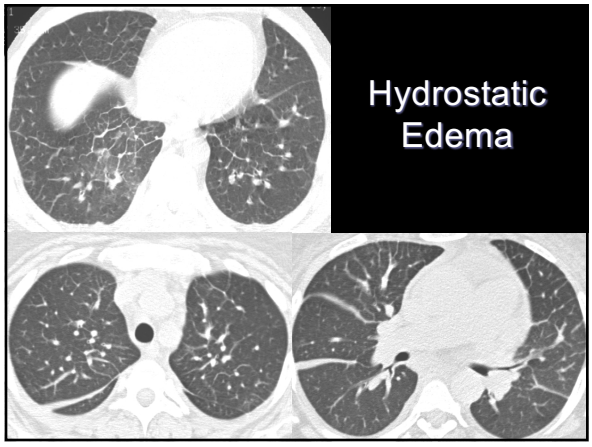
Answer: #4 - Lymphangitic Spread of Tumor.
Findings are Characteristic – Usually it is *Adenocarcinoma or Lymphoma*

Interlobular Septal Thickening:

Hydrostatic Pulmonary Edema
Lymphangitic Spread of Tumor
Acute Eosinophilic Pneumonia







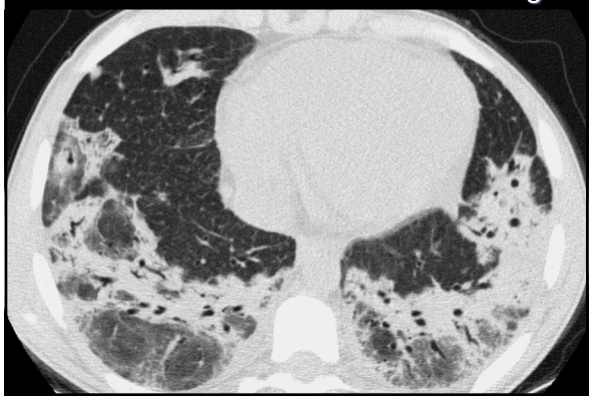
Hydrostatic Edema

'If you can't explain it simply…

You don't understand it well enough.'

Albert Einstein

28 Year Old Female with Chronic Cough



Chronic Consolidation:

COP *and* Eosinophilic Pneumonia

Mucinous AdenoCA *and* Lymphoma

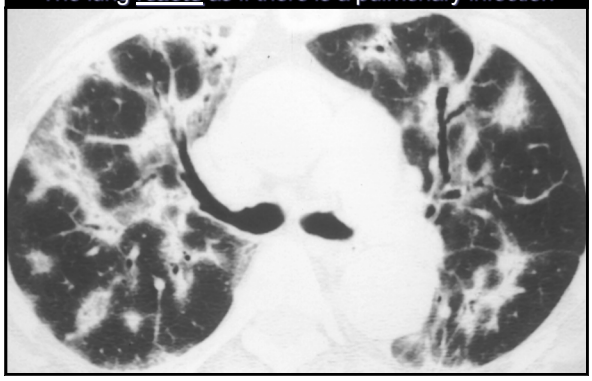
TB/Fungal *and* Alveolar Sarcoidosis

Chronic Aspiration *and* Lipoid Pneumonia

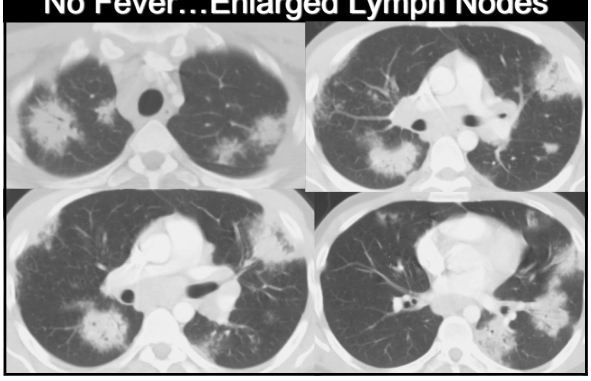
Alveolar Proteinosis

Cryptogenic Organizing Pneumonia

The lung reacts as if there is a pulmonary infection

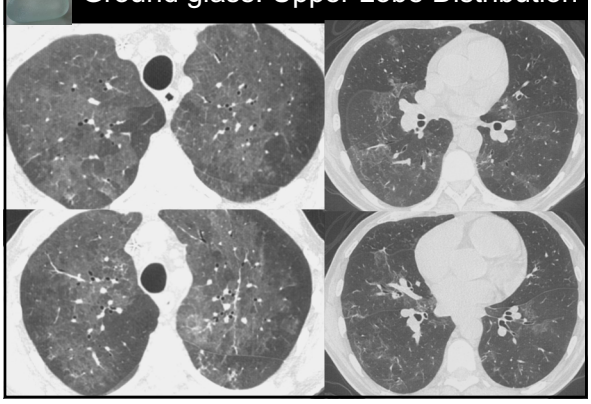


45 Year Old Male: Cough for 3 Months, No Fever…Enlarged Lymph Nodes

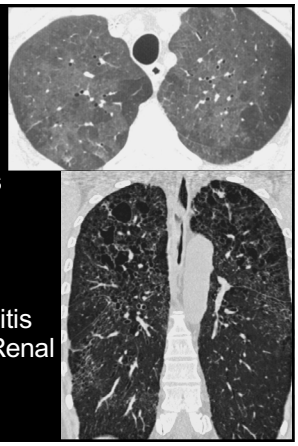


Sunriver/Bend, Oregon

Ground glass: Upper Lobe Distribution



Upper Lobe Distribution: "SET PARC"

