

AMSER Case of the Month

July 2024

HPI: 41-year-old male with abnormal liver function tests.

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Patient Presentation

- **HPI:** A 41-year-old male presented to the to the clinic for a health maintenance exam and was found to have abnormal liver enzymes, with a predominant hepatocellular pattern. Per the patient, he has had intermittently high LFTs for several years. The patient has no symptoms or signs of chronic liver disease. Of note, the patient is a bodybuilder and took anabolic steroids for 10 years, ceasing use six years before presentation.
- **Past Medical Hx:** GERD, depression, anxiety, degenerative joint disease, hypogonadism 2/2 prior exogenous steroid use, hypothyroidism
- **Surgical Hx:** Nissen fundoplication
- **Family Hx:** Autoimmune hepatitis
- **Medications:** Levothyroxine, testosterone injections, trazodone
- **Physical Exam:** No scleral icterus, ascites, or HSM, abdomen is soft, non-tender, BS present

Pertinent Labs

- **CMP:**
 - AST: 69 U/L (normal: 15 - 41 U/L)
 - ALT: 119 U/L (normal: 15-50 U/L)
 - Bilirubin: 0.5 mg/dL (normal: 0.4-1.5 mg/dL)
 - Alk phos: 55 U/L (normal: 24-110 U/L)
- **AFP:** 2.2 ng/mL
- **Hepatitis Panel:** Non-Reactive for HAV, HBV, or HCV

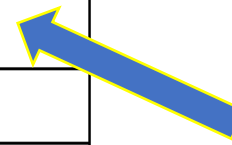
What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1:

Abnormal liver function tests. Hepatocellular predominance with mild aminotransferase increase. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
US abdomen	Usually Appropriate	0
US duplex Doppler abdomen	Usually Appropriate	0
US shear wave elastography abdomen	May Be Appropriate	0
MR elastography abdomen	May Be Appropriate	0
MRI abdomen without and with IV contrast with MRCP	May Be Appropriate	0
MRI abdomen without IV contrast with MRCP	May Be Appropriate	0
CT abdomen and pelvis without IV contrast	May Be Appropriate	☢☢☢
US abdomen with IV contrast	Usually Not Appropriate	0
CT abdomen and pelvis with IV contrast	Usually Not Appropriate	☢☢☢
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☢☢☢☢



This imaging modality was ordered by the primary care physician

Findings (unlabeled)

