

AMSER Rad Path Case of the Month:

66 Year Old Presents for Lung Cancer Screening

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Patient History

- 66 year old presenting for lung cancer screening
- Social History
 - 24 pack-year history of tobacco use, quit one month prior
 - Cocaine use
- United States Preventative Services Task Force recommendations for Lung Cancer
 - Must be ages 50 to 80 years
 - Have a 20 pack-year smoking history
 - Currently smoke cigarettes or quit within the past 15 years

Lung Cancer Screening

ACR Appropriateness Criteria

American College of Radiology
ACR Appropriateness Criteria®
Lung Cancer Screening

Variant 1:

Lung cancer screening. Patient 50 to 80 years of age and 20 or more packs per year smoking history and currently smoke or have quit within the past 15 years. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT chest without IV contrast screening	Usually Appropriate	⊕⊕⊕
Radiography chest	Usually Not Appropriate	⊕
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○
CT chest with IV contrast	Usually Not Appropriate	⊕⊕⊕
CT chest without and with IV contrast	Usually Not Appropriate	⊕⊕⊕
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	⊕⊕⊕⊕

Test
ordered
in this
case



Lung Cancer Screening

- Low dose CT chest without IV contrast performed
- No suspicious lung nodules found on screening
- However, concerning finding in liver was noted

CT Lung Cancer Screening (unlabeled)



Axial Slice

CT Lung Cancer Screening (labeled)



Mass-like
hypodensity

Findings:

Ill-defined left hepatic lobe mass-like hypodensity, not well evaluated on low-dose noncontrast CT.

Axial Slice

Final Interpretation

- Negative for lung cancer as no suspicious pulmonary nodule
- Significant finding in the liver, overall Lung-RADS Category 1S

Incidental Liver Mass

ACR Appropriateness Criteria

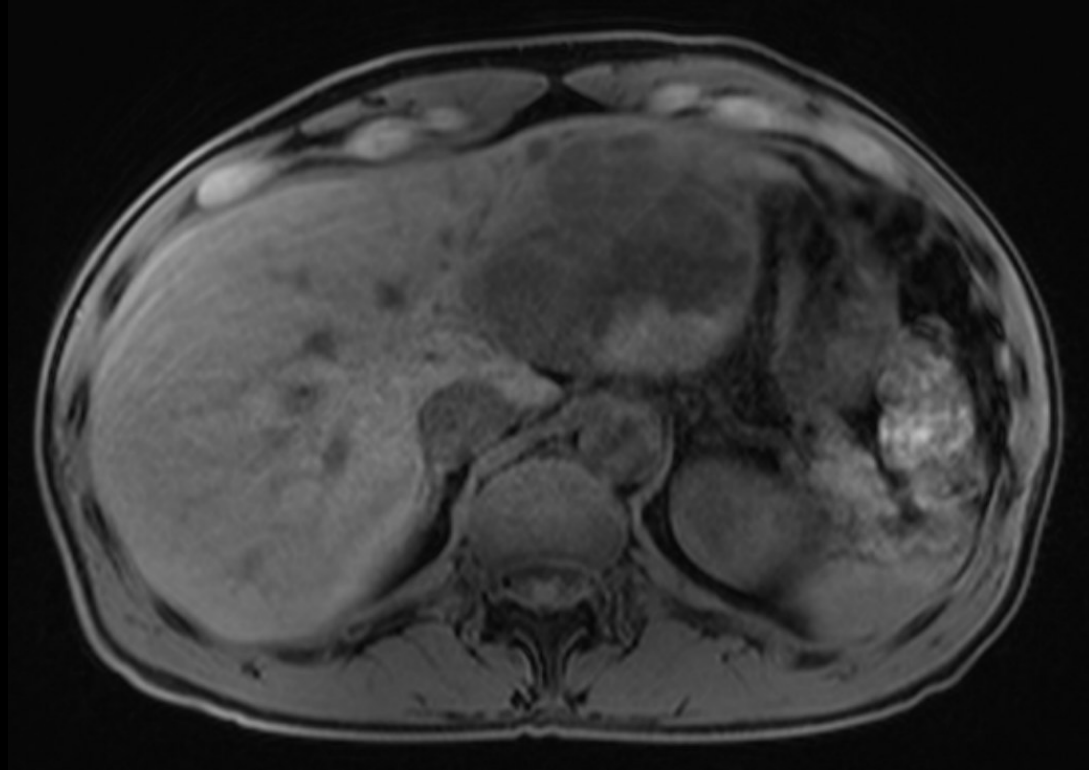
Variant 2:

Indeterminate, greater than 1 cm liver lesion on initial imaging with CT (noncontrast or single-phase) or noncontrast MRI. Normal liver. No suspicion or evidence of extrahepatic malignancy or underlying liver disease.