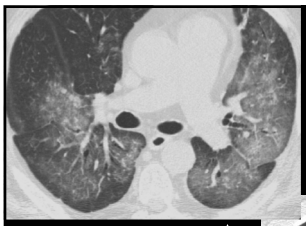


S - Sarcoidosis/Silicosis
E - EG/EAA
T - TB/Fungal

P- PJP
A – Ankylosing Spondylitis
R - Radiation Therapy/Renal
C – Cystic Fibrosis

Ground Glass: *Acute Symptoms*

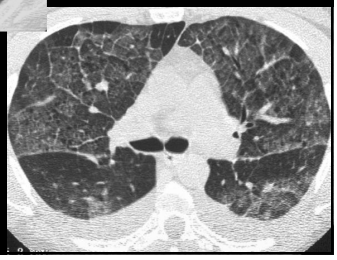
- *Blood, pus or water*
- Presence or absence of **pleural fluid** often helpful.
- **"Wet" Disease**: Hydrostatic and Non-cardiogenic edema/ARDS
- **"Dry" Disease**: PJP, CMV infections, acute hypersensitivity pneumonitis or Pulmonary hemorrhage syndromes

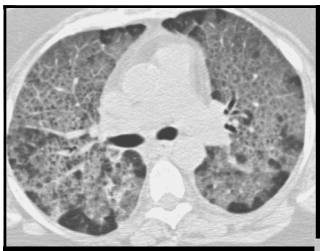


2 Patients with Acute Ground Glass Opacities

No Pleural Fluid

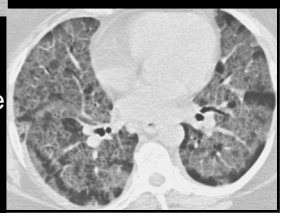
Bilateral Pleural Effusions

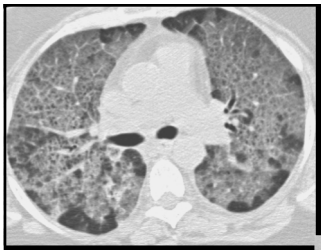




#3: 40 yo with Dyspnea over 2 days. What would you report as the *most likely pathologic process?*

1. Hydrostatic Edema
2. Pulmonary Hemorrhage Syndrome
3. Non cardiogenic edema
4. Alveolar Proteinosis

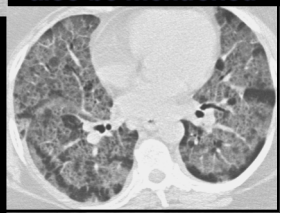




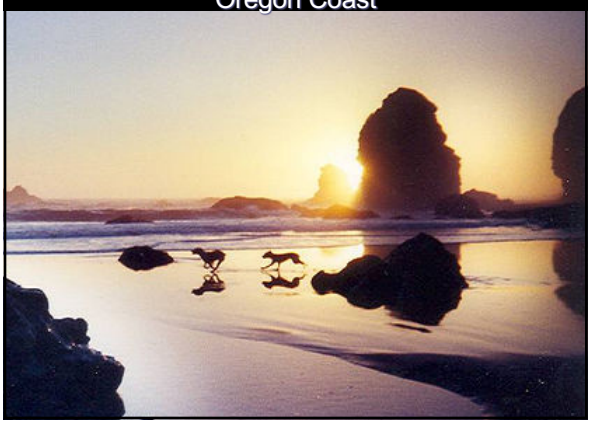
Answer: #2 Pulmonary Hemorrhage Syndrome

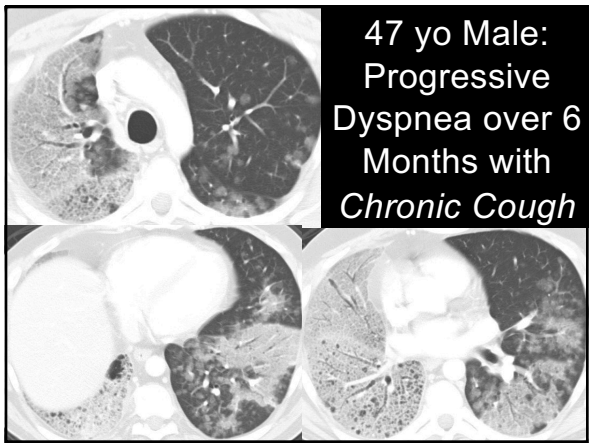
****#3 is *certainly possible* and should also be mentioned**