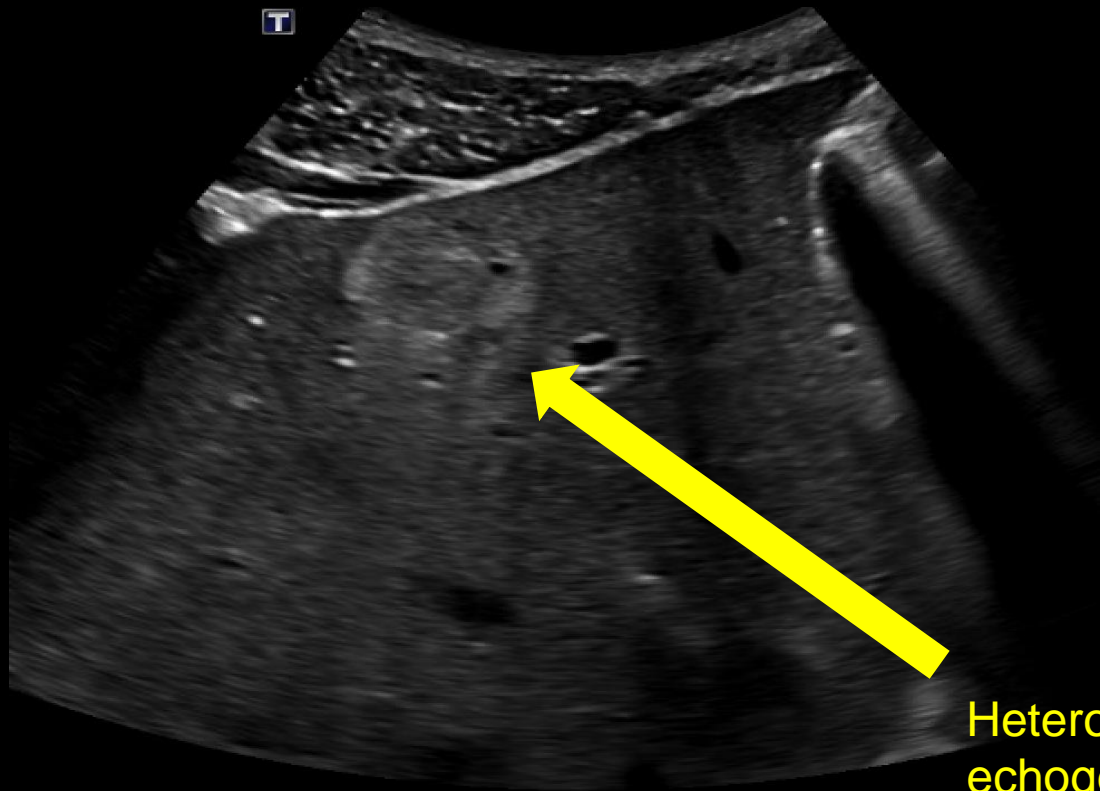


TRANS ML LIVER



