Canadian Family Medicine Clinical Card

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Chest X-Ray Interpretation

Community CXR Indications:
- Symptomatic pts with cardiac or respiratory symptoms
- Following up known pulmonary diseases
- Evaluating malignancies (staging, determining extent of spread)

1. Decide if the CXR quality is suitable for interpretation:

2. Analyze Frontal (PA/AP) CXR:

ID, Date
❑ Make sure you have the right CXR
❑ Know when the X-ray was taken, to compare sequential CXRs for the pt

Imaging technique: AP or PA?
- Assume PA unless told otherwise
- PA: clavicles usually more V-shaped
- AP: clavicles usually more horizontal
- In babies, AP view is common
- Only assess heart size on PA view *(AP projection artificially magnifies heart)*

Rotation/Centering
- CXR is centered when spinous processes are midway between clavicular ends
- If not centered, normal anatomy can be misinterpreted (i.e. tracheal shifts)

Adequate inspiration? *Count Ribs!*
- Good = 8-10 posterior ribs visible above diaphragm (Remember: ribs 1+2 overlap)
- Inadequate inspiration can be misinterpreted (i.e. as interstitial lung disease)

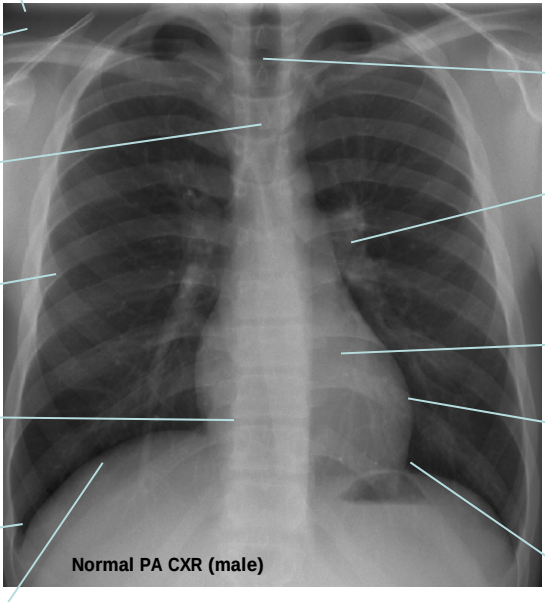
Adequate exposure?
- Exposure adequate when intervertebral discs can be just barely seen through the cardiac shadow *(can adjust digitally)*
- Under-exposure creates abnormal whiteness on CXR; over-exposure (x-ray darkening) may hide pathologies

Costo-phrenic angles
- Blunted = pleural effusion >200-400mL
- Wide = flat diaphragm; suggests air trapping due to obstructive lung diseases

Bones *(inspect while counting ribs):* Inspect for **fractures, lesions (lucencies or densities in the bone)**, or rib notching (small grooves along the edges of the ribs, suggestive of aortic coarctation)

Symmetry: are findings similar on both left and right sides?

Pleura: Assess for any pleural lines (suggestive of pneumothorax), masses, thickening, or calcification



Normal PA CXR (male)

Hemi-Diaphragms (Right and Left)
- If flat: COPD, asthma exacerbation, foreign body
- **Air under R hemidiaphragm: perforated viscous**
- Blurred edge of diaphragm: lower lobe airspace disease
- Hemi-diaphragm height: normally R > L (liver beneath); if one side higher: atelectasis

Lung fields – Assess:
❑ Degree of whiteness
❑ Equivalency between right and left sides
❑ Opacifications/Infiltrates
❑ Presence of Kerley A/B lines
❑ Lung apices (above clavicles)
❑ Vasculature (size, position, and whether vascular markings run to the lung periphery)

If infiltrates present, note pattern:
- Lobar, cloud-like densities with air-bronchograms: alveolar/air-space disease (aka consolidation); suggests pus (i.e. pneumonia), blood, water, cells, or protein within alveoli
- Net-like, reticular: suggests interstitial lung diseases (upper-lobe predominant: inhalational lung injuries; lower-lobe predominant: aspiration, asbestosis, sarcoidosis, etc)

Trachea:
- Find air column, check for tracheal deviation (**Tension pneumothorax** or pleural effusion)
- If a patient is intubated, the endotracheal tube tip should ideally be 4cm above the carina

Hilum:
- Contains 1) pulmonary arteries/veins, 2) main-stem bronchi, 3) lymph nodes
- Enlarged? (if hilum contour is straight or convex instead of concave, hilum is enlarged)
- Hilum Shifted? Asymmetrical?
- **Unilateral hilar enlargement: 95% malignant**

Heart:
- Size (normal cardiothoracic ratio <0.5 on PA film), shape, and location within mediastinum

Cardiac Shadows (Right and Left):
- R cardiac shadow = R atrium
- L cardiac shadow (top to bottom) = aortic arch, L pulmonary artery, L ventricle
- Assess contour, shape, size, and location
- White blurring of any cardiac border suggests airspace disease of upper or middle lung lobes

Cardio-phrenic angles
- Blunted = tumor masses (**lymphoma**, other mediastinal tumors), pericardial fat, pericardial cysts, cardiophrenic space varices, diaphragmatic hernia

Key References: Raoof S *et al*. Interpretation of plain chest roentgenogram. *Chest*. 2012 Feb; 141(2):545-58. Pineda V *et al*. Lesions of the Cardiophrenic Space: Findings at Cross-sectional Imaging. *RadioGraphics*. 2007 Jan; 27:19-32.

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