- Symptoms are only 2 days (Acute)
- Extensive Ground glass *without septal lines nor pleural effusion*



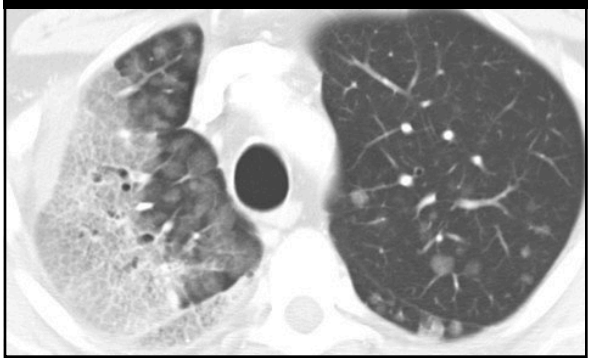
Oregon Coast

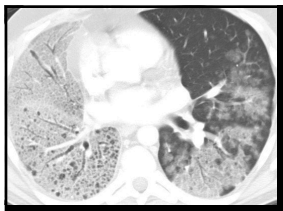




47 yo Male: Progressive Dyspnea over 6 Months with *Chronic Cough*

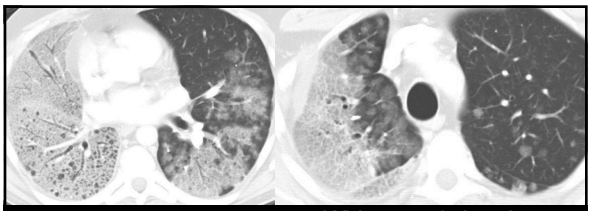
Look in the Regions with *Less Involvement* for Clues: *Interesting there is no fibrosis, eh?*





#4: What would you predict is the best description for this patient's cough?

- 1. Dry non-productive cough
- 2. Green purulent sputum
- 3. Blood (Hemoptysis)
- 4. Mucinous sputum (Bronchorrhea)



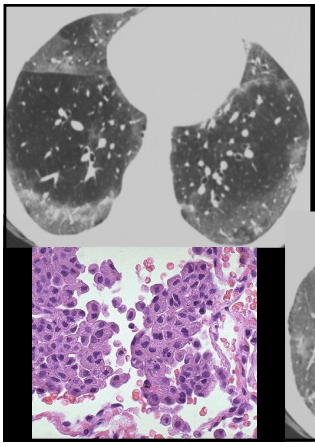
Answer #3: Mucinous sputum (Bronchorrhea)

Mucinous secreting adenocarcinoma

- Widespread chronic progressive ground glass and consolidation without fibrosis
- *Sharply defined Ground glass nodules* in areas of less involvement are very helpful!

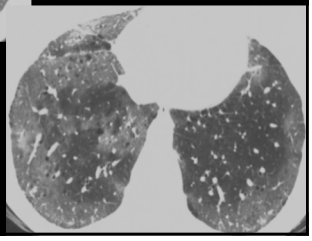
Ground Glass: ***Chronic Symptoms***

- *Imaging evidence of **fibrosis** is very helpful*!
- No or minimal imaging findings of fibrosis: Hypersensitivity pneumonitis, RB-ILD/DIP, Follicular bronchiolitis/LIP, Mucinous secreting AdenoCA, Alveolar Proteinosis, Cellular NSIP, PVOD (Pulmonary hypertension).
- Moderate to Severe fibrosis: UIP, Chronic hypersensitivity pneumonitis, Fibrotic NSIP

