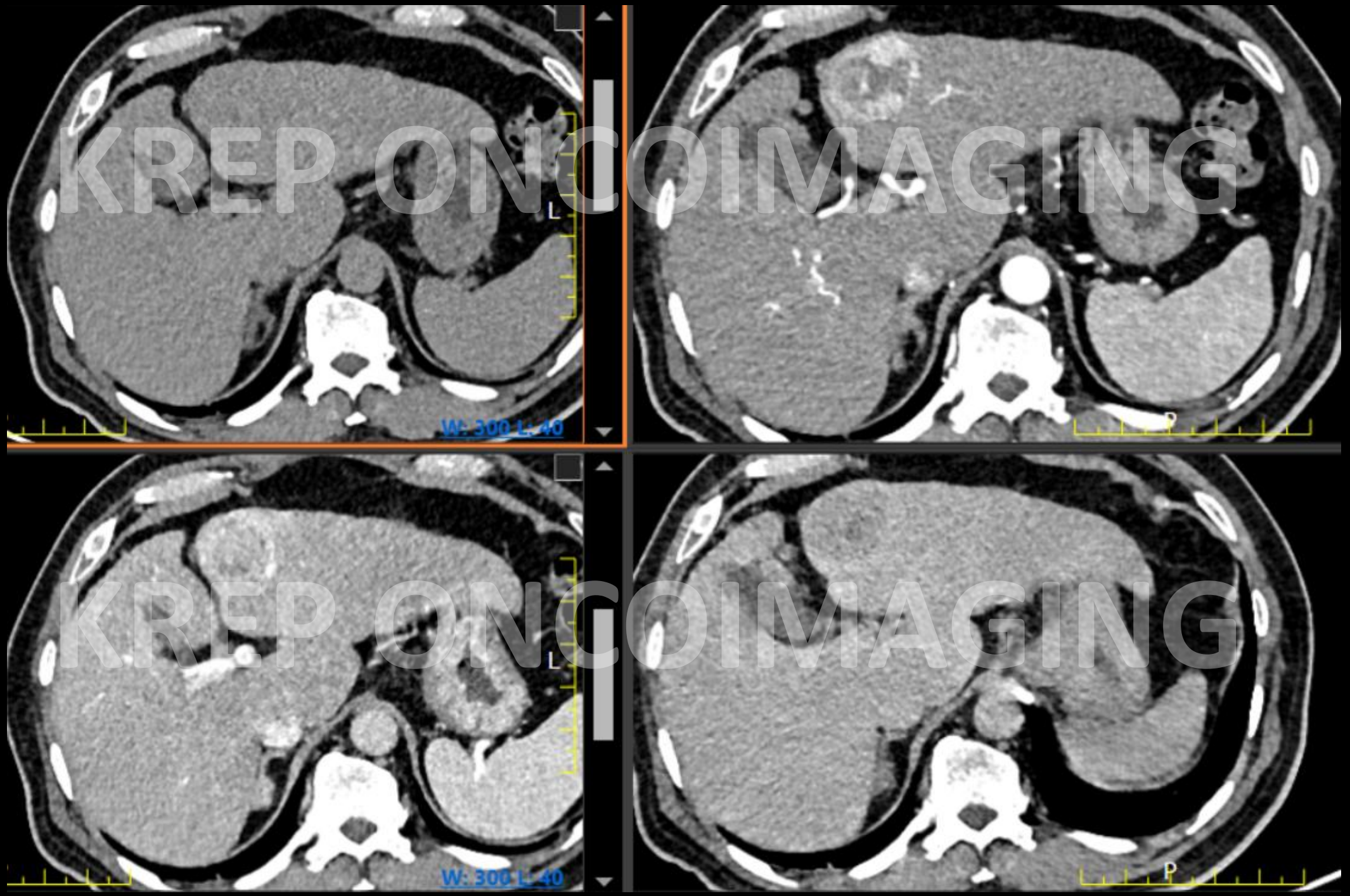
2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM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- Known HBV related cirrhosis
- Observation in segment 3 measuring 4.1 cm in longest dimension shows non rim APHE+Washout – LIRADS 5.
- Background liver shows cirrhosis with volume redistribution, mild left and caudate lobe hypertrophy.

