


CHEST RADIOLOGY WORKSHOP



AAPA 2022
CHRISTY WILSON PA-C

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DISCLOSURES

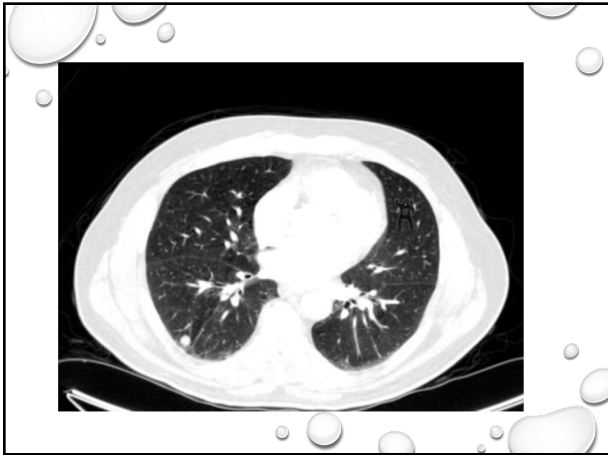
- I HAVE NO RELEVANT RELATIONSHIPS WITH INELIGIBLE COMPANIES TO DISCLOSE WITHIN THE PAST 24 MONTHS

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OBJECTIVES

- Review chest anatomy and location on chest radiography, including identification of the radiographic landmarks on chest X-rays and CT of the chest
- Recognize identifiers of poor quality films and demonstrate proper placement of chest tubes, central venous catheters and endotracheal tubes on CXRs
- Outline a systematic approach to interpreting CXRs and reviewing the importance of reviewing frontal and later chest radiographs
- Review the types of chest radiograph such as high resolution CT chest and CT pulmonary angiogram and when these studies are indicated
- Recognize common identifiable disease states on CXR and CT chest such as pneumonia, pleural effusions, pulmonary edema, pulmonary fibrosis, bronchiectasis and pneumothorax

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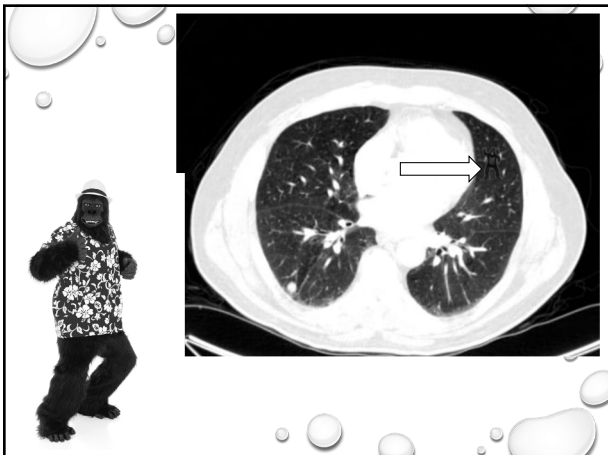
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GORILLA IN THE ROOM

- 24 RADIOLOGISTS WERE ASKED TO PERFORM A FAMILIAR LUNG-NODULE DETECTION TASK.
- A GORILLA, 48X THE SIZE OF THE AVERAGE LUNG NODULE, WAS INSERTED IN THE LAST CASE
- 83% OF THE RADIOLOGISTS DID NOT SEE THE GORILLA
- EYE TRACKING REVEALED THAT THE MAJORITY OF THOSE WHO MISSED THE GORILLA LOOKED DIRECTLY AT ITS LOCATION
- CONCLUSION: "EVEN EXPERT SEARCHERS, OPERATING IN THEIR DOMAIN OF EXPERTISE, ARE VULNERABLE TO *INATTENTIONAL BLINDNESS*."

The Invisible Gorilla Strikes Again: Sustained Inattentional Blindness in Expert Observers
 Tralfon Drew, Melissa L.-H. V6, Jeremy M. Wolfe
 Psychological Science
 Vol 24, Issue 9, pp. 1848 - 1853
 First Published July 17, 2013


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CHEST X-RAYS

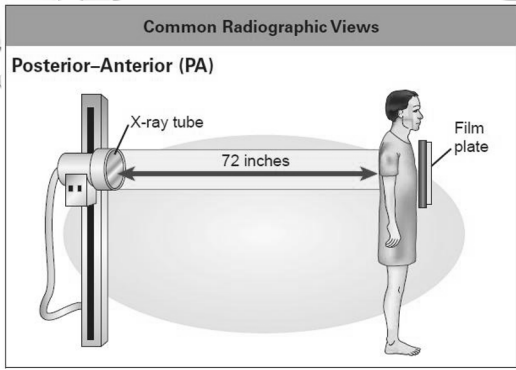
Types
 AP view / Portable – bedbound patients
PA and Lateral – patient is facing left on the lateral film
 Preferred
 Decubitus



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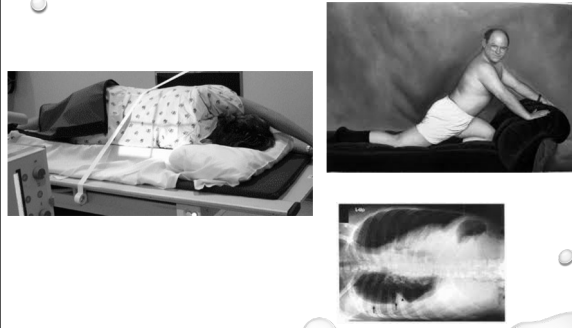
Common Radiographic Views

Posterior–Anterior (PA)



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LATERAL DECUBITUS FILMS



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INDICATIONS FOR CHEST X-RAYS

- INFECTION: EXCLUDE PNEUMONIA
- MAJOR TRAUMA: EXCLUDE WIDENED MEDIASTINUM, PNEUMOTHORAX AND HEMOTHORAX
- ACUTE CHEST PAIN: EXCLUDE PNEUMOTHORAX, PERFORATED VISCUS, AORTIC DISSECTION
- ASTHMA /BRONCHIOLITIS: WHEN DIAGNOSIS UNCLEAR AND/OR NOT RESPONDING TO USUAL THERAPY
- ACUTE DYSPNEA: EXCLUDE HEART FAILURE, PLEURAL EFFUSION
- CHRONIC DYSPNEA: EXCLUDE HEART FAILURE, EFFUSION AND INTERSTITIAL LUNG DISEASE
- HEMOPTYSIS
- SUSPECTED MASS, METASTASIS OR LYMPHADENOPATHY

Guide to thoracic imaging
Volume 44, No. 8, August 2015 Pages 558-562

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STEPS TO READING A CXR:

PLACEMENT OF CXR

VERIFY THE XR

- Name
- Date
- Position markers
- Type of CXR
- Patient History is very important (review first!)
- View side by side with previous films

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STEPS TO INTERPRETING CXR

- TYPE OF EXAM / IMAGE
- CLINICAL HISTORY
- COMPARISON
- TECHNIQUE
- FINDINGS
- IMPRESSION

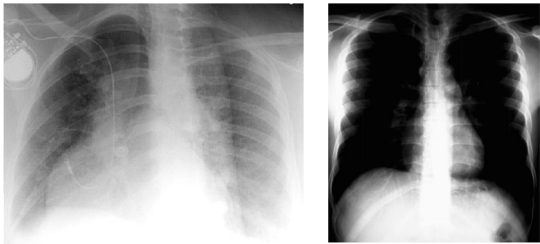
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WHAT MAKES A GOOD CXR?