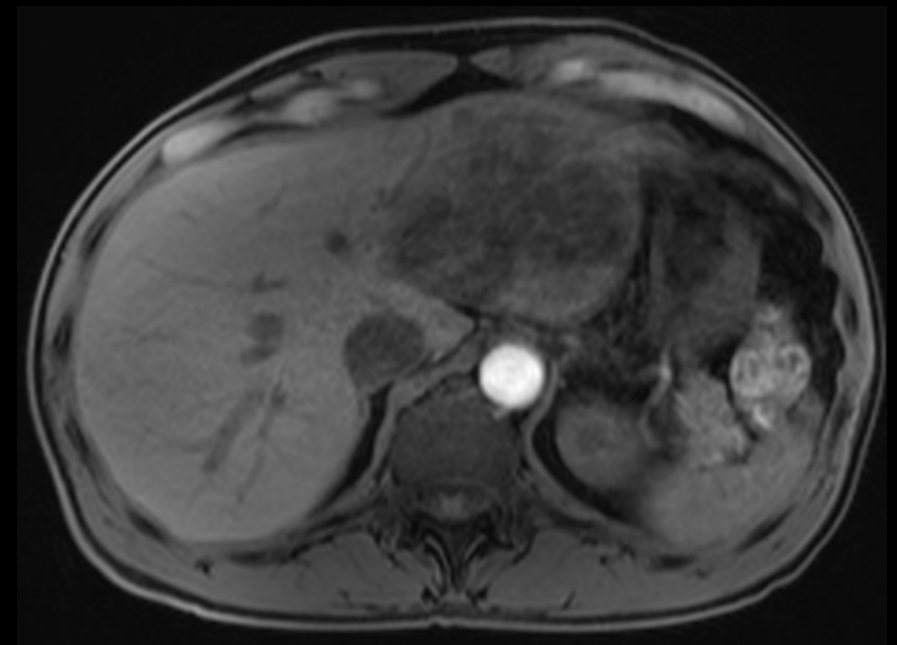
Test
ordered
in this
case

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

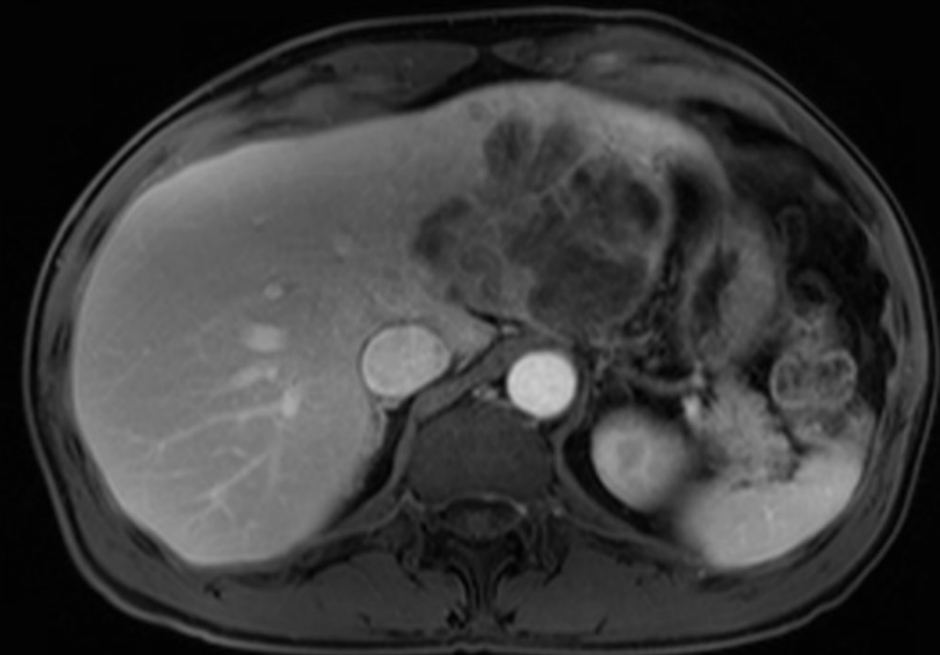
MRI Abdomen With and Without Contrast (unlabeled)



