



AMSER Rad Path Case of the Month:

28-year-old nulliparous female with liver cirrhosis
presents for follow-up after abnormal lab results

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Patient Presentation

28-year-old G0P0 female presenting for evaluation of abnormal lab results

- **PSHx**: Fontan, serial liver biopsies
- **PMHx**: HLHS, ASD, Tricuspid insufficiency, SVT, Asthma, Protein losing enteropathy, *Liver cirrhosis*
- **Medications**: Aspirin, Cholecalciferol, Enalapril, Furosemide, Adenosine, Metoprolol, Spironolactone, Warfarin
- **Allergies**: NKDA

Pertinent Labs

Date	AFP (Normal: 0 - 8.3 ng/mL)
7/21/2005	13.6
1/8/2016	16.3
1/5/2017	36.7
4/19/2018	920.5
6/21/2018	1060.0

What Imaging Should We Order?

ACR Appropriateness Criteria¹

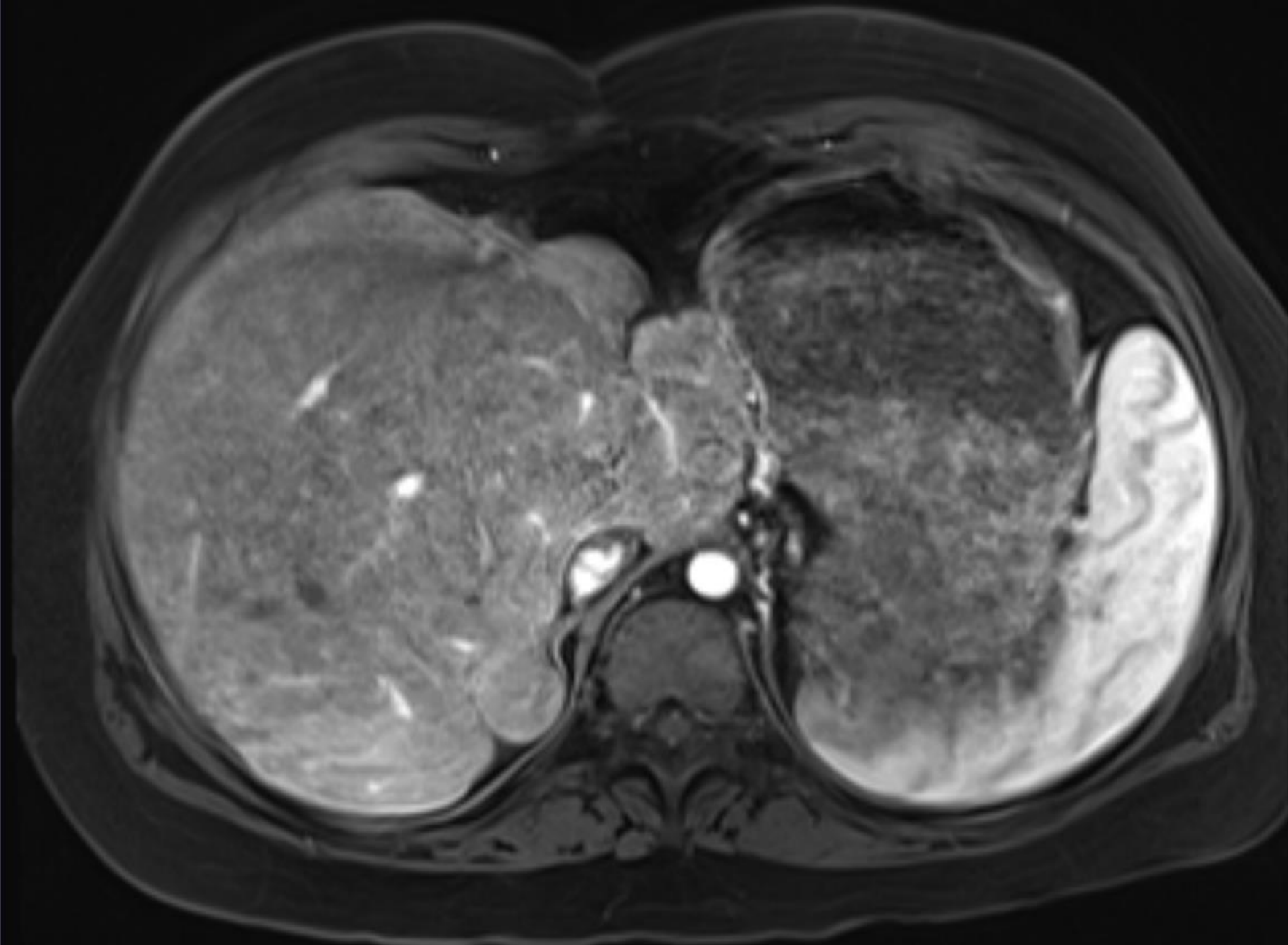
Variant 2: Chronic liver disease. Screening and surveillance for hepatocellular carcinoma (HCC). No prior diagnosis of HCC.

Procedure	Appropriateness Category	Relative Radiation Level
MRI abdomen without and with IV contrast	Usually Appropriate	0
MRI abdomen without and with hepatobiliary contrast	Usually Appropriate	0
US abdomen	Usually Appropriate	0
CT abdomen with IV contrast multiphase	Usually Appropriate	⊕⊕⊕⊕
MRI abdomen without IV contrast	May Be Appropriate	0
MR elastography abdomen	May Be Appropriate	0
US elastography ARFI abdomen	May Be Appropriate	0
CT abdomen without IV contrast	Usually Not Appropriate	⊕⊕⊕
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	⊕⊕⊕⊕
1D transient elastography abdomen	Usually Not Appropriate	0
CT abdomen without and with IV contrast	Usually Not Appropriate	⊕⊕⊕⊕