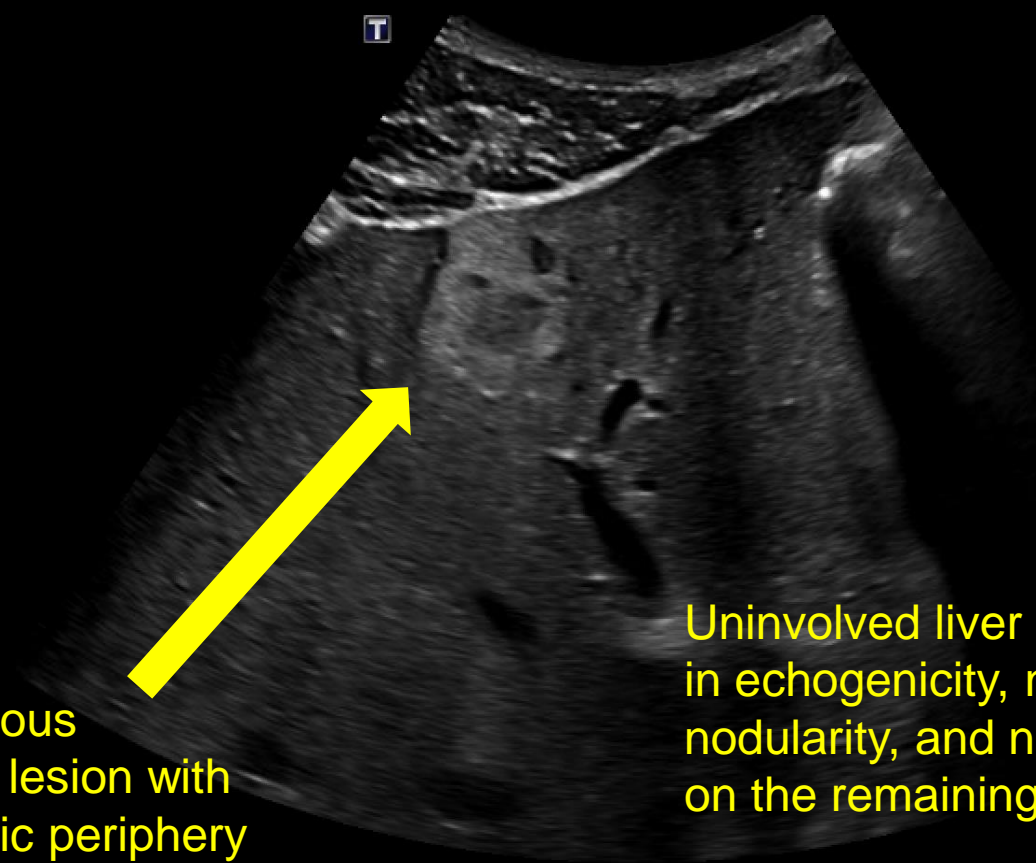
TRANS ML LIVER

Findings (labeled)