Axial T1 Fat Sat Pre-Contrast

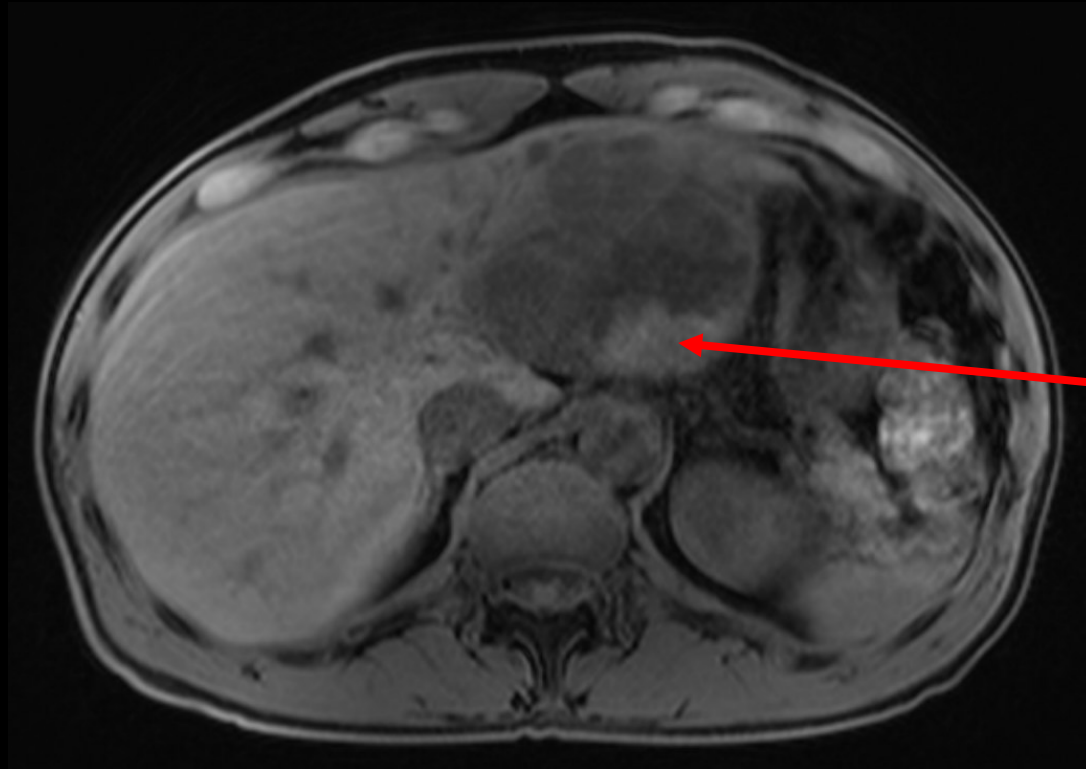


Axial T1 Fat Sat Post-Contrast Early



Axial T1 Fat Sat Post-Contrast Late

MRI Abdomen With and Without Contrast

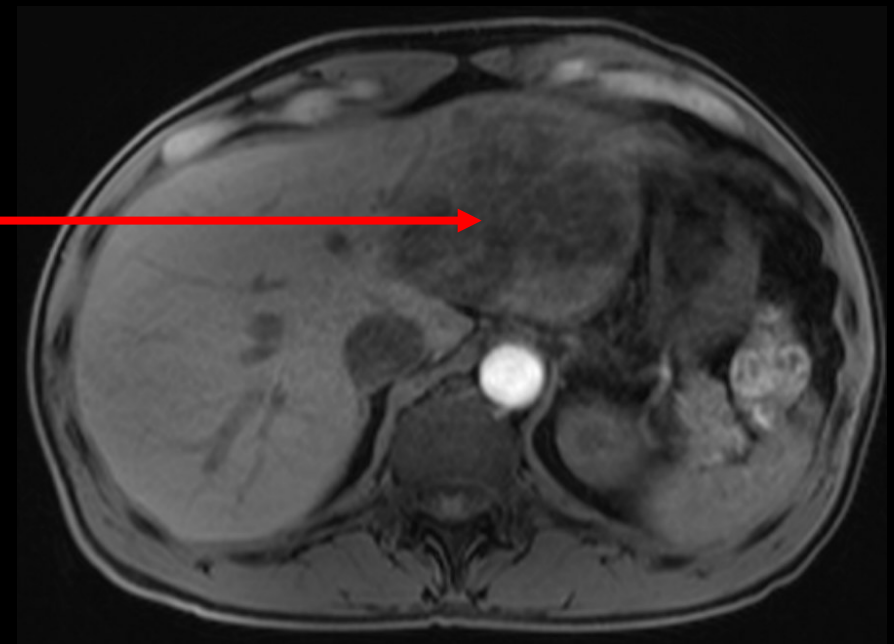


Axial T1 Fat Sat Pre-Contrast

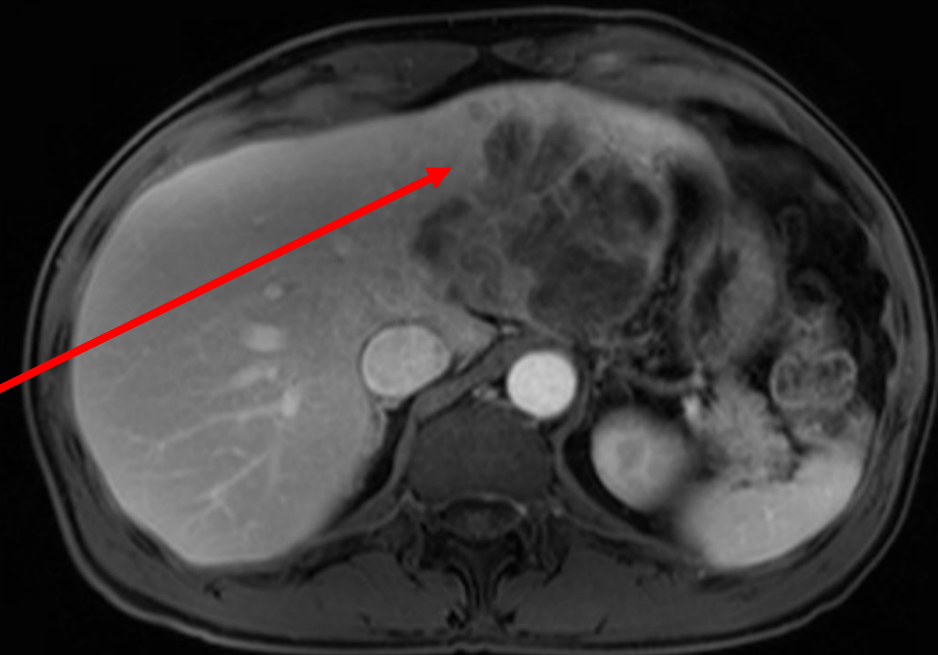
Solitary 10.5 x 7.8 x 8.1 cm mass in the left hepatic lobe