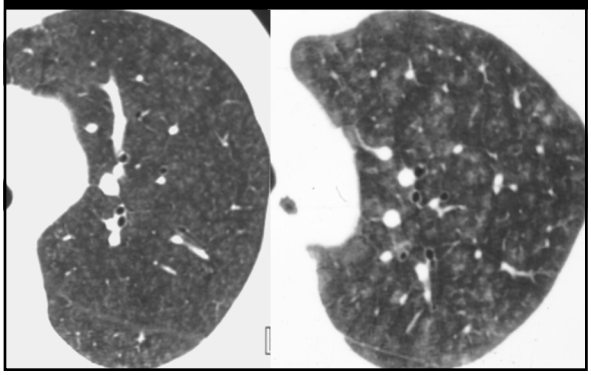


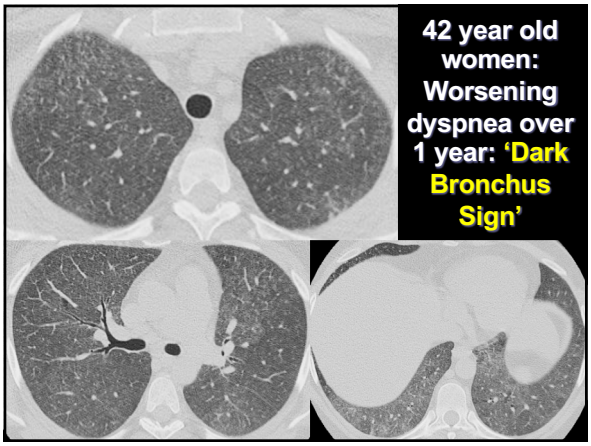
37 Year Old Female: Chronic Dyspnea

Smokes 2 packs/day



35 yo Non-smoker 33 yo Heavy Smoker

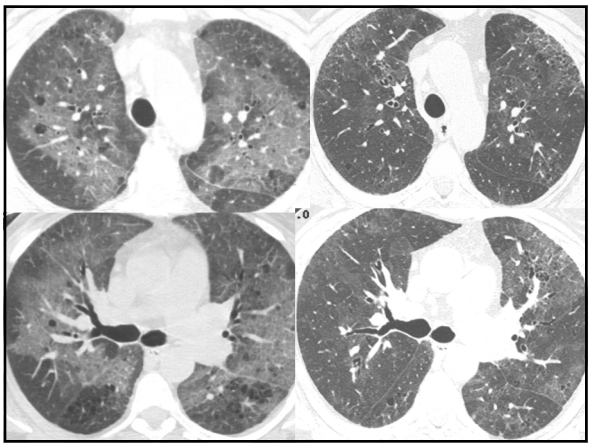




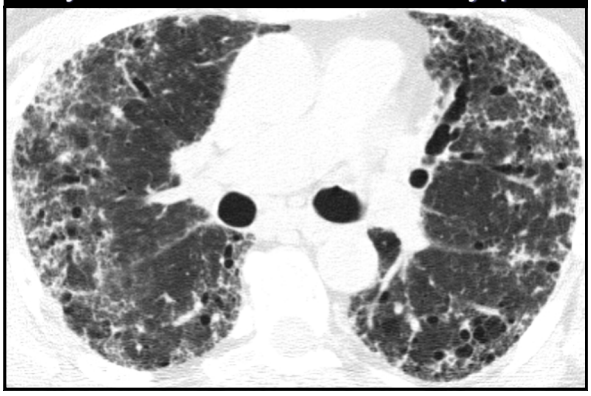
42 year old women: Worsening dyspnea over 1 year: 'Dark Bronchus Sign'

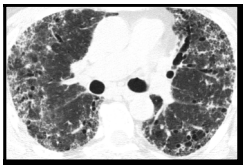
NSIP: Cellular to Fibrotic Spectrum

- **NSIP IS NOT A DISEASE!** It's an inflammatory/fibrotic pattern of ***pathology***, often from collagen-vascular diseases or hypersensitivity pneumonitis.
- CT findings include GGO/consolidation and/or reticular opacities. *Reflects the underlying etiology.*
  - Honeycombing **much less common** than in UIP
  - GGO/consolidation predominates in cellular form
  - Reticular opacities predominate in Fibrotic form
- Prognosis: Cellular NSIP > Fibrotic NSIP > UIP
  - 10 year survival 100%, 35%, 15%, respectively



67 year old male with chronic dyspnea



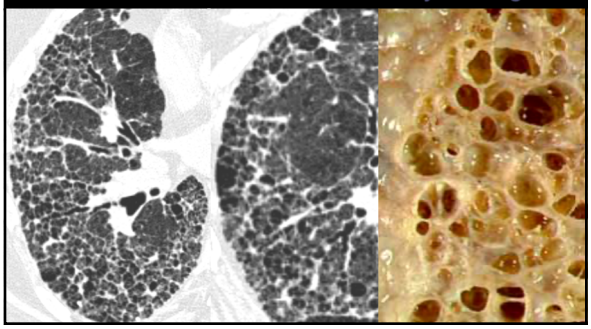


#5: What would be your report impression?

- 1. Indeterminate Pulmonary fibrosis, Consult pulmonology
- 2. Fibrosis likely represents Drug toxicity or connective tissue disease pathology.
- 3. Imaging typical for UIP.
- 4. Finding probable for UIP fibrosis versus possibly NSIP pathology.

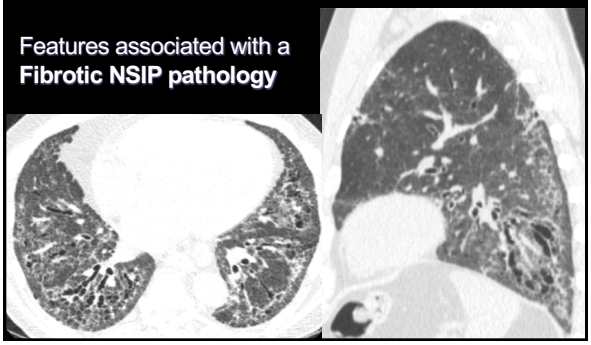
Four Imaging Findings of Fibrosis:

1. Irregular Visceral Pleura 2. Short Reticular Opacities
3. Traction Bronchiectasis 4. *Honeycombing*



Subtle subpleural sparing and Bronchovascular distribution

Features associated with a **Fibrotic NSIP pathology**



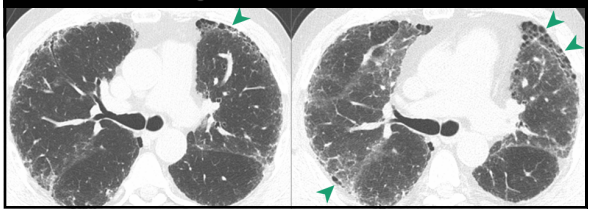
Usual Interstitial Pneumonitis

- Often ***peripheral and basilar*** distribution
- Imaging evidence of fibrosis: Reticular opacities, traction bronchiectasis, irregular visceral pleura +/- ***Honeycombing***
- ***Hypoxia/Low DIco*** *more severe than NSIP*
- New medical therapies
- **Active search**: Pulmonary hypertension, any new nodules or ground glass opacities

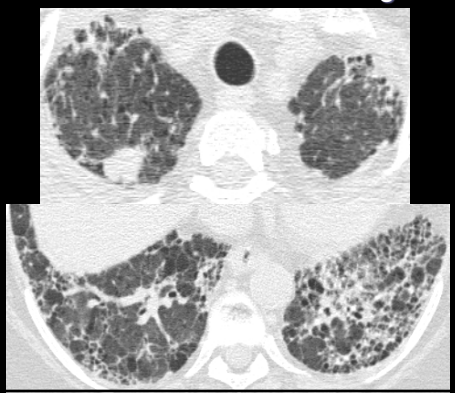
Honeycombing:

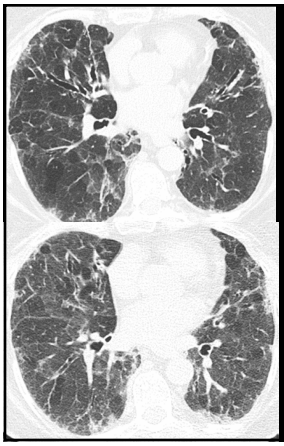
3-10 mm shared thickened wall cystic spaces that ***contact the pleura***

Progression over time is often ***Peripheral to Central***



UIP: Increased Incidence of Lung Cancer

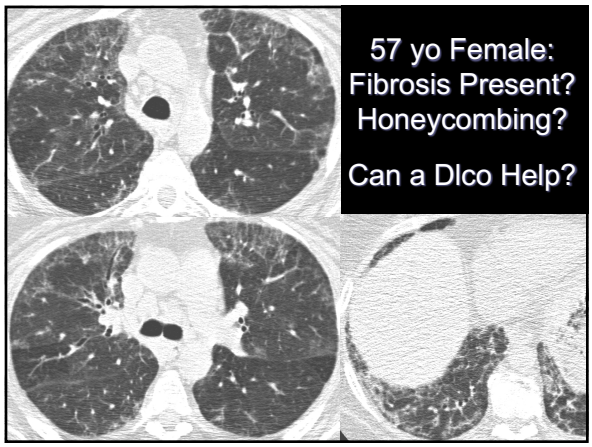




Inspiratory and Expiratory imaging:

Mosaic lung attenuation accentuated on the expiratory

Most consistent with Hypersensitivity pneumonitis/ EAA



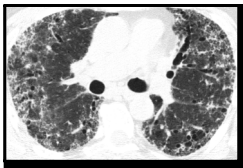
57 yo Female: Fibrosis Present? Honeycombing?

Can a Dlco Help?

Importance of ***Imaging*** on Fibrosis Diagnosis (*Pathology not the Gold Standard*)

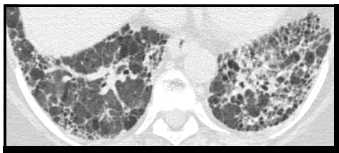
- **Typical UIP Pattern:** Subpleural basal distribution, Reticular opacities, ***Honeycombing*** +/- traction bronchiectasis and absence of features inconsistent with UIP
- **Probable UIP Pattern:** Same as Typical, except *no* identifiable honeycombing
- **Indeterminate UIP Pattern** or **consistent with another pathological diagnosis**

Lynch et al. Fleischner Society White paper. Lancet Respir Med. 2017;S2213-2600(17) 30433-2



Repeat #5: What would be your report impression?

- 1. Indeterminate Pulmonary fibrosis, Consult pulmonology
- 2. Fibrosis likely represents Drug toxicity or connective tissue disease pathology.
- 3. Imaging typical for UIP.
- 4. Finding probable for UIP fibrosis versus possibly NSIP pathology.