- RIPE
 - ROTATION
 - MEDIAL CLAVICLE ENDS EQUIDISTANT FROM SPINOUS PROCESS
 - INSPIRATION
 - 8-10 POSTERIOR RIBS
 - PICTURE
 - STRAIGHT / FULL LUNG FIELDS
 - EXPOSURE
 - OVER OR UNDER PENETRATED

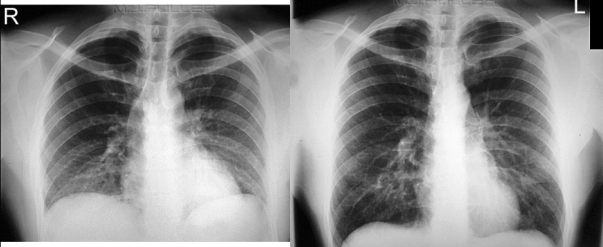
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GARBAGE IN GARBAGE OUT

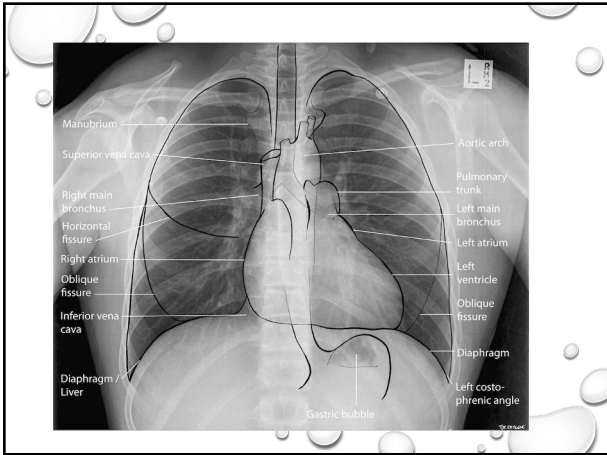


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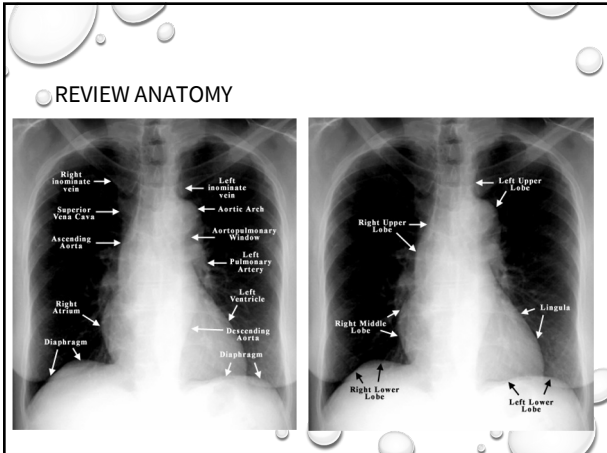
THE VALUE OF GOOD INSPIRATION



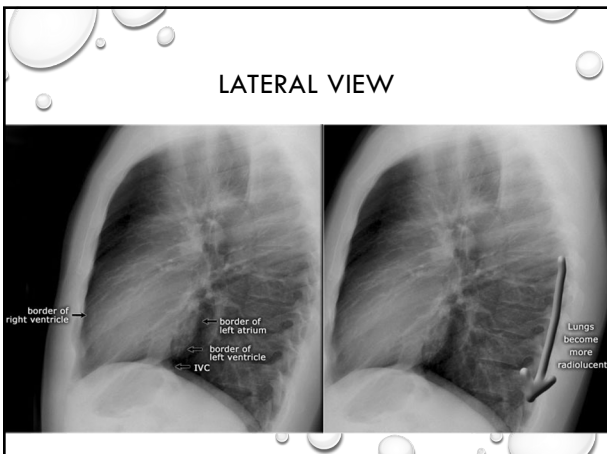
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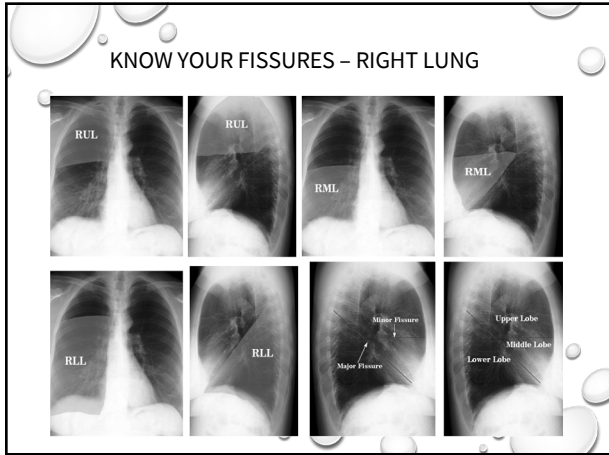
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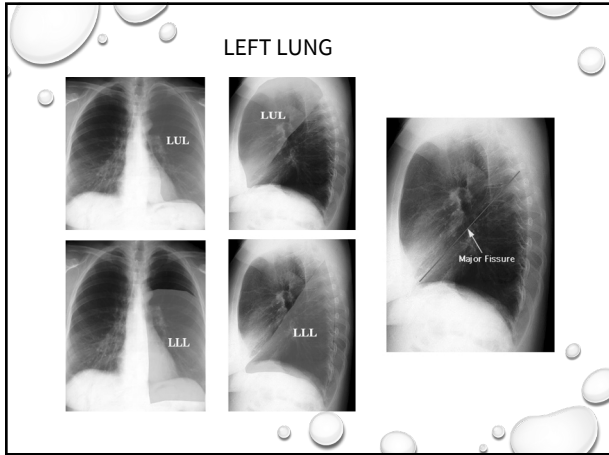
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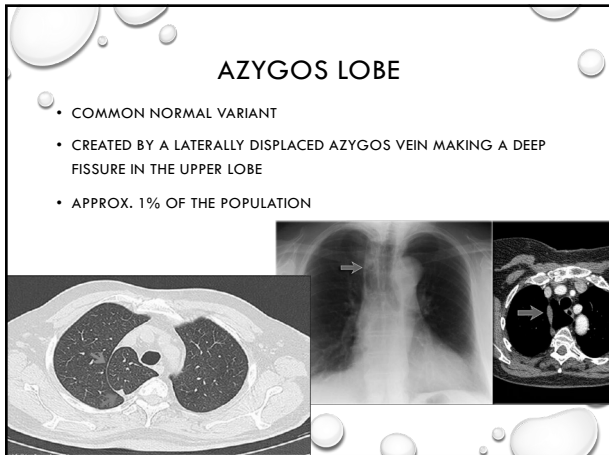
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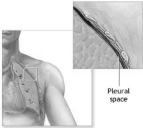
STEPS TO READING A CXR

- HEART
- SILHOUETTE SIGN
- MEDIASTINUM
- DIAPHRAGM
- COSTOPHRENIC ANGLES / EFFUSIONS
- LUNGS
- ALVEOLAR PATTERN VS. INTERSTITIAL PATTERN
- SKELETON / BONES
- CHECK EACH RIB
- CHECK VERTEBRAL BODY HEIGHT ON LATERAL VIEW

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DESCRIBING THE LUNGS

<p>PULMONARY VASCULATURE</p> <ul style="list-style-type: none"> • Pulmonary edema <p>COSTOPHRENIC ANGLES</p> <ul style="list-style-type: none"> • Pleural effusions <p>INFLATION</p> <ul style="list-style-type: none"> • Count the ribs, look at diaphragm • Emphysema 	<p>MASSES/NODULES</p> <p>RULE OF 3</p> <p>CONSOLIDATION PARENCHYMA</p> <ul style="list-style-type: none"> • Compare lung fields to each other
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#ADAM

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LUNGS

UNILATERAL VS. BILATERAL

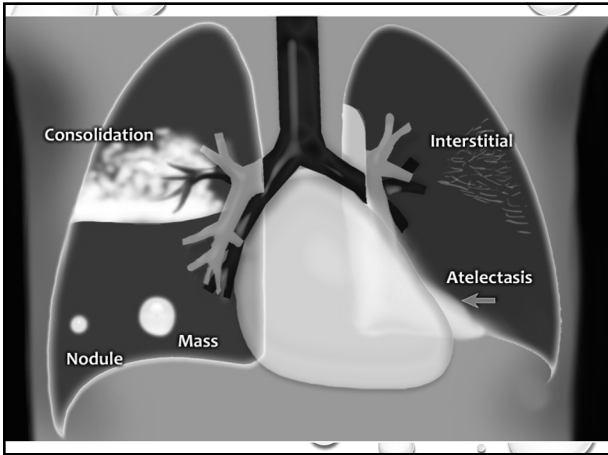
FOCAL VS. DIFFUSE

LOCATION
(APEX, BASE, MEDIASTINAL, HILAR REGIONS)

