



2025

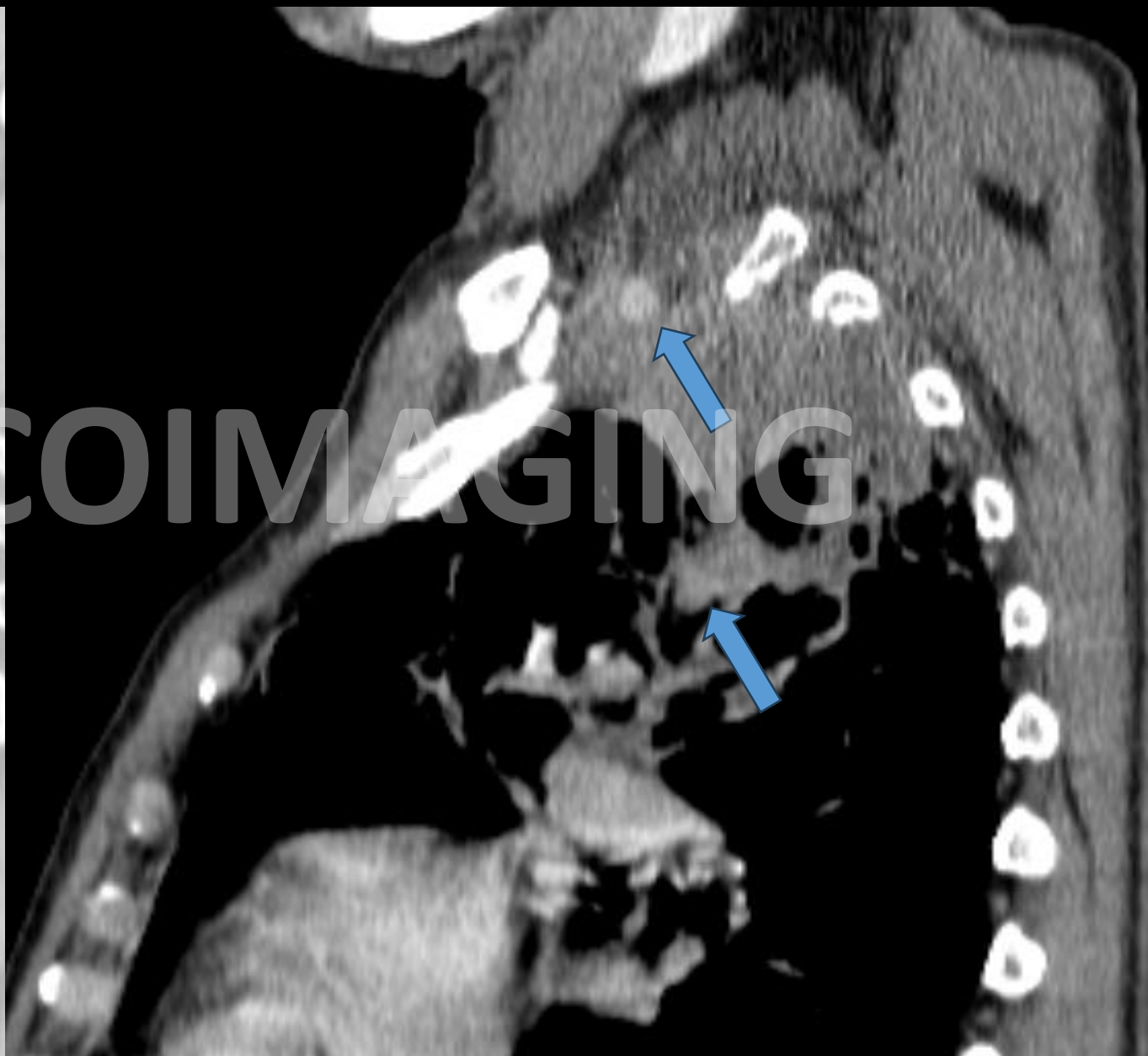