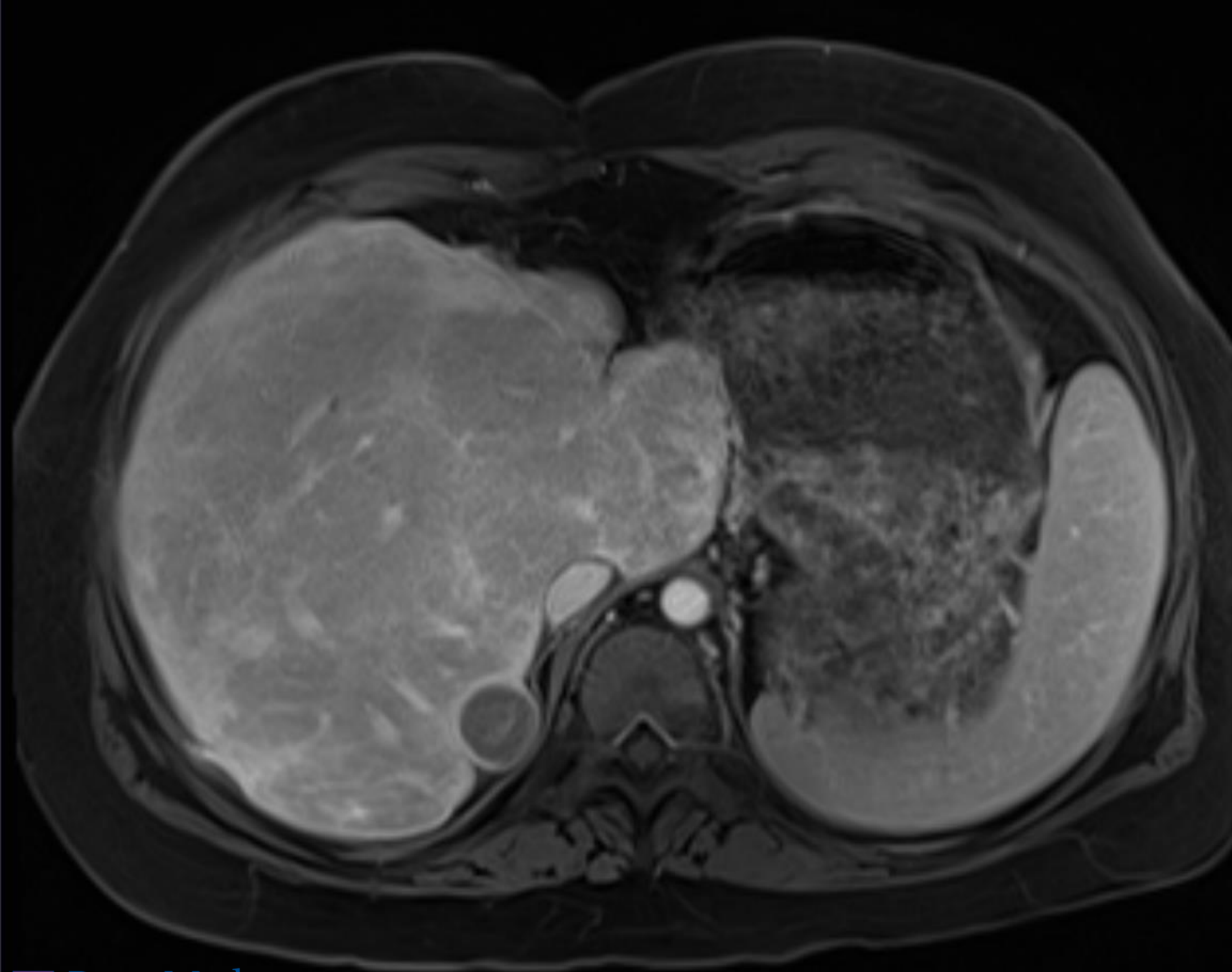
This imaging modality was ordered by the gastroenterologist



