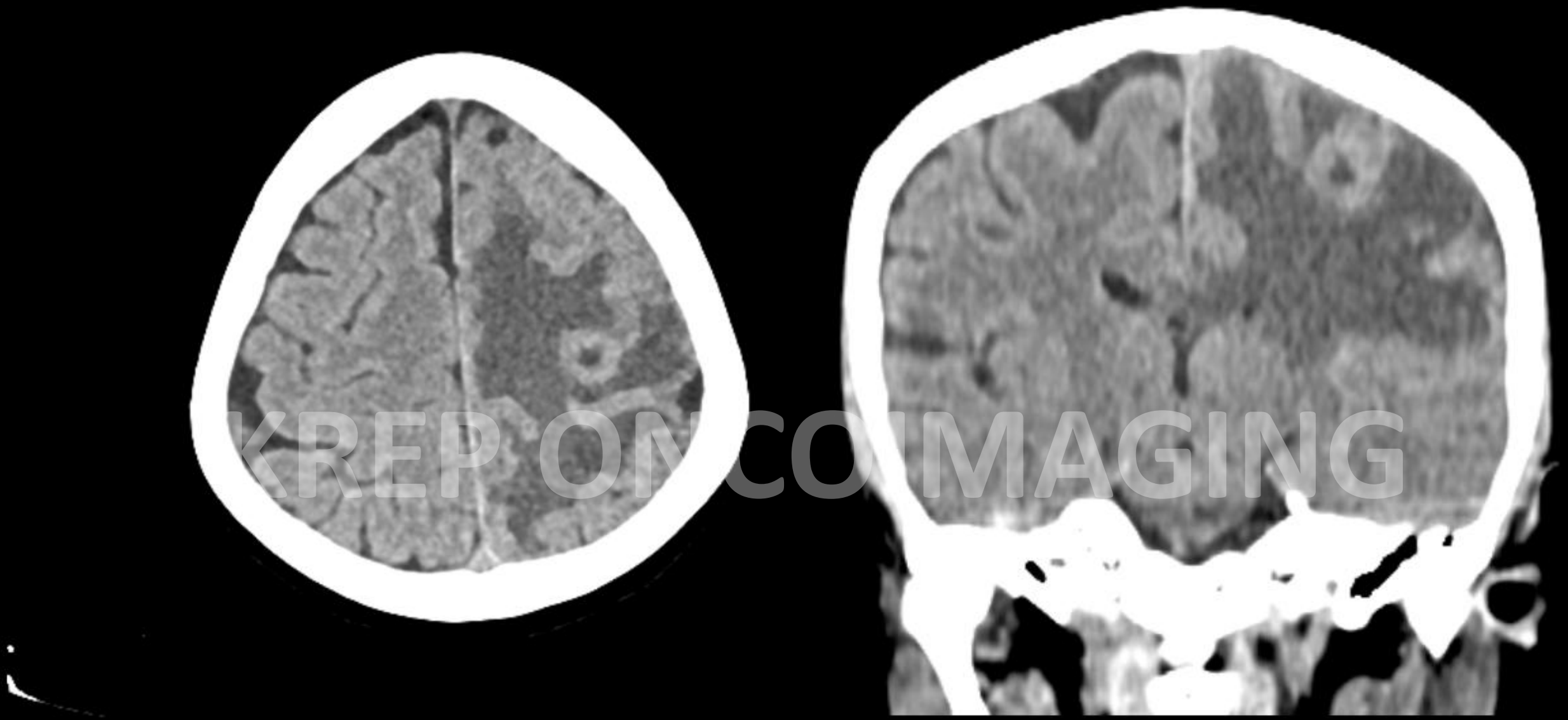
2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

