CHEST RADIOLOGY

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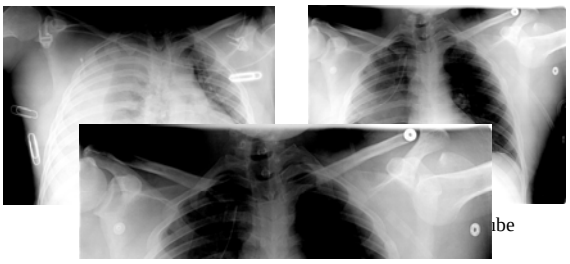
31-year-old man
Gunshot wound right hemithorax



HOW DO YOU EVALUATE A CHEST RADIOGRAPH

LOOK AT EVERYTHING

WHAT IS RADIOLOGY?

THE IMAGING LANGUAGE OF DISEASE

- HISTORY
- PHYSICAL EXAMINATION
- LABORATORY TESTS
- PATHOLOGY
- IMAGING

WHAT ARE THE DIALECTS OF THE IMAGING LANGUAGE

- RADIOGRAPHS
- COMPUTED TOMOGRAPHY
- MAGNETIC RESONANCE IMAGING
- ULTRASOUND
- ANGIOGRAPHY
- NUCLEAR MEDICINE

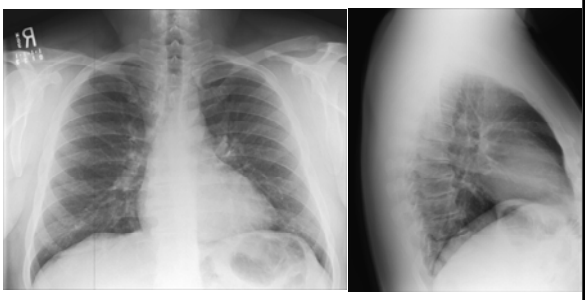
HOW DO YOU EVALUATE A CHEST RADIOGRAPH

- HOW DO YOU LOOK AT EVERYTHING?
  - BONES
  - SOFT TISSUE
  - BELOW DIAPHRAGM
  - LUNGS
  - VESSELS
  - AIRWAYS
  - MEDIASTINUM
  - HEART
  - SUPPORT LINES AND TUBES

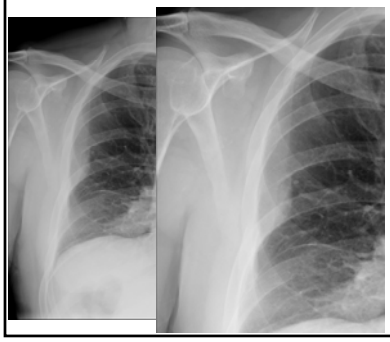
- Follow support lines and tubes FIRST
- Look at lungs and heart LAST
- Look in the order that YOU chose
- Look in the same order every time

