X-Ray Interpretation

Michigan Society for Respiratory Care
Fall Conference 2015
Rob Wonnacott MSN, RN, CCRN
University of Michigan Medical Center
Objectives

- Background
- Types
- Technical qualities
- ABCDEF Mnemonic
- Case Studies
- Q&A
Family
History

• By accident in 1895 by German scientist Wilhelm Conrad Roentgen
• Was able to see opaque items such as bones and foreign bodies
• First x-ray made public Jan 23 1896
• Used in 40 & 50’s to fit shoes
How it works
The 5 Colors

Air  Fat  Soft tissue  Bone  Metal
Tissue Densities

Key points
- 1 - Air/Lung
- 2 - Fat (layer between soft tissues)
- 3 - Soft tissue
- 4 - Bones
Position

- AP – anteriorposterior
- PA – posterioanterior
- LAT – lateral
- Supine
- Upright
Positioning Example 1
Why the difference

- Project a cone shape image
- Converts 3D to 2D
- Big impact on what really stands out.
AP vs PA

- Distance plays a big part!
- AP 40 inches (optimal)
- PA 70 inches (optimal)
- PA is industry standard
Lateral views

• Clarifying of significant finding
• Should not be routinely done
Supine vs Upright

- Used primarily to assess chest fluid levels.
- Supine allows for full expansion of lungs
- Standard for CXR
Assessment of Quality R.I.P.

- Rotation
  - Spinous processes should be midpoint between clavicles
- Inspiration
  - 5 – 7 costal spaces present at the midclavicular line
- Penetration
  - Can the spine be visualized behind the heart?
Rotation

- Spinous processes
- Medial clavicles
Inspiration

- **Clavicle**: The clavicle is the collarbone located at the top of the chest.
- **Ribs**: The ribs are the bones that form the protective cage of the chest.
- **Diaphragm**: The diaphragm is a muscular sheet that separates the chest cavity from the abdominal cavity.
- **Midclavicular line**: This line runs vertically through the sternum and is often used as a reference in medical imaging.
- **Consolidation?**: This area shows a possible abnormality that requires further investigation.
Inspiration
Expansion
Penetration
• Systematic approach to reading x-rays
  • Airway
  • Bones and soft tissue
  • Cardiac silhouette
  • Diaphragms
  • Effusions
  • Fields
Airway

Anatomy - Airways

- Trachea
- Right main bronchus
- Left main bronchus

Anatomy - Airways

- Trachea
- Right main bronchus
- Left main bronchus
Bones

- 4 main bones to identify
  - Clavicle
  - Rib
  - Vertebral body
  - Sternum
    - Hard to discern
Cardiac Silhouette

- Mediastinum interpretation
Diaphragm

- Right elevated by liver
- Costophrenic angle
- Gastric bubble
Effusions

• Assess pleura to ensure full expansion.
Fields
Devices, Gastric Tubes
Devices ETT
Devices CVL
Devices Chest Tubes
Devices-cardiac
Test Time
References

- All pictures courtesy of
  - Radiopaedia.org
  - Radiologymasterclass.com.uk
  - University of Virginia
  - Sharon Dickinson MSN, CNS, NP, CCRN University of Michigan Medical Center