**Clinical history**

**History**

- Chronic Liver Disease
- Primary Malignancy
- No Known Disease

**Chronic Liver Disease**
- HCC most common malignant lesion
- Regenerative/dysplastic nodules
- Independently worrisome features:
  - Mild hyperintensity on T2
  - Early intense enhancement
  - Washout with late capsule
  - Alpha fetoprotein
- Hemangioma not rare
- Cysts/hamartoma not rare

- Fatty HCC
- Hypovascular HCC
Acute on Chronic Hepatitis

Portal vein thrombosis

Acute Budd-Chiari

Primary Malignancy

- Histologic type and location
  - Clues to vascularity of liver metastases
- Chemotherapy administration and when
  - Liver metastases can adopt a variety of appearances in acute, subacute and chronic response to chemotherapy

Hypervascular carcinoid metastases

Hypervascular liver metastases
No Known Disease

- Benign lesions 10x to 100x more common than malignant, based on actuarial data
- Benign lesions are common (20% population)
- Normal background liver?
- Could the patient have cirrhosis?
  - MRI appearance of background liver
  - HCC uncommon in the absence of underlying chronic disease (<1 in 100)
- Could the patient have an unsuspected primary malignancy?
  - Uncommon (<1 in 200)
Small Type 2 hemangioma

Type 3 hemangioma

FNH

Unsuspected primary malignancy
Islet cell tumor metastases

Unsuspected primary malignancy
Islet cell tumor metastases

Liver metastases from unsuspected colon cancer
**MRI findings**

**Lesion appearance on:**
- T1, T2,
- early and late post-Gd images
- ± hepatocyte uptake

**MRI appearance**
- Margins
- SI on noncontrast images
  - Qualify SI e.g. mild, mod, marked ↑ SI
  - e.g. HCC mild ↑ T2, never mod or marked
  - e.g. hemangioma mod or marked ↑ T2

**Enhancement early post gad**
- Uniform
- Ring
- Diffuse heterogeneous
- Nodular
- None (cyst, hypovascular lesion)
Enhancement late post gad
- Enlargement + coalescence nodules (hemangioma)
- Fading (to background liver) (adenoma, FNH, high grade dysplastic nodules, mets)
- Washout (lower than liver) (HCC, hypervascular mets)
- Centripedal (hemangioma or mets)
- Progressive intensified of enhancement (fibrosis, chemo tx mets)
- None (cyst)
**Imaging Pearls:**

- Hemangioma always bright on T2
- HCC never bright on T2
- Background fatty liver: FNH, mets
- Fatty lesions: focal fat, adenoma, HCC
- Cirrhotic liver, never describe FNH or adenoma, describe RN/DN/HCC
- Could this liver be cirrhotic?
  - Fibrosis on short TE T1W images
  - Early negligible, late progressive enhancement

**Imaging Pearls**

- Benign liver lesions are common
  (especially if there is no underlying liver disease)
- In cirrhotic liver, malignant lesions are HCC (mets uncommon when coexistent other primary tumor is present)
- Could this be a chemo tx met?
**Imaging Pearls:**

- Distinguish hemorrhage/protein from enhancement (noncontrast T1)
- Distinguish fat effects from washout (look at all non-suppressed and fat suppressed images)
- Confluent fibrosis or fibrotic lesions, minimal early enhancement with progressive increased enhancement

**Modifying Myths**

- Don’t start with clinical history. Clinical history is always important, start with that
- Uncommon appearance of common lesions is more common than common appearance of uncommon lesions – over simplification – how common is common, how uncommon is uncommon
- Sequence X is not needed, T1, T2, early and late post gad are always important

**Conclusion**

- MRI is by far the most diagnostically accurate approach for liver lesions
- Radiation hazards of CT must be considered when deciding on which modality to use
- MRI is relatively safe
- Logical approach
Conclusion

- Logical approach
  - Clinical history
  - Lesion appearance: T1, T2,
  - Early and late post Gd
  - Benign lesions common
  - Could this be a chemo-tx met
  - Could this be a cirrhotic liver