Learn Normal

Normal Chest



40-year-old woman right chest pain for a month



Breast carcinoma metastasis

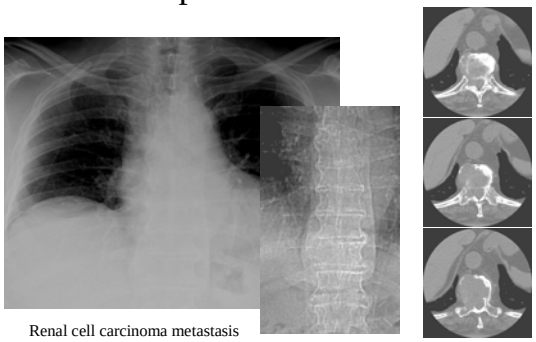
Use PACS image menu to evaluate image

Image that appears first

Right click to get Image menu

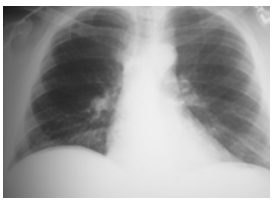
Closeup, more contrast

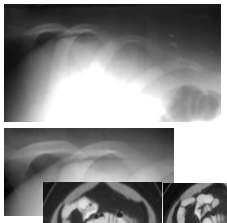
63-year-old man Back pain for 2 months

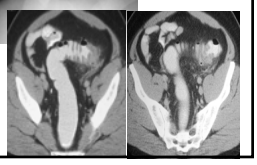


Renal cell carcinoma metastasis

47-year-old man 4 days post neck surgery with tachypnea and abdominal pain

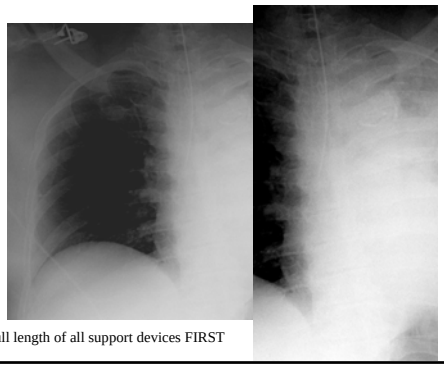






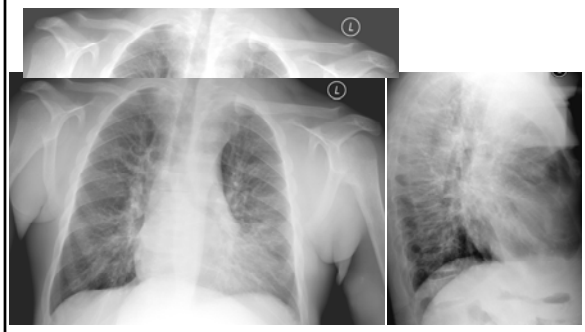
Diverticulitis with free intraperitoneal gas

Dyspnea 2 days post lumbar spine fusion

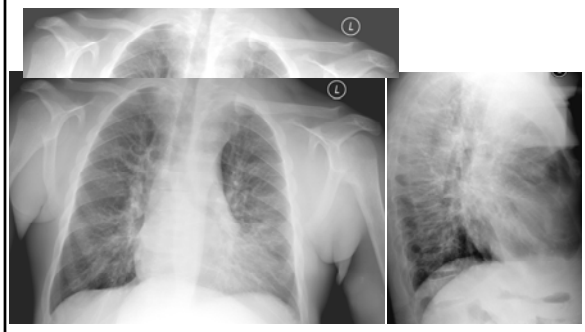


Trace full length of all support devices FIRST

Lingular pneumonia
Renal osteodystrophy



Lingular pneumonia
Renal osteodystrophy



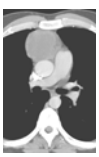
HOW DO YOUR READ AN IMAGING STUDY

- You don't "read" an imaging study.
  - An image is not a book.
- You interpret the study based on your knowledge of
  - Your patient
    - History, Physical Examination, Laboratory Data, Pathologic Data
  - Anatomy
    - Imaging Modality
  - Diseases
    - Clinical, Laboratory, Pathology, Imaging, Natural History, Differential Diagnosis

History

Your patient, a 35-year-old man



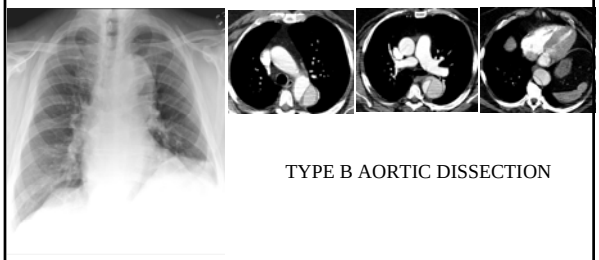


History of myasthenia gravis

Thymoma

72-year-old woman

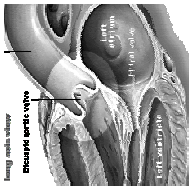
History of HTN now has severe acute chest pain



TYPE B AORTIC DISSECTION

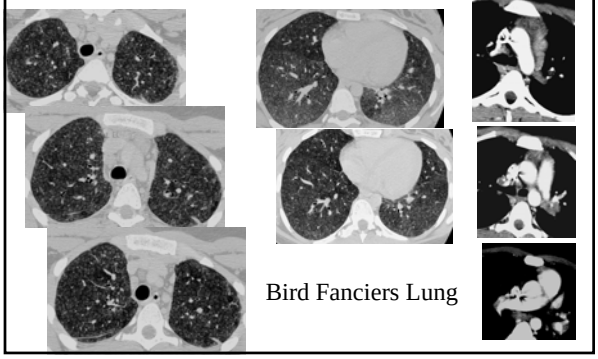
32-Year-old man

SYSTOLIC MURMUR



BICUSPID AORTIC VALVE
WITH AORTIC STENOSIS

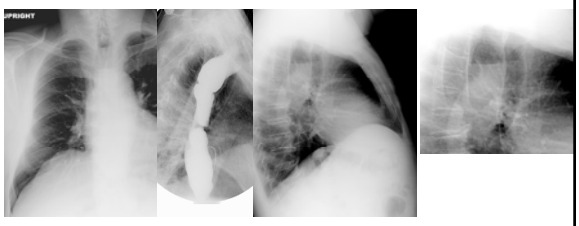
22-year-old woman keeping 6 parakeets in her closet



