



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



Universitair Medisch Centrum
Utrecht

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 mimick 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

- *HCC*
- *Hypervascular metastases*
 - *RCC, Endocrine tumors, Breast, melanoma*
- *FNH*
- *Adenoma*

2. Vascular lesions

- *Hemangioma*
- *Arterio-portal shunting*
- *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)

- 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 arterioportal shunting*
 - *Tumor vessels may mimic 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. *Abcess*

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)*