USG guided Bx

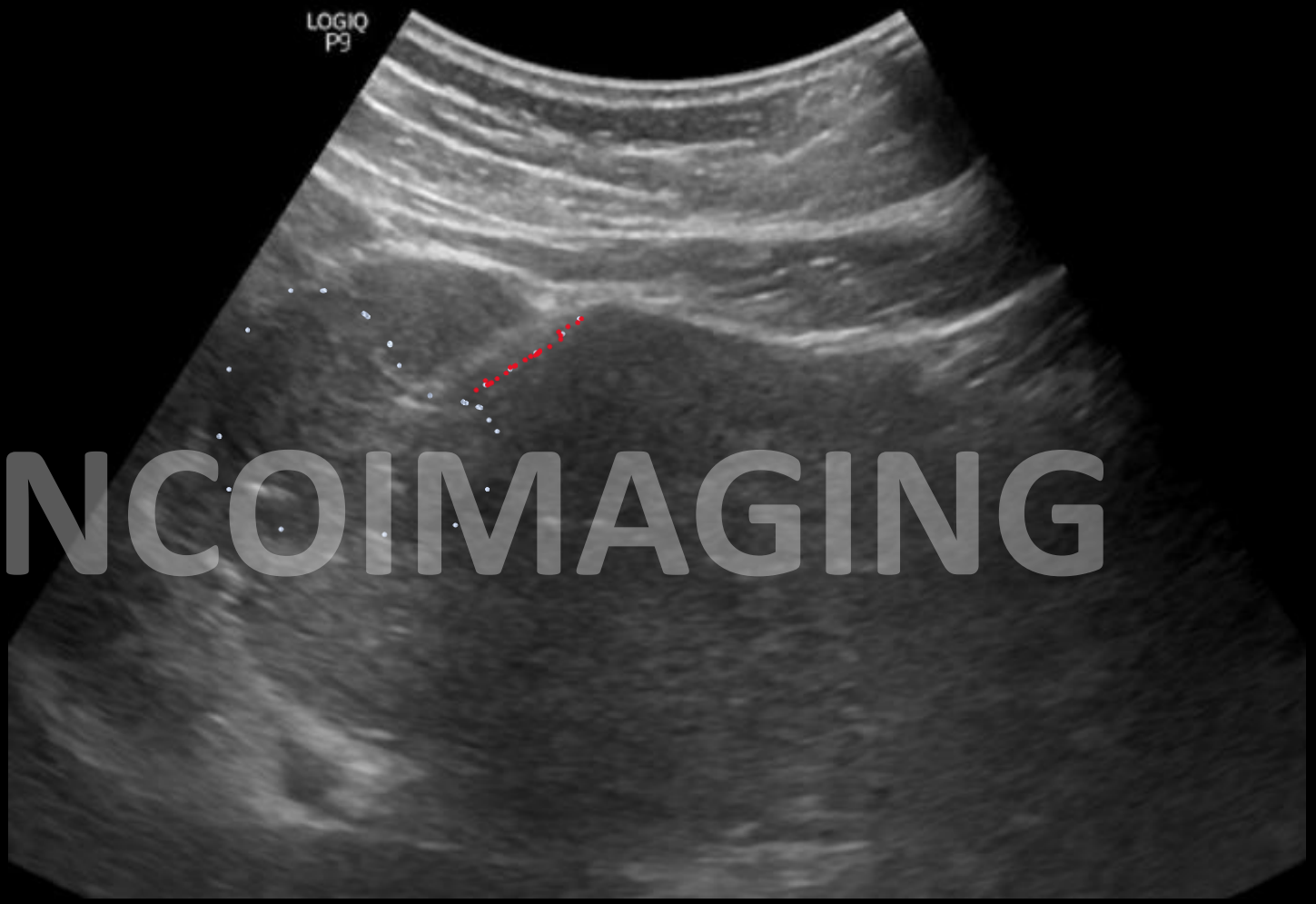
USG showed an isoechoic to mildly hyperechoic lesion.