Bird Fanciers Lung

54-year-old man

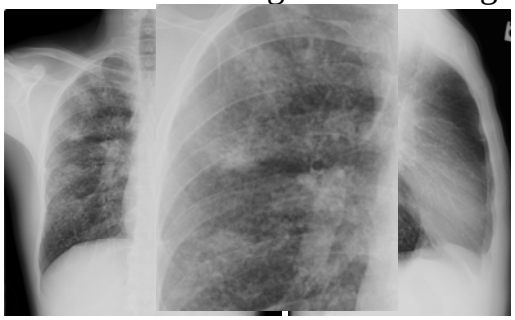
Dysphagia, insidious progression for 4 years



Achalasia

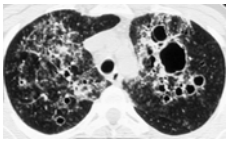
51-year-old man

Works sandblasting brick buildings



Silicosis

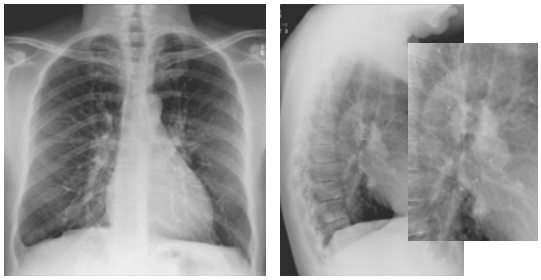
38-year-old man with AIDS



Pneumocystis jeroveci (PCP)

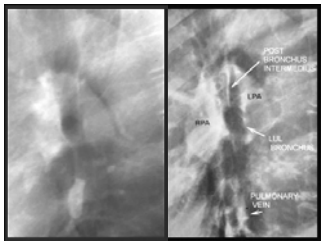
Anatomy

44-YEAR-OLD MAN WITH INTERMITTENT FEVERS

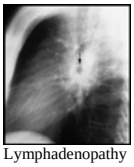


RIGHT HILAR LYMPHADENOPATHY
HODGKIN'S DISEASE

LEARN ANATOMY EVERY DAY



Lateral Chest Radiograph
Normal hilar anatomy



Lymphadenopathy
Donut sign

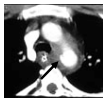
Lymphadenopathy
Mass below LUL bronchus

27-YEAR-OLD WOMAN WAS IN A T-BONE MVA. SHE IS COMATOSE BUT STABLE

ER supine chest radiograph

The nasogastric tube (arrows) is displaced laterally by the fractured aorta pseudoaneurysm and mediastinal hemorrhage

Normal esophagus and aorta (a) are contiguous

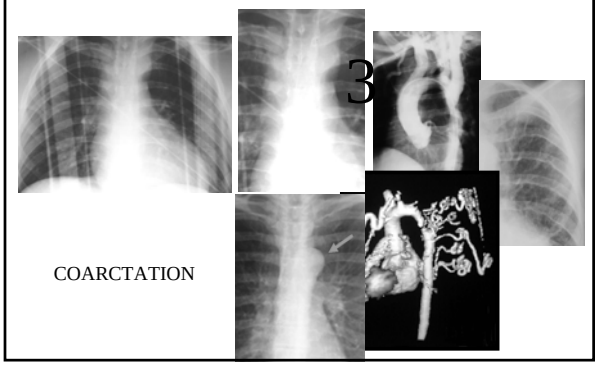


CT shows fractured aorta (arrow)

Angiogram shows pseudoaneurysm due to fractured aorta (arrow)

36-Year-old man crashed motorcycle

Lower blood pressure in legs than in arms

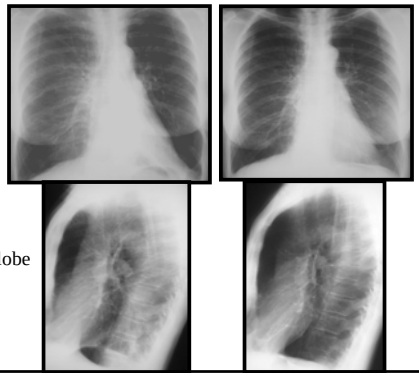


COARCTATION

WHICH IS THE BEST IMAGING STUDY TODAY?

- RADIOGRAPHS?
- COMPUTED TOMOGRAPHY?
- MAGNETIC RESONANCE IMAGING?
- ULTRASOUND?
- ANGIOGRAPHY?
- NUCLEAR MEDICINE?
- OTHER?