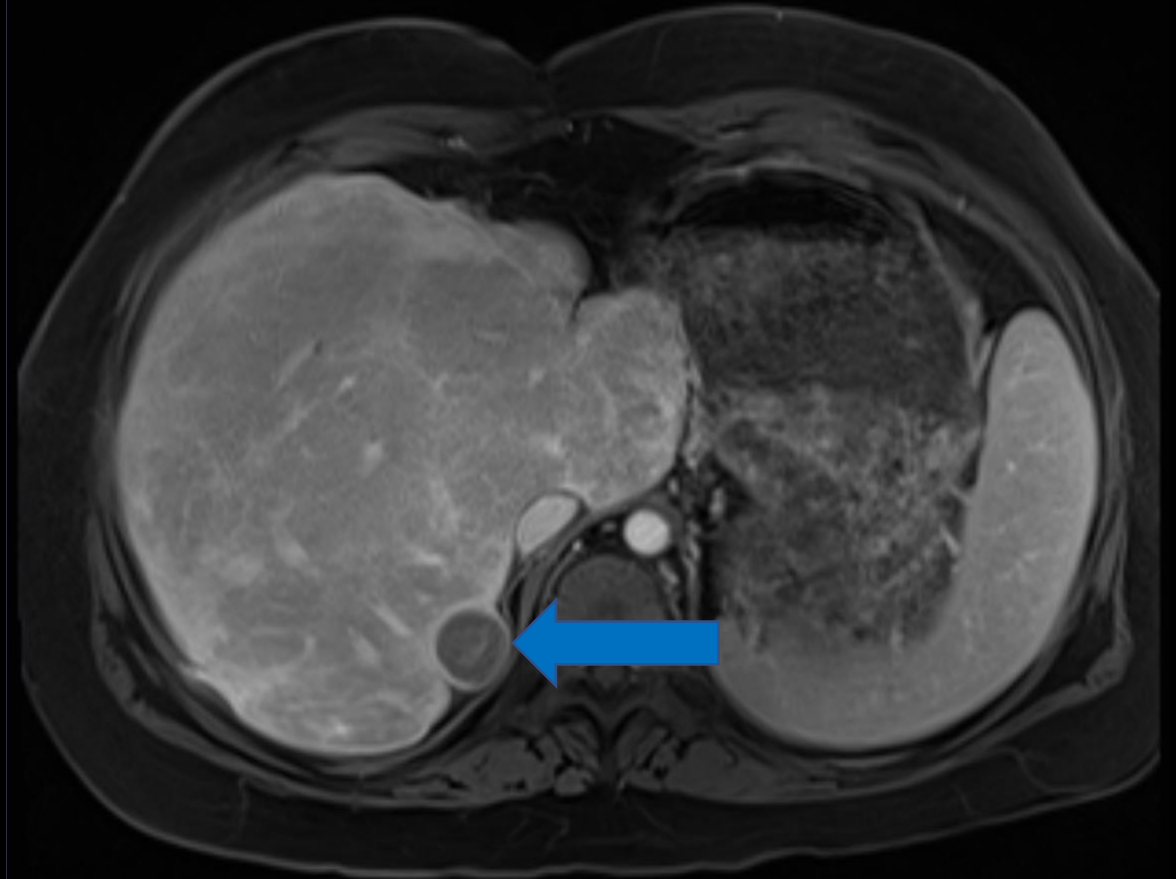
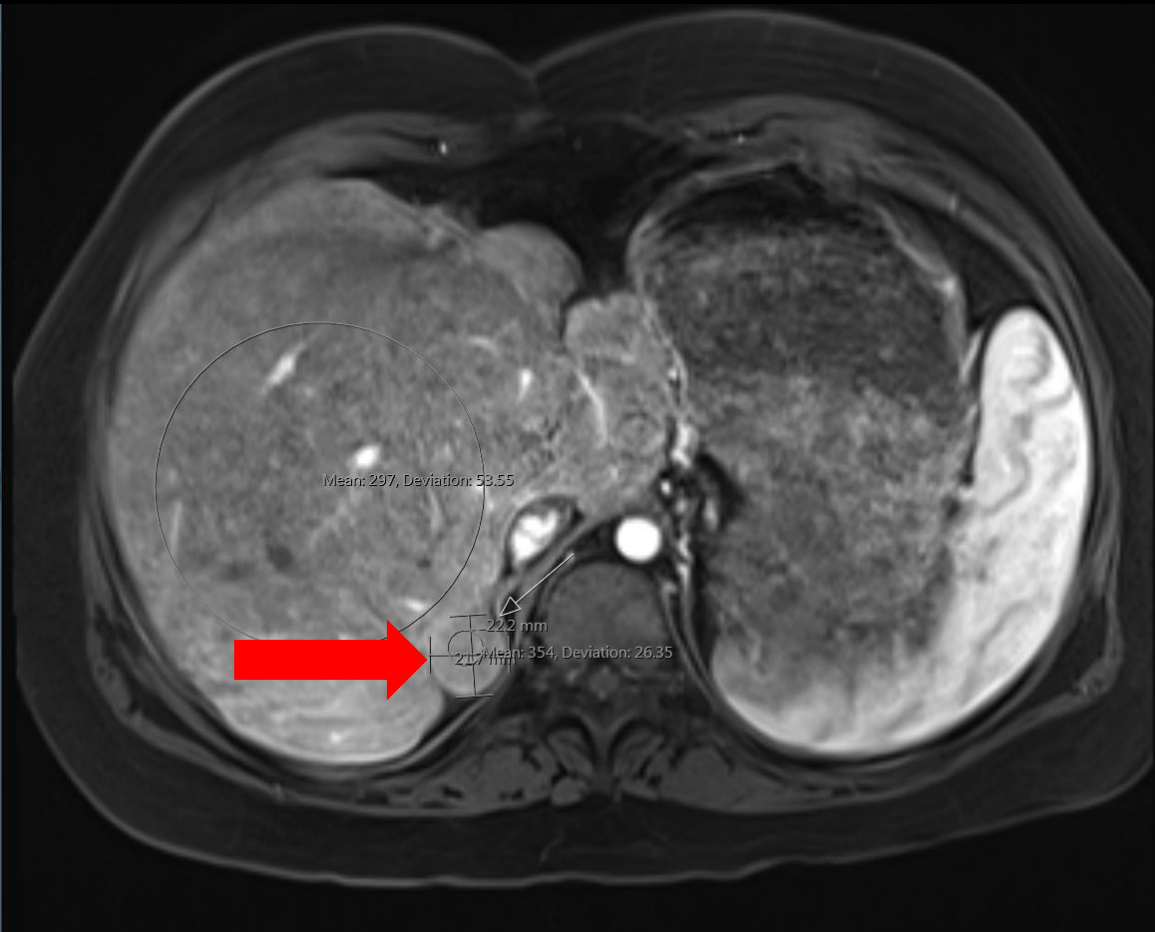
Findings
(unlabeled)



Findings
(unlabeled)