Notice that the needle traverses at least 1.5 cm normal parenchyma.

Direct puncture into a subcapsular lesion predisposes lesion rupture, bleeding and tumor seeding.

Post biopsy, gelfoam embolization was performed.

HPE – HCC.

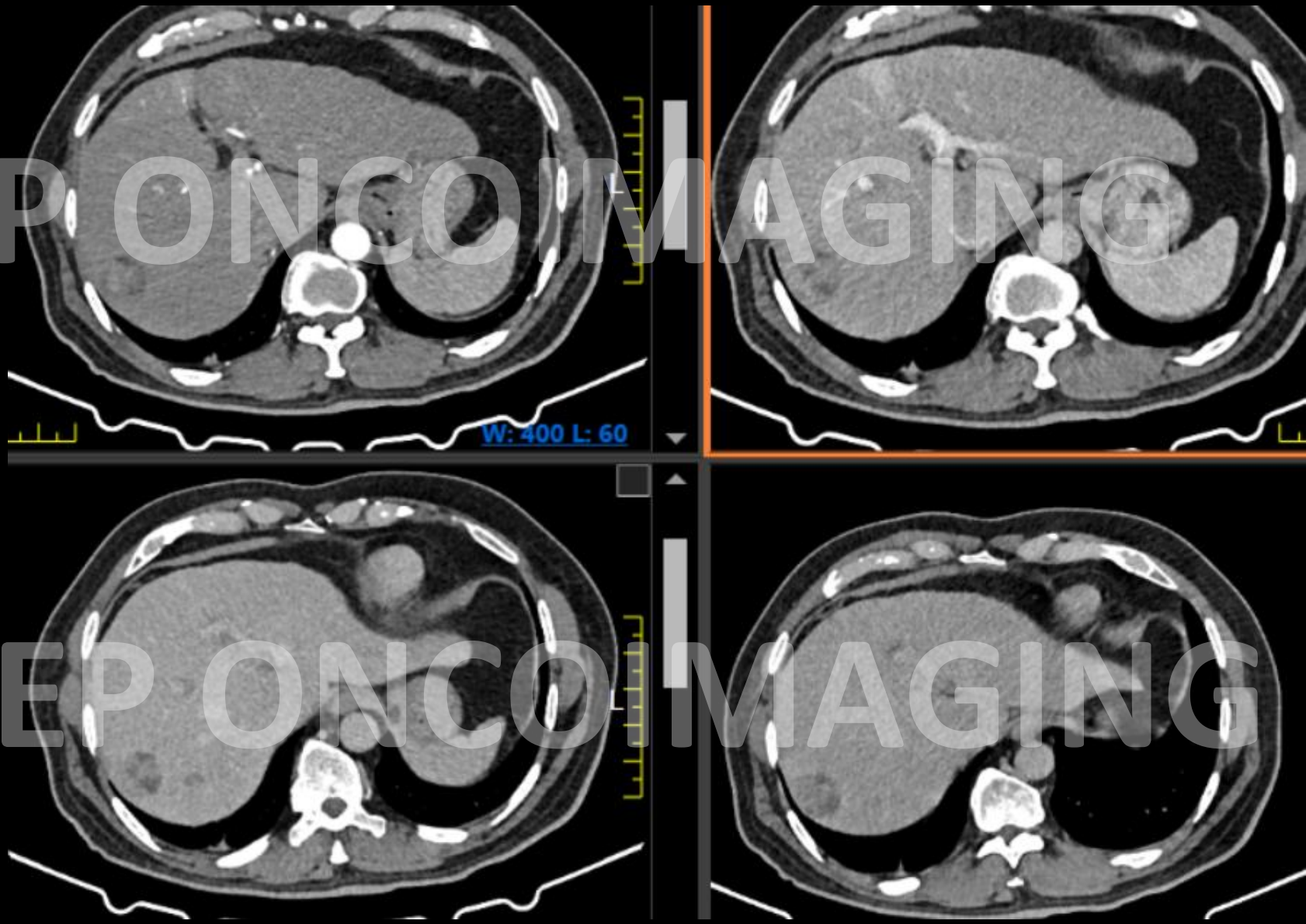


Another observation in segment 7 measuring 2.8 cm (elsewhere opined as possibly benign/ hemangioma)

Note the heterogeneous nodular appearance with fat attenuating areas. Subtle APHE and washout (equivocal / low interobserver variation) - This is suggestive of Multicentric origin over intrahepatic metastasis (IM).