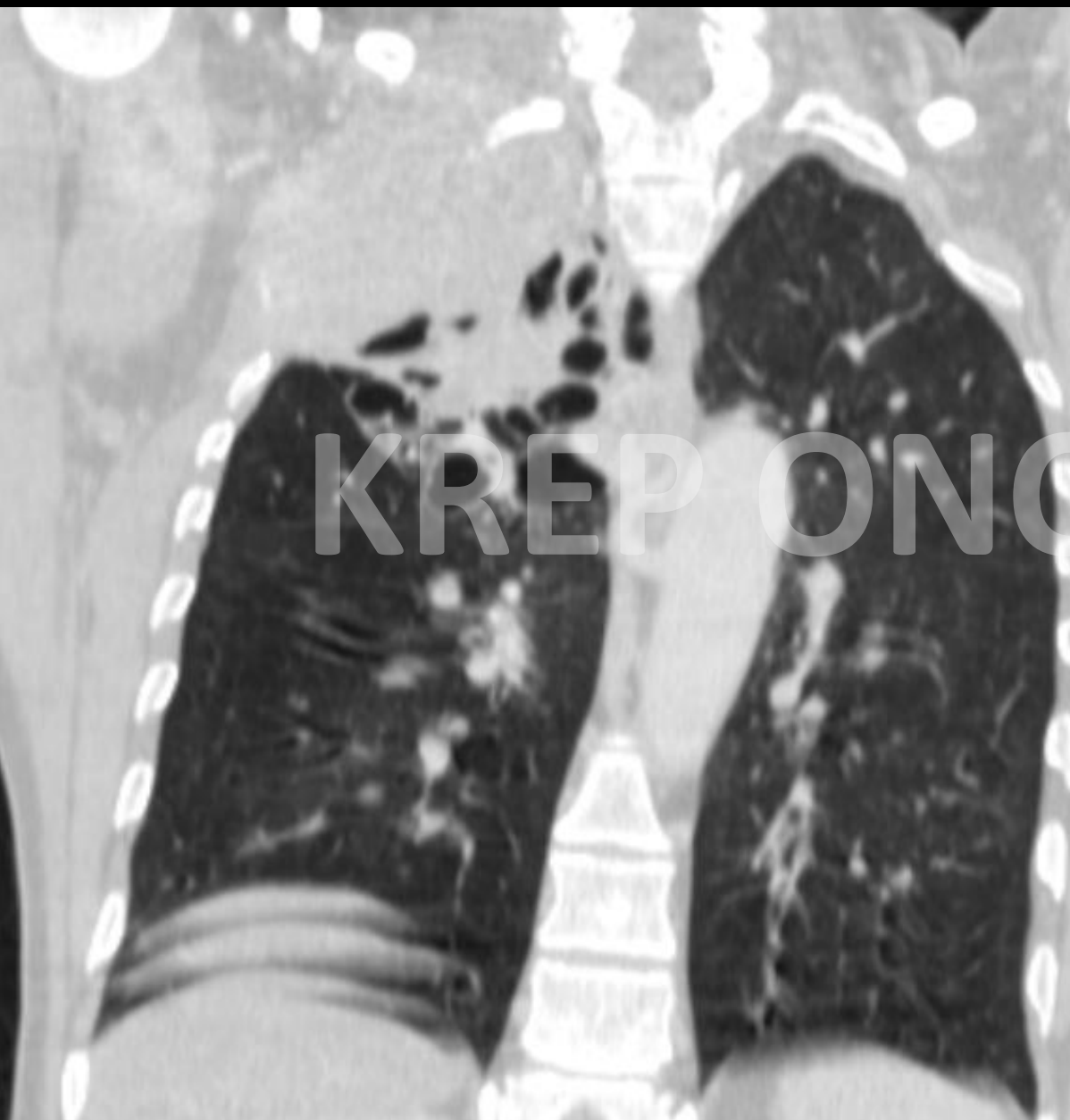
KARNATAKA RADIOLOGY EDUCATION PROGRAM