TRANS ML LIVER

Heterogenous echogenic lesion with hyperechoic periphery measuring 2.8 x 2.3 cm



Uninvolved liver is normal in echogenicity, no surface nodularity, and no ascites on the remaining images

TRANS ML LIVER

Select the applicable ACR Appropriateness Criteria

Variant 1:

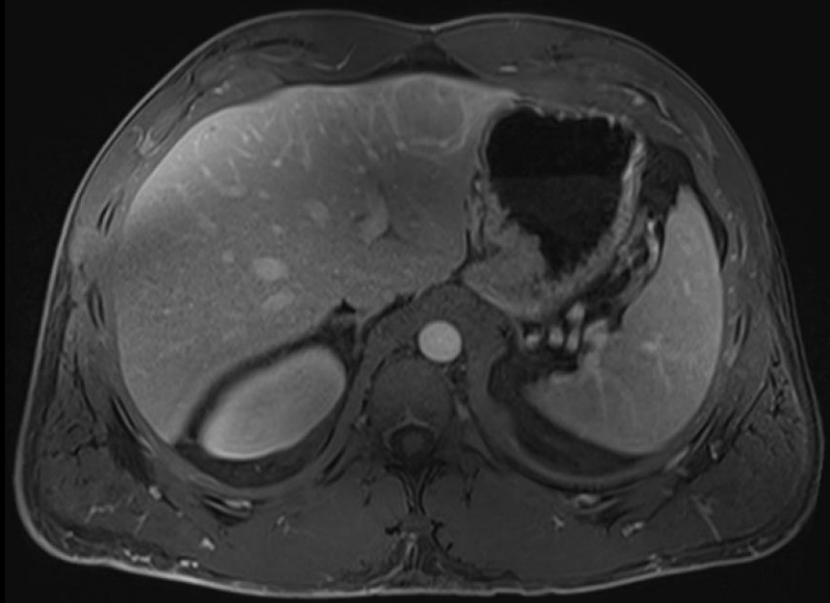