Dyspnea after bronchoscopy



Left lower lobe
Atelectasis

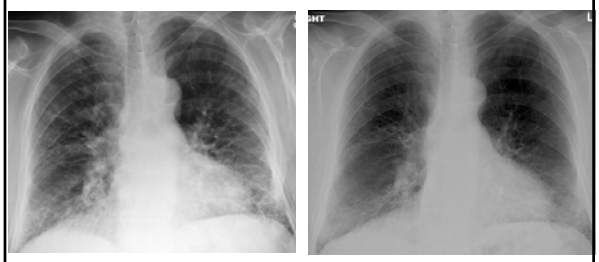
Always compare to old imagng studies

What is the best imaging study today?

The same as yesterday.

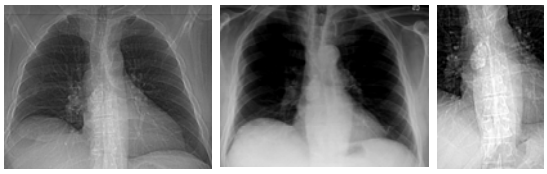
Old imaging study for comparison

Interstitial pulmonary edema before and after dialysis



Portable upright chest radiographs one day apart

This 62-year-old has had low grade fever for 6 weeks. He has had a nephrectomy for renal cell carcinoma.



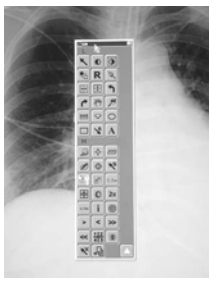
Cxr 1 year earlier

Spine 1 year earlier

OSTEOMYELITIS

4 months later

Images on PACS monitor



HOW TO BE THE BEST YOU CAN BE INTERPRETING IMAGING STUDIES

- LOOK IN THE SAME ORDER EACH TIME
  - Look at support lines and tubes first
  - Look at lungs and heart last
- YOU DECIDE THE ORDER OF LOOKING
- LOOK AT THE STUDIES BY YOURSELF
- ALWAYS COMPARE TO OLD EXAMINATIONS
- LOOK AT ALL YOUR PATIENT'S STUDIES
  - Learn anatomy and variations
  - Learn imaging language of disease
  - No one is perfect
    - Scrutiny by two physicians minimizes missed abnormalities

Merrill Sosman, MD

Father of neuroradiology
Associate of Harvey Cushing at Peter Bent Brigham in 1922

We see only what we look for and recognize only what we know.

Renal agenesis with counterclockwise splenic flexure deviated medially

Normal clockwise splenic flexure

Agenesis of left kidney, with empty renal fossa resulted in characteristic medial deviation of splenic flexure

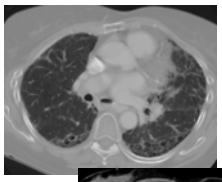
"The anatomic splenic flexure of the colon occupies the renal fossa in patients with left renal agenesis or ectopia and presents a characteristic appearance on radiographs and contrast enema studies."

Mascatello V, Lebowitz RL. Malposition of the colon in left renal agenesis and ectopia. Radiology 120:371-376

•This characterize finding, now easily recognized, was not recognized at all until the above paper was published.

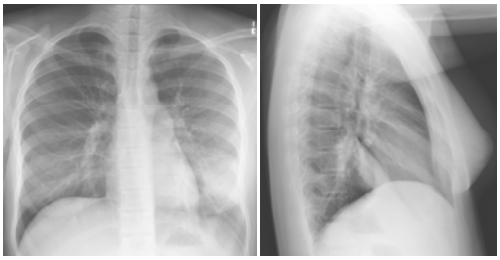
•"We see only what we look for and recognize only what we know."

