Solid Hypo and Hypervascular liver lesions

Maarten van Leeuwen
UMCU, Utrecht, Netherlands
Hypovascular lesions

1. Secondary tumors
   - *Metastases adeno-, squamous carcinoma*

2. Primary tumors
   - * Peripheral cholangiocarcinoma (CCC) *
   - * Minority of HCC’s *
   - * Gallbladder and Hilar cholangiocarcinoma *

3. Inflammatory lesions

4. Focal Fatty infiltration
Adeno-, squamous carcinoma metastases

- Vast majority hypovascular
- May have rim enhancement in art phase
- Varying amounts of necrosis
- Appearance depends on primary tumor
  - Colorectal: larger, few in number
    - Sensitivity 75-85%
  - Pancreatic, biliary tract, breast: small, many
    - Sensitivity lower
Cholangiocellular carcinoma

- **Site:**
  - Peripheral (small bile duct in portal area)
  - Major hepatic duct
  - Hilar bifurcation
  - Intraductal (intraductal papillomatosis)

- Peripheral: hilar: major duct: intraductal = 30:4:1:rare

- 10% of primary malignant hepatic tumors
- Some tumors have HCC features
- Increased incidence in Asian countries due to flukes
Peripheral Cholangiocellular carcinoma

- Majority hypovascular
- May have hypervascular component
  - Combined with Hepatocellular cell type
- Often solitary, large mass at presentation
- Peripheral location
- Retraction of capsule due to sclerosis
- May be combined with longstanding local biliary obstruction
HCC, Hypovascular

- Majority HCC (70-85%) hypervascular
- Minority hypovascular
  - Likely diagnosis in presence of cirrhosis
  - Often without necrosis
  - Usually persistent hypointense in portal and equilibrium
Gallbladder carcinoma

- Mass in vicinity of main scissura
- Usually in presence of gallstones
- Often infiltrative growth in liver parenchyma with preservation of part of gallbladder lumen
- Obstruction of biliary system, depending on location of tumor
- Small Gallbladder carcinoma regularly found on PA after cholecystectomy
Solitary infectious masses
Inflammatory mass

- Inflammation may present as solitary, solid tumor due to lack of liquefaction
- Inflammatory infiltrate, walled off from surroundings
- Often lack of mass-effect due to infiltrative nature
- Occurs especially in immune compromised patients
Pyogenic abscesses

- May mimic necrotic metastases
- Often result of subclinical abdominal infection
  - *Diverticulitis*
  - *Appendicitis*
- May be accompanied by local septic portal thrombosis
Focal Fatty infiltration

- May mimick tumor or metastases
- Predeliction for specific locations
  - $R(L)$ of Teres ligament
  - Base of segment 4
  - Next to gallbladder
- Caused by extrahepatic blood supply
  - Falciform ligament
  - Hilar vessels
  - Gallbladder
- Diag: no mass effect, combined with typical location
- When in doubt: MR in and out of phase
Hypervascular Lesions

1. Hypervascular tumors
   - \textit{HCC}
   - \textit{Hypervascular metastases}
     - \textit{RCC, Endocrine tumors, Breast, melanoma}
   - \textit{FNH}
   - \textit{Adenoma}

2. Vascular lesions
   - \textit{Hemangioma}
   - \textit{Arterio-portal shunting}
   - \textit{AVM}

3. Perfusion abnormalities
90% in chronic liver disease
- **Alcoholic cirrhosis** 45%
- **B viral cirrhosis** 25%
- **Cryptogenic cirrhosis** 20%

10% in normal livers

**Typical sequence**
1. Hyperplastic nodule (hypovascular)
2. Dysplastic nodule (hypovascular)
3. Early HCC (majority hypovascular, occasionally hyper)
4. Advanced HCC (majority hypervascular, occ hypovascular)
HCC

- Majority in cirrhotic livers
- Majority hypervascular
  - Ranges from slight to marked
  - May be inhomogeneous; so called mosaic-pattern
  - Vascular ingrowth, leading to tumor thrombus
  - Possible arteriportal shunting
  - Tumor vessels may mimick hemangioma enhancement
  - due to aneurysm formation
- Arterial phase essential for detection
  - 5mL/sec best enhancement
- Usually wash-out on portal and/or equilibrium phase
- May be isointense on portal phase
Hypervascular metastases

- Type of tumor
  - Renal cell carcinoma
  - Endocrine tumors
    - Thyroid, Carcinoid, Pancreatic Neuroendocrine Tumors
    - Breast carcinoma (minority)
- Often mixed hypo- and hypervascular metastases
- May be missed on portal phase alone
- CT less sensitive than for hypovascular mets
- MRI>CT for detection
Incidental solitary mass in young females

• Prevalence
  1. Hemangioma
  2. FNH
  3. Adenoma
  4. Other
    • Malignant ??

• Clinical Goal: DD:
  1. Hemangioma and FNH: no treatment, no FU
  2. Adenoma, other: treatment or FU
Summary hypovascular liver lesions

Malignant

1. Metastases
   • Adeno, squamous
2. Cholangiocarcinoma
   • Peripheral, Hilar, gallbladder
3. Hypovascular HCC

Benign

1. Inflammatory mass
2. Abscess
3. Fat
Summary hypervascular liver lesions

Malignant

1. Hypervascular metastases
   • Endocrine, renal, breast, melanoma

2. HCC

3. CCC with HCC component

Benign

1. FNH

2. Adenoma

3. THAD

4. AVM

5. (Hemangioma)