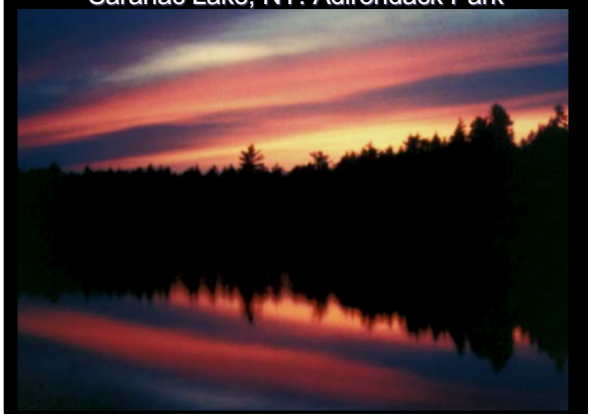


Answer #3: Findings Typical for UIP

***Answer #4 is also acceptable**

- **Typical UIP Pattern:** Subpleural basal distribution, Reticular opacities, ***Honeycombing*** +/- traction bronchiectasis and absence of features inconsistent with UIP
- **Probable UIP Pattern:** Same as Typical, except *no* identifiable honeycombing
- **Indeterminate UIP Pattern** or **consistent with another pathological diagnosis**

Saranac Lake, NY: Adirondack Park

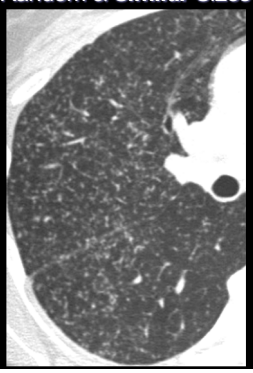


Nodules

- **Perilymphatic distribution**
- **Random distribution**
- **Centrilobular distribution:** No nodules along fissures or sub-pleural regions
  1. Terminal bronchial filling ('Budding-Tree')
  2. Ill-defined respiratory bronchial inflammation

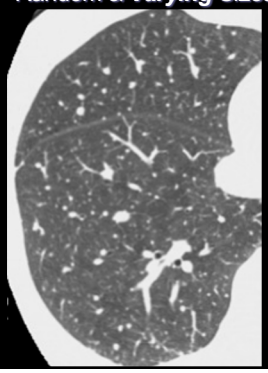
Miliary Nodules:

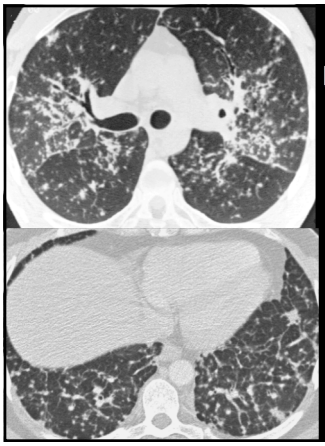
Random & ***Similar*** Sizes



Miliary Nodules:

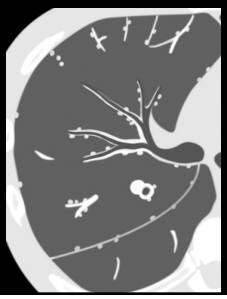
Random & ***Varying*** Sizes

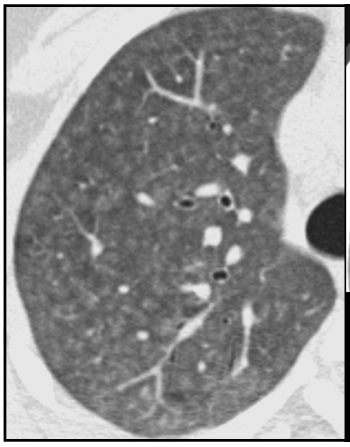


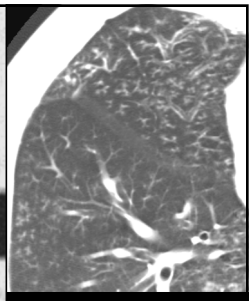


2 Cases:
Perilymphatic Nodules

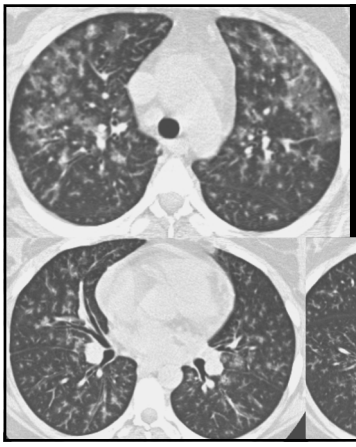
Distribution Is Very Helpful



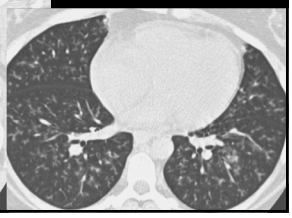




Centrilobular Nodules: 2 *Types*

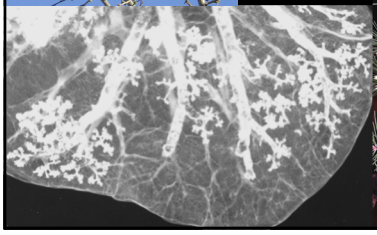


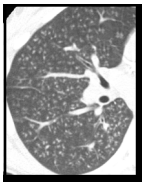
160 Days Post BMT with a Cough and Fever