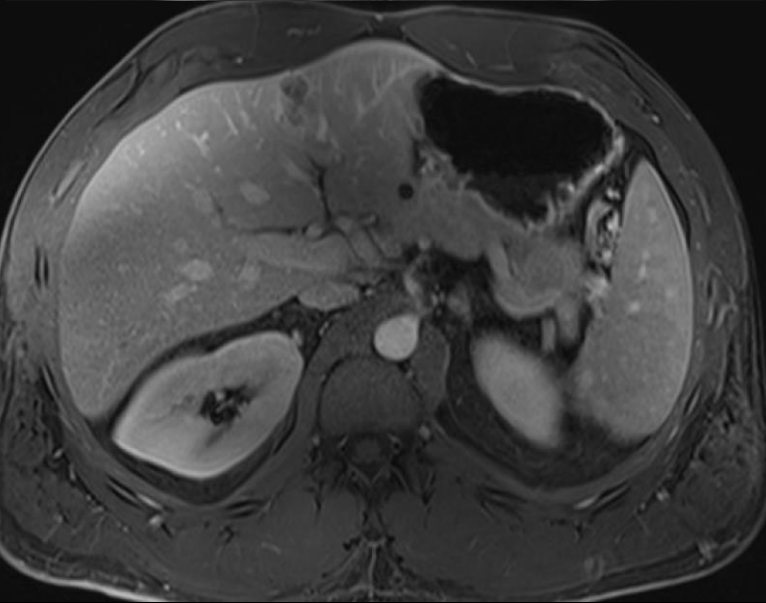
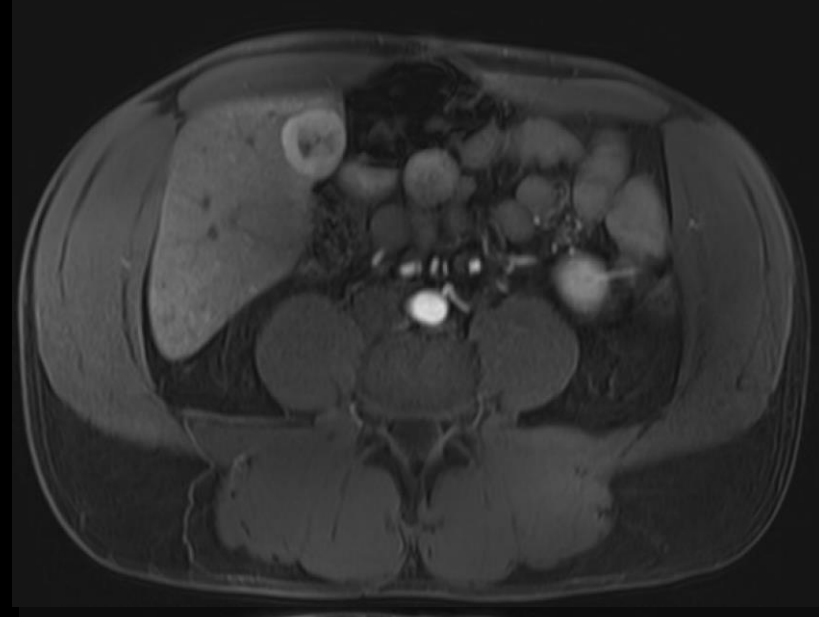
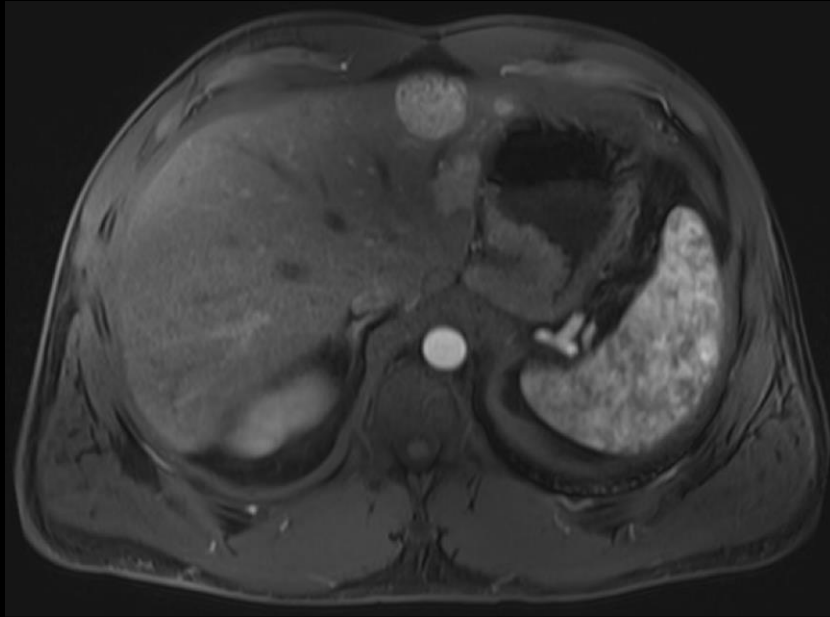
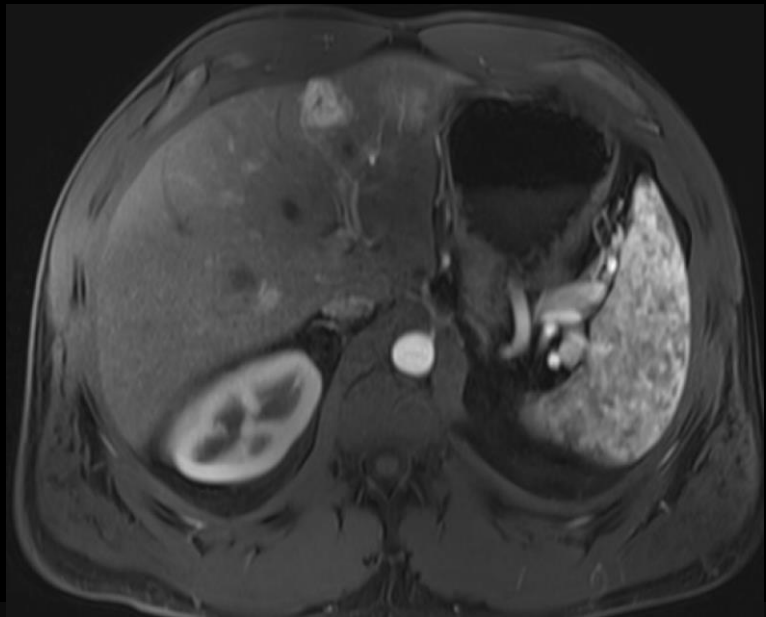
Indeterminate, greater than 1 cm liver lesion on initial imaging with US. Normal liver. No suspicion or evidence of extrahepatic malignancy or underlying liver disease.

