Signs in Cardiopulmonary Imaging

Luftsichel Sign

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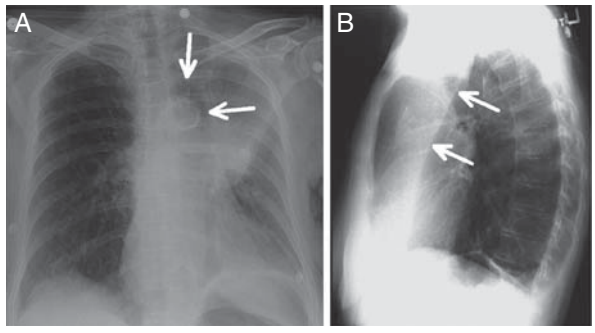

Luftsichel Sign

Para-aortic hyperlucency representing a hyperinflated superior segment of the left lower lobe positioned between the mediastinum and the collapsed left upper lobe

Differential diagnosis

- Right lung herniation
- Medial pneumothorax
- Pneumomediastinum

FIGURE 1. A, Frontal chest radiograph demonstrates a para-aortic hyperlucency (arrows) representing a hyperinflated superior segment of the left lower lobe positioned between the mediastinum and the collapsed left upper lobe, the luftsichel sign. B, Lateral chest radiograph demonstrates a retrosternal opacity (arrows), which constitutes the collapsed left upper lobe with compensatory hyperinflation of the left lower lobe seen posteriorly to it.

Appearance: The luftsichel sign is seen on frontal chest radiographs and can be identified in the presence of left upper lobe collapse.[1] The sign is a sharply demarcated paraaortic hyperlucency that can extend from the left apex to the left superior pulmonary vein with the outline representing the medial, and occasionally upper, aspect of the densely collapsed left upper lobe.

Explanation: The word *luftsichel* is German for "air crescent." This "air crescent" represents the hyperexpanded superior segment of the left lower lobe interposed between the aortic arch and collapsed left upper lobe. With progressive left upper lobe collapse, the major fissure moves anteromedially until the atelectatic left upper lobe abuts the left heart border. The superior segment of the left lower lobe will compensate by hyperinflation and extension superiorly towards the apex. When the hyperinflated superior segment of the left lower lobe is positioned between the mediastinum and the collapsed left upper lobe, the luftsichel sign can be seen. The appearance of the luftsichel sign is dependent on the degree of left upper lobe collapse and may not be present if the collapsed left upper lobe abuts the aortic arch causing loss of its silhouette.

Discussion: Collapse of the right and left upper lobes differ in radiographic appearance due to their distinct anatomy. The right lung typically has three lobes divided by major and minor fissures. The left lung is typically divided by the major fissure into the upper and lower lobes. The left upper lobe is anchored by the left pulmonary artery, left superior pulmonary vein, and left upper lobe bronchus. With progressive left upper lobe volume loss, the major fissure moves anteriorly, superiorly, and medially until the collapsed left upper lobe is positioned against the anterior chest wall and the left heart border. The vertically oriented collapsed left upper lobe appears as a hazy or veil-like opacity that fades superiorly, laterally, and inferiorly.[2] The cardiomediastinal contour may be silhouetted by the contiguous aspects of the collapsed left upper lobe. Direct signs of volume loss can also be seen including elevation of the left hilum, elevation of the left main stem bronchus with a near horizontal course, elevation of the left hemidiaphragm, crowding of the left sided ribs, leftward mediastinal shift, posterior and leftward rotation of the heart, and vascular crowding. On lateral radiographs, increased retrosternal opacity can be seen with a hyperlucent expanded left lower lobe. Identification of left upper lobe collapse should raise consideration of an underlying endobronchial neoplasm in the absence of a clear explanation.

The left lower lobe hyperinflates to compensate for the volume loss of the left upper lobe. When the hyperinflated superior segment is positioned between the mediastinum and the collapsed left upper lobe, the luftsichel sign can be seen. Luftsichel sign is a helpful sign of the diagnosis of left upper lobe collapse but its absence does not exclude this diagnosis.

Luftsichel sign should not be mistaken for right lung herniation which will demonstrate leftward displacement of the anterior junction line. Right lung herniation occurs posterior to the manubrium and body of the sternum resulting in a parasternal lucency compared to a parasternal opacity in left upper lobe collapse. Luftsichel sign should not be mistaken for medial pneumothorax or pneumomediastinum given other evidence of left upper lobe collapse.

REFERENCES

1. Webber M, Davies P. The Luftsichel: an old sign in upper lobe collapse. *Clin Radiol*. 1981;32:271–275.
2. Proto AV, Tocino I. Radiographic manifestations of lobar collapse. *Semin Roentgenol*. 1980;15:117–173.

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