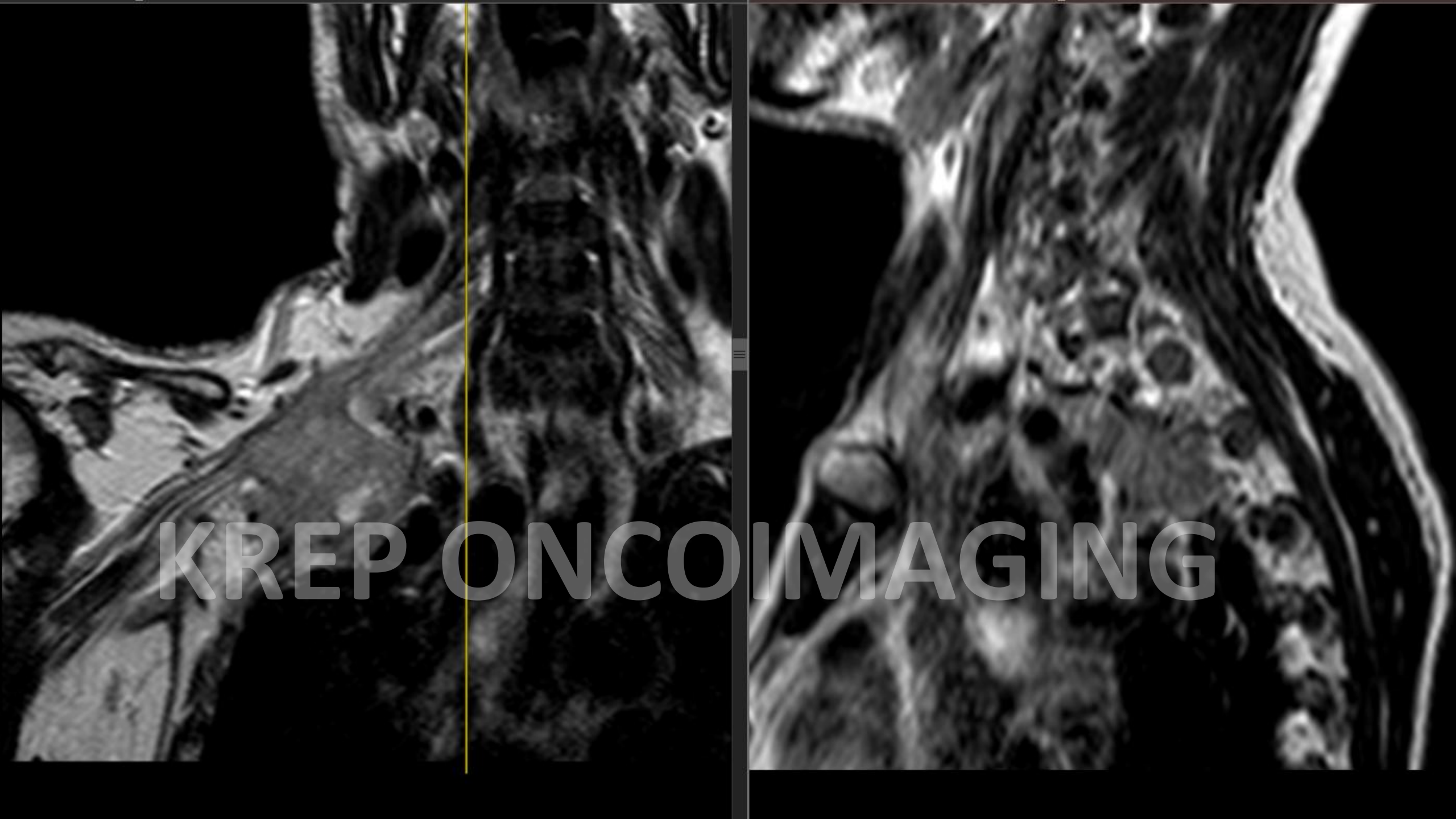
An anteroposterior (AP) chest X-ray of a human torso. The image shows the bony structures of the rib cage, spine, and shoulders. The lung fields are visible as darker areas on either side of the central mediastinum. The diaphragm is seen at the bottom of the thoracic cavity. The text 'KREP ONCOIMAGING' is overlaid in the center of the image.