52-YEAR-OLD WOMAN WITH DYSPNEA AND REFLUX ESOPHAGITIS



SCLERODERMA

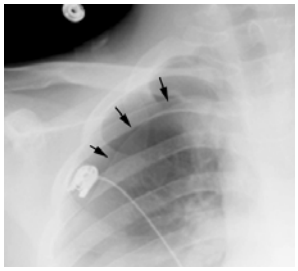
Right lower lobe pneumonia



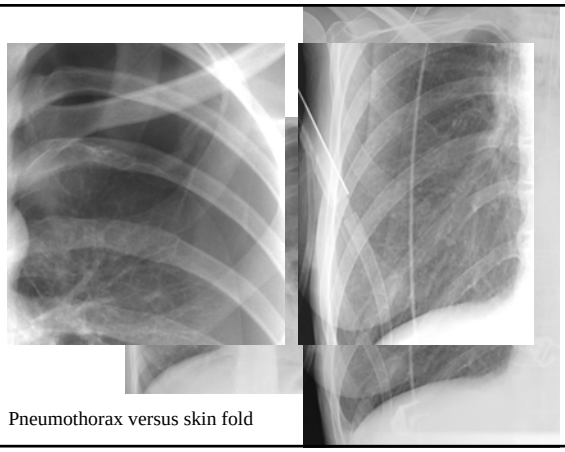
Pneumothorax

Pneumomediatinum

Pleural effusion

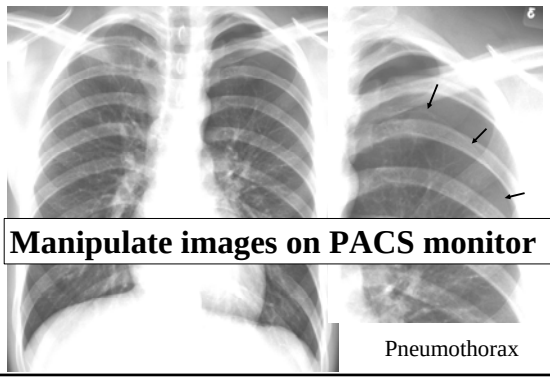


- Pneumothorax
  - Displaced visceral pleura (curved thin line)
  - No peripheral vessels
  - Hyperlucency
  - Questionable? Get lateral decubitus view



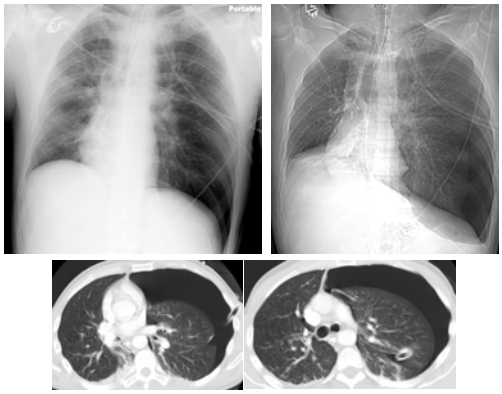
Pneumothorax versus skin fold

17-year-old with acute chest pain



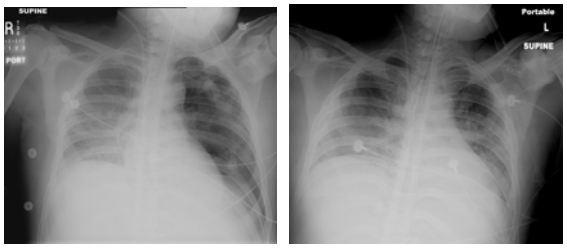
Manipulate images on PACS monitor

Pneumothorax



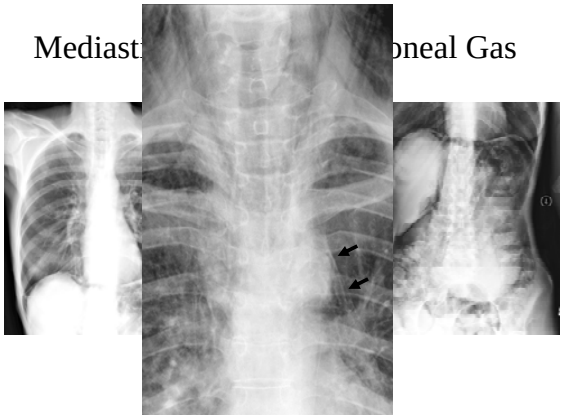
Deep Sulcus Sign with Tension pneumothorax

Pneumothorax supine patient
Deep Sulcus sign



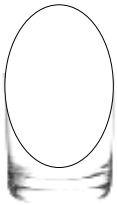
Supine patient, anterior gas bubble , sharp anatomy definition, deep sulcus

