UNDERSTANDING X-RAYS:
CHEST IMAGING

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CHEST IMAGING

RADIOGRAPHIC DENSITIES

What are the different basic radiographic densities?

Density Characteristics

1. Metal
2. Bone (Calcification)
3. Soft Tissue
4. Fat
5. Air

Hounsfield Units

Bone 1000 HU
Liver 40 - 60 HU
Blood 40 HU
Muscle 10 - 40 HU
Kidney 30 HU
Water 0 HU
Fat -50 - -100 HU
Air -1000 HU
Hounsfield Units

- Bone: 1000 HU
- Liver: 40 - 60 HU
- Blood: 40 HU
- Muscle: 10 - 40 HU
- Kidney: 30 HU
- Water: 0 HU
- Fat: -50 - -100 HU
- Air: -1000 HU

MENISCUS SIGN

RADIOGRAPHIC FEATURES
- Smooth contour
- Wedged shaped, reverse “V”, triangular
- Lies along dependent portion of lung
- Indicates UNCOMPLICATED fluid

PLEURAL EFFUSION

GENERAL
- A small amount of fluid is normally present to lubricate the surfaces of the pleura
- A pleural effusion occurs when an excessive amount of fluid accumulates between the layers of tissue that line the lungs
- At least 200-300 cc of fluid must be present before visible on an upright Chest X-Ray
  - Decubitus views of chest may show smaller amounts of fluid

SYMPTOMS
- Chest pain
  - Usually sharp
  - Worse with cough or deep breath
- Dyspnea
- Cough
- Hiccups
- Tachypnea
- Shortness of breath
- Sometimes no symptoms
PLEURAL EFFUSION

Different types of fluid can accumulate in the pleural space:
- Serous fluid (hydrothorax)
- Blood (hemothorax)
- Chyle (chylothorax)
- Pus (pyothorax or empyema)

PLEURAL EFFUSION

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PLEURAL EFFUSION

MALIGNANT PLEURAL PROLIFERATION

Malignant pleural effusion occurs when cancers cause an abnormal accumulation of fluid that cannot be removed by suction. Lung cancer and breast cancer account for approximately 50% to 65% of malignant pleural effusions. 

EXUDATE

EXUDATE

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PLEURAL EFFUSION

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MALIGNANT PLEURAL EFFUSION

Malignant effusions are exudates
A low pleural fluid pH is associated with poorer survival
Ultrasound has a sensitivity of approx 73% of distinguishing malignant pleural effusions from other causes of pleural effusions
CT guided biopsy has a sensitivity of approx 87%

CONGESTIVE HEART FAILURE

- Affects up to 5 million Americans
- 400,000 new cases each year
- 40,000 deaths a year
- Contributing factor in over 200,000 deaths
- Men > Women
- Blacks > Whites

CONGESTIVE HEART FAILURE

Risk Factors

- Smoking
- High Cholesterol
- Hypertension
- Diabetes
- Obesity
- CAD

CONGESTIVE HEART FAILURE

-Radiographic Signs-

- Cardiac Enlargement
- Enlarged Pulmonary Vasculature
- Increased Interstitial Markings
- Pulmonary Edema
- Pleural Effusions
  - Blunting of CPA
  - If unilateral usually on right
  - If bilateral usually larger on right
  - If pt supine see homogeneous density over affected lung

PNEUMONIA
PNEUMONIA
Can be caused by a variety of agents
Bacterial
Viral
Mycoplasma
Fungi

PNEUMONIA
An important cause of morbidity and mortality in the US
Millions of cases reported yearly
Accounts for over 1 mil hospitalizations
Accounts for over 1 mil ER visits

PNEUMONIA
VIRAL PNEUMONIA
Approx 50% of pneumonias believed to be caused by viruses
Generally less severe than those caused by bacteria
Often seen in very young patients

PNEUMONIA
BACTERIAL PNEUMONIA
Pneumococcus most common cause
Commonly called lobar pneumonia, even though infection does not usually involve the entire lobe
Lower lobes and posterior segments of upper lobes most common

PNEUMONIA
MYCOPLASMA PNEUMONIA
Has features of both bacterial and viral pneumonias
Usually causes a mild, wide spread infection
Common cause of community acquired pneumonia

PNEUMONIA
SYMPTOMS
Fever
Cough
Headache
Muscle pain
Weakness
Fatigue
SOB
PNEUMONIA

SYMPTOMS
Chills
Chest pain
Sweats
Tachypnea
Tachycardia
Etc

RADIOGRAPHIC FINDINGS
Patchy infiltrates
Mottled infiltrates
Peribronchial distribution
Diffuse
Homogeneous

RADIOGRAPHIC FINDINGS
Focal alveolar infiltrates
Interstitial densities
Miliary, nodular, reticular
With or w/o adenopathy

COMPPLICATIONS
Pleursy with effusion
Empyema
Pulmonary abscess
Toxic ileus

COMPLICATIONS
Rare:
Broncopleural fistulas
Pericarditis with effusion
CHF

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