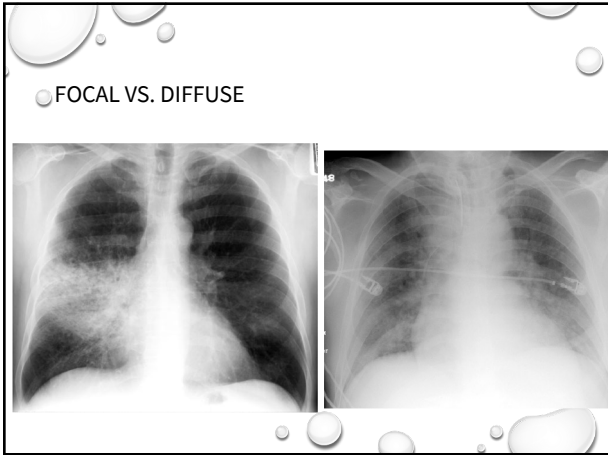
PERIPHERAL VS. CENTRAL

INTERSTITIAL VS. ALVEOLAR

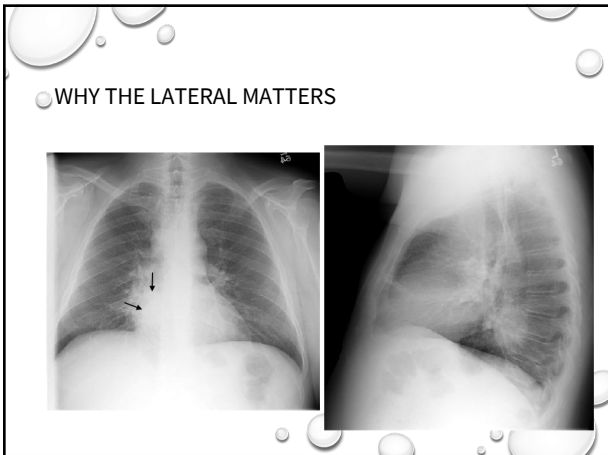
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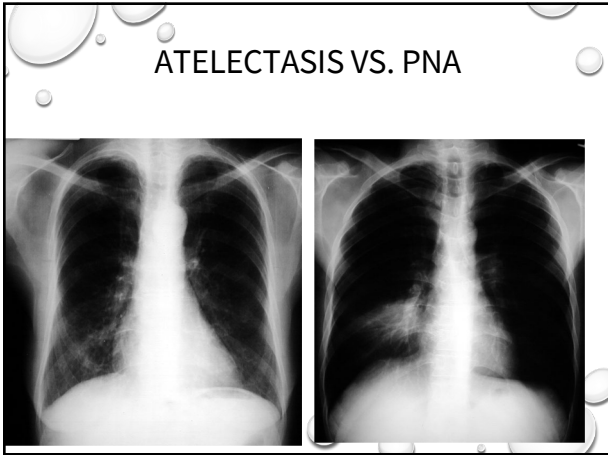
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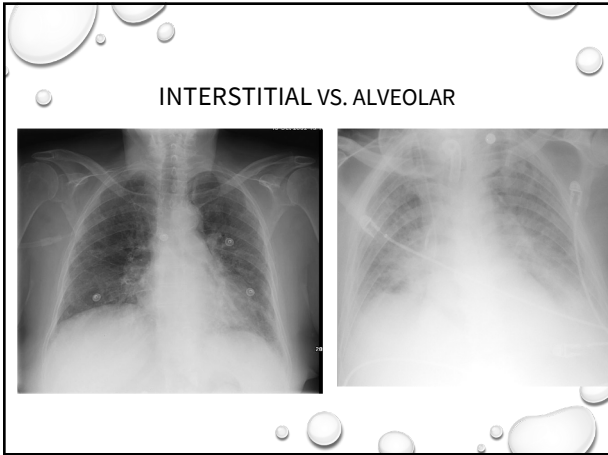
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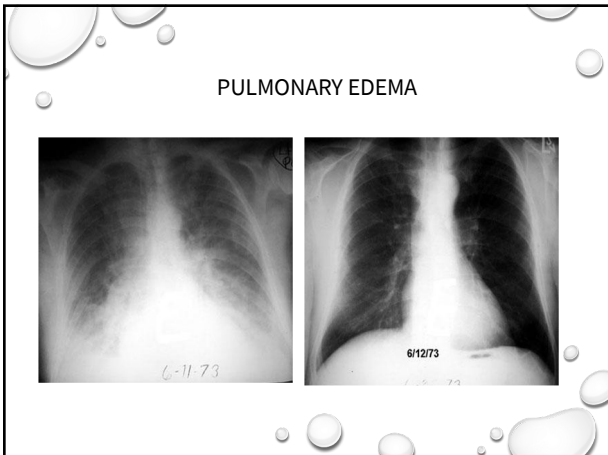
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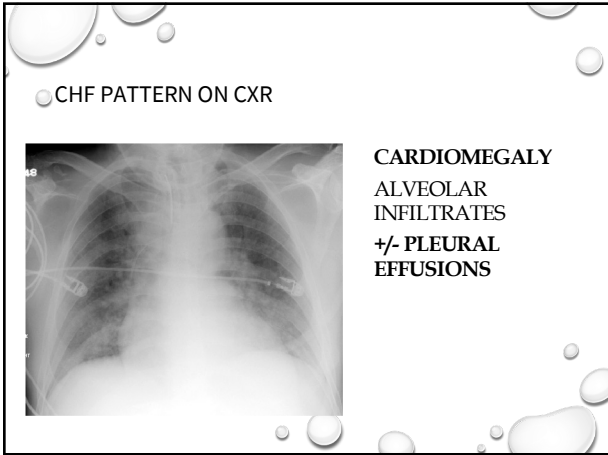
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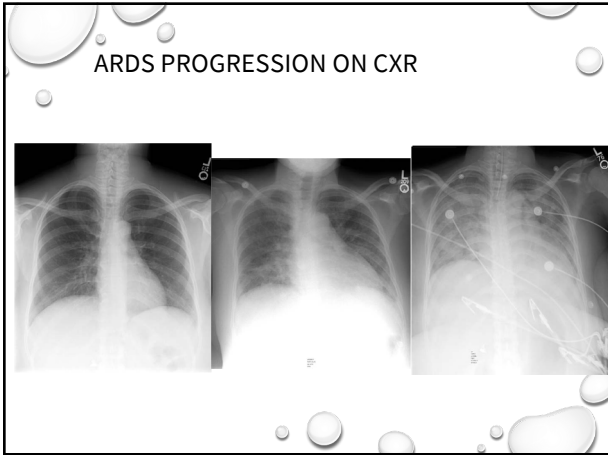
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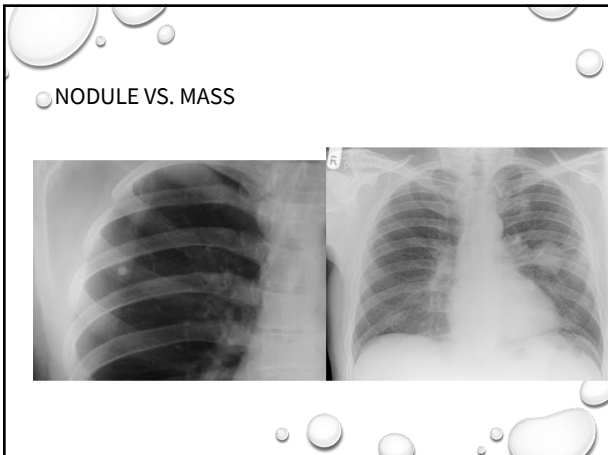
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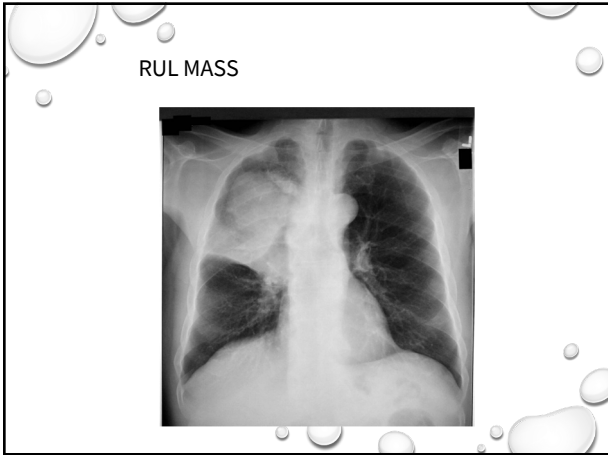
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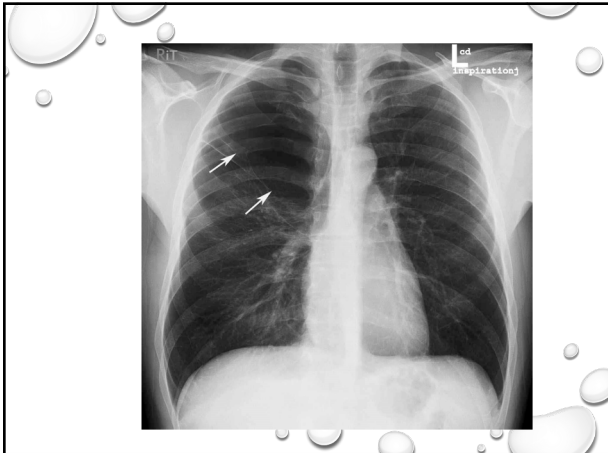
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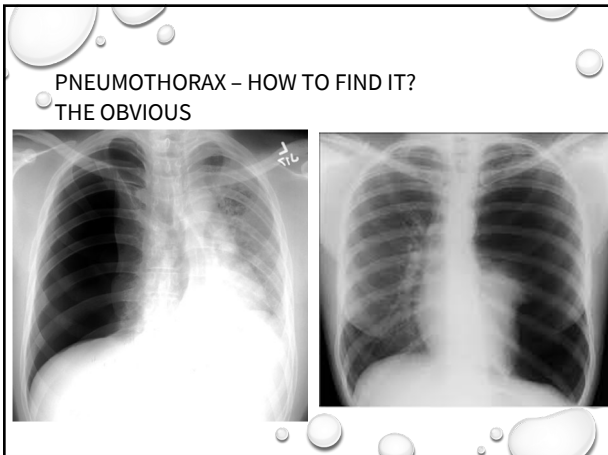
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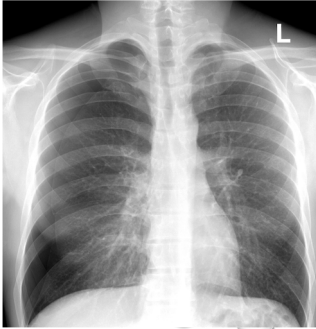


