Blind Spots on Chest Radiography and CT
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Purpose
- To review common locations of missed abnormalities on chest radiography and chest CT
- To develop an effective search pattern and comprehensive check-list to help avoid perceptual error in image interpretation

Teaching Points
- Look closely at tracheobronchial tree for endotracheal or endobronchial lesions
- Right paratracheal stripe should be smooth & <4mm in width

Teaching Points
- Be familiar with the normal mediastinal contour
- Check all mediastinal stripes and lines

Teaching Points
- Greatest number of missed lung cancers in upper lung zone
  - Lung cancers more common in upper lobes
  - Overlapping shadows from clavicles, ribs, and vascular structures obscure nodules
  - Check for symmetry

Teaching Points
- Hilum is abnormal if
  - Lobulated contour
  - Loss of concave hilar angle
  - Hilar convergence sign: Pulmonary vessels should converge into lateral aspect of enlarge hilum if due to vascular dilatation
<table>
<thead>
<tr>
<th>Teaching Points</th>
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<tbody>
<tr>
<td>➢ Infra-hilar window on lateral view: relative clear space below left mainstem bronchus</td>
<td>➢ Retrocardiac region should be clear except for traversing vessels</td>
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<tr>
<td>➢ Opacity indicates hilar or subcarinal lymphadenopathy</td>
<td>➢ Vessels taper distally</td>
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<td>➢ Vessels are symmetrical bilaterally</td>
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<td>➢ Margin of descending aorta should be smooth</td>
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<tr>
<td>➢ Retrocardiac space clear on lateral view</td>
<td>➢ Evaluate entire thoracic skeleton for</td>
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<td>➢ Spine sign:</td>
<td>➢ Alignment</td>
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<td>➢ Interruption in the progressive increase in lucency of the vertebral bodies from superior to inferior</td>
<td>➢ Cortical irregularity</td>
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<td>➢ Signals abnormal opacities in either of the lower lobes</td>
<td>➢ Lytic/sclerotic lesions</td>
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<td>➢ Expansion</td>
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<td>➢ Also check for soft tissue asymmetry</td>
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<th>Teaching Points</th>
<th>Beware of Satisfaction of Search</th>
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<td>➢ Not uncommon to only have frontal view</td>
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<td>➢ Posterior sulci extend to ~L1 level</td>
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<td>➢ Must window appropriately to see lung bases and abdominal pathology</td>
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</tbody>
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### Blind Spots on Frontal CXR
- Central Airways
- Lung Apices
- Mediastinum
- Hila
- Retrocardiac Region
- Inferior Lung Bases
- Thoracic Skeleton
- Upper Abdomen

### Blind Spots on Lateral CXR
- Central Airways
- Infra-hilar Region
- Sternum
- Vertebral Bodies
- Retrocardiac Region

### Teaching Points
- Pathology can hide in anatomically busy supraclavicular region.
- Artifacts due to contrast in the subclavian vein.
- Nodes >5-7 mm in short-axis are considered enlarged.
- Asymmetry & loss of fat planes helpful in detecting adenopathy.

### Teaching Points
- Small nodules along the bronchovascular bundles difficult to perceive.
- Being familiar with the normal bronchovascular anatomy can help avoid missing lesions.
- Look at Maximum Intensity Projection (MIP) images.

### Teaching Points
- Enhancing lesion in breast should prompt further evaluation with mammography.
- Check axillary region for lymph nodes.
- Quick look at the chest wall for symmetry and subcutaneous lesions, particular in patients with melanoma.

### Teaching Points
- Collapsed lung should be homogeneous in density.
- Heterogeneous enhancement may signal underlying nodules/masses or consolidation.
- Tumor may also produce a bulge in contour of collapsed lung.
- Check pleural surface for nodules.
Teaching Points

- Cardiac motion artifact limits evaluation of the cardiac structures on chest CT
- Incidental cardiac findings are common. Per Leyva, et al. 78% of PE CT studies had at least one incidental cardiac finding such as RV thrombus in 1%.
- Cardiac structures should be interrogated on every chest CT to exclude visible coronary artery disease, thrombus, myocardial infarction, fatty infiltration or aneurysm.

Teaching Points

- Primary malignancies of the trachea include squamous cell cancer and adenoid cystic carcinomas
- Metastatic disease to the airway also occur
- Tracheal or bronchial lesions may appear as nodular or smooth wall thickening, sessile or pedunculated luminal defects.

Teaching Points

- On non-contrast CTs, thrombus or mass can be hyper- or hypoattenuating
- Check all vessels for filling defects on contrast-enhanced CT
  - Incidental pulmonary emboli
  - Venous thrombus – internal jugular, subclavian, SVC, IVC
  - Tumor thrombus or tumor emboli

Teaching Points

- Check all lymph node stations
  - Internal mammary
  - Paracardiac/Diaphragmatic
  - Para-aortic/retrocrural
  - Paraesophageal

Teaching Points

- Contrast enhancement not optimal for evaluation of abdominal lesions
- Abdominal abnormalities can cause symptoms such as chest discomfort or shoulder pain
- Remember to check each abdominal organs carefully

Blind Spots on CT

- Cardiac abnormality: masses, thrombi, infarct
- Vessels: thrombi, emboli, tumor, dissection
- Airways: intra-luminal lesions or wall thickening
- Collapsed lung: underlying lesion or consolidation
- Nodal stations: supraclavicular, internal mammary, cardiophrenic angle, retrocrural, paraesophageal and axillary
- Pleura: nodularity or thickening
- Upper abdomen: masses or adenopathy
- Chest wall: lytic/sclerotic lesions, fractures, muscular/subcutaneous lesions
Summary

- Blind spots are routinely encountered on chest radiography and CT where we are at risk of making perceptual errors.
- Targeted review of these blind spots can help us avoid missing important findings.

References


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