Version 2.1

Chest Film (CXR) - Systematic Approach

12/06/2012

DRSABCDE of CXR Interpretation (developed by Matthew Lumchee)

D – Details

- Patient name, age / DOB, sex
- Date and time of study
- Film type – PA/AP, erect/supine, correct L/R marker, inspiratory/expiratory

R – RIPE (assessing the image quality)

- **R**otation – medial clavicle ends equidistant from spinous process
- **I**nspiration – Normal: 5-6 anterior ribs in MCL or 8-10 posterior ribs above diaphragm
- **P**icture – straight vs oblique, entire lung fields, scapulae outside lung fields, angulation
- **E**xposure (Penetration) – IV disc spaces, spinous procs to ~T4, all L hemidiaphragm visible

S – Soft tissues and bones

- Soft tissues – symmetry, swelling, loss of tissue planes, subcutaneous air, masses
- Breast shadows
- Calcification – great vessels, carotids
- Ribs, sternum, spine, clavicles – symmetry, fractures, dislocations, lytic lesions, density

A – Airway & mediastinum

- Trachea – central or slightly to right lung as crosses aortic arch
- Carina & RMB/LMB
- Hilum – T6-7 IV disc level, L usually higher (2cm) & squarer than V-shaped R hilum.
- Mediastinal width <8cm on PA film
- Paratracheal/mediastinal masses or adenopathy
- Check vessels incl Aortic knob, calcification.

B – Breathing

- Lung fields
  - Vascularity – to ~2cm of pleura (~3cm in apices), vessels in bases > apices
  - Outlines – abnormal opacity/lucency, atelectasis, collapse, consolidation, bullae
  - Pneumothorax – don't forget apices
  - Horizontal fissure on R lung
  - Pulmonary infiltrates – interstitial vs alveolar pattern
  - Coin or cavitating lesions
- Pleura
  - Pleural reflections or thickening/plaques

C – Circulation

- Heart position – ⅔ to left, ⅓ to right
- Heart shape & size – cardiothoracic ratio on PA film (normal <0.5 Adult, <0.7 Infant)
- Heart borders – R border is R atrium, L border is L atrium & L ventricle
- Aortic stripe

D – Diaphragm

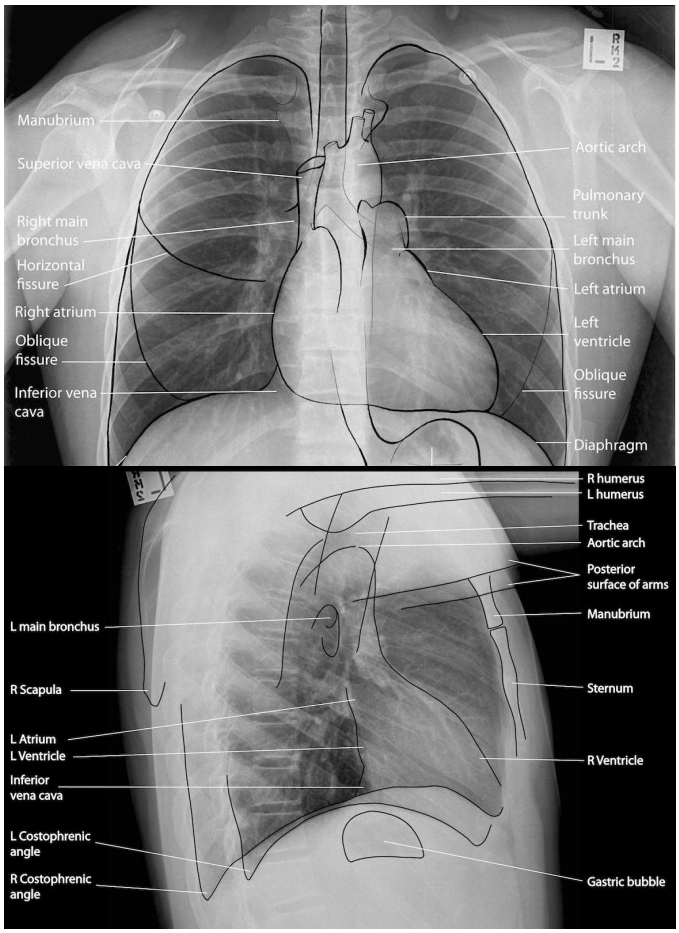
- Hemidiaphragm levels – R lung higher than L lung (~2.5cm / 1 intercostal space)
- Diaphragm shape/contour
- Cardiophrenic and costophrenic angles – clear and sharp
- Gastric bubble / colonic air / subdiaphragmatic air (pneumoperitoneum)

E – Extras

- ETT, CVP line, NG tube, PA catheters, ECG electrodes, PICC line, chest tube
- PPM, AIDC, metalwork

Lateral Film

- Usually left lateral (L side against film)
- Heart lies in the antero-inferior field.
- Black lung should be ant & sup to ♥. Opacified if disease in ant mediastinum or upper lobes.
- Similarly area post to ♥ should be black down to the hemidiaphragms. Opacified if collapse or consolidation in the lower lobes
- Degree of blackness in these two areas should be similar.



Abnormal Opacities

- Size and shape
- Number and location
- Clarity of structures and their margins
- Homogeneity
- If available, compare with an earlier film.

