# SONOGRAPHIC LIVER PATTERNS

- Normal
- Centrilobular
- Fatty-fibrotic

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# CENTRI-LOBULAR PATTERN

- Decreased echogenicity of liver parenchyma
- Increased visualization of PV walls
  - increased brightness
  - increased number
- Acute hepatitis, acute RT heart failure, leukemia/lymphoma, toxic shock, 2% normals



# FATTY-FIBROTIC PATTERN

- Increased echogenicity of liver parenchyma
- Decreased definition of PV walls
- Echotexture
  - homogeneous (fine)
  - heterogeneous (coarse)
- Posterior sound attenuation
- Fatty infiltration, chronic hepatits, cirrhosis, acute alcoholic hepatitis



# FATTY - FIBROTIC PATTERN

## Echotexture



Homogeneous



Heterogeneous

# FATTY LIVER

- Posterior sound attenuation
- Enlarged liver
- Tends to have fine homogeneous echotexture





# FOCAL FATTY LIVER CHANGES

- Focal fatty infiltration

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- Focal fatty sparing



# LIVER CIRRHOSIS

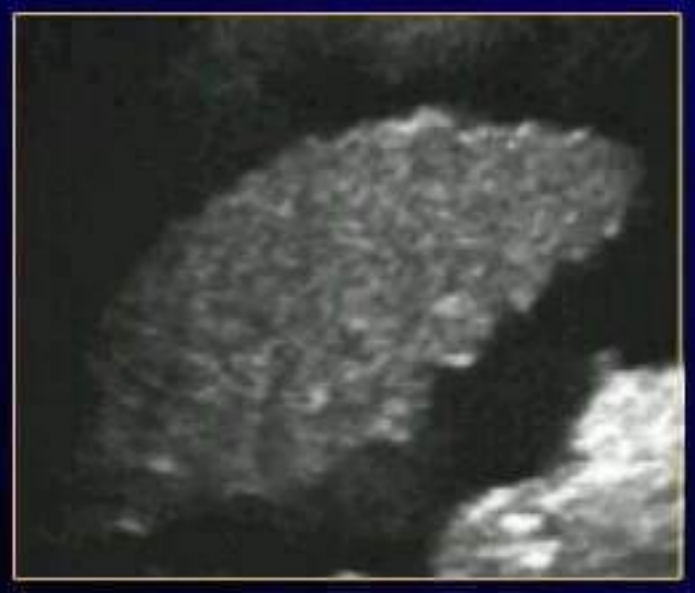
- Fatty-fibrotic pattern
  - heterogeneous echotexture
    (coarse "motheaten")
  - almost no posterior attenuation
- Shrunken liver
- Nodular surface
- Elevated caudate:right lobe ratio ( >0.73 has 99% specificity for cirrhosisS)



# LIVER CIRRHOSIS

- Accounts for > 90% of all portal hypertension
- Distorted liver architecture
  - Fibrosis
  - Regenerating nodules
  - Distorted vascular channels