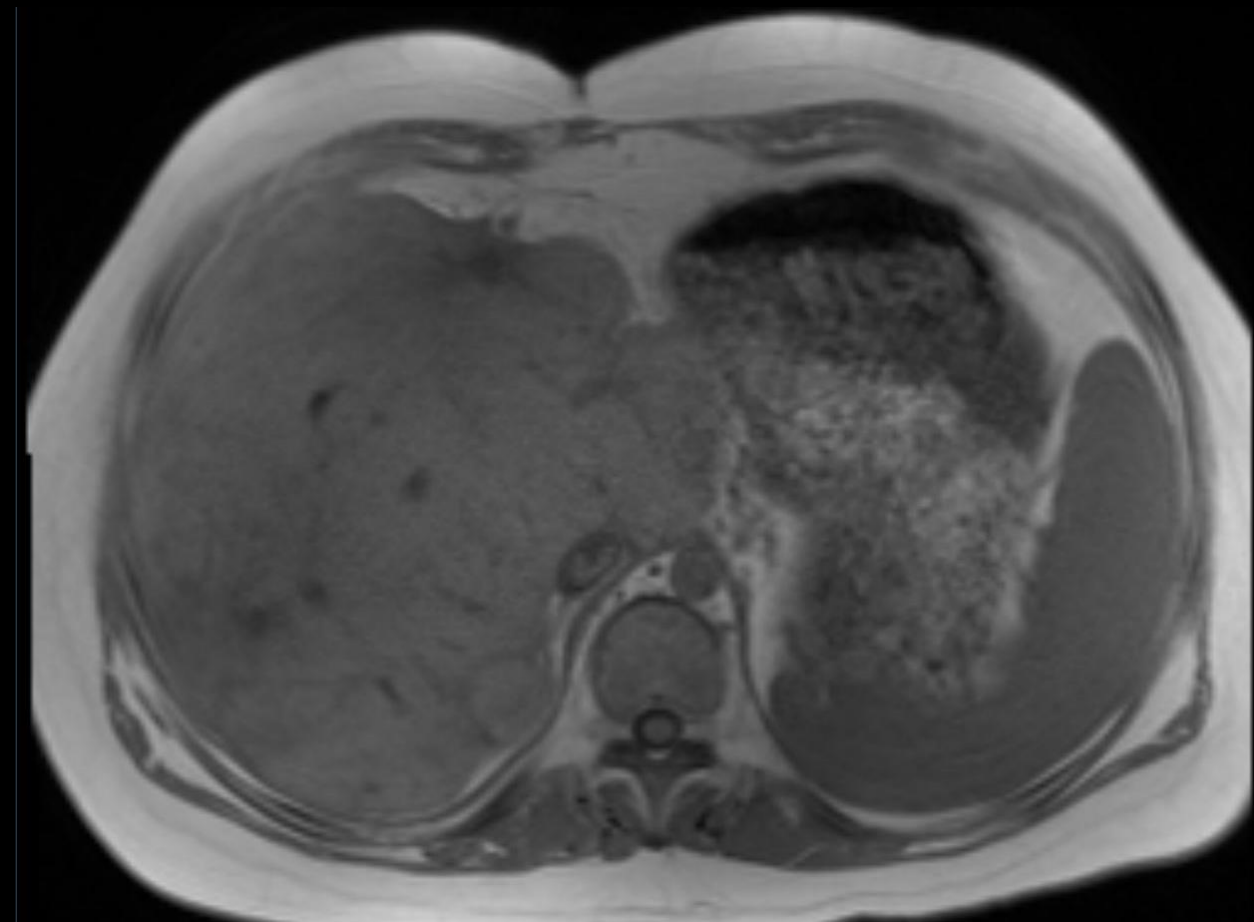


Findings: (labeled)

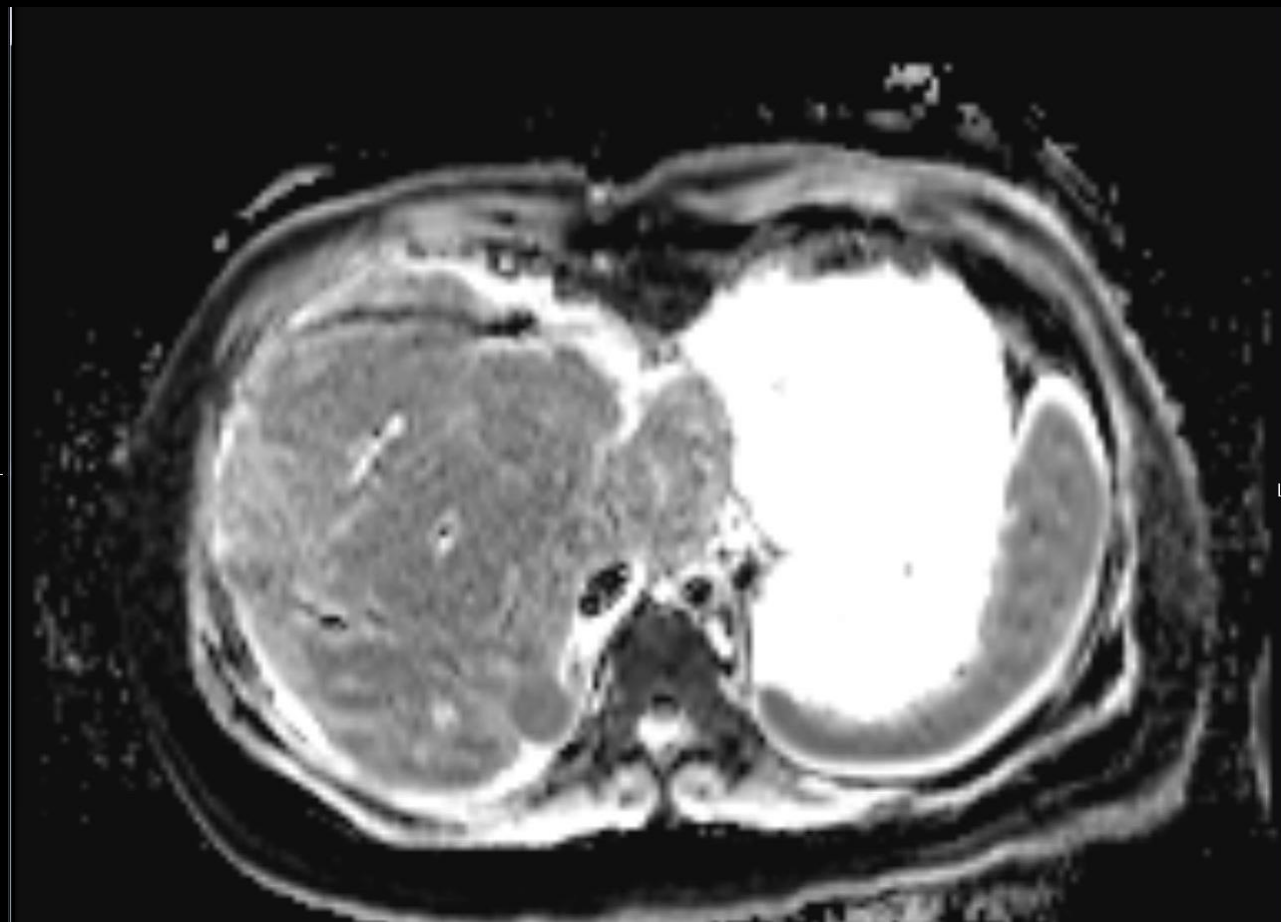


Impression: New 2.2 cm segment 7 lesion demonstrates arterial phase enhancement and delayed washout with enhancing pseudo-capsule

