AMSER Case of the Month
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HPI: 67 yo man with acute abdominal pain and chronic untreated Hepatitis C

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Patient Presentation - Subjective

- HPI: 67 yo man, non-verbal, brought via emergency medical services to emergency department with acute abdominal pain

- PMHx/PSHx: TBI in 2017 following motor vehicle collision, s/p L hemicraniotomy c/b seizures and chronic tracheostomy (not vented), PEG- and foley-dependent; insulin-dependent type 2 diabetes mellitus; untreated chronic Hepatitis C virus infection

Patient Presentation - Objective

- Vitals: BP 94/63, HR 66, RR 15, T 37.1ºC

- Physical exam: Nonverbal, appears chronically ill, no shortness of breath, normal S1/S2, dry mucous membranes, abdomen diffusely tender, non-distended, with guarding in all four quadrants, catheter, trach, and PEG tube in place without surrounding erythema or swelling

- Pertinent Labs: WBC 8.2, Hgb 13.2, Hct 40.6, Plt 124

Select the applicable ACR Appropriateness Criteria

Variant 2. Right upper quadrant pain. No fever or high white blood cell (WBC) count. Suspected biliary disease. Negative or equivocal ultrasound.

Procedure	Appropriateness Category	Relative Radiation Level
MRI abdomen without and with IV contrast with MRCP	Usually Appropriate	O
CT abdomen with IV contrast	Usually Appropriate	☢☢☢
MRI abdomen without IV contrast with MRCP	Usually Appropriate	O
Tc-99m cholescintigraphy	May Be Appropriate	☢☢
CT abdomen without IV contrast	May Be Appropriate	☢☢☢
CT abdomen without and with IV contrast	Usually Not Appropriate	☢☢☢☢

This imaging modality was ordered by the ER physician

Expert Panel on Gastrointestinal, I., Peterson, C. M., McNamara, M. M., Kamel, I. R., Al-Refaie, W. B., Arif-Tiwari, H., . . . Carucci, L. R. (2019). ACR Appropriateness Criteria((R)) Right Upper Quadrant Pain. *J AmColl Radiol, 16*(5S), S235-S243. doi:10.1016/j.jacr.2019.02.013
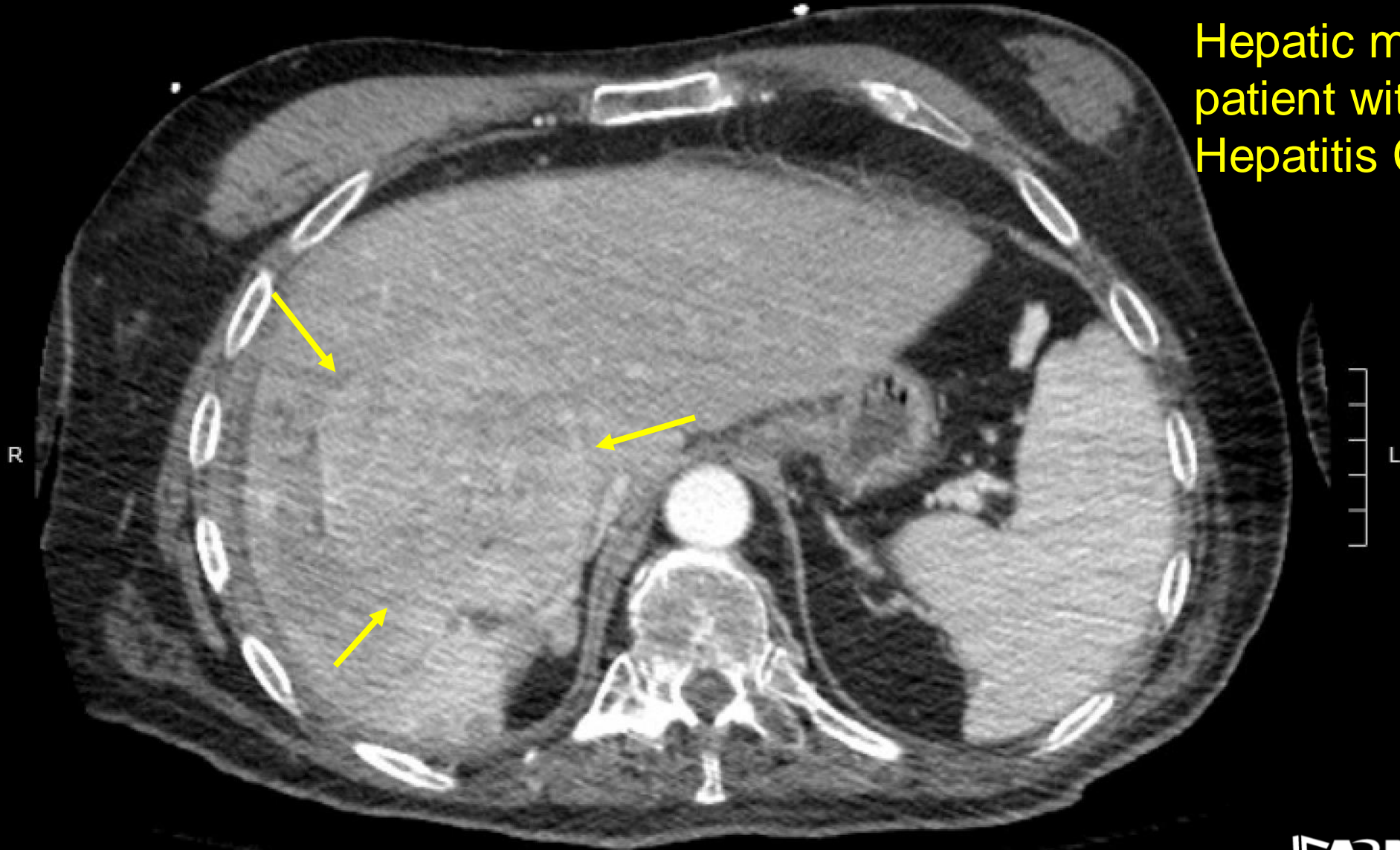
Findings (unlabeled)