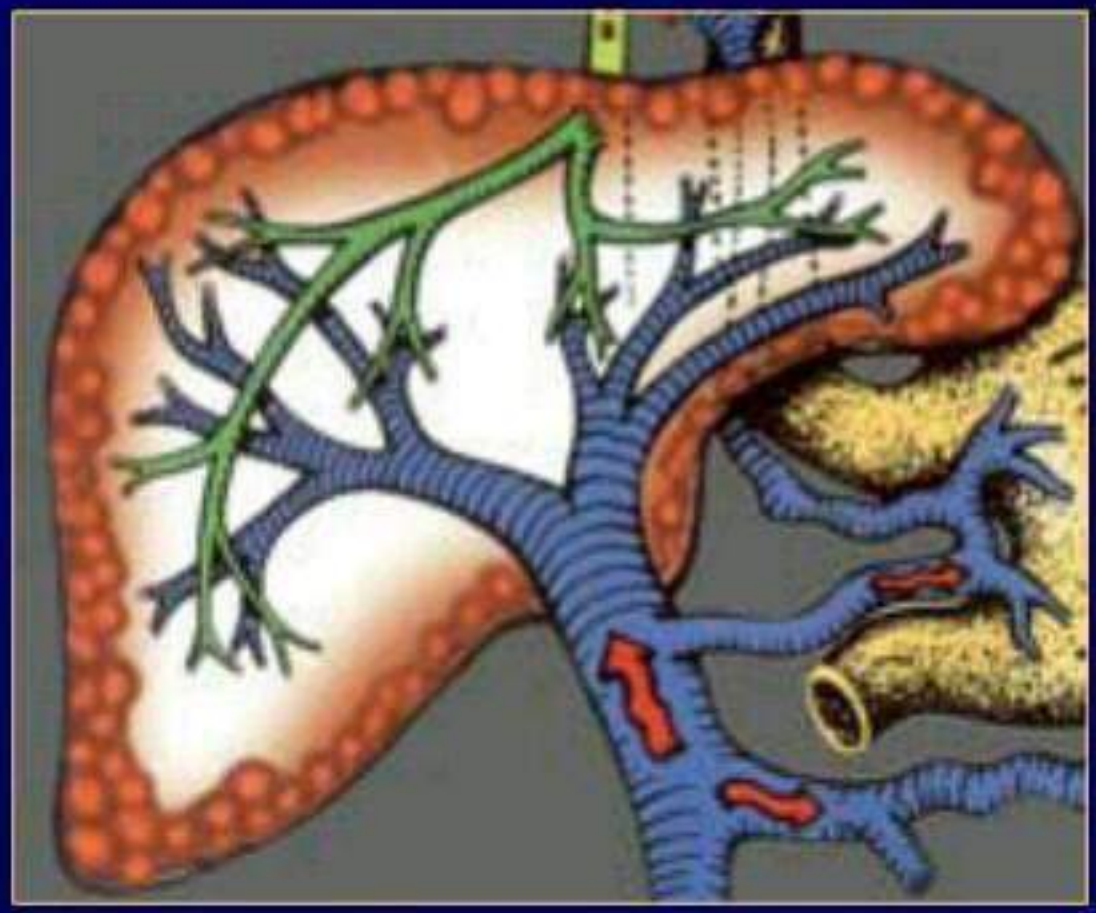








# PORTAL HYPERTENSION



↑ hepatic resistance, ↑ portal venous pressure, eventually ↓ portal flow, reversed portal flow

