Faisal Khan MD
Center for Respiratory and Sleep Medicine
St. Francis Hospital Indianapolis

Chest X-Ray Interpretation
Disclosure

- Financial: None
- Academic: Still learning to master the CXRs
Key to success

- Read hundred of NORMAL CXRs to know what is normal and, therefore, what is abnormal
- Follow the same systemic approach
- Know the anatomy
- “the eye does not see what the mind does not know”
  - Know the common problems
  - Interpret and generate a differential in relevance of history and physical examination
- Densities
- Technique
- Anatomy
- Interpretation
- Common pathologies
- Clinical scenarios
(1) WHITE - Bone
(2) BLACK – Air
(3) DARK GREY- Fat
(4) GREY- Soft tissue/water
(5) BRIGHT WHITE - Man-made
Technique

PA - the x-rays penetrate through the back of the patient on to the film

AP - the x-rays penetrate through the front of the patient on to the film.

All x-rays in the ICU are portable and are AP view
- The heart appears larger and flatter, more "distorted"
- Ribs and lungs appear more broader and shallower
- Clavicle appears higher and farther apart
- Anterior Ribs are more horizontal and may appear farther from midline
- Anterior ribs are wider than the posterior
- Diaphragm may be higher and hence less number of ribs above the diaphragm.
Technique - Lateral
Centered
Equal distance between medial end of clavicle and midline
• RIGHT UPPER LOBE:
• RIGHT MIDDLE LOBE:
• RIGHT LOWER LOBE:
• LEFT LOWER LOBE:
• LEFT UPPER LOBE WITH LINGULA:
• LINGULA
• LEFT UPPER LOBE - UPPER DIVISION:
Made of:
  - Pulmonary Artery and Veins
  - The Bronchi
  - Left Hilus higher (lower margin of left in line with upper margin of right)

Identical: size, shape, density
LATERAL CXR

- Rt diaphragm
- Left diaphragm
- Rt Ribs
• Size:
1. R Atrium
2. R Ventricle
3. Apex of L Ventricle
4. Superior Vena Cava
5. Inferior Vena Cava
6. Tricuspid Valve
7. Pulmonary Valve
8. Pulmonary Trunk
9. R PA
10. L PA
**INTERPRETATION**

Top Down, Bottom Up ABCDE

**TOP DOWN**
- Apices
- Breathing apparatus (lungs)
- CP angles
- Diaphragm
- Everything below

**BOTTOM UP**
- Everything around
- Mediastinum
- Cardiac
- Bones
- Above the chest
RUL PNEUMONIA
LUL PNEUMONIA
MULTIPLE MASSES
AIR IN WRONG PLACES
PNEUMOTHORAX
Figure 2. Repeat chest radiograph showing normal lung fields.
(A) Chest radiograph performed supine after central venous catheterisation; (B) erect radiograph showing the disappearance of the apparent pneumothorax.
FLUID IN WRONG PLACES
25 year old recently treated for pneumonia presents with right side chest pain and low grade fever.
4 hours post thoracentesis, develops increased shortness of breath, hypotension and light headedness.
If a needle is placed in right chest what will the aspirate look like

- Pus
- Clear fluid
- Air
- Nothing
- Blood
22 year old female smoker with history of asthma, on a vacation, presents to ER with worsening SOB that started 4 hrs ago. Earlier, she went for scuba diving.

- RR 32, BP 90/45, HR 132, Sats 85% on RA
What is the diagnosis

- Left lower lobe aspiration pneumonia
- Asthma exacerbation with hyperinflation
- Tension pneumothorax
Case 3

- What is the diagnosis?
Tube feeds started without confirming feeding tube placement.
Case 4

- 12 year old boy intubated for respiratory distress.
- After initial improvement, the oxygenation starts to worsen and ventilator pressure alarm goes off
- Diminished breath sounds on the left.
What is the next step?

- Emergent bronchoscopy and removal of mucus plug
- Place chest tube on the left
- Pull back ETT by 4 cm
Where is the tip of ETT located

- Right main stem (i.e. between carina and RUL bronchus)
- Right bronchus intermedius (i.e. between RUL bronchus and RML bronchus)
- Right lower lobe airway (i.e. beyond the RML bronchus take off)
THANK YOU!