CT AP w/contrast

Findings (labeled)

Hepatic mass in patient with untreated Hepatitis C

CT AP w/contrast

What Follow-Up Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

This imaging modality was ordered for further assessment of the liver mass

Variant 5. Incidental liver lesion, greater than 1 cm on US, noncontrast or single-phase CT, or noncontrast MRI. Known chronic liver disease.

| Procedure	Appropriateness Category	Relative Radiation Level
US abdomen with IV contrast	Usually Appropriate	O
MRI abdomen without and with IV contrast	Usually Appropriate	O
CT abdomen with IV contrast multiphase	Usually Appropriate	☢☢☢
Percutaneous image-guided biopsy liver	May Be Appropriate	Varies
Liver spleen scan	Usually Not Appropriate	☢☢☢
RBC scan abdomen and pelvis	Usually Not Appropriate	☢☢☢
CT abdomen without and with IV contrast	Usually Not Appropriate	☢☢☢☢
DOTATATE PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
Octreotide scan with SPECT or SPECT/CT chest and abdomen	Usually Not Appropriate	☢☢☢☢

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Findings (unlabeled)

CT abdomen w/contrast
Arterial phase

Findings (labeled)
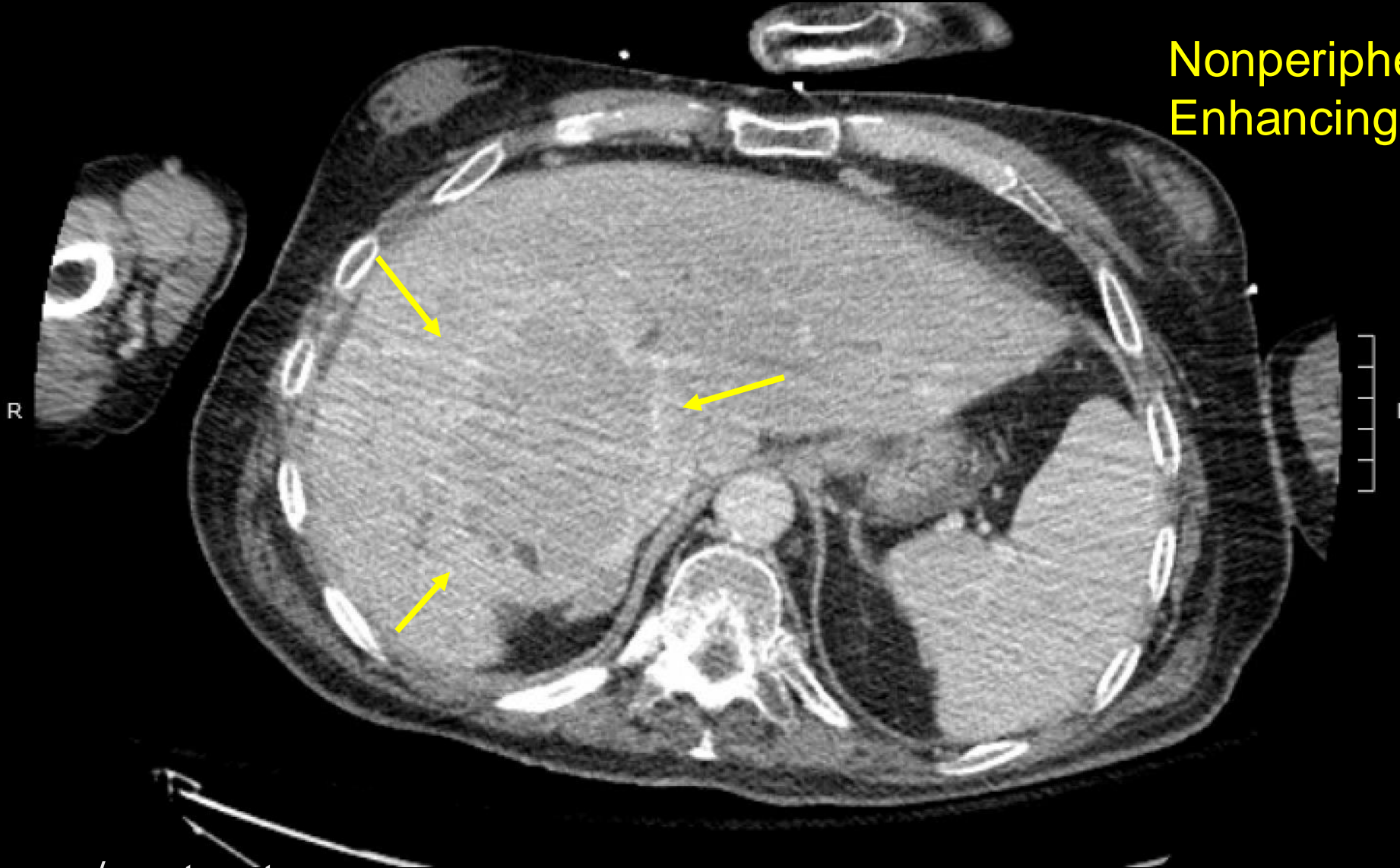

Arterial phase
hyperenhancement
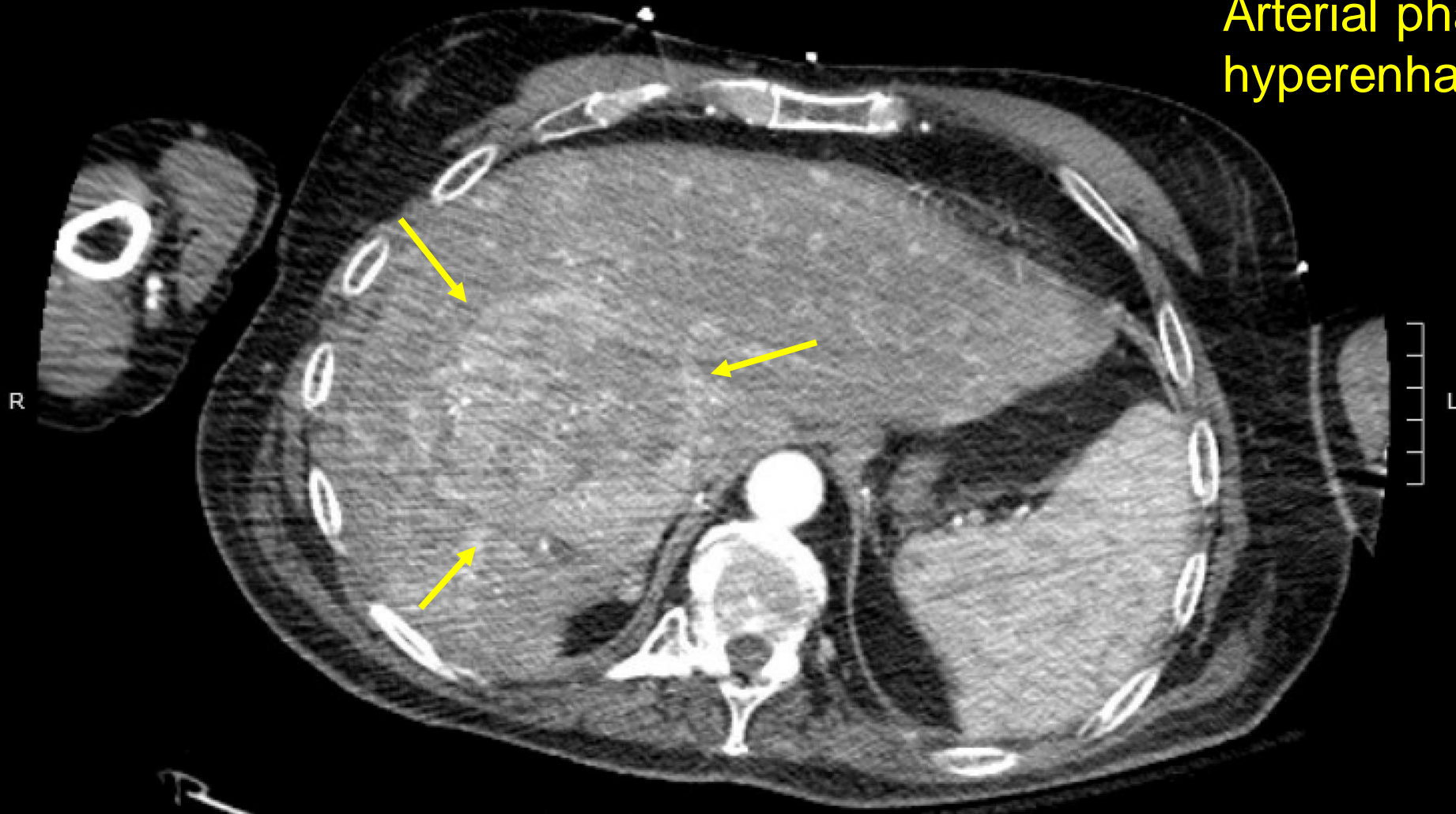
CT abdomen w/contrast
Arterial phase

Findings (unlabeled)

CT abdomen w/contrast
Portal venous phase

Findings (labeled)

Nonperipheral washout
Enhancing capsule

CT abdomen w/contrast
Portal venous phase

LI-RADS Findings

LR-1= definitely benign

LR-2 = probably benign

LR-3 = intermediate probability

LR-4 = probably HCC

*LR-5 = definitely HCC

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

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Final Dx:

Hepatocellular Carcinoma
(LI-RADS 5 observation)

Case Discussion

Partial differential diagnosis for solid liver mass

- Benign
  - Hepatic hemangioma
  - Focal nodular hyperplasia
  - Hepatocellular adenoma
  - Regenerative nodule

- Malignant
  - Metastatic disease
  - Hepatocellular carcinoma
  - Cholangiocarcinoma

Case Discussion

- Hepatocellular carcinoma
  - Most common primary cancer of the liver (75%-85%)
  - 6th most commonly diagnosed cancer globally
  - 4th leading cause of cancer-related mortality globally
  - 5-year survival = 18% (second most lethal after pancreatic cancer)
  - High risk groups
    - Cirrhosis
    - Chronic Hepatitis B
    - Chronic Hepatitis C

Case Discussion

- HCC is the only cancer that can be diagnosed by imaging alone (no biopsy) if appearance is sufficiently classic.

- The LI-RADS criteria associate combinations of imaging features with the likelihood of HCC.

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

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References:

- Expert Panel on Gastrointestinal, I., Peterson, C. M., McNamara, M. M., Kamel, I. R., Al-Refaie, W. B., Arif-Tiwari, H., . . . Carucci, L. R. (2019). ACR Appropriateness Criteria((R)) Right Upper Quadrant Pain. *J Am Coll Radiol, 16*(5S), S235-S243. doi:10.1016/j.jacr.2019.02.013

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