Procedure	Appropriateness Category	Relative Radiation Level
US abdomen with IV contrast	Usually Appropriate	○
MRI abdomen without and with IV contrast	Usually Appropriate	○
CT abdomen with IV contrast multiphase	Usually Appropriate	☼☼☼
MRI abdomen without IV contrast	May Be Appropriate	○
Image-guided biopsy liver	Usually Not Appropriate	Varies
CT abdomen without IV contrast	Usually Not Appropriate	☼☼☼
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	☼☼☼☼



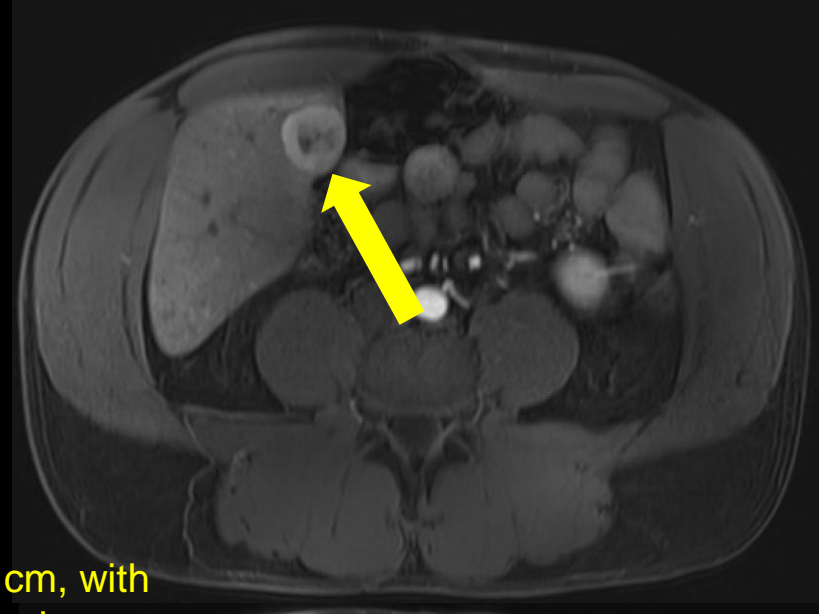
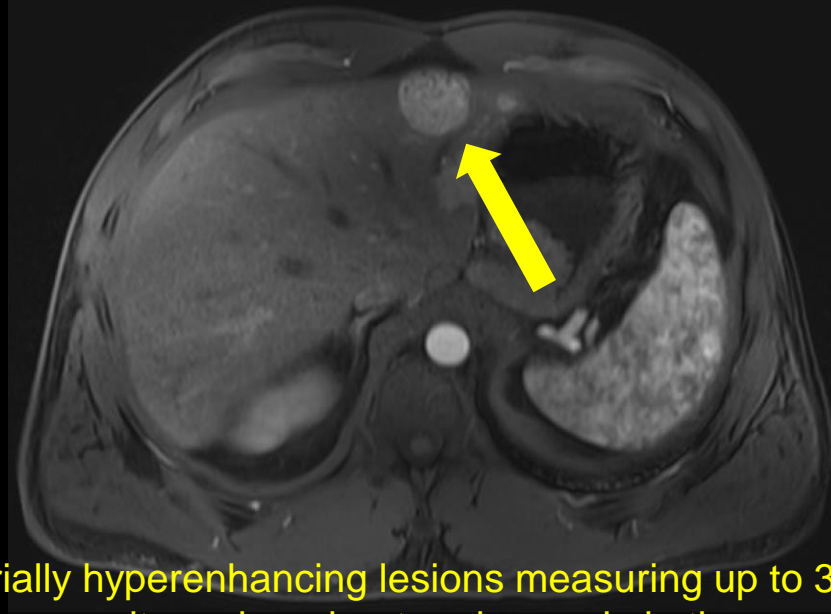
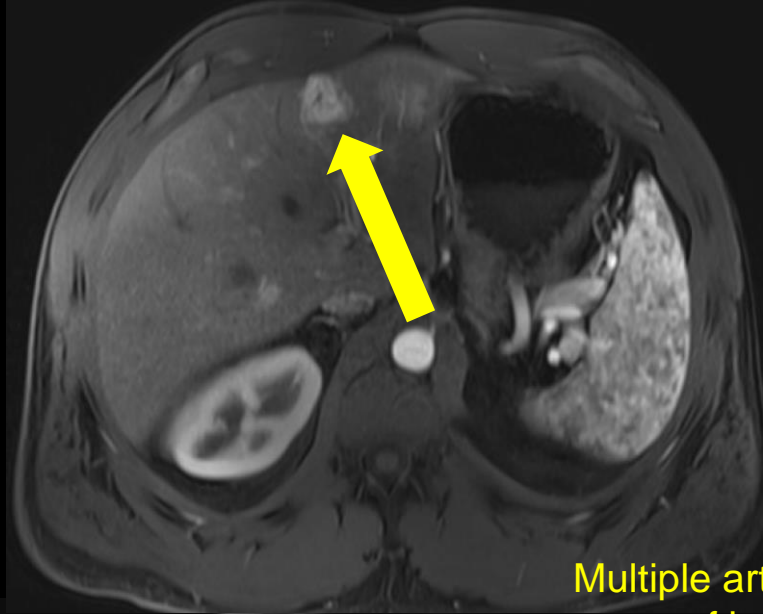
This imaging modality was ordered for further assessment of the liver mass; US visibility was limited in the original study

Findings (Unlabeled)