Prognostication for risk of hemorrhage

# PORTAL HYPERTENSION

## Sonographic Signs

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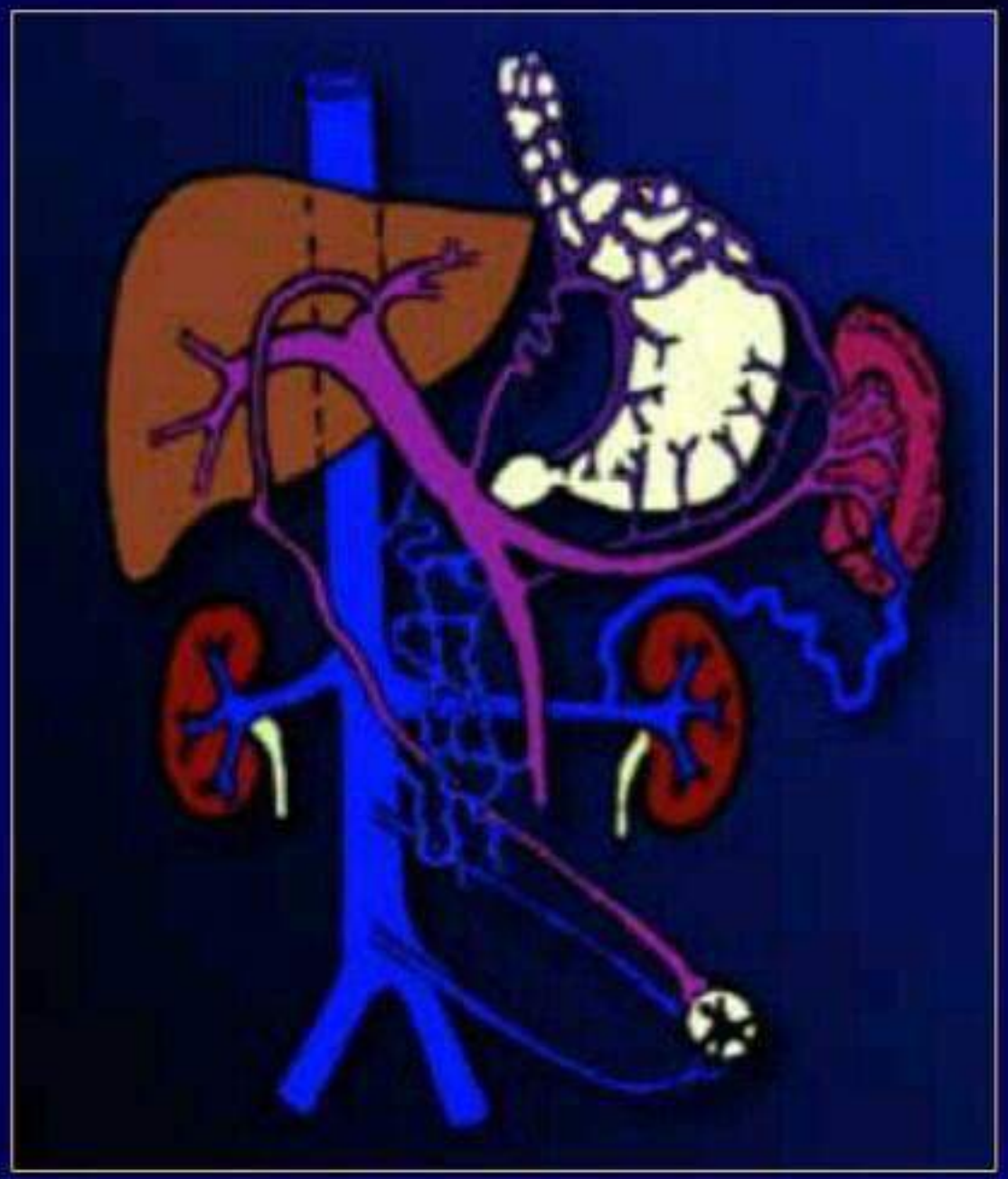
- Ascites
- Dilated MPV, SV, SMV
- Collaterals
- Splenomegaly
- Various Doppler findings





# COLLATERAL VEINS

- Gastroesophageal
- Coronary
- Umbilical
- Gastrosplenic
- Splenorenal/gastrorenal
- Perisplenic
- Intestinal
- Retroperitoneal