Heterogenous areas of intrinsic T1 hyperintensity

Heterogenous delayed contrast enhancement

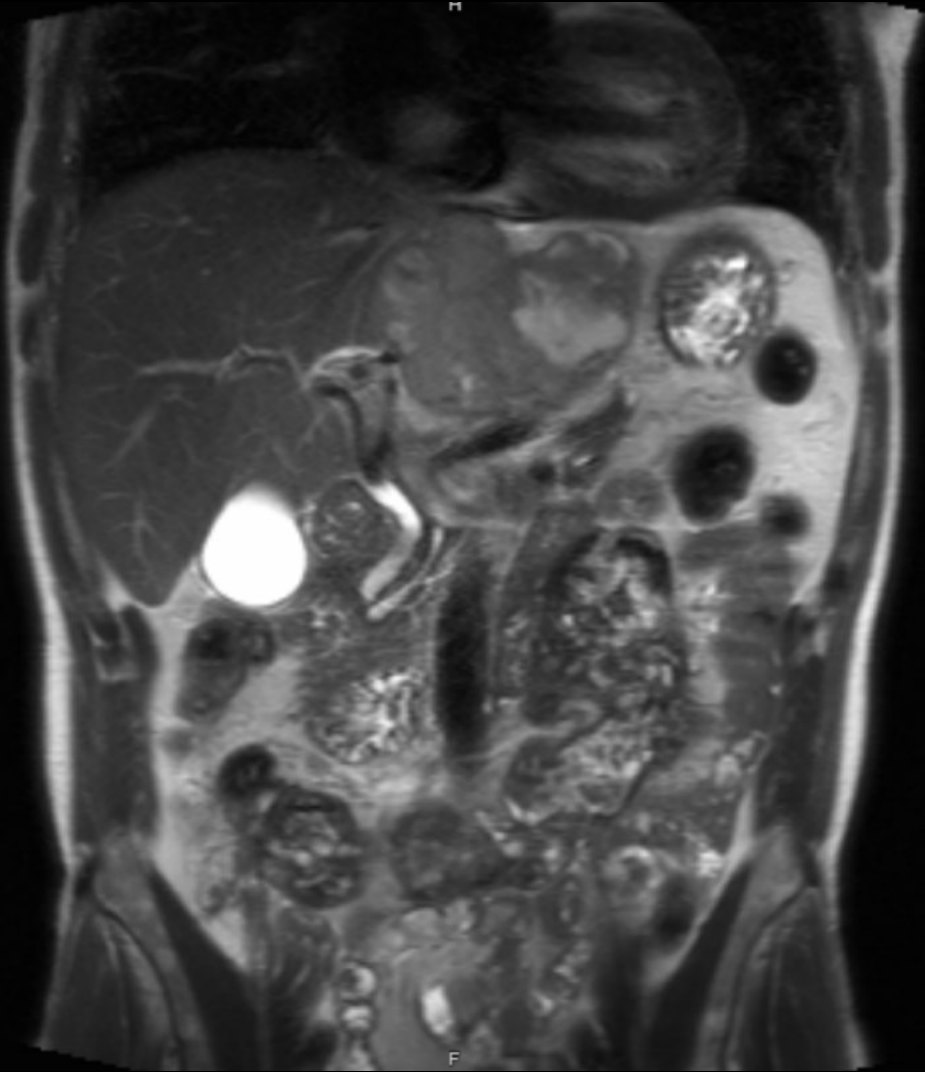


Axial T1 Fat Sat Post-Contrast Early

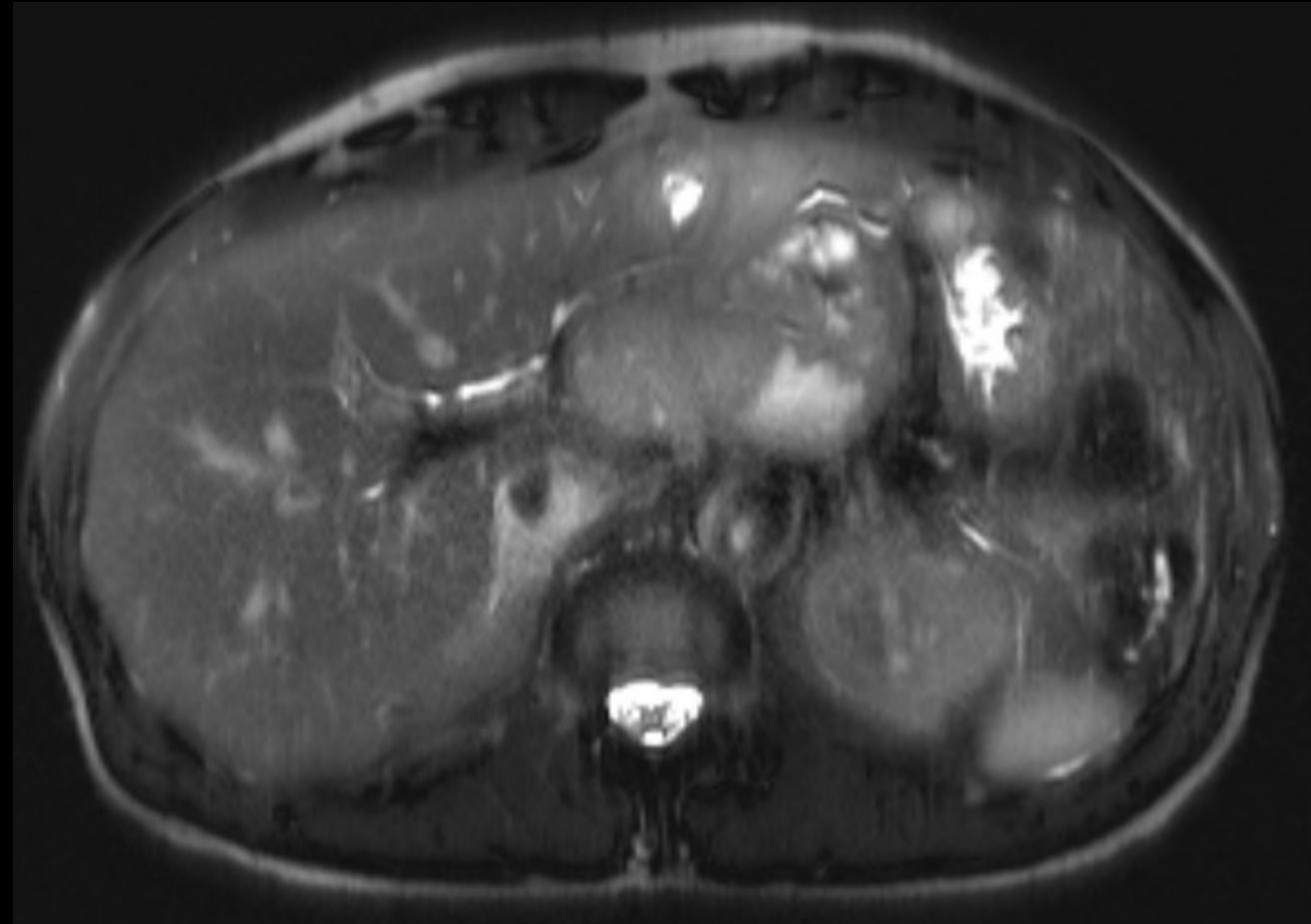


Axial T1 Fat Sat Post-Contrast Late

MRI Abdomen With and Without Contrast (unlabeled)