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... AND THE NOT SO OBVIOUS



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LOOK FOR THE LACK OF LUNG MARKINGS



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MEDIASTINAL/ HILAR REGION

DIFFERENTIAL DIAGNOSIS:

PULMONARY VESSEL ENLARGEMENT

• more "smooth" appearance

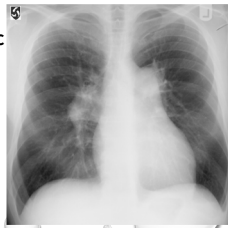
• **HILAR ADENOPATHY**

• more "bumpy" appearance

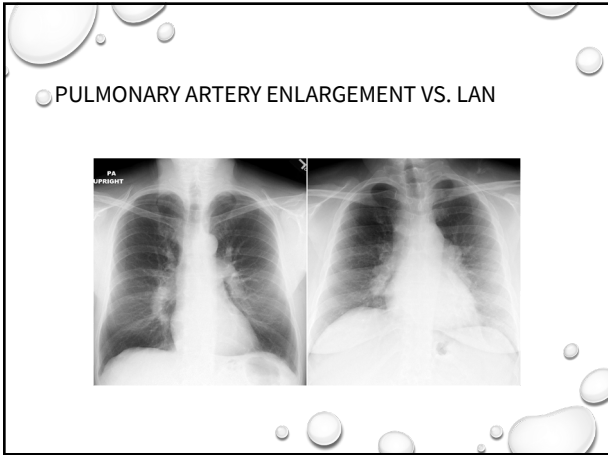
• **INFLAMMATION (SARCOIDOSIS, SILICOSIS)**

• **NEOPLASM (LYMPHOMA, METZ, BRONCOGENIC CA)**

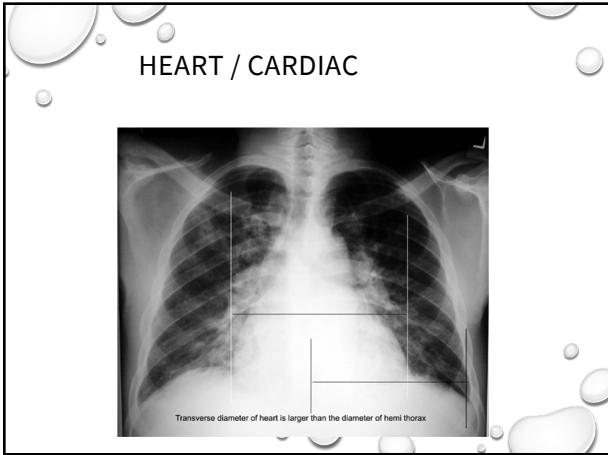
• **INFECTION (TB, HISTOPLASMOSIS, MONO)**