Additional MRI Characteristics

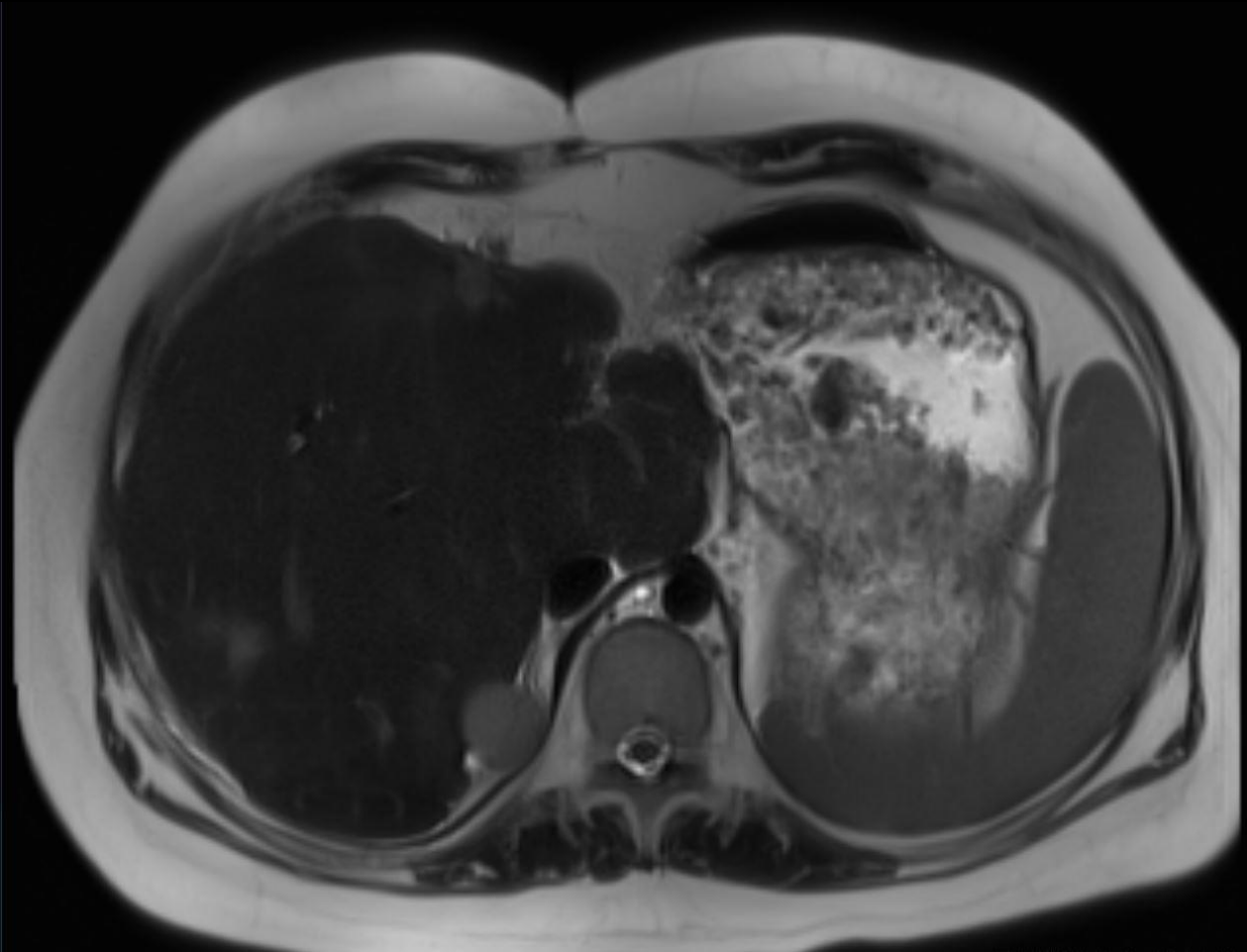


T1 In phase - Isointense to liver

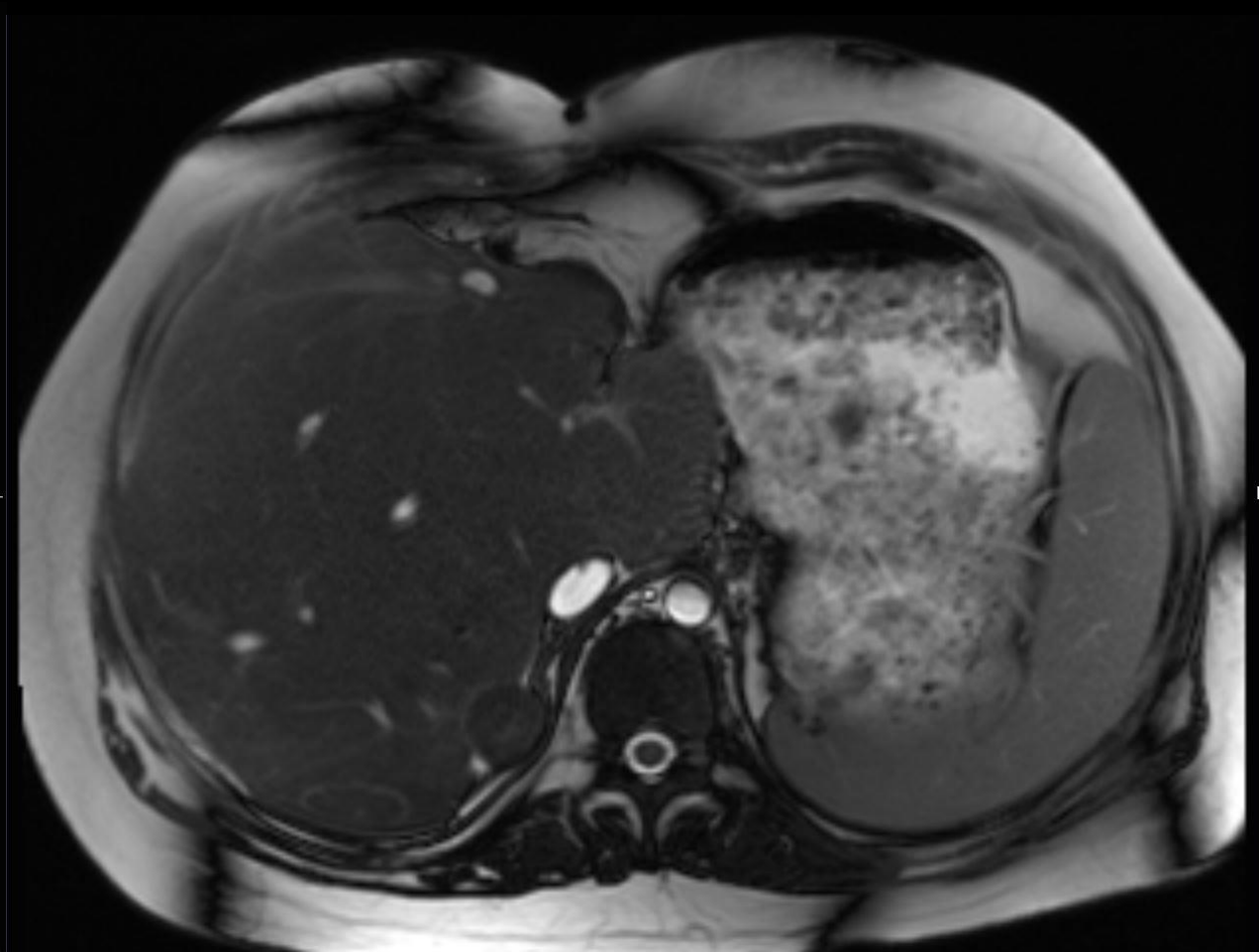