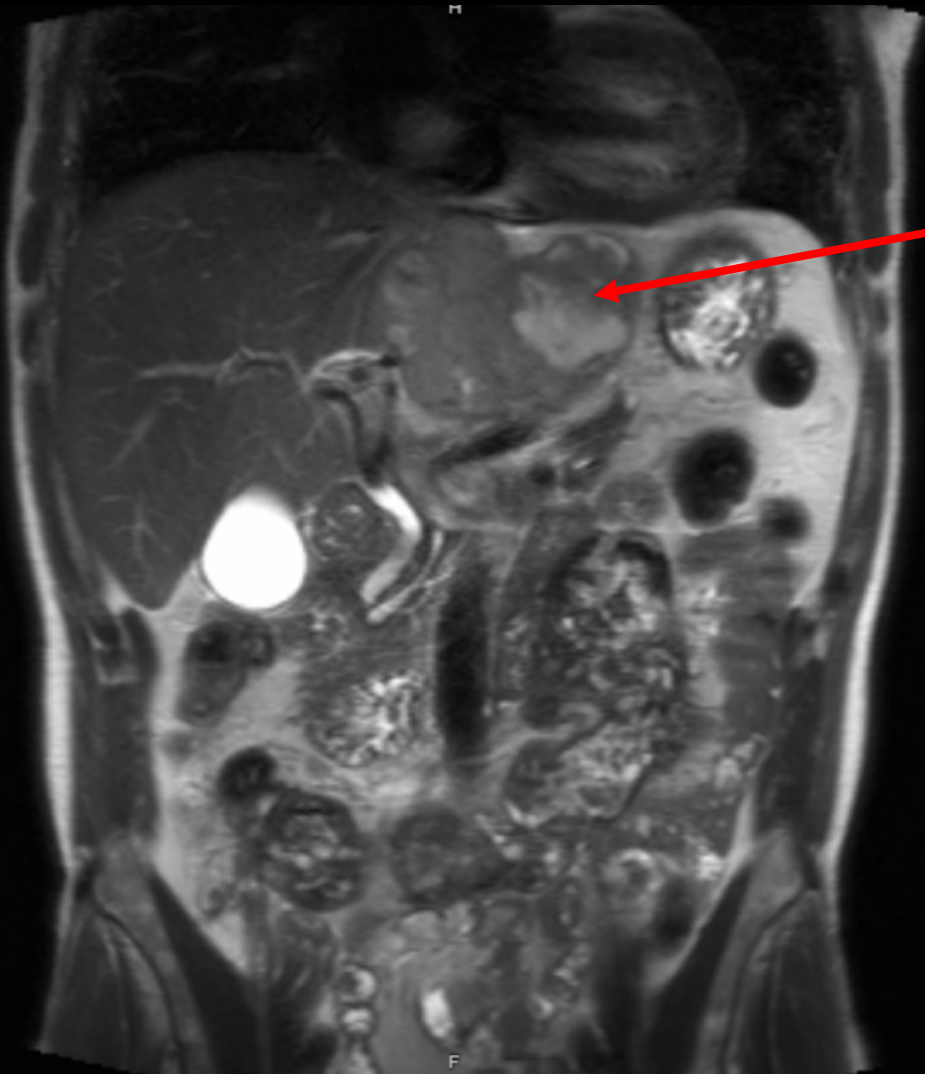


Coronal T2 Fat Sat



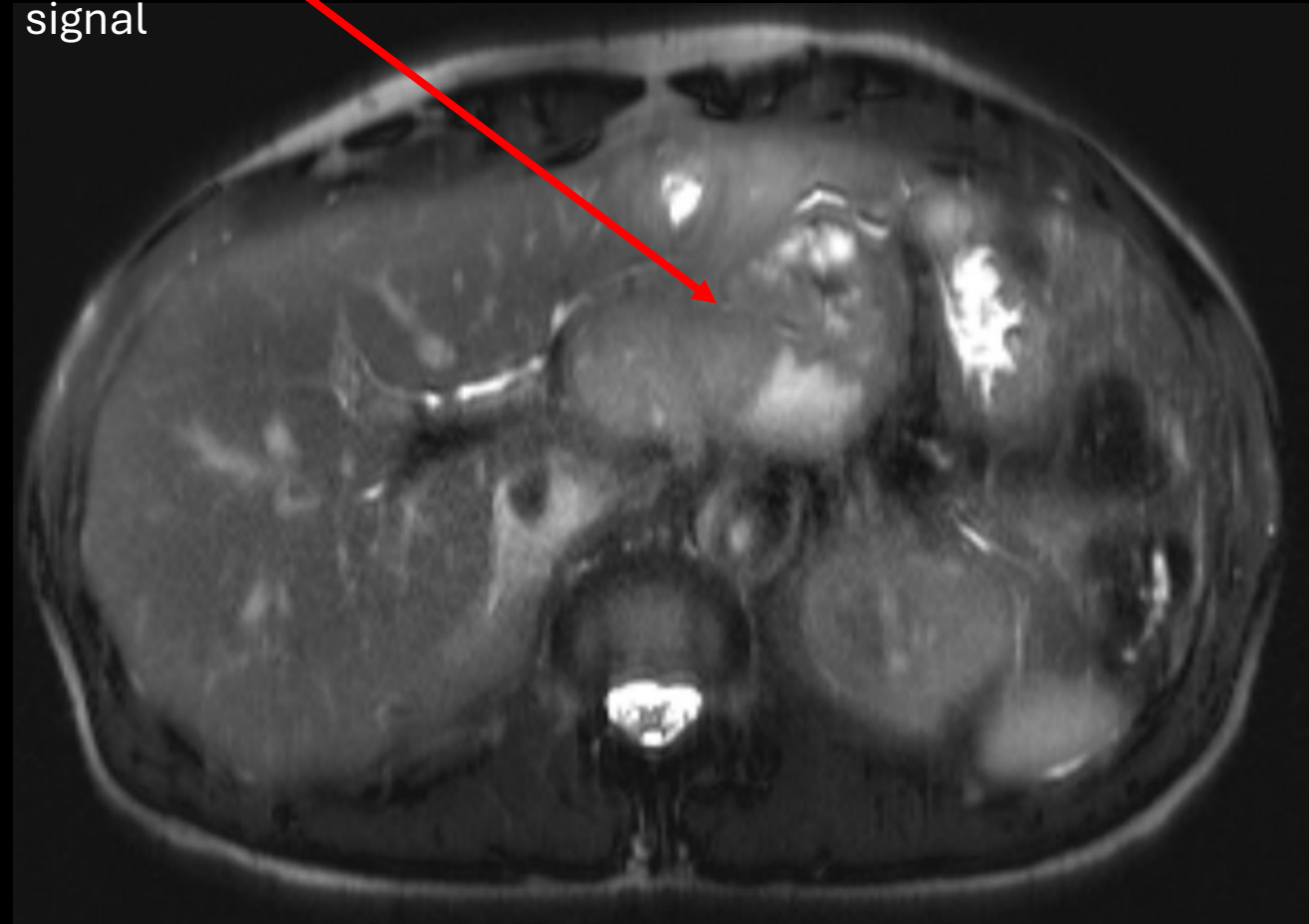
Axial T2 Fat Sat

MRI Abdomen With and Without Contrast



Coronal T2 Fat Sat