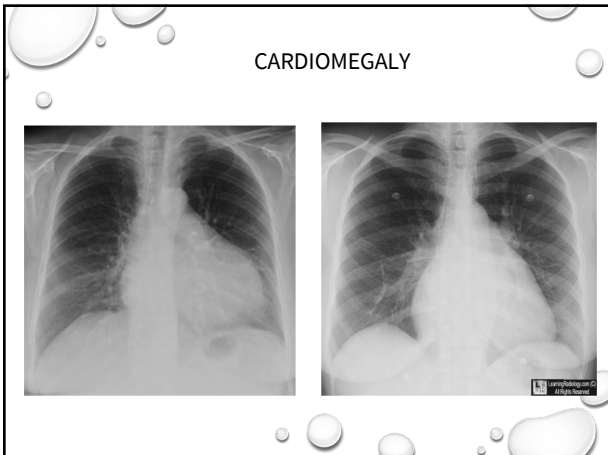
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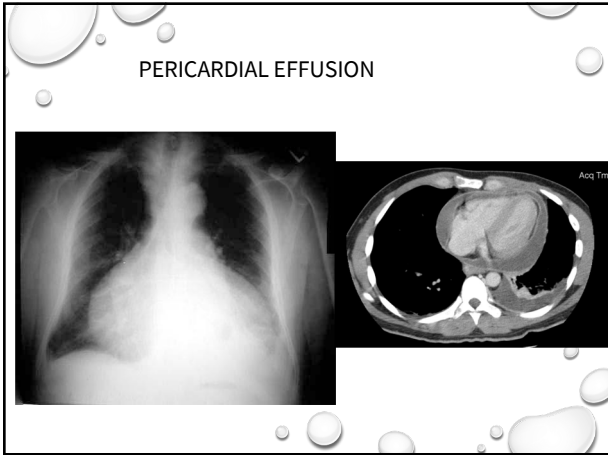
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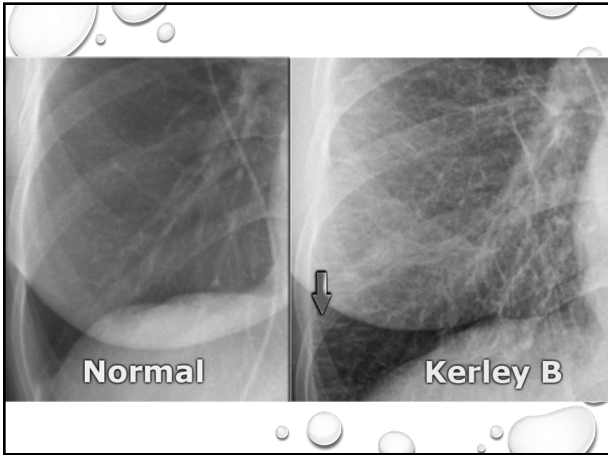
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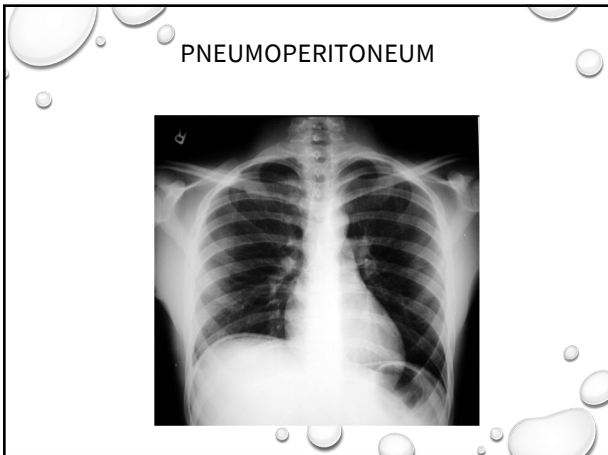
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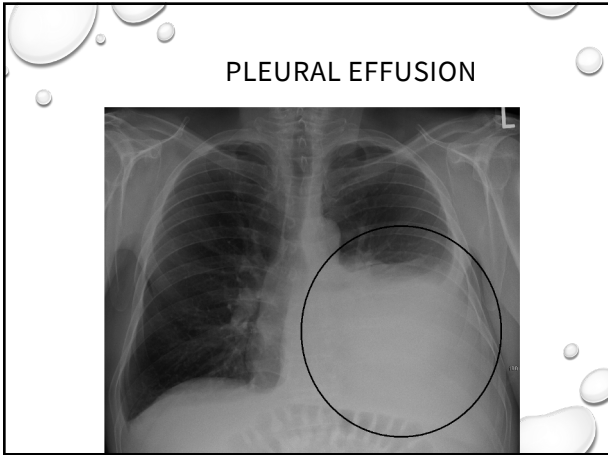
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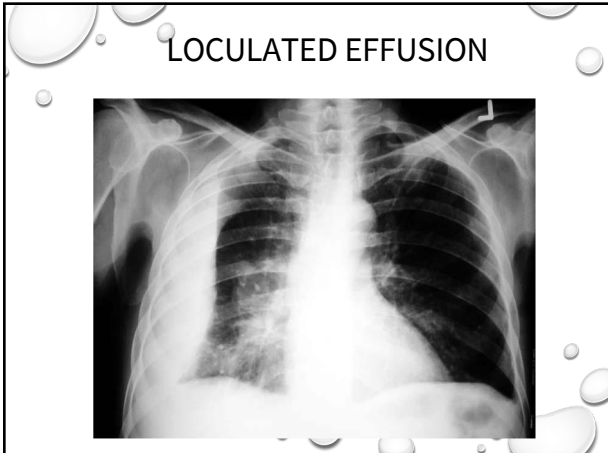
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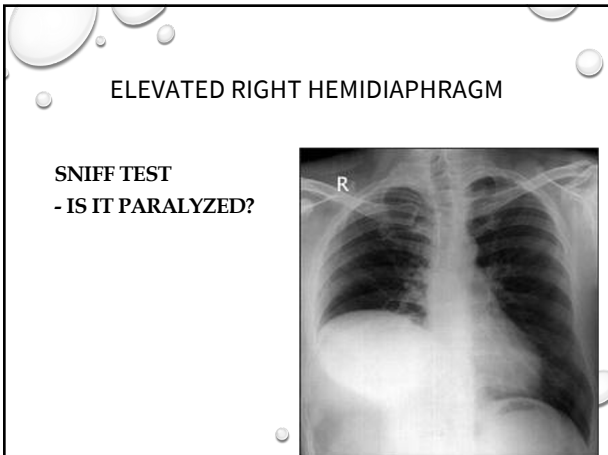
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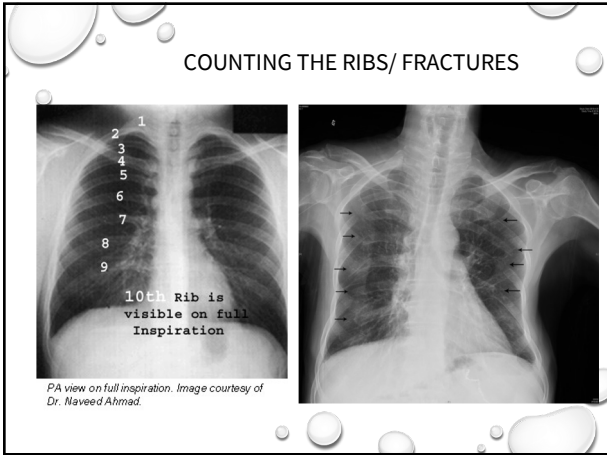
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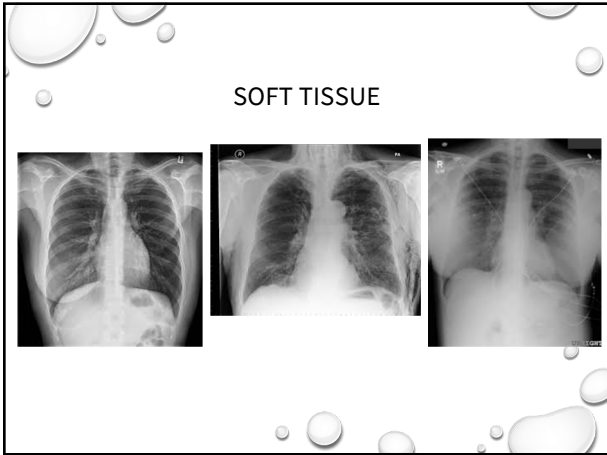
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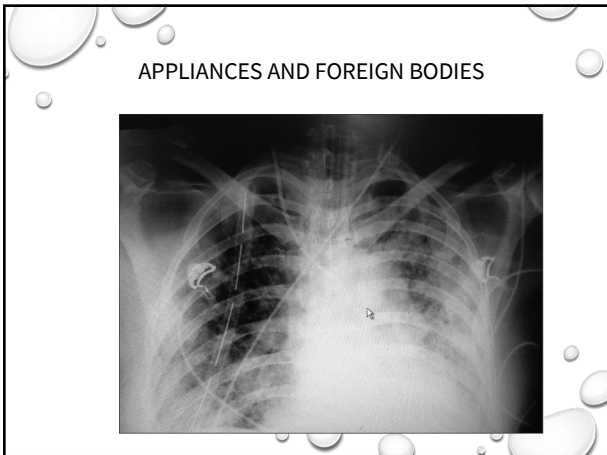
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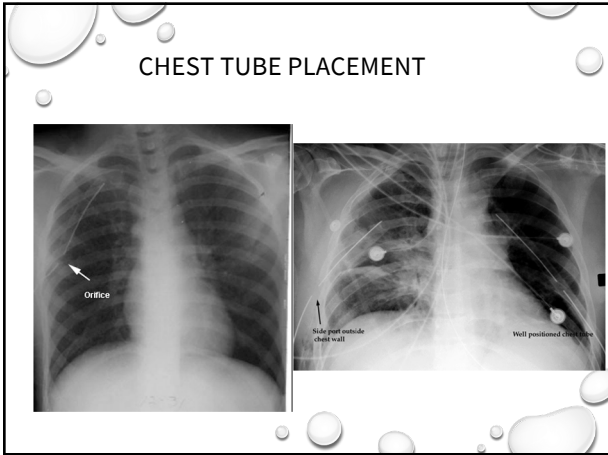
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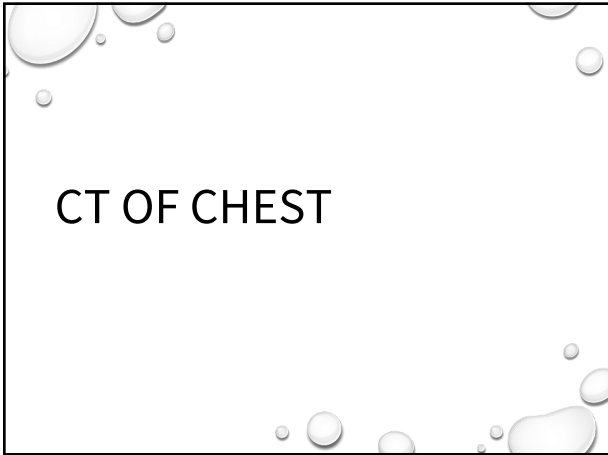
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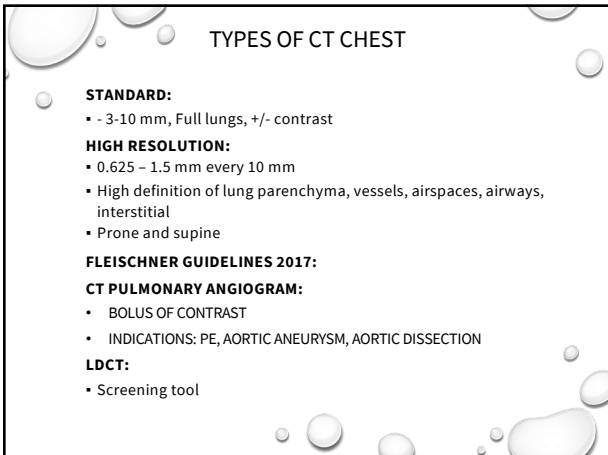
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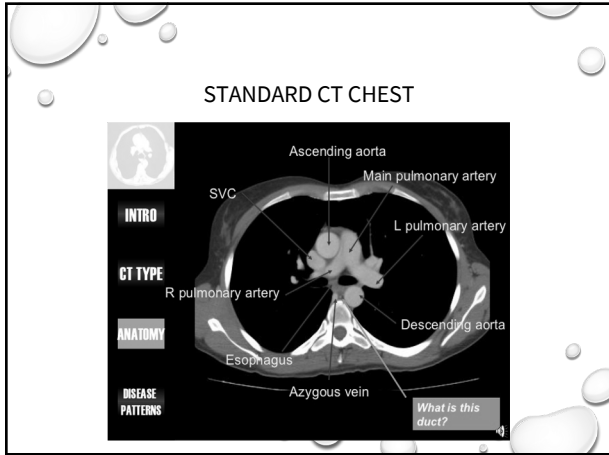
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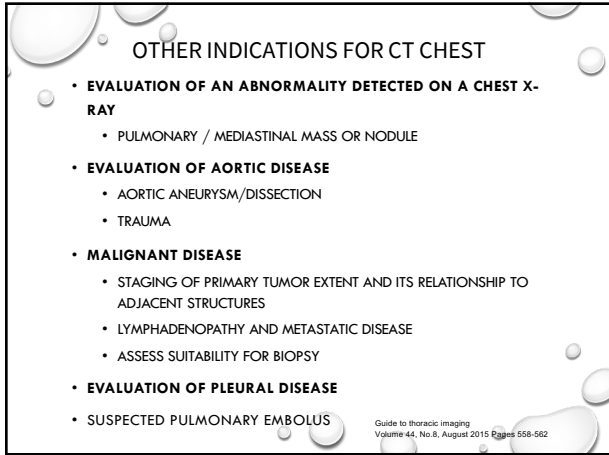
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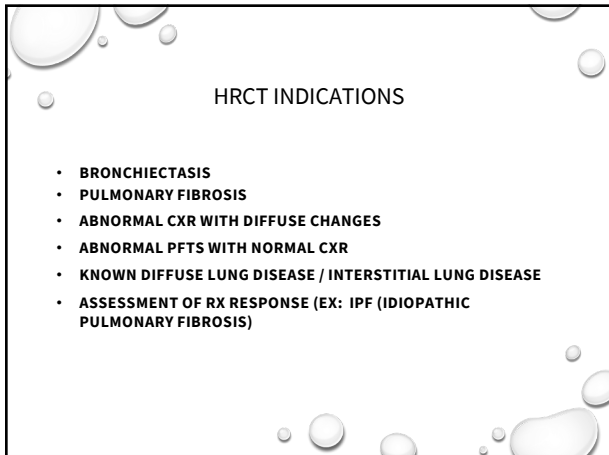
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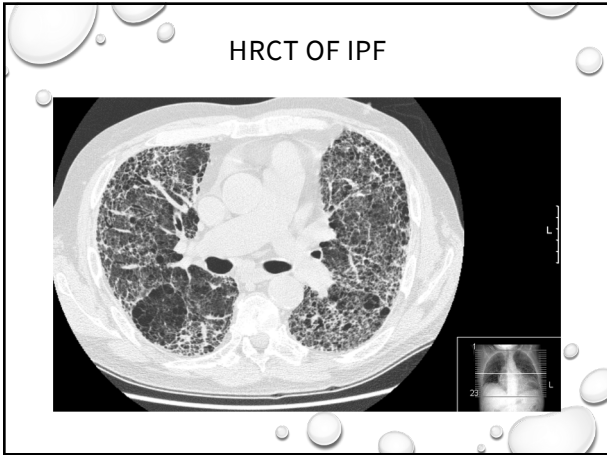
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LOW DOSE CT CHEST / SCREENING TOOL