Diffusion Restriction in ADC, which favors malignancy²

Additional MRI Characteristics



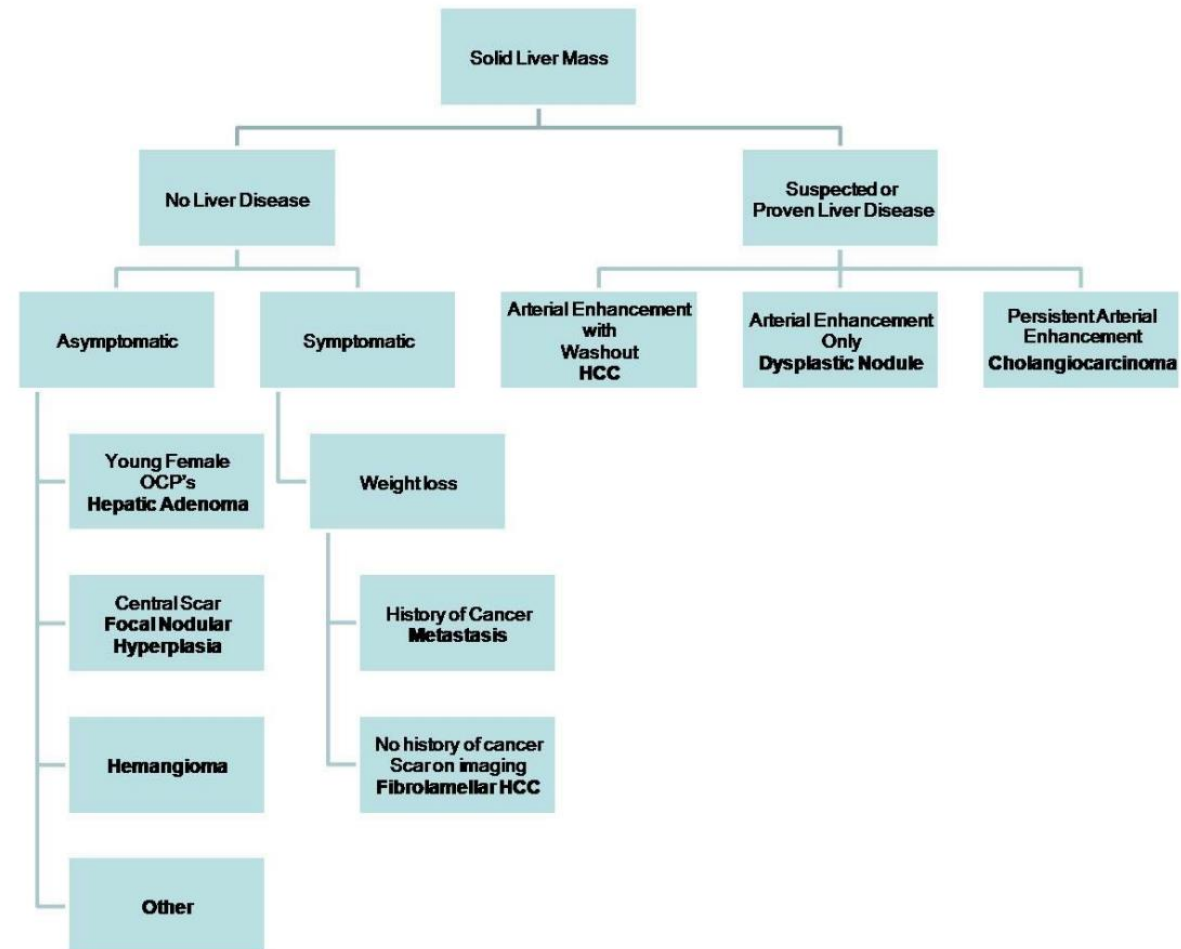
T2 - Isointense to spleen, which suggests a solid lesion²



