



# Solid Hypo and Hypervascular liver lesions

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# 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



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# 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)*