CMS GUIDELINES FOR ORDERING LDCT (LOW DOSE CT FOR LUNG CANCER SCREENING)

- Age 55-77 years old
- Asymptomatic
- Tobacco abuse of ≥ 30 pack history
- Current smoker or quit within the last 15 years

• Medicare coverage as of February 2015
 • www.cms.gov for specifics

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LUNG WINDOWS on CT Chest

- EMPHYSEMATOUS CHANGES
- BRONCHIECTASIS
- HONEYCOMBING
- GROUND GLASS OPACITIES
- NODULES/MASSES
- AIR BRONCHOGRAMS
- TREE IN BUD PATTERN

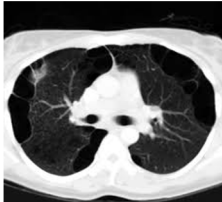
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EMPHYSEMATOUS CHANGES

- PERMANENT ENLARGEMENT OF AIR SPACES DISTAL TO BRONCHIOLES
- DESTRUCTION OF ELASTIN IN THE WALLS OF THE ALVEOLI
- OFTEN SEE BARREL CHEST/HYPERINFLATION/ FLATTENED DIAPHRAGMS

• **DIFFERENTIAL DIAGNOSIS:**

- COPD
- Hx smoking
- Alpha 1 antitrypsin def.



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EMPHYSEMA

3 TYPES:

CENTRIOBLULAR:
FROM SMOKING/UPPER HALF OF THE LUNGS, MOST COMMON

PANACINAR:
DESTROYS ENTIRE ALVEOLUS/ LOWER HALF OF LUNGS/A1AT DEF.

PARASEPTAL:
DISTAL AIRWAYS/ APICAL BULLAE



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BRONCHIECTASIS

DILATION OF THE BRONCHI

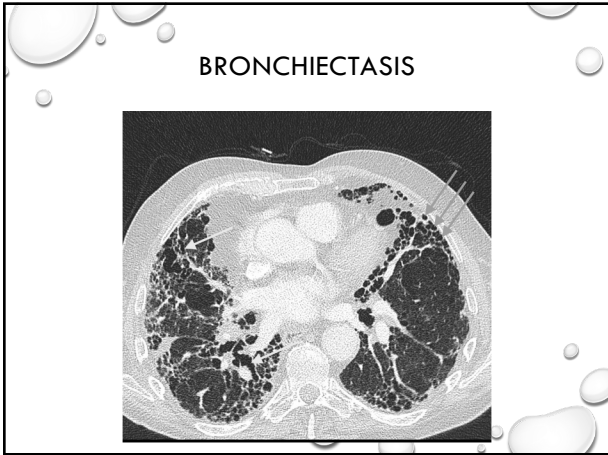
- CAUSES IMPAIRMENT OF CLEARANCE OF AIRWAYS -> RECURRENT INFECTIONS -> BRONCHIAL DAMAGE
- HRCT IS BEST CT OF CHOICE

DIFFERENTIAL DIAGNOSIS:

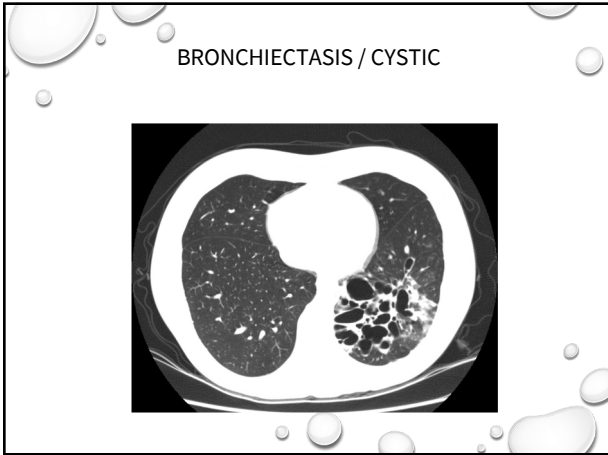
- INFECTION
- BRONCHIAL
- CYSTIC FIBROSIS
- IMMUNODEFICIENCY / A1AT DEF.
- PULMONARY FIBROSIS