# PORTAL HYPERTENSION

## Collateral Vessels









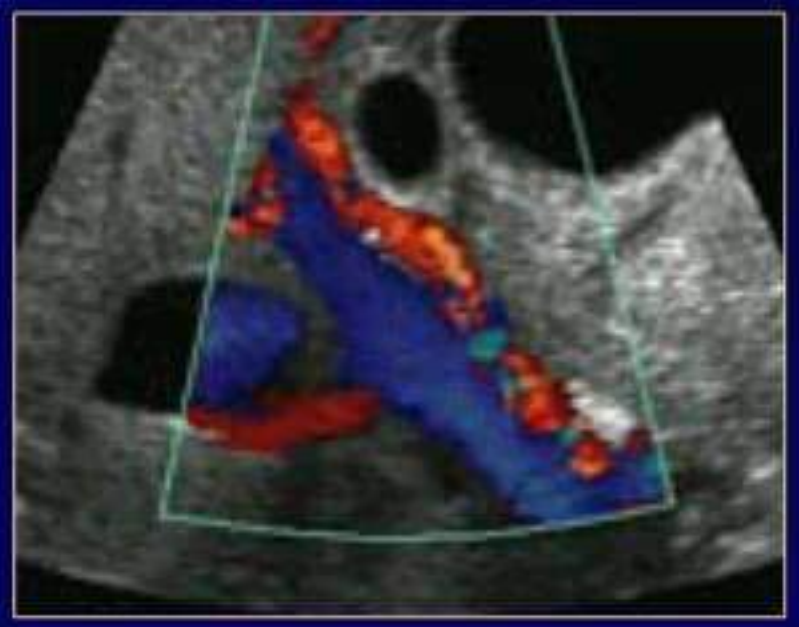


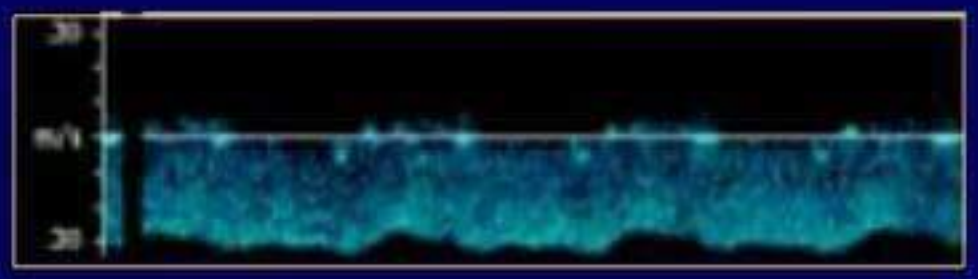


# DOPPLER in PORTAL HYPERTENSION

- Portal veins:
  - loss of respiratory variation
  - decreased velocity MPV
  - hepatofugal (reversed) flow
- Hepatic veins:
  - loss of normal pulsatility
  - non-triphasic flow
  - flattened waveform
- Hepatic arteries:
  - enlarged hepatic arteries







# PORTAL HYPERTENSION

## Enlarged Hepatic Arteries

A cause of intraparenchymal “double duct” sign





# FOCAL LIVER MASSES

- US is excellent in detecting focal liver lesions
- US is specific for liver cysts > 1 cm
- Not good in differentiating among pathologic entities
  - Very few US features are characteristic
- Not good in distinguishing between benign and malignant masses
- Triple phase Liver CT and MRI are excellent
- US is very helpful for diagnosis in the proper clinical setting, for follow-up and as guidance for biopsy

# SIMPLE CYSTIC LESIONS

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- Cyst
- Old hematoma
- Abscess (hydatid)
- Biloma / seroma
- Vascular
  - aneurysm
  - fistula (a-pv, p-hv)





# COMPLEX CYSTIC LESIONS

- Hemorrhagic cyst
- Infected cyst
- Hematoma
- Abscess
- Biloma / seroma
- Biliary cystadenoma
- Cystic/necrotic malignant tumors