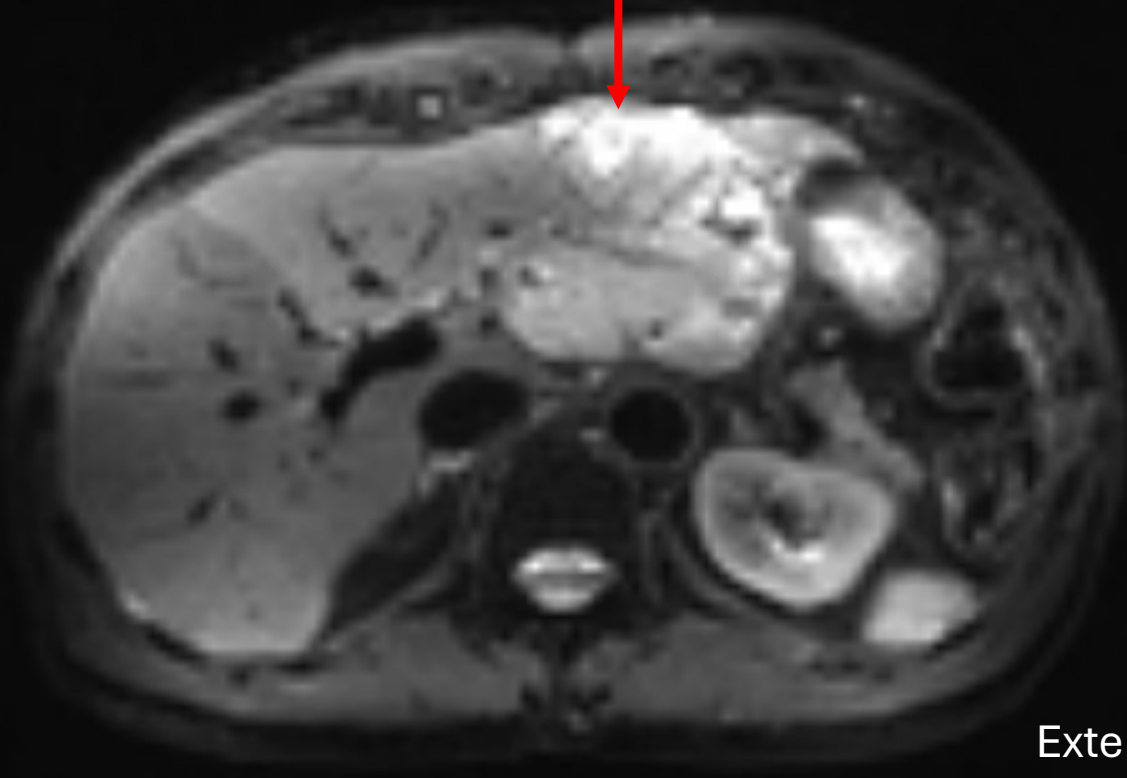
Mildly increased
heterogenous T2
signal



Axial T2 Fat Sat

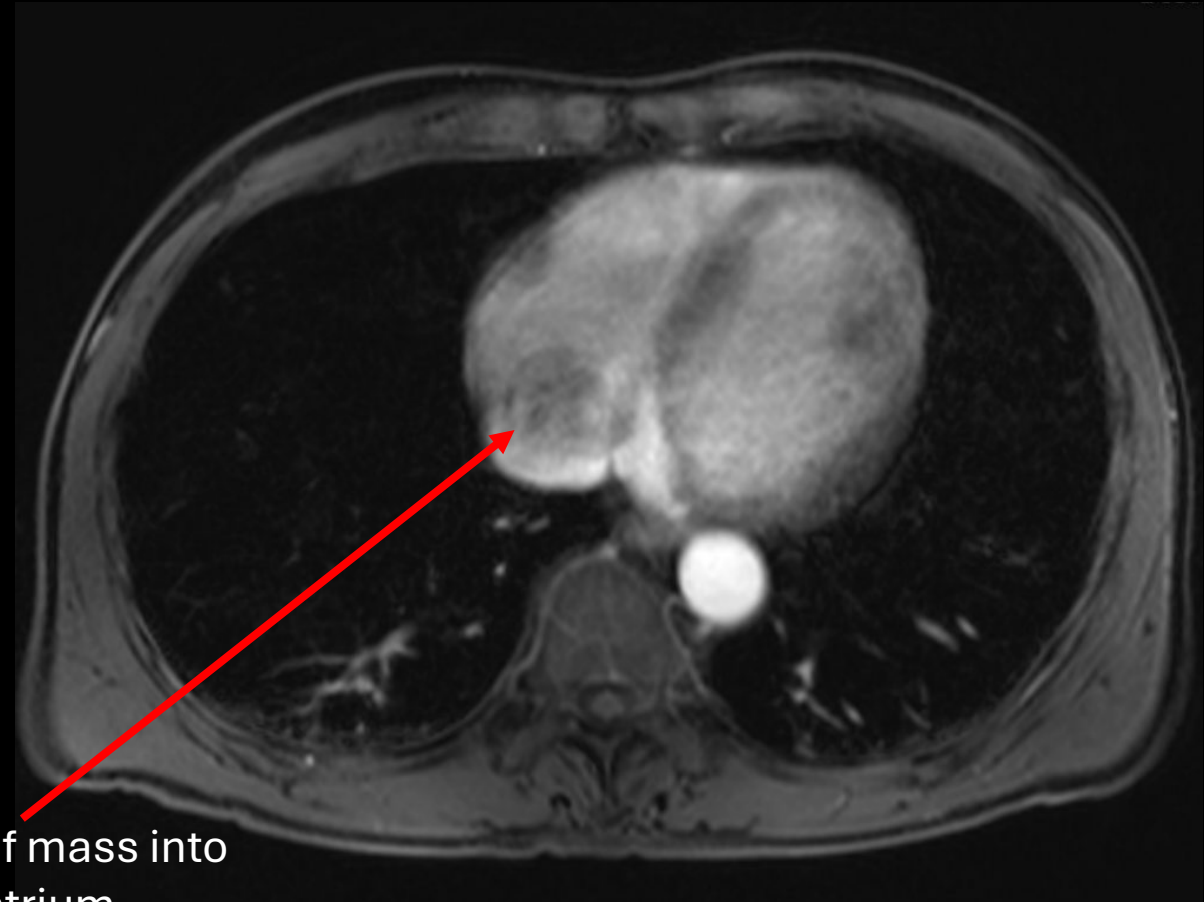
MRI Abdomen With and Without Contrast

Diffusion restriction
present