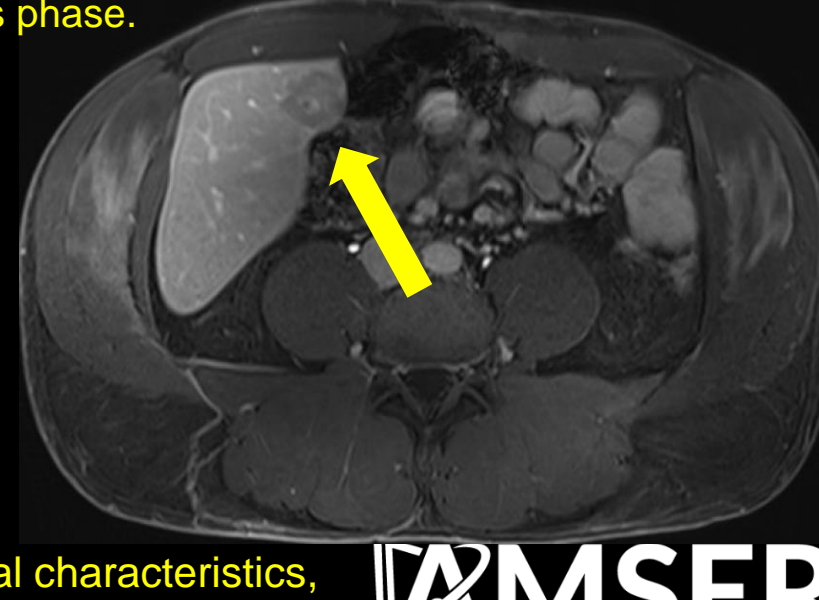
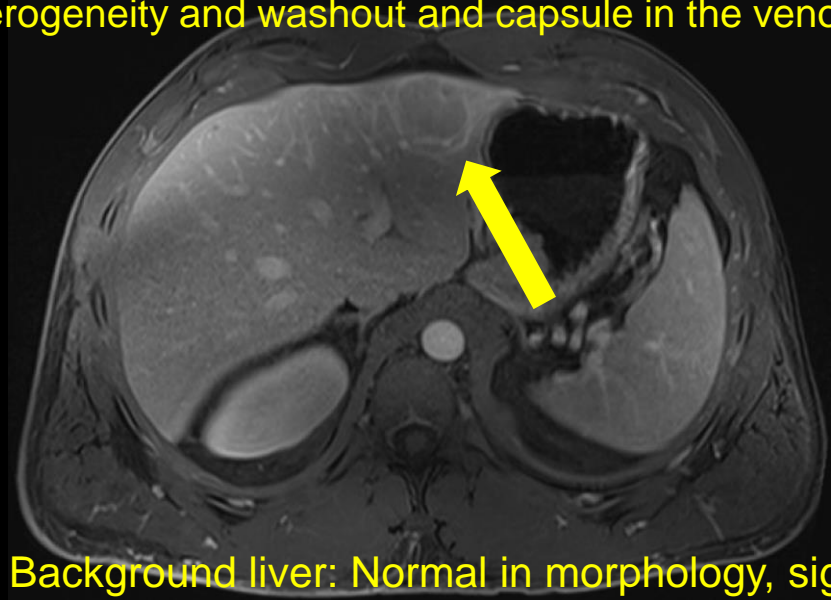
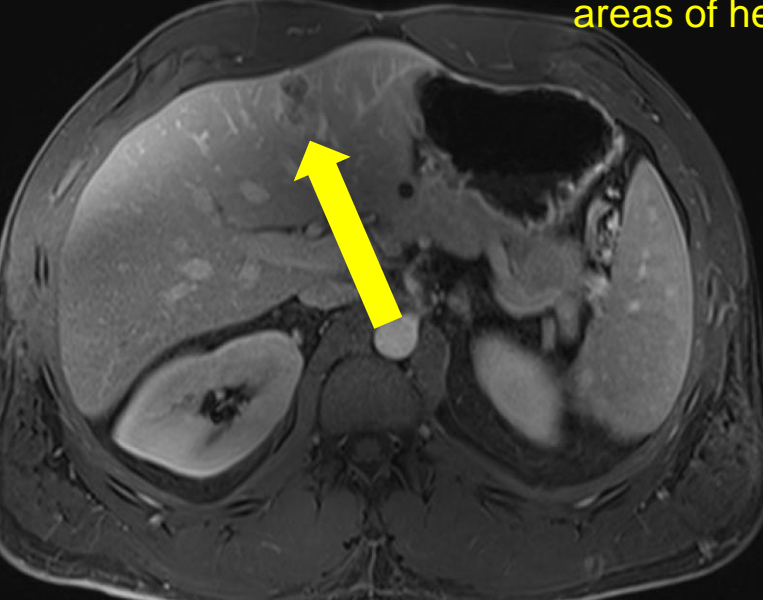


Findings (Labeled)

Top: Arterial phase images



Multiple arterially hyperenhancing lesions measuring up to 3.5 cm, with areas of heterogeneity and washout and capsule in the venous phase.