46Y F with history of seizures

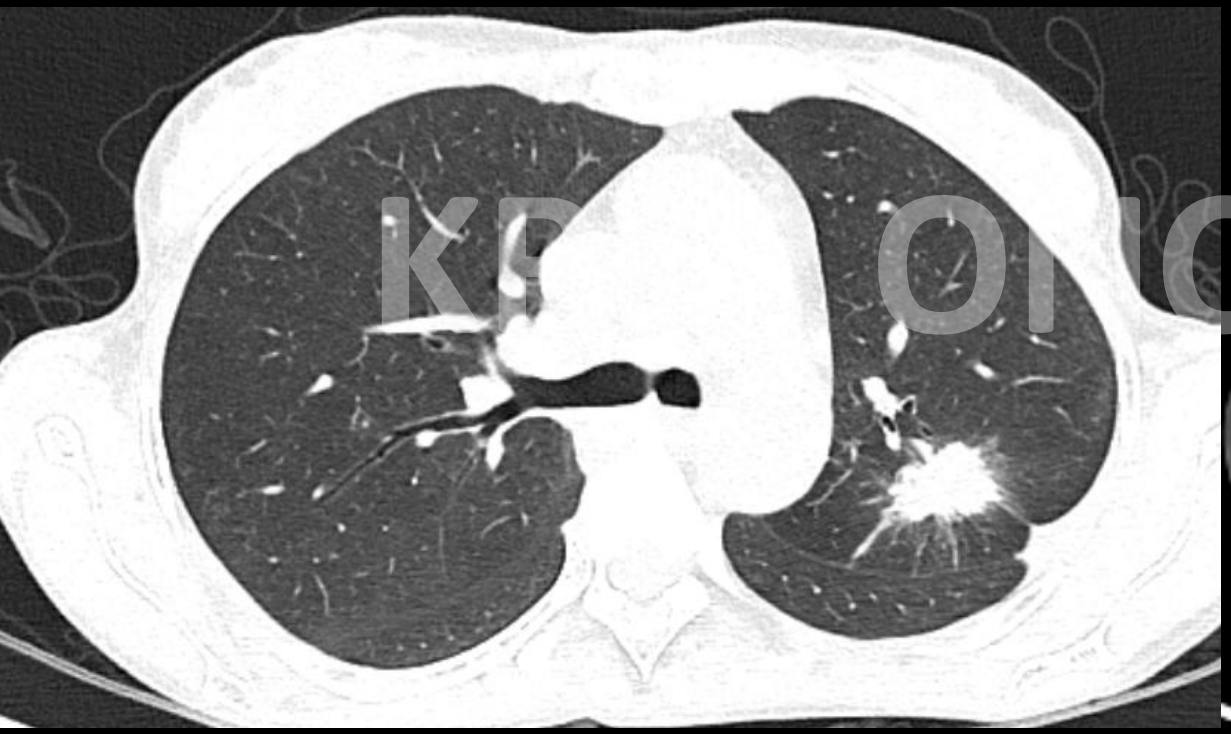


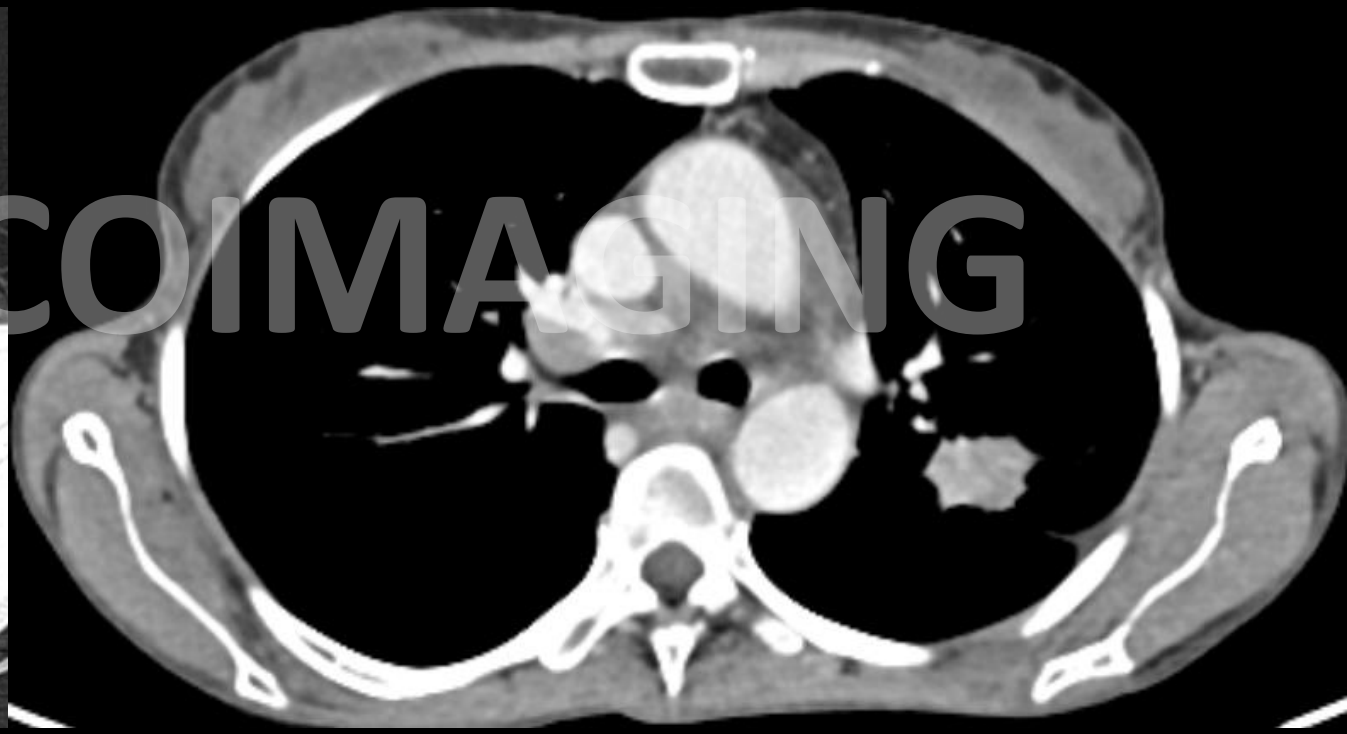
Small isodense ring like focus with central cavitation in left frontal region with disproportionate marked perifocal edema

– of concern for metastasis. D/D less likely infectious etiology.