Axial DWI

Extension of mass into
right atrium



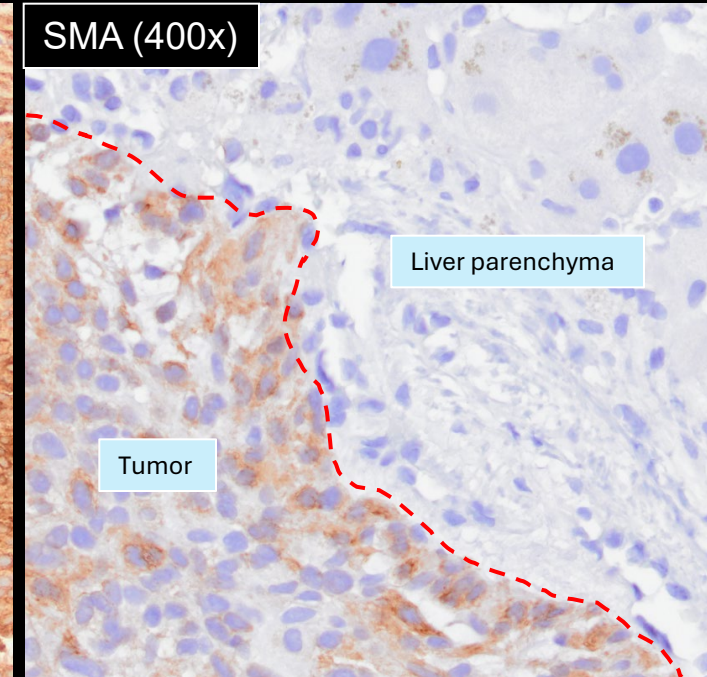
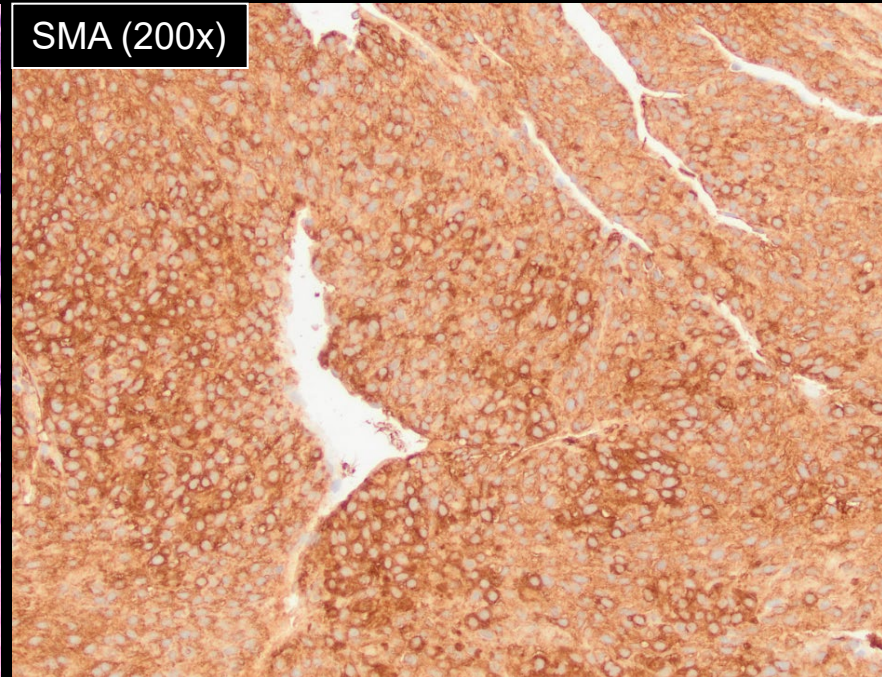
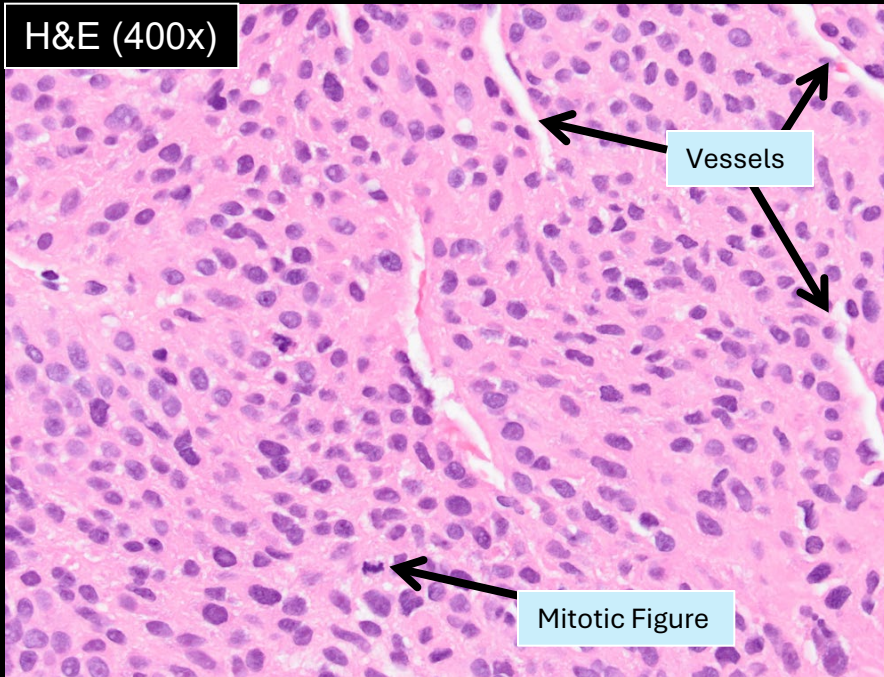
Axial T1 Fat Sat Post-Contrast