Adjacent to it a smaller nodule (0.9 cm) is visible - this could be IM of segment 7 lesion.

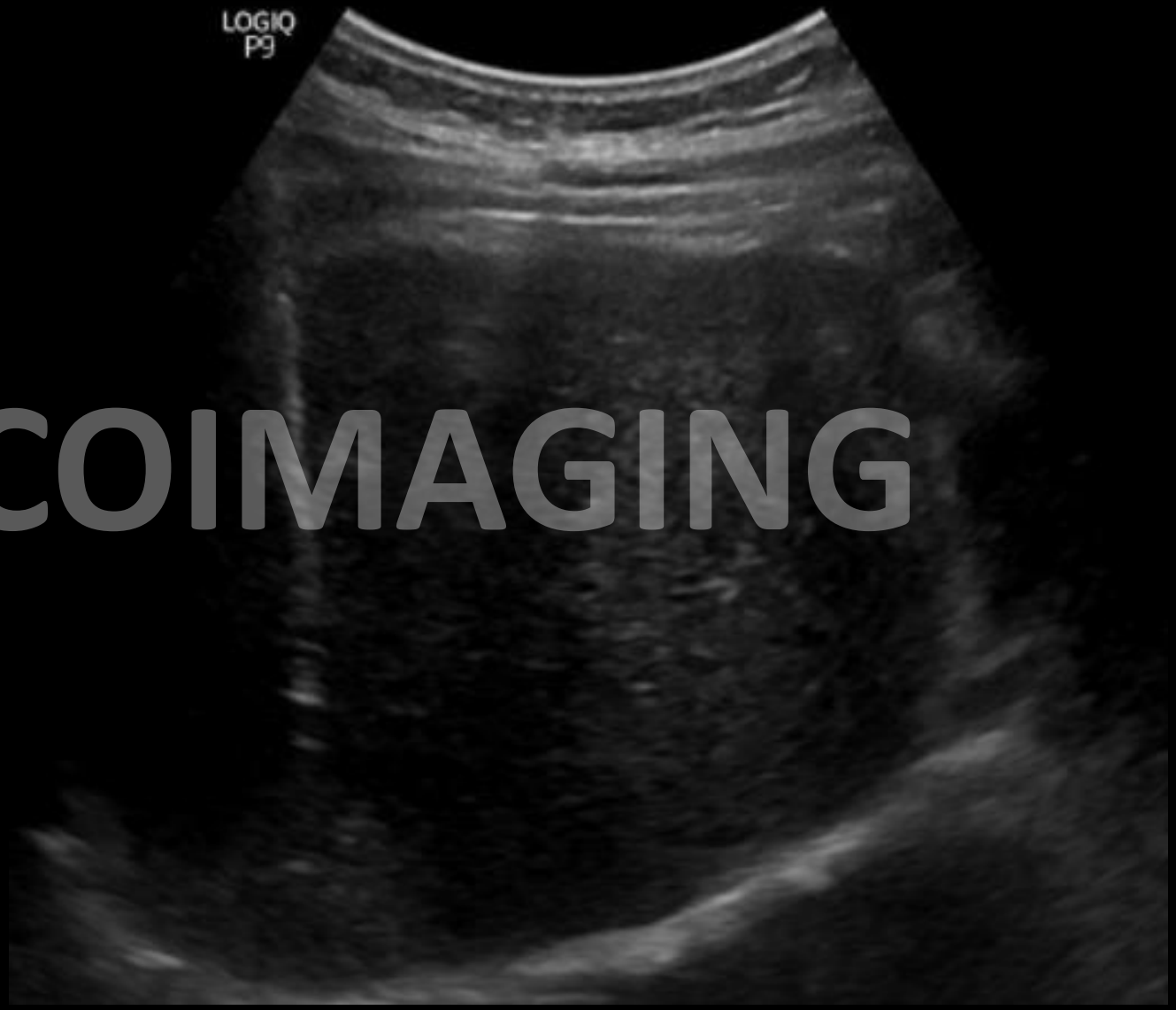
Patient was referred for core biopsy



USG guided Bx

Under USG guidance the subcapsular lesion was approached and biopsied, the track was embolized. The procedure was uneventful

HPE – Moderately differentiated HCC.



- As the patient cannot undergo left or right hepatectomy – theorectically combined left lateral (2,3) and right lateral sectionectomy(6,7) is an option but poses significant morbidity and then recurrence in residual liver means the surgery was not useful.
- A viable option is liver transplant (which is becoming increasingly popular).
- Alternative treatment options include locoregional (TACE/TARE and RFA/MWA/cryo)
- Radiation segmentectomy is another alternative.
- Monitoring can be with serial AFP and PIVKA – II levels, interval imaging (MRI with liver specific agents over triple phase CT).
- Post treatment LIRADS has separate descriptors.

1. **Clinical & Disease Context:**
    - HCC most commonly arises in the setting of **chronic liver disease / cirrhosis** (HBV, HCV, alcohol, NAFLD).
    - Surveillance imaging (US ± AFP) is recommended in at-risk populations.
2. **Key Pathophysiology:**
    - HCC develops from **dysplastic nodules → high-grade dysplasia → early HCC → overt HCC**, with progressive **arterial neovascularization** and **reduced portal venous supply**.
    - This vascular shift is the **basis of hallmark imaging patterns**.
3. **CT/MRI Hallmark Imaging Criteria (LI-RADS Major Features):**
    - **Arterial Phase Hyperenhancement (APHE)** — higher enhancement than background liver.
    - **Portal venous / delayed phase washout** — becomes **hypointense** relative to liver.
    - **Enhancing capsule** on delayed phase.