Atelectasis and Consolidation

- Collapse (atelectasis) → loss of volume / lucency, shift fissures or ↑hemidiaphragm
- Silhouette Sign – Blurred interface of similarly dense elements. Hemidiaphragm/heart with consolidation, infarction or fluid.
- Air bronchogram - where the airway is highlighted against denser consolidation.
- Confluent opacification (white out) of the hemithorax may be caused by consolidation, pleural effusion, complete lobar collapse, and after a pneumonectomy.

Heart and Mediastinum

- The heart & mediastinum are deviated away from effusion & PTX, and towards collapse.
- If heart is enlarged, look for signs of CCF: ↑vascular markings in upper lobes, wide pulmonary veins and possible Kerly B lines.
- In children ant mediastinum has thymus gland. Largest at ~2yo but continues to grow into adolescence, and becomes relatively smaller. R lobe of the thymus can rest on the horizontal fissure, which is often called the sail sign.
- Bronchial wall thickening is a common finding on children's x-rays. Look for "tram track" parallel lines around the hila. Usual caused by viral infection or asthma but also CF.

TB Patterns

Primary:

- Small consolidated area in lower UL or upper LL
- Resolves leaving small calcified node (Ghon focus)
- Hilar lymphadenopathy – may calcify

Secondary:

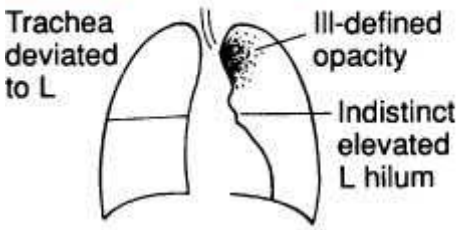
- Post apex, uni-or bilateral.
- May scar or calcify.
- Cavitation ± fluid level ± surrounding fibrosis (& elevation of hila)
- No hilar lymphadenopathy.

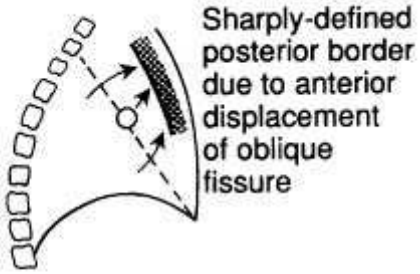
Miliary: 1-2mm diffuse nodules

Tuberculoma: well defined edge, streaking towards hilum, specks of calcification.

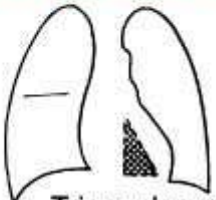
Consolidation/Collapse Patterns

Left upper-lobe collapse

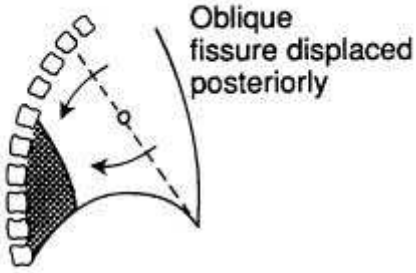




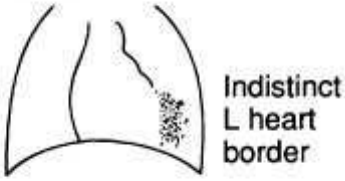
Left lower-lobe collapse



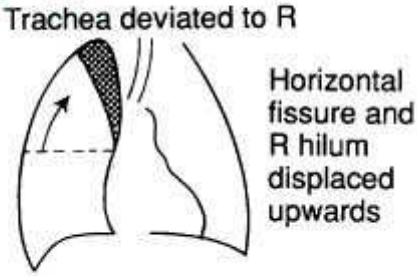
Triangular opacity visible through the heart with loss of medial end of diaphragm

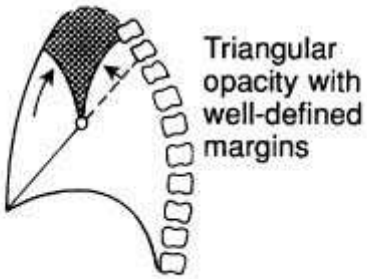


Lingular consolidation

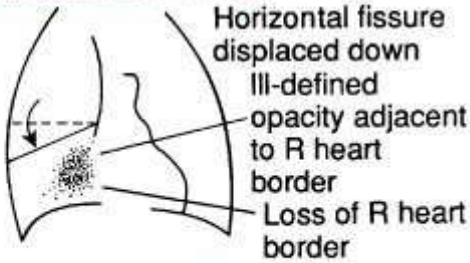


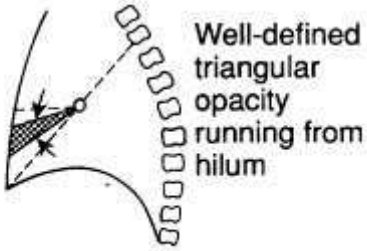
Right upper lobe collapse



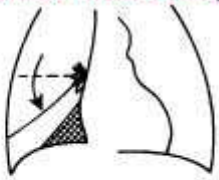


Right middle lobe collapse





Right lower-lobe collapse



Well-defined opacity adjacent to R heart border (R heart border still visible)