T2 Out of phase - loses signal, (unusual) which suggests microscopic fat²

DDX (based on imaging)⁷

Figure 2. Differential diagnosis of a solid mass



Micro Path

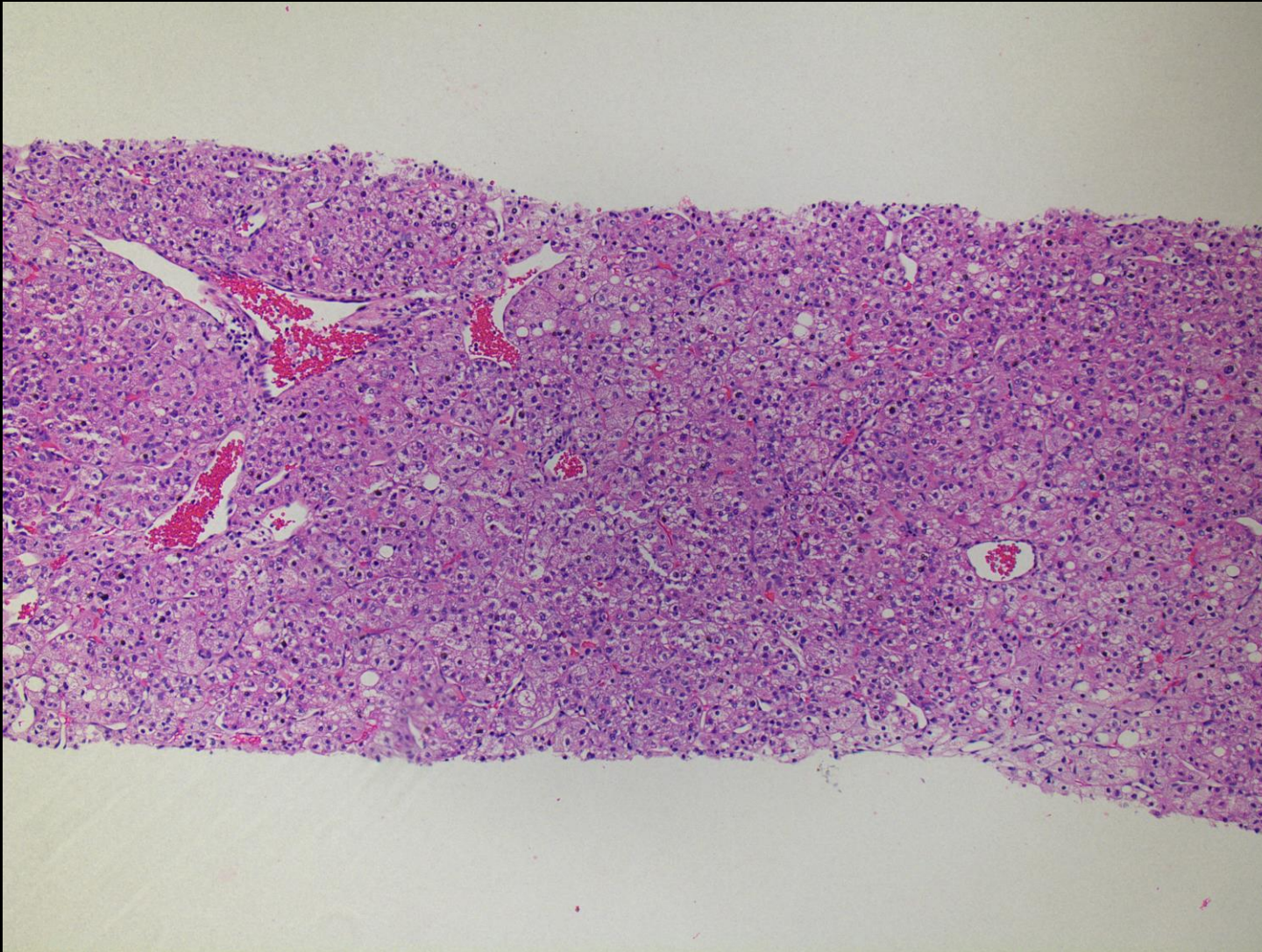


Image of lesion demonstrates thickened trabeculae surrounded by endothelial cells. Individual tumor cells are polygonal with high nuclear cytoplasmic ratio, distinct cell membranes and granular eosinophilic cytoplasm.

(H&E image, 10X magnification)

Image courtesy of Dr. Rashmi Tondon
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LI-RADS[®] v2018³

CT/MRI Diagnostic Table

Arterial phase hyperenhancement (APHE)		No APHE		Nonrim APHE		
Observation size (mm)		< 20	≥ 20	< 10	10-19	≥ 20
Count additional major features: ✓ Enhancing “capsule” ✓ Nonperipheral “washout” • Threshold growth	None	LR-3	LR-3	LR-3	LR-3	LR-4
	One	LR-3	LR-4	LR-4	LR-4 / LR-5	LR-5
	≥ Two	LR-4	LR-4	LR-4	LR-5	LR-5



Observations in this cell are categorized based on one additional major feature:

- LR-4 – if enhancing “capsule”
- LR-5 – if nonperipheral “washout” **OR** threshold growth

Final Dx:

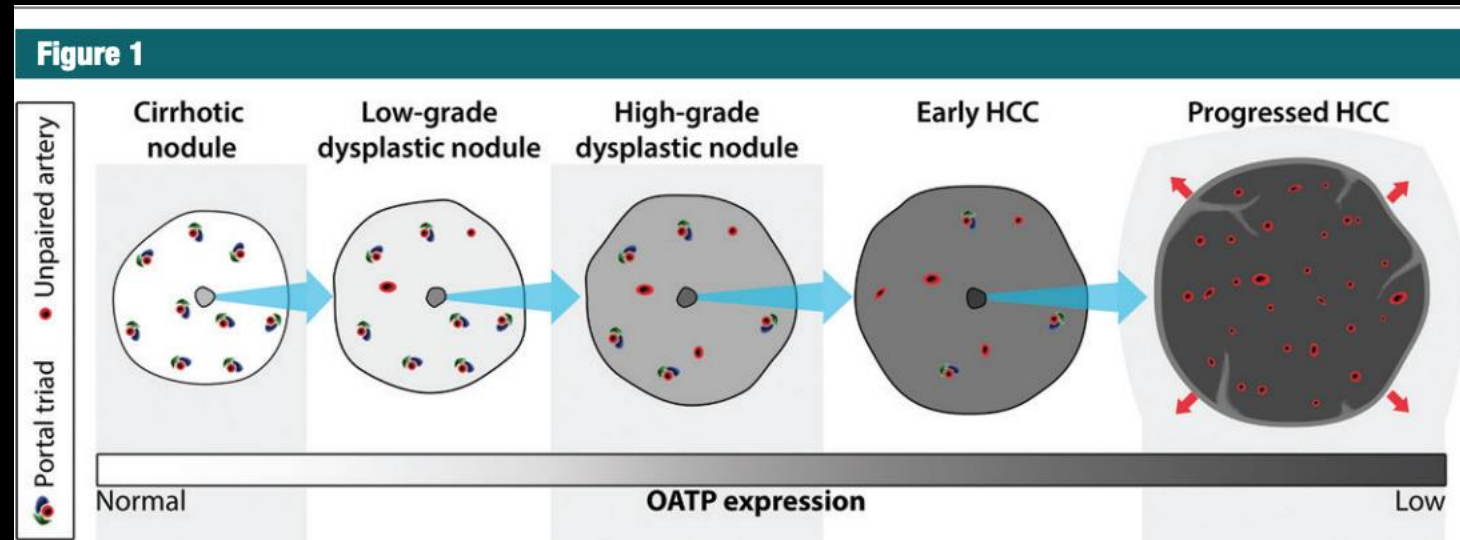
Hepatocellular Carcinoma (HCC) with subsequent
pathology concordance