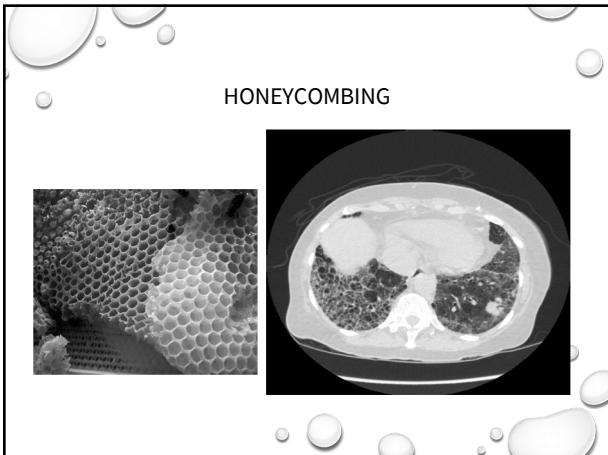
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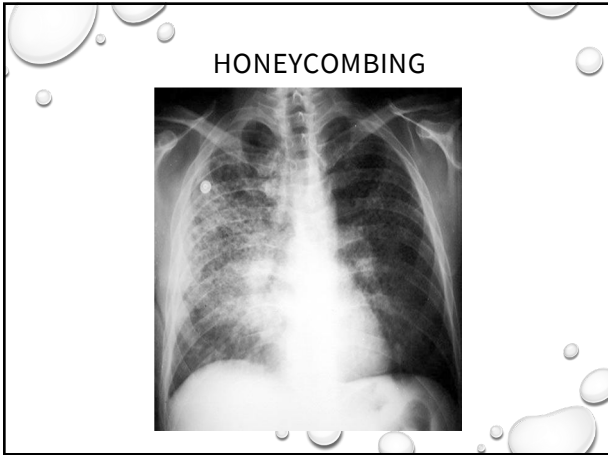
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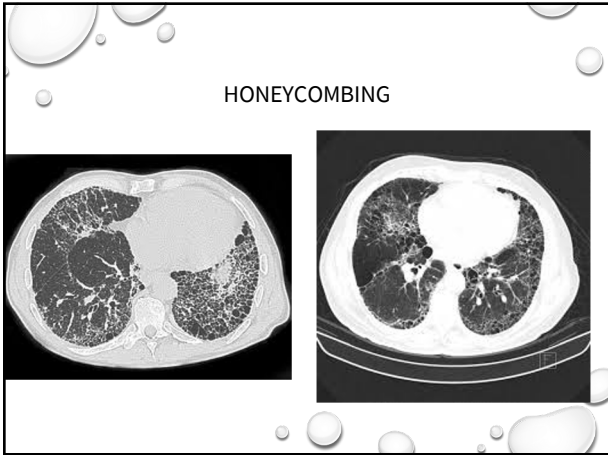
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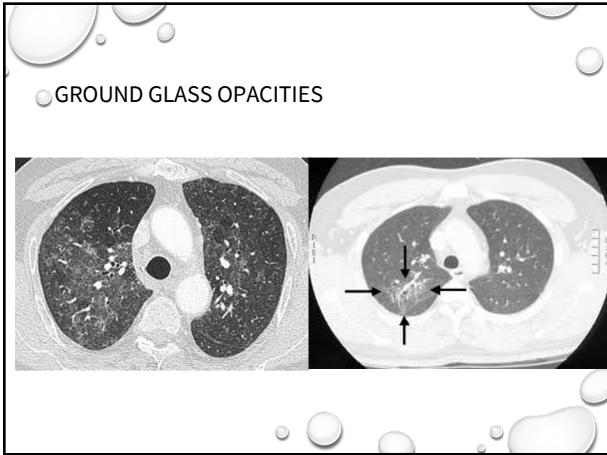
GROUND GLASS OPACITIES

- **COMMON NON-SPECIFIC FINDING**
- **DECREASE AIR WITHOUT COMPLETE OBILTERATION OF ALVEOLI**
- **LUNG OPACITY / INFILTRATE BUT DOESN'T OBSCURE THE PULMONARY VESSELS**

DIFFERENTIAL DIAGNOSIS:

- alveolitis / interstitial pneumonitis (HP/IPF/sarcoidosis)
- Pulmonary edema
- Resolving PNA or hemorrhage
- COVID 19 pneumonia

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FLEISCHNER 2017 GUIDELINE FOR PULMONARY NODULES

- UPDATED IN 2017 FROM 2005
- PURPOSE IS TO GIVE PROVIDERS GUIDELINES / MANAGEMENT RECOMMENDATIONS FOR FOLLOW UP
- PULMONARY NODULE
 - SOLID LESION
 - SUB-SOLID LESION
 - PART SOLID VS. GGO

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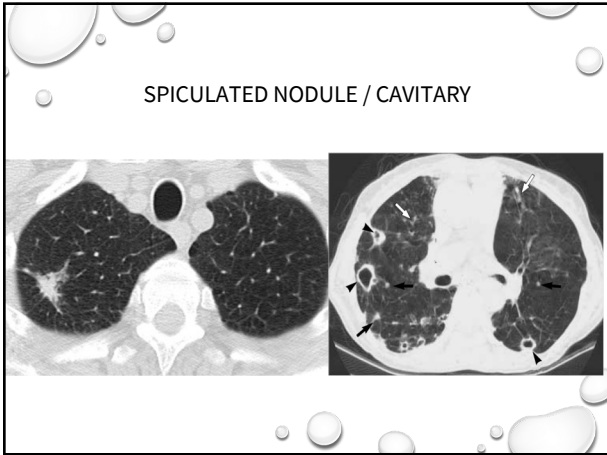
NODULES / MASSES

TYPES OF COMMON LUNG NODULES/MASSES:

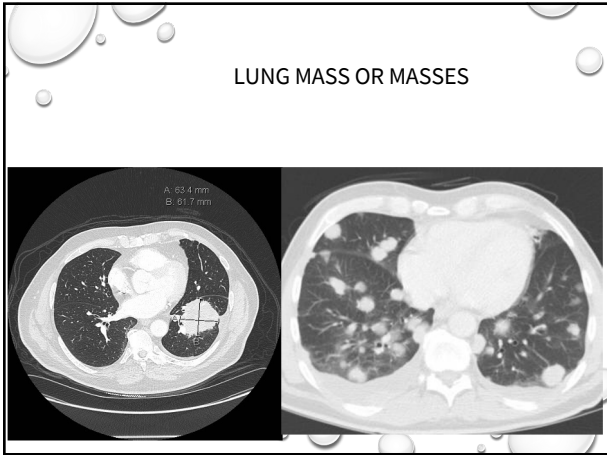
- GRANULOMA
- METASTATIC DISEASE
- LYMPHOMA
- CAVITARY
- LUNG PRIMARY CANCER
- SARCOIDOSIS