# LIVER ABSCESS

- May cause difficulty in diagnosis






# CHARACTERISTIC LESION

## Echinococcal cyst with laminated membrane





# COMPLEX CYSTIC LESIONS

## Benign versus Malignant



Echinococcal cyst

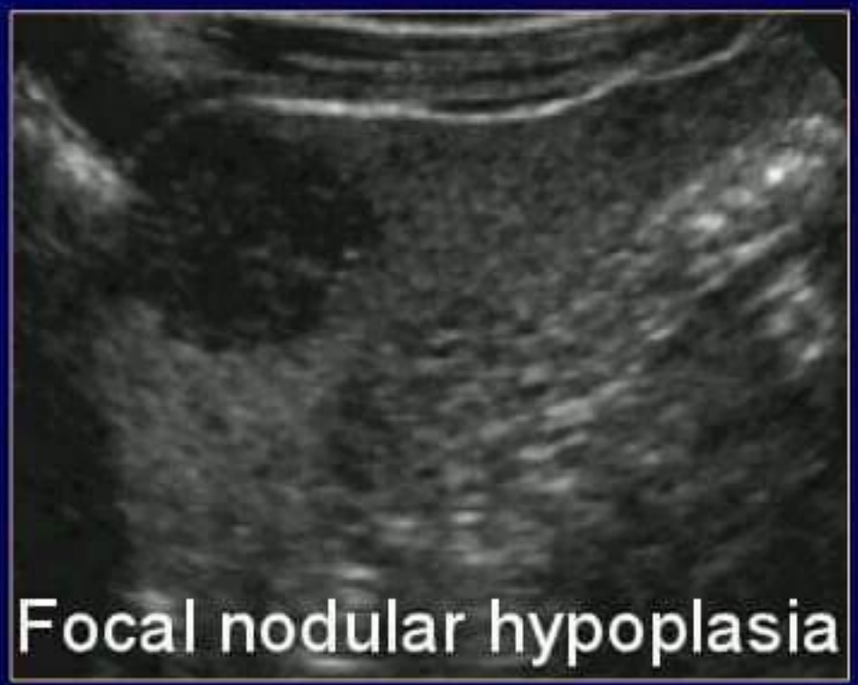


Metastases

# HYPOECHOIC MASS

| BENIGN | MALIGNANT |
| --- | --- |
| Abscess | Metastasis |
| Adenoma | Hepatocellular carcinoma |
| Focal nodular hypoplasia | Lymphoma |
| Hemangioma | |
| Microabscesses | |
| Focal fatty sparing | |

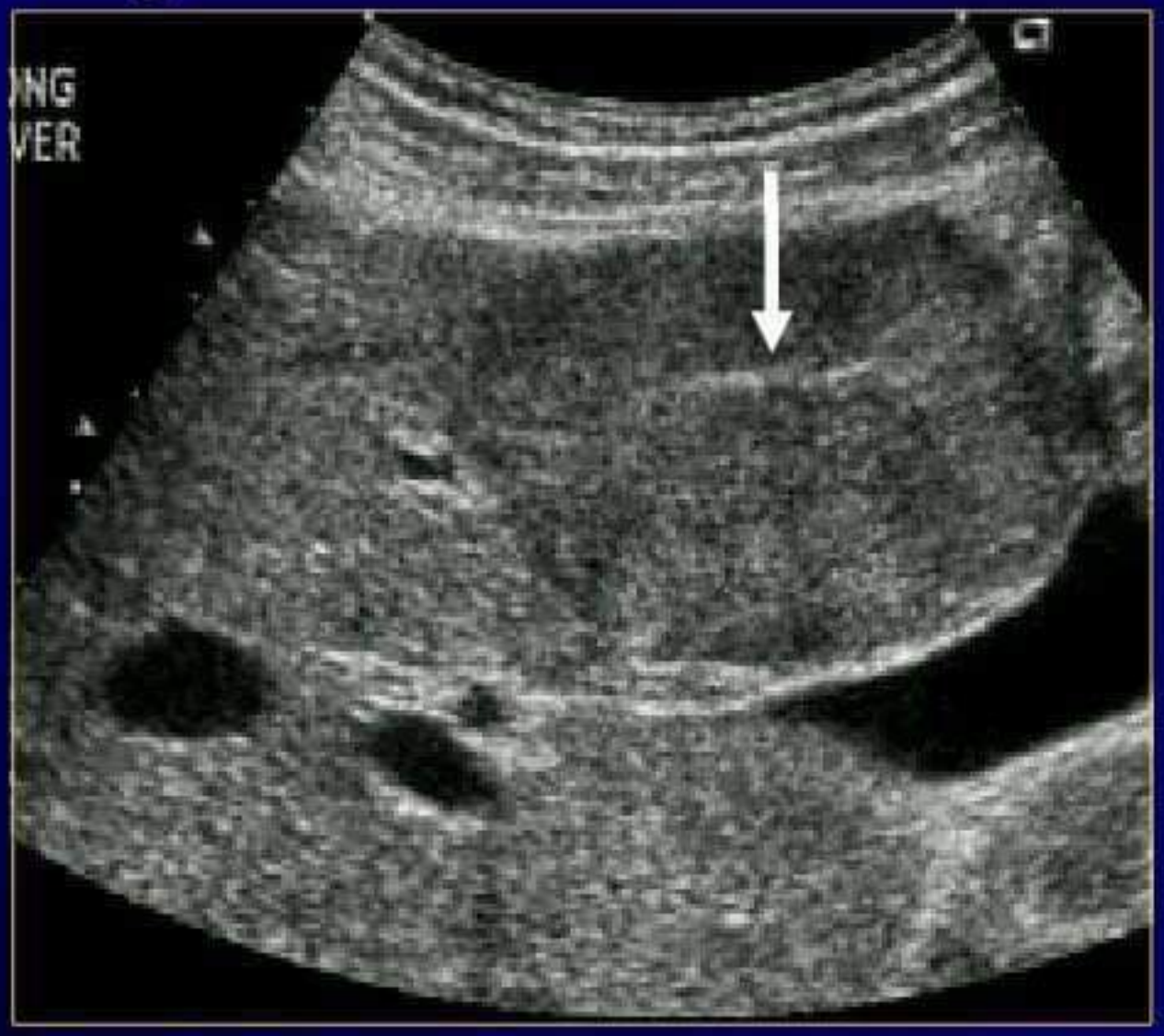
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Focal nodular hypoplasia