Mediast[illegible]oneal Gas

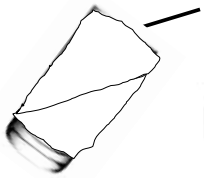


38-YEAR-OLD WOMAN WITH POLYARTHRALGIAS

Pleural effusion
Upright, Semiupright, Supine

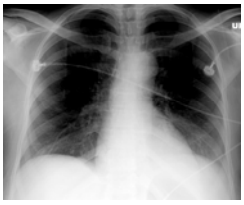


Menicus

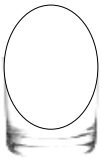


Opacity fades superiorly

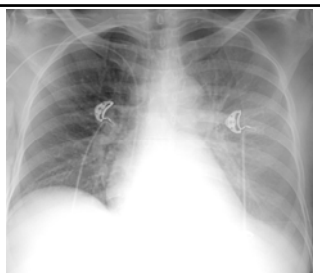
Uniform opacity

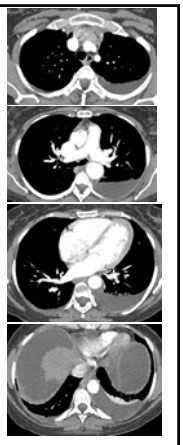


Upright chest: Pleural effusion meniscus



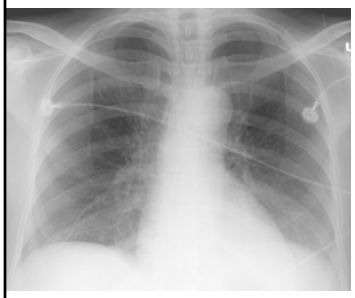
Meniscus





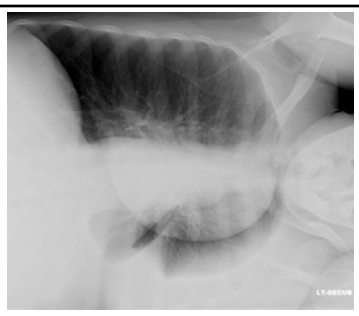
Supine patient: dorsally layered effusion

Uniform opacity

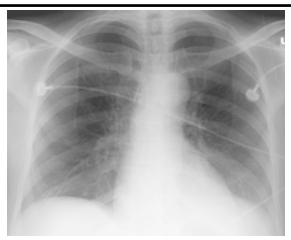


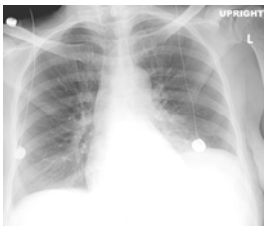
Opacity fades superiorly

Semiupright portable chest: partially layered pleural effusion



- Lateral decubitus view: dependent layered effusion
  - Confirm questionable pleural effusion
  - Most sensitive for *free pleural* effusion
  - Determine volume of effusion before thoracentesis

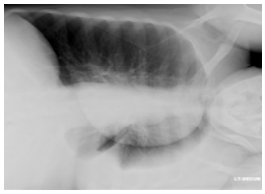


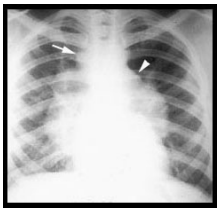


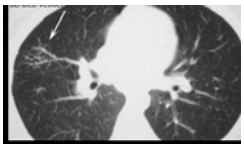
Pleural effusion simulates elevated hemidiaphragm

(Effusion loculated between lung and hemidiaphragm)