LUNG NODULES IS LESS THAN 3 CM IN SIZE

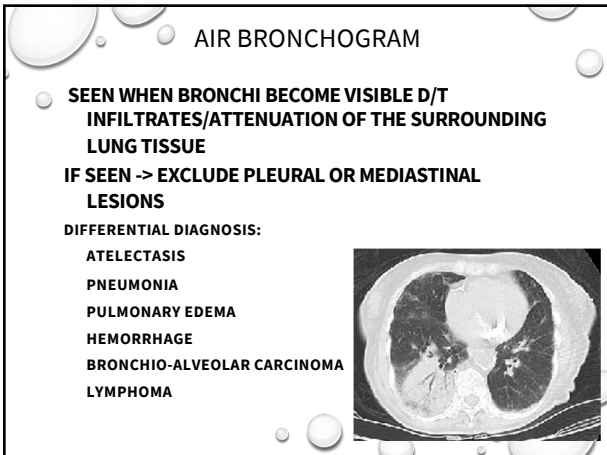
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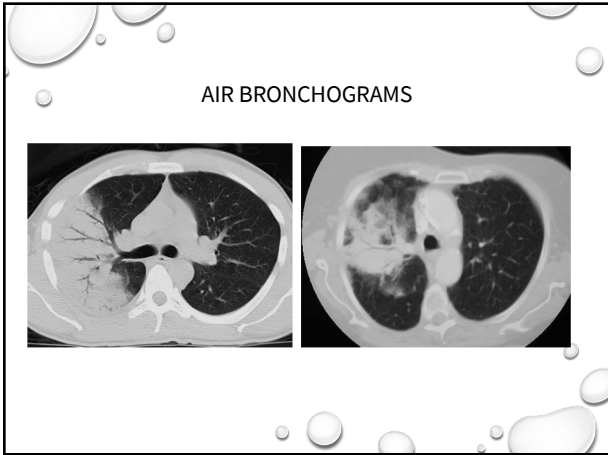
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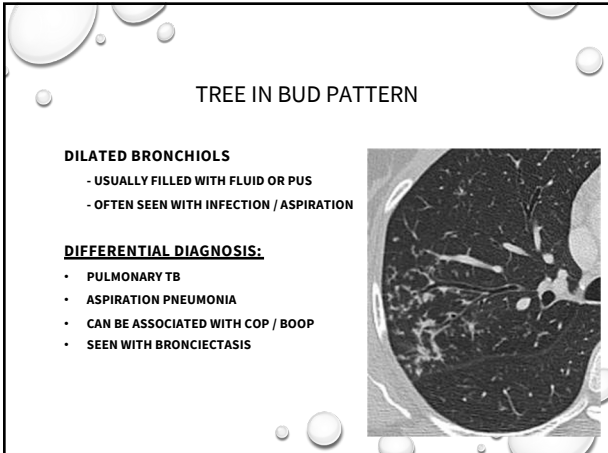
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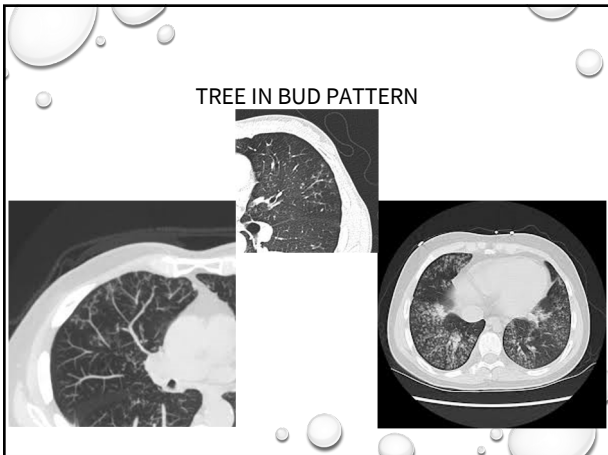
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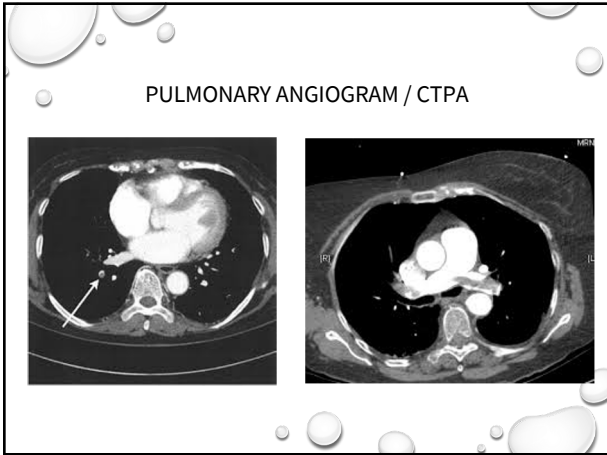
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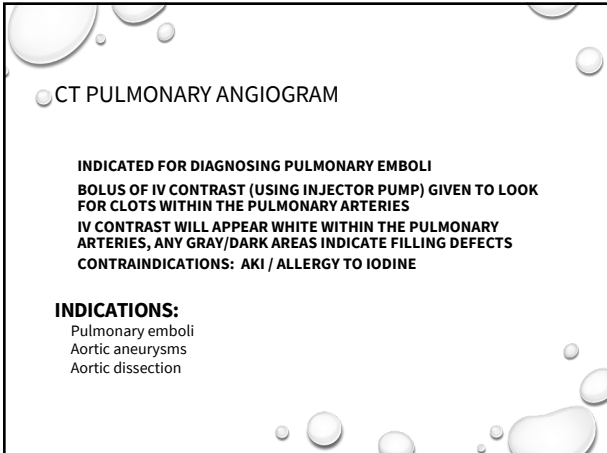
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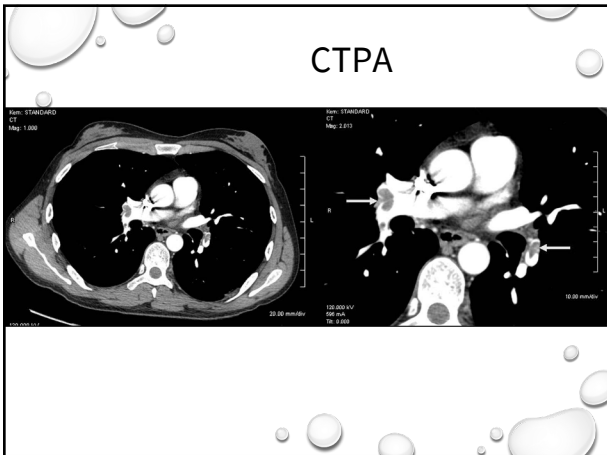
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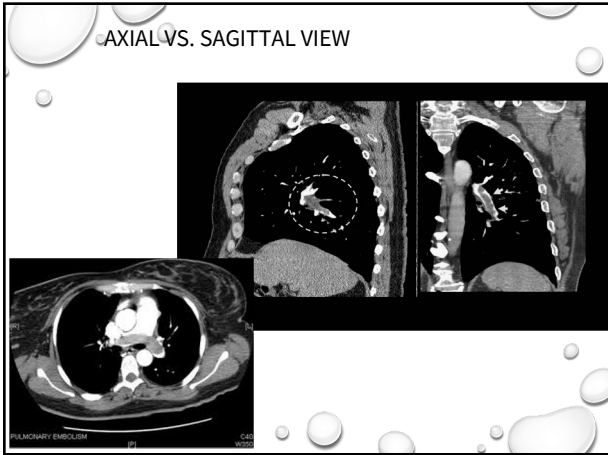
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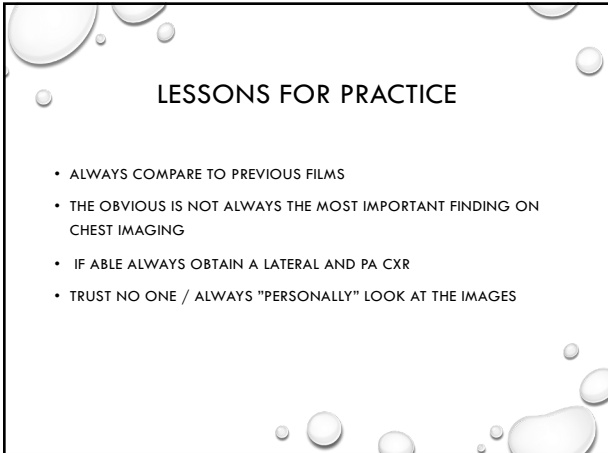
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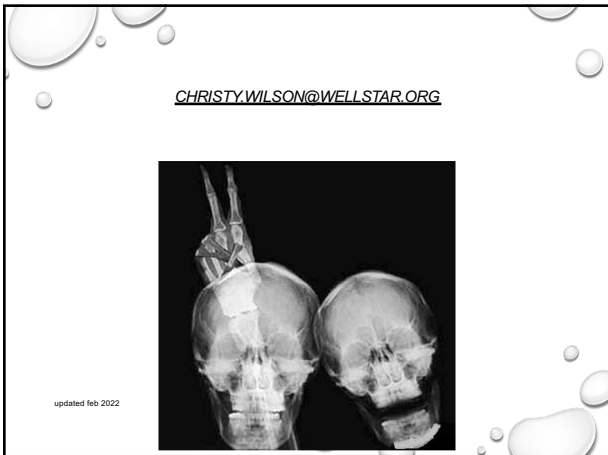
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