DDx of Hypervascular Liver Lesions

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What is “Hypervascular”?

- Enhancement in HAP (CT/MRI)
- Most are hypovascular
- Hypervascular (some)
  - Benign tumors: hemangioma, focal nodular hyperplasia, adenoma
  - Vascular lesions: AVMs; AVFs, peliosis hepatis
  - Malignant: hepatocellular carcinoma
  - Mets: carcinoid, renal cell, melanoma, pancreatic islet cell
Hypervascular: HAP

- Occurs ~ 20 seconds
- Best for hypervascular lesions
“Hypervascular” in PVP?

- ~60 sec after IV
  - Hemangioma
“Hypervascular” in Equilibrium?

- 3 min after contrast
  - Central scar of FNH
  - Cholangiocarcinoma
  - Cirrhotic liver (confluent fibrosis)
  - Hemangioma: progressive centripetal enh.
Clinical Features

• Age, gender
• Chronic liver disease
• Extrahepatic malignancy
• Others:
  – Birth control pills
  – Glycogen storage disease
  – Aflatoxin
  – IBD/PSC/cholangio
  – HIV

*Can be misleading*
Imaging Features

- Size
- Margins
- Peritumoral halo
- Central scar
- Capsule
- Hemorrhage
- Fat; Calcifications
- Invasiveness
Hemangioma

- Most common benign neoplasm *
- 5 - 20% of population, F>M
- Large endothelial-lined vascular spaces
- Subcapsular, right lobe
- Asymptomatic, even if large
- Complications extremely rare

Typical Hemangioma

• Confident diagnosis in 90% of cases (proper
technique and interpretive criteria)

• Unenhanced CT: isodense to large vessels

• Rapid IV bolus: nodular or peripheral
  enhancement, isodense with large vessels

• Progressive centripetal fill-in over time *, **

* Quinn SF and Benjamin GG. Radiology 1992;182:545-8.
Focal nodular hyperplasia

- 2-5% of the population *
- *Nonencapsulated* firm nodule
- *Normal hepatocytes* +/- central scar
- Thin radiating fibrous septa, Kupffer cells and primitive bile ductules **
- Calcification, fat, hemorrhage, and necrosis are *extremely rare*

Hepatocellular adenoma

- Rare, in livers with abnormal metabolism (exogenous steroids)
- Over 90% in women on oral contraceptives, may regress with withdrawal
- Risk of spontaneous hemorrhage
- Rare malignant degeneration
- Capsulated, excessive glycogen and lipids characteristic. May have calcification.
Arterio-Venous Fistula

Arterial
Peliosis Hepatis

- Small cystic blood-filled cavities in the liver
- No endothelial lining
- Chronic infection, advanced malignancy
- Bacillary angiomatosis (cutaneous) in HIV
- Pain, fever, hepatomegaly

* NEJM Volume 337:1603; 1997
Hepatic metastasis

- Hypervascular
  - carcinoid, renal cell, melanoma, pancreatic islet cell, breast cancer
  - *Dual phase (HAP and PVP)*
  - HAP improves detection 8% - 39% of cases, esp. small (<1.5 cm) *

* Paulson EK et al. Radiology 1998;206:143-50
Hepatocellular carcinoma

- **Dual phase**
  - HAP: early enhancement (BEST)
  - PVP: rapid washout
- 9 % of nodules seen only on HAP *
- Small tumors (< 3 cm) are homogeneous
- Large: heterogeneous ± central necrosis

Hypervascular in HAP

Multiple, known primary: mets

Cirrhotic liver: HCC

Imaging features

- Periph nod enh
  - Typical Hemang.
  - FNH Hemang. HCC

- Central scar
  - Hemang.

- Fibrous Capsule
  - Adenoma HCC (not FNH)

- Fat/Calcif
  - Adenoma
  - HCC Adenoma

Bleeding

Vascular shunts??
Hypervascular in HAP

Clinical features
(can be misleading)

- Known Primary
- Chronic Liver Ds (Cirrhosis, Viral hep., Primary hemochromatosis)
- Young female on BCP

- Mets
- HCC
- Adenoma

Difficulty: Atypical hemangioma or FNH in a patient with known primary or cirrhosis
Hypervascular in HAP

Clinical and imaging features

1. Peripheral nodular enh.  Yes  Typical hemangioma
   No

2. Known primary  Yes  Mets (until proven otherwise)
   No

3. Ch liver disease  Yes  HCC (until proven otherwise)
   No

4. Capsule/fat/hge  Yes  HCC in non-cirrhotic
   No  Adenoma in young female on BCP

5. ? FNH, ? Atypical hemangioma ? Vascular shunts

Difficulty: Atypical hemangioma or FNH in a patient with known primary or cirrhosis