DDX (based on imaging)

- Hepatocellular carcinoma
- Intrahepatic Cholangiocarcinoma
- Angiosarcoma
- Liver metastasis
 - Colorectal carcinoma
 - Neuroendocrine tumor
- Other

Ultrasound guided core needle biopsy was performed

Microscopic Findings



H&E sections of the biopsy demonstrate a lesion composed predominantly of bland, epithelioid cells with round nuclei, inconspicuous nucleoli, and indistinct cell borders. Mitoses are rare. Slit-like vessels are present throughout.

The epithelioid cells are positive for smooth muscle actin (SMA) immunohistochemistry. For reference, the background liver parenchyma is negative for SMA.

DDX (based on pathology)

- Well-differentiated neuroendocrine tumor
 - common in the tubular gut and commonly metastasizes to liver
- Primary liver tumors
 - well-differentiated hepatocellular carcinomas can have extremely bland appearances
- Gastrointestinal stromal tumor
 - an epithelioid-to-spindle celled neoplasm common in the tubular gut that commonly metastasizes to the liver
- Melanoma
 - this tumor can arise anywhere in the body or be metastatic. It has a wide spectrum of histologic appearances
- Other metastases
 - the liver is a common site of metastasis from tumors anywhere in the body
- Given positive SMA, a highly sensitive marker for liver glomus, the bland appearance on pathology, and the lack of other malignant findings on imaging, glomus tumor is the most likely diagnosis

Final Dx:

MALIGNANT GLOMUS TUMOR

Case Discussion: Malignant Glomus Tumor Pathology

- Pathology in this case consistent with malignant glomus tumor
- Benign Glomus tumor grossly is an encapsulated mass
 - Glomus cells, smooth muscle cells, endothelial cells
 - Punched out nuclei with branching capillary vessels
- Multiple classes of glomus
 - See figure on right
- Malignant glomus tumor classification
 - Tumors with a deep location and a size of more than 2 cm, *or* atypical mitotic figures, *or* moderate to high nuclear grade and ≥ 5 mitotic figures/50 HPF
 - SMA (smooth muscle actin) is a highly sensitive marker for glomus tumor

Malignant glomus tumor	Symplastic glomus tumor
1) Large size and deep location or 2) Atypical mitotic figures or 3) Marked atypia with mitotic activity	1) Lacks criteria for malignant glomus tumor and 2) Marked nuclear atypia only
Glomus tumor of uncertain malignant potential	Glomangiomas
1) Superficial location with high mitotic activity or 2) Large size only or 3) Deep location only	1) Lacks criteria for malignant glomus tumor or glomus tumor of uncertain malignant potential and 2) Diffuse growth, resembling angiomas, with excess glomus cells

Case Discussion Glomus Tumor

Epidemiology and Presentation

- Tumors arising from contractile glomus body
 - Most benign
 - 75% occur in the hand, visceral glomus tumors rare
- 2% of soft tumors of soft tissue in extremities
 - Classic presentation is a painful, temperature sensitive hand nodule
 - More common in females than males
 - Mean age of diagnosis 42.3 years
- Glomus tumor of the liver is exceptionally rare, few case reports exist
 - ~1% of tumors are malignant
 - Familial cases uncommon but can occur with MEN II
 - Glomus tumors of this size are uncommon
 - Only one reported case of liver glomus extending to the heart

Case Discussion: Glomus Tumor Imaging

- MRI is the test of choice to evaluate glomus tumors
- T1
 - Hypointense on T1, often post-contrast enhancement
- T2
 - Hyperintensities on T2 imaging as in this case, often with a hypointense rim
- Extension into heart as discovered via MRI here is rare
- With this case a liver mass can also represent HCC and other metastases, so biopsy is needed
 - Extension through vasculature implies a malignant mass

Case Discussion: Glomus Tumor Treatment

- Surgical excision with wide margin is recommended for glomus tumors
 - Excision was not possible in this case due to vascular and cardiac extension
- Some providers use chemotherapy regiment
 - No major data or trials for this, protocols for sarcoma often used
 - Oncology Recommended Doxil 40 mg/m² IV every 28 days, patient declined
 - 1 cycle of radiation therapy performed, without significant change in tumor size
- Patient elected only symptomatic care
 - Patient has had multiple admissions for symptomatic management

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