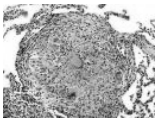
Prove with lateral decubitus view







Sarcoidosis



Erythema nodosum

42-YEAR-OLD MAN WITH HEMATURIA

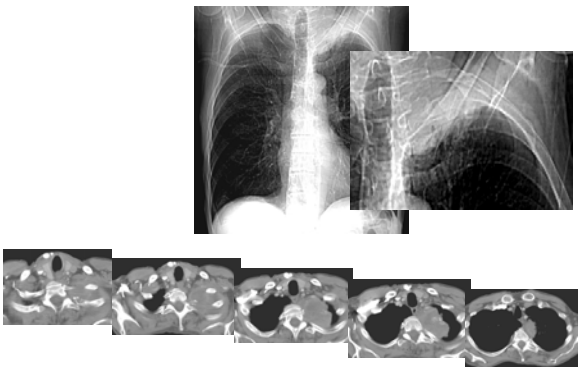
WEGENER'S GRANULOMATOSIS

ANCA C positive

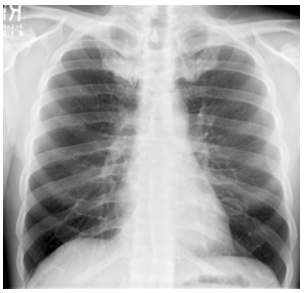
まわりの尿細管は拡大して
上皮は萎縮している

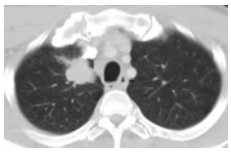
Diseases

Superior sulcus tumor

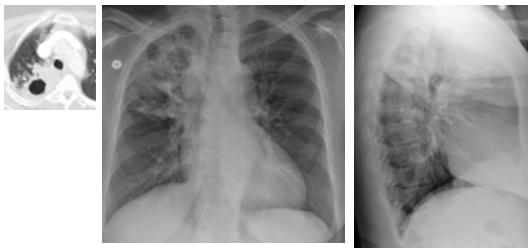


Bronchogenic Carcinoma

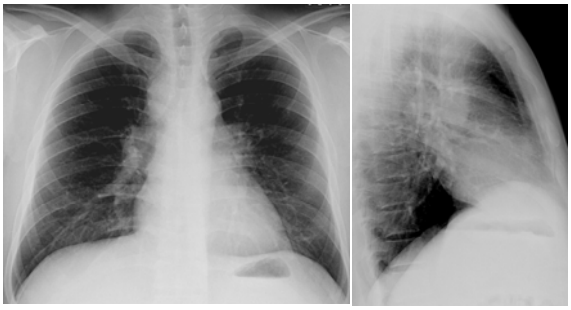




Mycoplasma tuberculosis

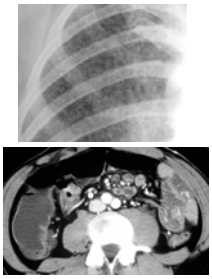


Primary tuberculosis



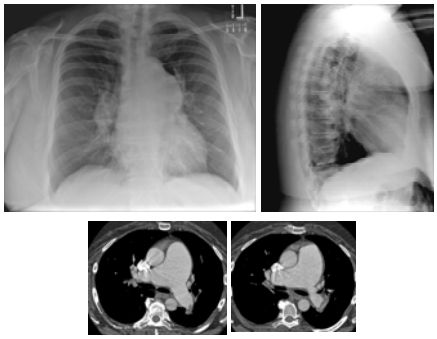
44-year-old man with low grade fever

31-year-old man
Fever and fatigue for 3weeks

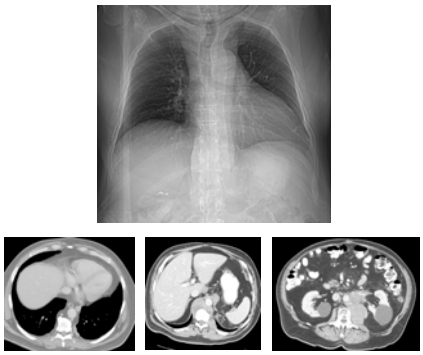


Miliary Tuberculosis

Pulmonary arterial hypertension

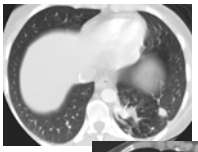
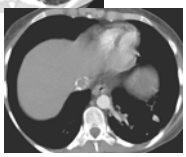


Lymphoma



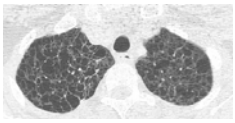
Right Aortic Arch
aberrant left subclavian type

INTRALOBAR SEQESTRATION

38-YEAR-OLD WOMAN

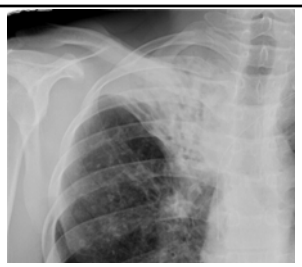




LYMPHANGIOLEIOMYOMATOSIS

Women
Interstitial lung disease with normal to large lung volume
Chylous pleural effusion
Pneumothorax

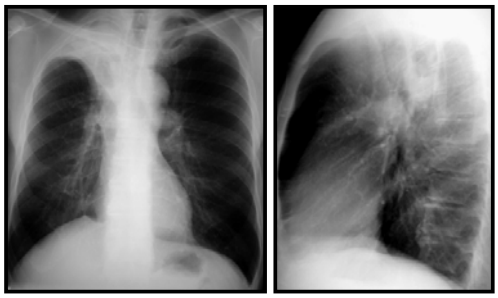
Tuberous sclerosis overlap
…..Renal angiomyolipomas
….Congenital lymphatic structures