Case Discussion

- Hepatocellular carcinoma⁵
 - Annual incidence of HCC in the US: 6 per 100,000
 - 4th leading cause of cancer-related death in the world
 - 3.7 times more likely to occur in men than women

Hepatocarcinogenesis:

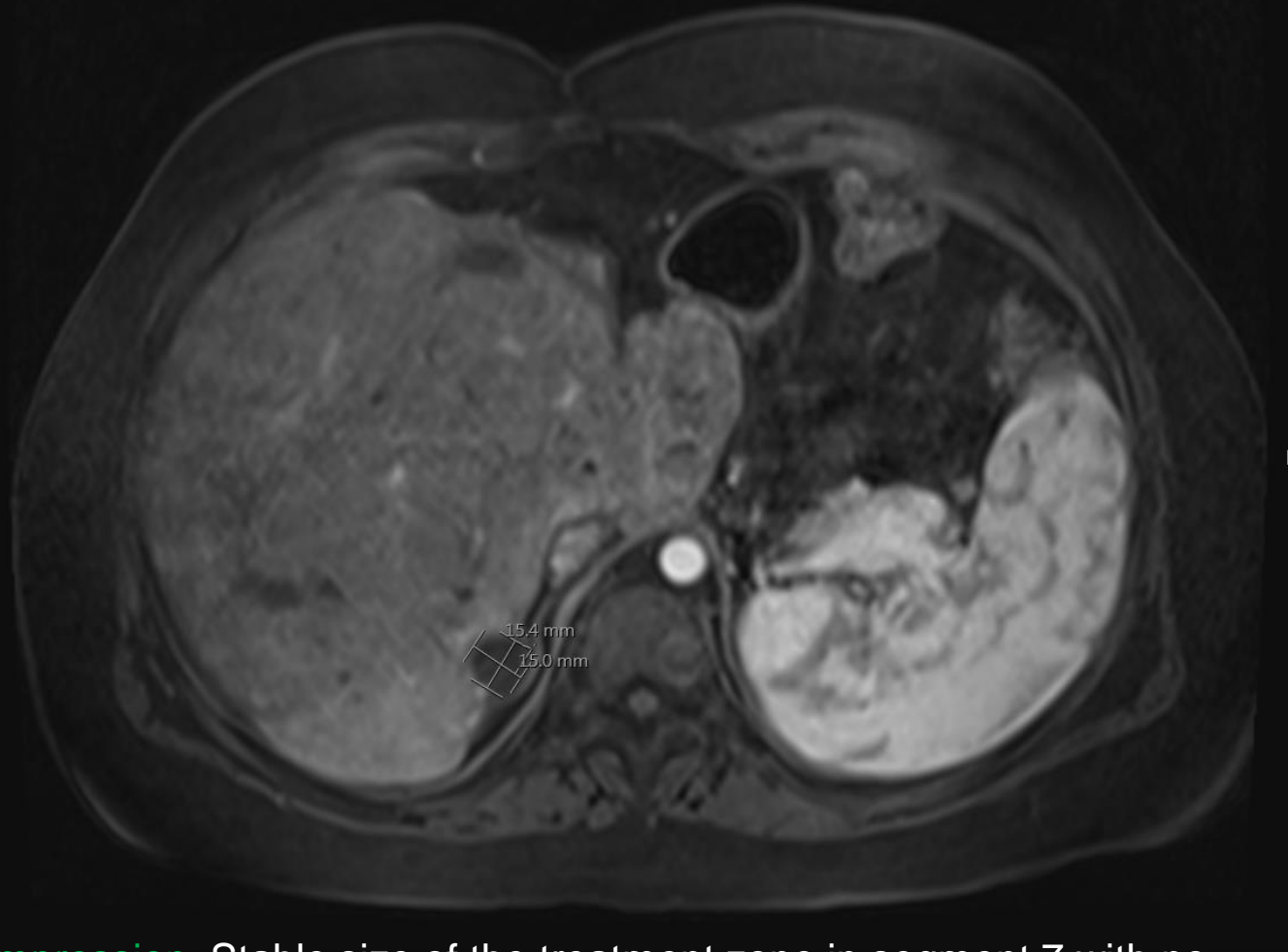
- ↑ Arterial flow
- ↓ Portal venous flow
- ↓ OATP Expression



OATP: Organic anionic transporting polypeptides⁶

Case Resolution

Patient underwent Trans-Catheter Arterial Chemoembolization (TACE) in 7/2018



Impression Stable size of the treatment zone in segment 7 with no findings of viable HCC. No new suspicious liver lesion.

Date	AFP (Normal: 0-8.3 ng/mL)
6/2018	1060.0
8/2018	412.0
1/2019	19.2
6/2019	18.9
8/2019	20.9

- Currently placed on combined heart (UNOS Status 4) and liver transplant list (with HCC exception).

References:

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