Influenza:

"Budding Tree" pattern





"Budding Trees" Pattern:
"Springtime in the Lungs"

Terminal Airway ***Centered*** Diseases

- Aspiration (Gravity based distribution)
- Mycoplasma & Bronchopneumonia (*especially HIV*)
- Endobronchial TB (Cavity often required)
- Viral infections: Influenza, Parainfluenza, RSV
- MAC/MAI infections
- Cystic Fibrosis
- Diffuse Panbronchiolitis

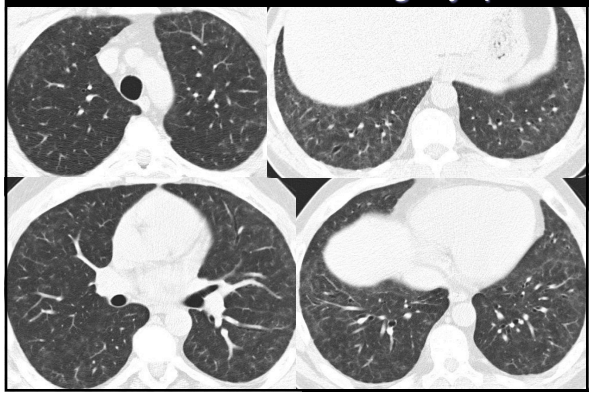
Gossett: American Journal of Roentgenology. 2009;193: W472-W477. 10.2214/AJR.09.3401

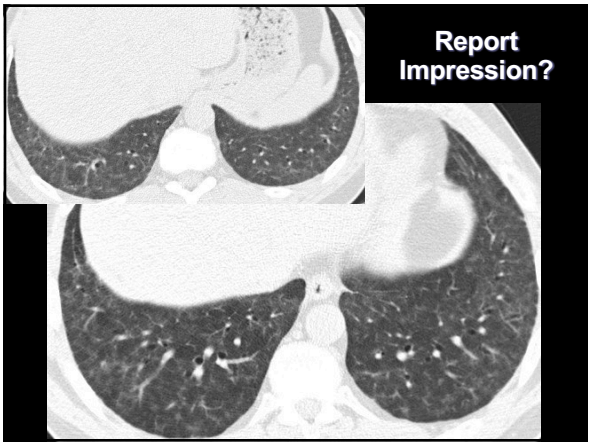
Newport, OR

Diagnosis Is Not Know: Imaging ***Not Characteristic*** or Has a ***Longer Differential***

- Common Imaging result
- Unusual presentations of more common diseases
- Uncommon to rare diseases that may not be considered during day to day work
- Follow up imaging, Laboratory tests, sputum and/or tissue sampling?

Avid Athlete: Worsening Dyspnea



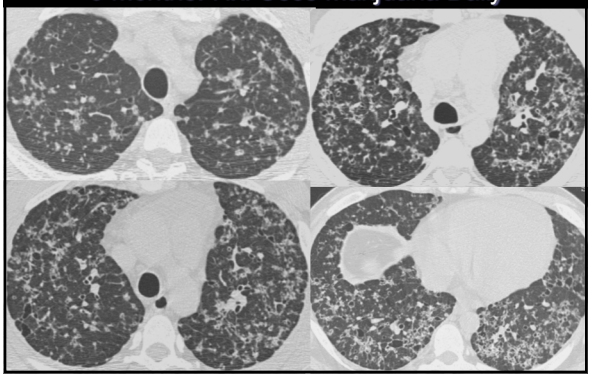


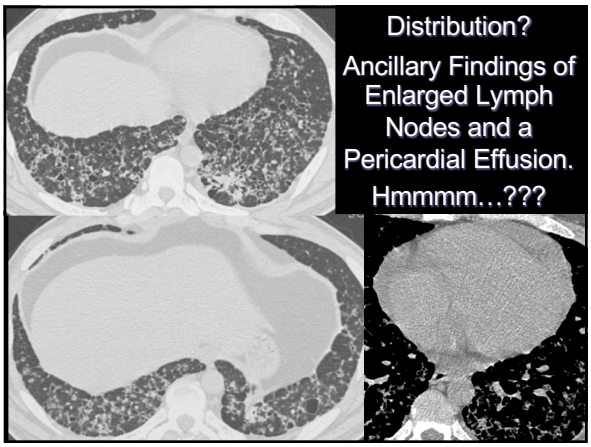
‘Medicine is the Science of Uncertainty and the Art of Probability’

Sir William Osler

JCA - GIE

Last One: 32 yo male: Worsening Dyspnea for 3 Months: Hx: Uses Marijuana Daily

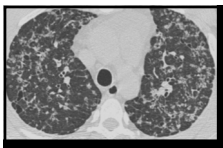




Distribution?

