Basic Steps to reading Chest X-rays
A guide to help you study film!
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Objectives
- At the conclusion of this workshop, the participant will be able to:
  - 1) Assess Chest Radiographs by incorporating an organized examination approach to preparing, reading and interpreting radiographic findings.
  - 2) Differentiate normal from abnormal findings at the beginner’s level using an organized examination approach.

Radiologic Terms
- Radiography (XR Plain Films)
- Ultrasonography (US)
- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)
- Beam Direction (PA Chest)
- Body part Closest to FILM (Left Lat. Chest)

Basic Densities
- Gas (Air) Appears as ....
- Fat & Lipids appear as....
- Soft Tissue (muscle) appears as...
- Calcium (Bone) appears as...
- Heavy Metal (FB) appears as...
General Approach to X-rays

- First thing you check for is........
  - PATIENT’S NAME!!!!
- Next – check Date Done!
- Position Markers: (left, right, upright)
- Type of film: CT, MRI, radiograph
- Patient position: Upright, Supine, Lateral
- Quality of film

REMEMBER YOUR RULES!

- Superior to inferior
- Compare side to side
- External to internal
- Seek pathology

Ethics and Legals involved

- Have a rationale– Should support or refute a diagnosis
- DOES NOT REPLACE EXAM!!!
- Responsible for entire X-ray.
- Must be reviewed by a Radiologist – You are not a radiologist!!

“Reading” a chest X-ray

Reading a Chest X-ray is reading Through the chest and “Seeing” all structures.

Important to understand anatomy of area you are looking at.

“right” and “left” refer to Patient orientation.
General Approach to CHEST

First, Evaluate the film.
- Is Client midline and in alignment?
- Is film developed correctly?
- Is it a quality film?

Scapula Position

Scapula should project outside the lung fields

Rotation

- Look at the clavicles of an X-ray
- Medial ends should be of Equal Distance from the Spinous Process.

Inspiration
Now let’s evaluate a chest X-ray.

- Soft Tissue & Bones
- Mediastinum
  - Lymphoma
  - Aortic aneurysm
  - Dilated esophagus

Looking at the Thymus
Radiologic Terms

- Beam Direction (PA Chest)

Radiologic Terms

- AP view of the Chest

Radiologic Terms

- Body part Closest to FILM (Left Lat. Chest)

The Heart

- 1. Always look at both films
- 2. Right border: Edge of (r) Atrium
- 3. Left border: (l) Ventricle + Atrium
Lateral View

- Posterior border: left Ventricle
- Anterior border: right Ventricle

Now let's evaluate a chest X-ray.

- Soft Tissue & Bones
- Mediastinum
- Heart
- Diaphragm
- Pleura/Fissures
- Lungs
  - Trachea & Bronchi
  - Hilum
  - Vasculature
  - Parenchyma
  - Apex
  - Behind Heart

When looking at lungs

- Look for areas of increased or decreased density
- INCREASED Densities (opacities)
  - most common
    - Consolidation
    - Interstitial
    - Nodules or masses
    - Atelectasis

Consolidations

- Pathology that fills the alveoli with fluid, pus, blood, cells (including tumor cells) or other substances.
- Lobar
- Diffuse
- Multifocal ill-defined
Examples of Consolidation

- Diffuse – Peri-hilar (Batwing) or Peripheral (Reverse-Batwing)
- Lobar = Focal
- Multiple – multiple ill-defined densities

Trying to diagnose

- Can’t determine cause based on image alone.
- Must consider other issues
  - Acute vs. Chronic
  - Clinical data
  - Other non-pulmonary findings
Trying to diagnose

1. Lobar pneumonia
2. Pulmonary hemorrhage
3. Organizing pneumonia
4. Infarction
5. Pulmonary Cardiogenic edema
6. Sarcoidosis (First glance – consolidation….But actually nodular interstitial lung dx

Interstitial

- Involvement of the supporting tissue of lung (Lung parenchyma = alveoli, alveolar ducts, respiratory bronchioles.)
- Will see fine or coarse reticular opacities

Congestive Heart Failure

- Normal (Left) vs. CHF
- Basal reticular pattern, Kerley B lines, Inc heart size, pleural fluid on left side, pulmonary vessels more prominent

Nodules or Masses

- A space occupying lesion
- Single
- Multiple
Decreased Density (lucency)

- **Cavity** - lucency with a thick wall
- **Cyst** - lucency with a thin wall
- **Emphysema** - lucency without a visible wall

Pneumonia with Cavitation

- In virulent pyogenic infections - abscess may form within consolidated lung (Necrosis from inflammation/thrombosis)
  When pus is coughed up, a cavity can be seen
- These patients are usually very ill.
  In granulomatous infection (TB), cavities may form, but these patients are usually not that ill.
- Cavitation is not seen in viral pneumonia, mycoplasma and rarely in streptococcus pneumoniae.

Atelectasis

- Collapse of part of the lung due
- Due to decrease in the amount of air in the alveoli
- Less volume and increased density

Chest X-ray site:

http://www.yale.edu/imaging/contents.html

OTHER SITES:

http://radiology.yale.edu/education/resources.aspx

http://www.radiologyeducation.com/