Background liver: Normal in morphology, signal characteristics, and enhancement. Patent portal and hepatic veins

Bottom: Venous phase images

Diagnostic Laparoscopy With Liver Biopsy Was Performed

Histologic findings:

- Liver segment 3 biopsy: well-differentiated hepatocellular carcinoma with areas of reticulin loss surrounding neoplastic cells.
- Liver segment 2, tumor #1: well-differentiated neoplasm, beta-catenin mutated atypical hepatocellular adenoma
- Liver segment 2, tumor #2: hepatocellular adenoma
- Uninvolved liver: no significant lobular inflammation, steatosis, or fibrosis

Final Dx:

Hepatic Adenomas and Hepatocellular Carcinoma

Case Discussion

➤ Background

- Hepatocellular adenomas(HCAs) are rare, benign liver lesions typically developing in non-cirrhotic livers.
- HCAs tend to be solitary (70-80%).
- HCAs have a significant risk for hemorrhage or malignancy transformation, particularly in lesions greater than 5 cm.
- HCAs with beta-catenin mutations are associated with an increased risk for malignant transformation. These mutations are associated with males and anabolic androgen use.
- HCAs undergo malignant transformation in up to 4.2% of individuals.
- Malignant transformation is more common in males vs. females.

Case Discussion

➤ Risk Factors for HCAs

-Exposure to estrogen – OCP use

-Anabolic androgen use – Fanconi Syndrome, aplastic anemia, hereditary angioedema, bodybuilders

-Genetic syndromes – Glycogen storage diseases and Familial Adenomatous Polyposis

-Metabolic Syndrome & obesity.

Case Discussion

➤ Clinical features for HCAs

- Presentation varies from incidental findings in asymptomatic patients to life-threatening hemorrhage.
- When symptomatic, episodic abdominal pain localized to the RUQ or epigastric area is the most common symptom.
- Hypotension with severe pain may signify bleeding into the peritoneum.
- Physical Exam: abdominal mass, hepatomegaly, or jaundice may be present
- Abnormal LFTs are uncommon unless the lesion > 5cm
- AFP can be normal with or without malignant transformation

Case Discussion

➤ Diagnosis/Imaging

- MRI is the preferred modality
- The presence of arterial phase hyperenhancement, fat, or hemorrhage may suggest an HCA
- HCAs may appear variable on T1 (Hyper-, Hypo-, or Isointense)
- HCAs typically appear mildly hyperintense on T2
- In females, MRI alone is sufficient to confirm HCA
- In males, contrast-enhanced multiphase MRI with histology obtained at the time of surgical resection is used to confirm HCA.

➤ Other Imaging modalities

- CEUS and MRI with hepatobiliary contrast agents can help differentiate between FNH and HCA
- CT, nuclear medicine scans may also be used

Case Discussion

➤ Management

- Depends on symptoms, lesion size, lesion progression, and patient sex.
- General measures – discontinue estrogen and maintain ideal body weight

➤ Females with lesions < 5cm/ asymptomatic:

- Observe and repeat MRI in 6 months. If no growth repeat MRI annually. If 20% increase or > 5cm, remove surgically

➤ Females with symptoms or lesions >5 cm:

- Surgical resection

➤ Males:

- Surgical resection regardless of size due to risk of transformation to hepatocellular carcinoma.

References

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