    - **Threshold growth** over time.
    - Lesions ≥10 mm with APHE + washout are **diagnostic** without biopsy.
4. **MRI Specific Characteristics:**
    - **T1**: variable; **T2**: mild–moderate hyperintensity.
    - **Restricted diffusion** common (high cellularity).
    - **Hepatobiliary phase (with Gd-EOB-DTPA)**: HCC is typically **hypointense**, helping differentiate from benign lesions (e.g., FNH is iso/hyperintense).

5. **Vascular & Invasive Behavior:**
    - **Portal vein tumor thrombus** is a critical adverse feature — appears as enhancing thrombus on arterial phase or FDG-avid on PET.
    - Satellite nodules + capsular breach indicate aggressive biology.
6. **Staging Systems & Imaging Implications:**
    - Clinical decision-making guided by **BCLC staging** (0 → D), incorporating tumor burden, liver function (Child-Pugh), and performance status.
    - Imaging determines candidacy for **resection, transplant (Milan criteria), ablation**, or **locoregional therapy**.
7. **Treatment-Relevant Imaging Roles:**
    - **Curative:** surgery, transplantation, thermal ablation (best for ≤3 cm lesions).
    - **Locoregional: TACE, TARE (Y-90)** for multifocal/unresectable disease.
    - **Systemic therapy:** immunotherapy (PD-1/PD-L1), TKIs (sorafenib/lenvatinib) for advanced disease.
    - Post-therapy assessment uses **mRECIST**, evaluating **enhancing viable tumor**, not size alone.
8. **Oncoradiologist Reporting Must Include:**
    - Number, size, and **segmental location** of lesions.
    - Presence of **APHE, washout, capsule**, and diffusion restriction.
    - **Macrovascular invasion** (especially PVTT).
    - **Extrahepatic metastases** (lung, bone, nodes).
    - Liver parenchymal reserve and background cirrhosis morphology.

Contributors

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