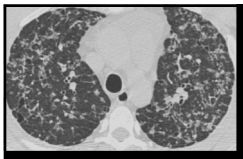
Ancillary Findings of Enlarged Lymph Nodes and a Pericardial Effusion.

Hmmmm…???



#6: Which would best reflect your report Impression?

- 1. Findings characteristic for Langerhans Cell Histiocytosis.
- 2. Imaging highly suspect for widespread adenocarcinoma. Suggest tissue sampling
- 3. Nonspecific reticulonodular opacities. Clinical correlation suggested.
- 4. Probable Langerhans cell Histiocytosis, but with some features that are uncommon. Suggest tissue sampling.



Answer is #2 – Widespread adenocarcinoma was found on open lung biopsy and in the pericardial fluid.

Answer number #4 is more than acceptable as well

Remember: If something is not entirely consistent with a diagnosis, do not force it by saying it is 'characteristic'. It may very well be correct, but better to approach unusual imaging findings as a red flag *that something else may be present*.

Diffuse Lung Disease Summary

- 5 Major concepts of report impressions
- Separate between *Pathology Differential* and *Etiology Differential*
- Combine imaging of Morphological abnormalities and Disease Distribution
- Duration of symptoms, looking in areas of less involvement and Hypoxia/Dlco are helpful
- Pathology is NOT the Gold standard for diffuse lung disease…Earn your paycheck

Thank you!

mgosselin@visionradiology.com or gosselin@ohsu.edu

Next talk

- Cystic Disease
- Mosaic lung attenuation vs Global
- Budding Tree

Number of nodding-off events per lecture (NOELs) per 100 attendees over length of time of presentation

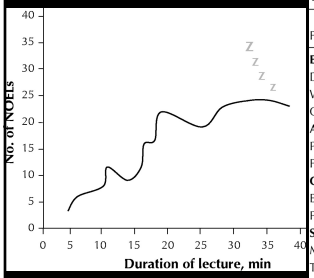


Table 1: Risk factors for nodding off at lectures

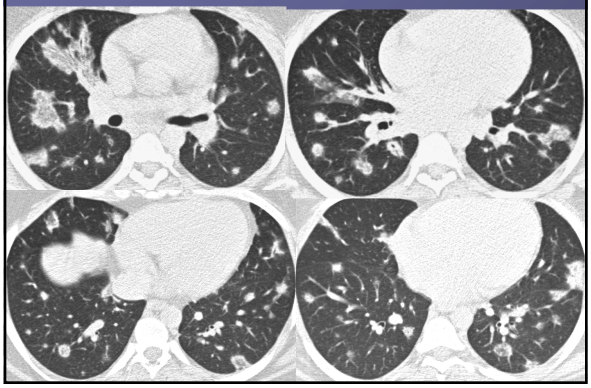
Factor	Odds ratio (and 95% CI
Environmental	
Dim lighting	1.6 (0.8–2.5
Warm room temperature	1.4 (0.9–1.6
Comfortable seating	1.0 (0.7–1.3
Audiovisual	
Poor slides	1.8 (1.3–2.0
Failure to speak into microphone	1.7 (1.3–2.1
Circadian	
Early morning	1.3 (0.9–1.8
Post prandial	1.7 (0.9–2.3
Speaker-related	
Monotonous tone	6.8 (5.4–8.0
Tweed jacket	2.1 (1.7–3.0
Losing place in lecture	2.0 (1.5–2.6

Note: CI = confidence interval

Rockwood, K. et al. CMAJ 2004;171:1443-1445

CMAJ•JAMC

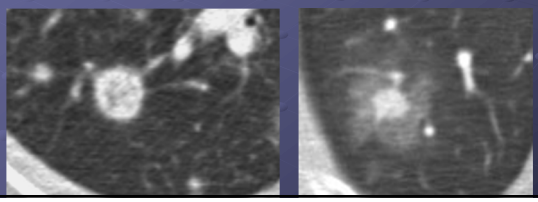
48 yo Female: 2 Months of Dyspnea and Cough



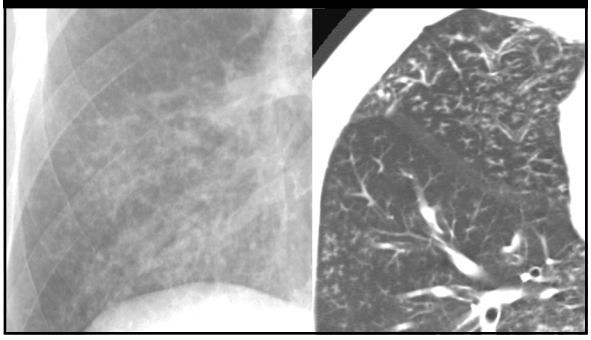
Open Lung Biopsy:

Cryptogenic Organizing Pneumonia/Cellular NSIP

"Reverse Halo" Sign



Radiograph and HRCT



Comparisons can be helpful