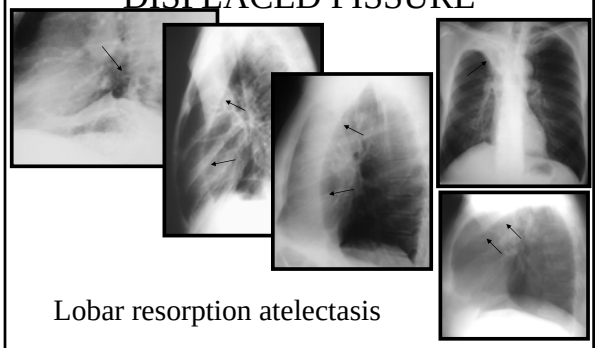
Direct signs

- Crowded vessels
- Crowded bronchi
- Displaced fissure

RIGHT UPPER LOBE ATELECTASIS
BRONCHOGENIC CA INVADES ESOPHAGUS



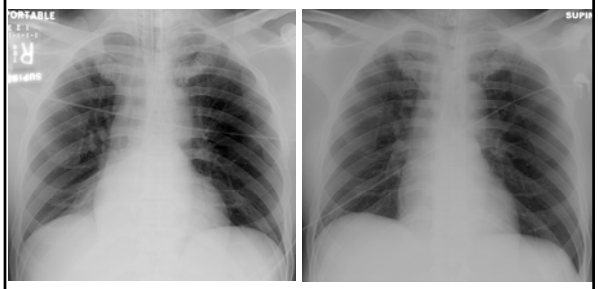
DISPLACED FISSURE



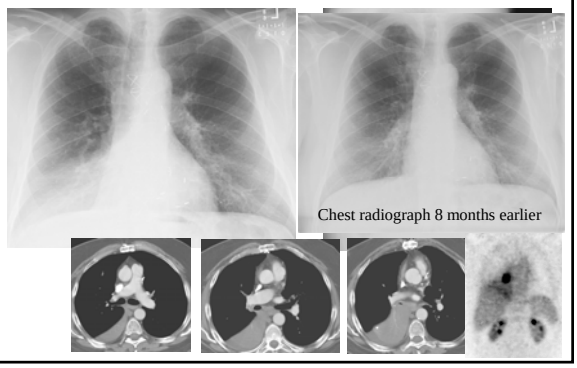
Lobar resorption atelectasis

Right lower lobe atelectasis

Right lower lobe atelectasis

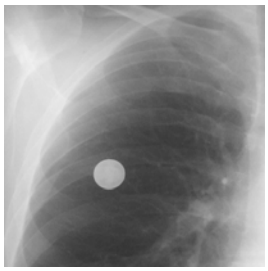
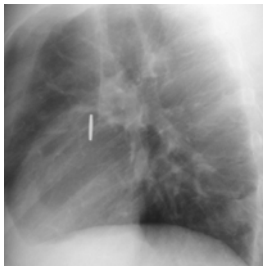


RLL atelectasis
Intermediate bronchus Squamous Ca

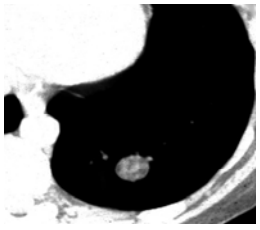


Solitary Pulmonary Nodules

COIN LESION

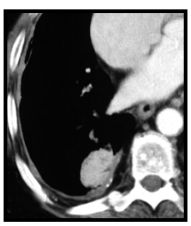
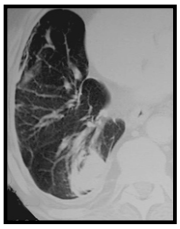
HAMARTOMA

73-YEAR-OLD MAN TRANSFERRED TO LUMC. HIS EJECTION FRACTION IS 10%


PSEUDTUMOR: PLEURAL FLUID LOCULATED IN FISSURE

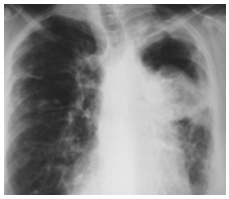
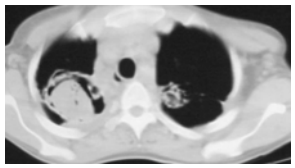
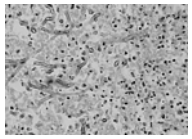
61-YEAR-OLD MAN WITH HISTORY OF ASBESTOS EXPOSURE


ROUND ATELECTASIS

ROUND PLEURAL BASED MASS, THICK PLEURA, INCURVING VESSELS

67-YEAR-OLD MAN WITH EMPHYSEMA AND MULTIPLE BULLAE HAS HEMPTYSIS

ASPERGILLOMA

Sherlock Holmes and Watson

WATSON SAYS:

I could not help laughing at the ease with which he explained his process of deduction. " When I hear you give your reasons," I remarked, "the thing always appears to me to be so ridiculously simple that I could easily do it myself, though at each successive instance of your reasoning I am baffled until you explain your process. And yet, *I believe that my eyes are as good as yours."*

Sherlock Holmes and Watson

SHERLOCK HOLMES SAYS:

"Quite so", he answered, "you see but do not observe. *The distinction is clear, you did not know where to look, and so you missed all that was important."*

The Beginning