# CHARACTERISTIC LESION

- Focal nodular hyperplasia with a central scar
- But not diagnostic



# CENTRAL SCAR IN LESION

Hepatocellular carcinoma,
Fibrolamellar type



Giant hemangioma



# CHARACTERISTIC LESION

- Hyperechoic hemangioma



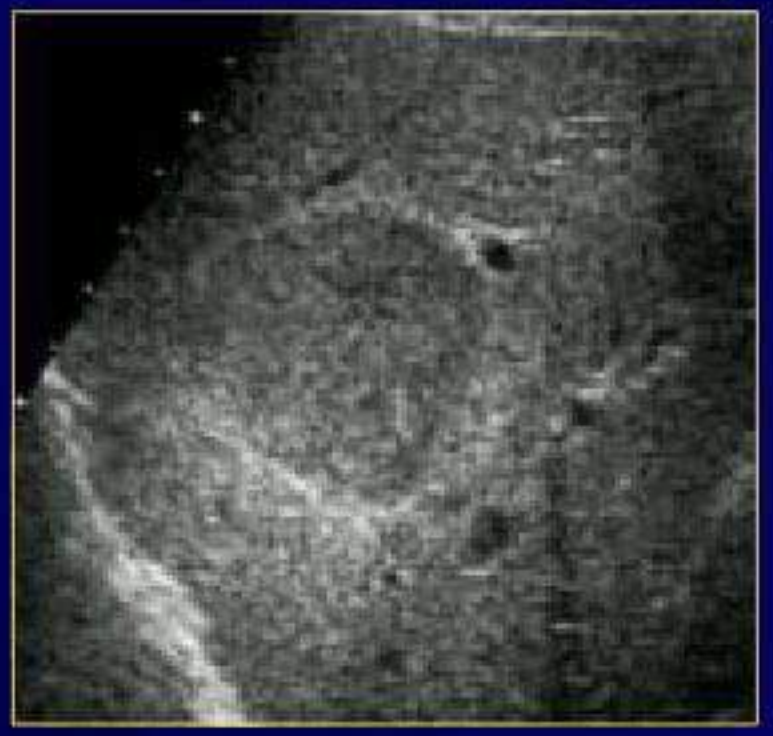


# ATYPICAL HEMAGIOMAS









# HYPERECHOIC MASS

## BENIGN

- Hemangioma
- Abscess
- Adenoma
- Focal nodular hypoplasia
- Focal fat
- Hemorrhagic cyst

## MALIGNANT

- Metastasis
- Hepatocellular carcinoma
- Lymphoma



Thyroid cancer metastasis

# MULTIPLE SOLID MASSES

- Metastases



Regenerating nodules
in cirrhosis



Lymphoma

# MULTIPLE SOLID MASSES

- Multifocal HCC, Multiple hemangiomas, microabscesses



Multiple hemangiomas



Microabscesses

# CHARACTERISTIC METASTASES

- Colon metastases





Also seen with cancers of ovary, breast, stomach, pancreas, osteosarcoma, leiomyosarcoma, chondrosarcoma, teratocarcinoma

# US GUIDANCE

- Usefulness of sonography
- For aspiration, biopsy and drainage