Patient was advised further evaluation.

- On close inspection of topogram a fissural thickening is evident. (Retrospectively a nodule may be seen in left upper lobe)





- A spiculated nodule is noted in left upper lobe showing post contrast enhancement with interstitial bands reaching the pleura with puckering of visceral pleura. No significant enhancement or thickening of visceral pleura.
- The lesion measures 2.9 cm in largest dimension – T1c.


KREP ONCOIMAGING

- Heterogeneously enhancing nodes – ipsilateral hilar, subcarinal, **contralateral** hilar, **right lower and upper** paratracheal – N3


KREP ONCOIMAGING

- Sclerotic lesion in left iliac bone – M1b.

Biopsy showed – Adenocarcinoma.

1. **Pathology & Classification:**
   - **Adenocarcinoma** is the **most common primary lung cancer (~40–50%)**, arising from **type II pneumocytes or Clara cells.**
   - WHO classification recognizes a spectrum:
     Atypical Adenomatous Hyperplasia → Adenocarcinoma in situ (AIS) → Minimally Invasive Adenocarcinoma (MIA) → Invasive Adenocarcinoma (IA).
   - **Molecular subtypes:** EGFR, ALK, KRAS, ROS1, BRAF mutations — crucial for targeted therapy.

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2. **Epidemiology:**
   - **Most common in non-smokers, women, and younger patients**, especially with EGFR mutations.
   - Commonly **peripheral in location**, often involving **lung periphery or subpleural regions.**

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3. **CT Morphologic Spectrum:**
   - **AIS/MIA: Ground-glass nodules** (GGNs) or part-solid lesions with smooth margins; usually <3 cm; no invasion, no lymphadenopathy.
   - **Invasive Adenocarcinoma: Solid or part-solid mass**, spiculated margins, lobulation, **air bronchogram**, or **pleural retraction.**
   - **Lepidic growth pattern** (tumor cells lining alveolar septa) may produce **"pneumonic-type" consolidation** mimicking infection.

4. **Key Imaging Signs on HRCT:**
    - **Spiculated or irregular margins** ("corona radiata" sign).
    - **Pleural tags** or **retraction**.
    - **Air bronchogram within mass** (common in acinar/lepidic types).
    - **Ground-glass halo** around solid focus (invasive focus in GGN).
    - **Bubble-like lucencies** or "pseudo-cavitation" due to patent bronchioles within tumor.

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5. **MRI and PET/CT Features:**
    - **MRI:** Limited role but useful for **chest wall, mediastinal, and vertebral invasion**.
    - **FDG-PET/CT:** Strong FDG uptake in invasive lesions (SUV > 2.5); **low uptake in AIS/MIA**.
    - PET defines **nodal and distant metastases** (adrenal, bone, brain) and aids in **staging and therapy monitoring**.

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6. **Patterns of Spread:**
    - **Local:** Pleural and chest wall invasion, fissural transgression.
    - **Lymphatic:** Hilar → mediastinal → supraclavicular nodes.
    - **Hematogenous:** Brain, bone, liver, adrenal metastases.
    - **Aerogenous spread** (in lepidic subtype): "Multifocal ground-glass" lesions in the same or opposite lung.

7. **Imaging–Pathology Correlation:**
    - **Pure GGN (AIS):** Non-invasive, excellent prognosis (>95% 5-year survival).
    - **Part-solid (MIA):** Limited invasive component (<5 mm).
    - **Solid, spiculated (IA):** Invasive, nodal disease likely.
    - Size and **solid component proportion** on CT are the strongest prognostic indicators.

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8. **Oncoradiologic Relevance:**
    - Imaging guides **TNM staging (T-size, pleural invasion, N nodes, M metastases)** and **molecular testing triage (biopsy target selection)**.
    - CT and PET findings drive **surgical vs ablative vs systemic therapy** decisions.
    - Follow-up CT is crucial for **indeterminate GGNs** — persistent or enlarging solid component indicates progression.
    - Structured reporting should describe **location, morphology (GGO vs solid), margins, solid component %, pleural relation, and PET avidity**.

Contributors

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