KREP ONCOIMAGING

- Ill defined opacity in right apex with incomplete visualization of first and second ribs suggesting erosions.
- Few ring like opacities in right upper zone suggesting bronchiectasis.







KREP ONCOIMAGING

- Large heterogeneously enhancing mass in the right lung apex posteriorly; measuring about 6 x 7.3 x 4.5 cm with rib expansion and erosions.
- Enhancing nodular endobronchial component is noted in the upper lobe posterior segmental bronchus.
- Extrathoracic extension is noted in the right infraclavicular region.
- The subclavian artery is encased (180-270 degree arc of contact).
- Definite invasion into brachial plexus at level of divisions and trunks, proximal extension into roots.
- The subjacent parenchyma shows bronchiectasis.
- T staging – T4.

1. Pathology & Origin:

- A **non-small cell lung carcinoma (NSCLC)** subtype derived from **bronchial epithelium**, showing **keratinization** or **intercellular bridges** histologically.
 - Strongly associated with **tobacco smoking**; **central (hilar) location** is characteristic.
 - Arises from **bronchial squamous metaplasia** → **dysplasia** → **carcinoma in situ** → **invasive carcinoma** sequence.
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2. Epidemiology & Clinical Context:

- Typically affects **older male smokers** (6th–7th decade).
 - Symptoms: **Cough**, **hemoptysis**, **wheeze**, **post-obstructive pneumonia**, or **collapse**.
 - May produce **paraneoplastic hypercalcemia** due to ectopic PTHrP secretion.
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3. CT Morphologic Features:

- Usually a **centrally located, endobronchial or hilar mass**; may cause **bronchial obstruction** → distal **atelectasis**, **collapse**, or **mucoid impaction**.
- **Spiculated** or **lobulated solid mass**, often with **air bronchogram**, **cavitation**, or **necrosis** (seen in ~20–30%).
- **Peripheral SCC variants** may mimic adenocarcinoma but often show **pleural contact** and **cavitation**.
- **Calcification** can occur (granular, central, or eccentric).

4. MRI Features:

- **T1:** Iso- to slightly hypointense; **T2:** variable signal (often heterogeneous if necrotic).
 - **Post-contrast:** Irregular, heterogeneous enhancement; helps delineate **mediastinal invasion** and **chest wall encroachment**.
 - MRI is particularly valuable for assessing **superior sulcus (Pancoast) tumors** — for brachial plexus and subclavian vessel involvement.
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5. PET/CT Findings:

- Typically shows **intense FDG uptake (SUV > 10)** due to high metabolic activity.
 - Used for **staging, radiotherapy planning, and detecting occult metastases**.
 - PET helps differentiate **active tumor from post-obstructive collapse** and guides **biopsy to viable regions**.
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6. Patterns of Spread:

- **Local invasion:** Commonly involves **bronchi, mediastinum, pericardium, or chest wall**.
- **Lymphatic spread:** Hilar → mediastinal → supraclavicular nodes.
- **Hematogenous metastases:** To **liver, adrenal, bone, and brain** (less frequent than adenocarcinoma).
- **Cavitation** and central necrosis increase risk of **bronchial fistula or infection** post-therapy.

7. Differential Diagnosis (Imaging):

- **Adenocarcinoma:** Usually peripheral, spiculated, non-cavitating, in non-smokers.
 - **Carcinoid tumor:** Central but smaller, hyperenhancing, less necrotic.
 - **Metastasis:** Multiple lesions; check primary elsewhere.
 - **Tuberculosis / fungal ball:** May mimic cavitating SCC, but show **thin, smooth walls** and **air-crescent sign**.
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8. Oncoradiologic Importance:

- Imaging defines **tumor location, airway involvement, mediastinal/chest wall invasion, nodal and metastatic status (TNM)**.
- Essential for **staging and surgical planning** — distinguishes **resectable (lobectomy/pneumonectomy)** from **unresectable (T4 or N3)** disease.
- PET/CT and MRI complement CT for **accurate T and M staging**, while **bronchial origin and cavitation** remain hallmark CT clues.
- Surveillance imaging post-therapy must differentiate **post-radiation fibrosis (linear, retractile, low SUV)** from **recurrent tumor (mass-like, high SUV)**.

Contributors

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