What's the Best Approach to Evaluate the Liver Mass?

WHAT IS THE BEST WAY TO EVALUATE THE LIVER MASS?

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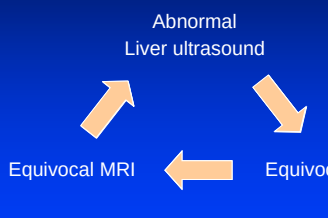
LIVER MASSES
DISCOVERY AND SIGNIFICANCE

- Incidental when ultrasound is performed for non-specific symptoms.
- Symptoms unlikely due to the lesion
- Raises great concern for patient and physician
- Leads to more radiologic testing
- Defining the true cause of symptoms significantly delayed
- Eventually physician convinced that lesion is benign
- Initial symptoms resolved spontaneously

LIVER MASS LESIONS
RADIOLOGY CYCLE

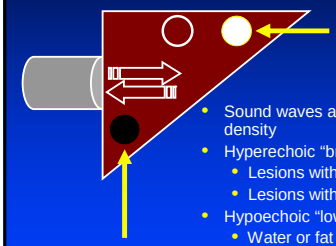


What's the Best Approach to Evaluate the Liver Mass?

RADIOLOGIC TESTING
ULTRASOUND

- Inexpensive
- Non-invasive
- Easily and rapidly performed
- Best screening test for RUQ symptoms or liver test abnormalities
- Findings are frequently non-specific and non-diagnostic

ULTRASOUND
LIVER MASS LESIONS

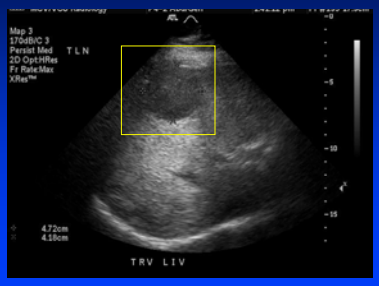


- Sound waves able to detect differences in tissue density
- Hyperechoic "bright"
  - Lesions with numerous irregular structures.
  - Lesions with a capsule
- Hypoechoic "low density"
  - Water or fat
- Isoechoic
  - Lesions with same density as liver

ULTRASOUND
HYPERECHOIC HEMANGIOMA

What's the Best Approach to Evaluate the Liver Mass?

ULTRASOUND
HYPOECHOIC ADENOMA



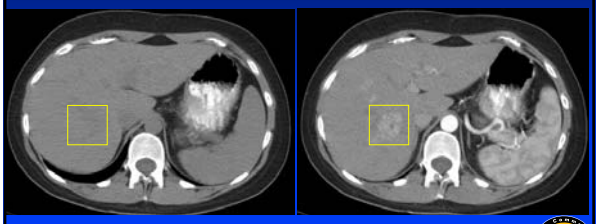
RADIOLOGIC TESTING
COMPUTED TOMOGRAPHY

- Intravenous contrast must be administered to better define liver mass lesions
- Oral contrast may or may not be given
- Rapid scanning – 10 seconds
- Well tolerated
- Triple phase essential to characterize liver mass lesions. Acquires images:
  - Prior to IV contrast
  - During administration of IV contrast
  - After contrast administered – “washout phase”

COMPUTED TOMOGRAPHY
IMPORTANCE OF CONTRAST

Focal Nodular Hyperplasia

Baseline/Pre-Contrast | Contrast-phase

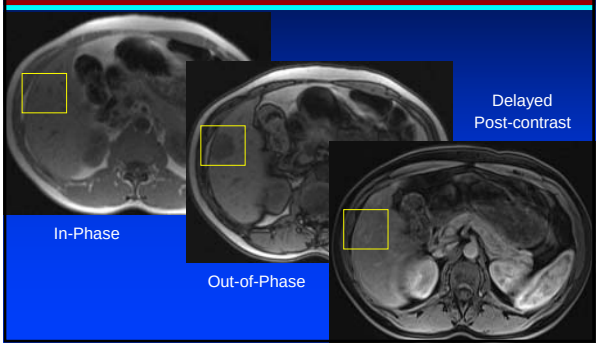


What's the Best Approach to Evaluate the Liver Mass?

RADIOLOGIC TESTING
MAGNETIC RESONANCE IMAGING

- Highly accurate for characterizing liver mass lesions
- Long procedure – 10-20 minutes
- Confining - difficult for some patients to tolerate
  - Obesity
  - Claustrophobic
- Intravenous contrast, gadolinium, must be administered to define liver mass lesions

MAGNETIC RESONANCE IMAGING
ADENOMA

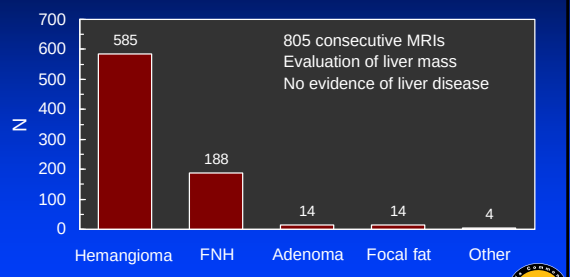


RADIOLOGIC TESTING
RADIONUCLIDE IMAGING

- Intravenous administration of radioactive agent
- Sulfer-colloid
  - Taken up by Kupffer cells
  - Any lesion composed of non-liver tissue does not take up sulphur–colloid
  - Cold “nodule”
  - Metastatic lesions
  - Cysts
- Red blood cells:
  - Assesses perfusion
  - Hemangiomas

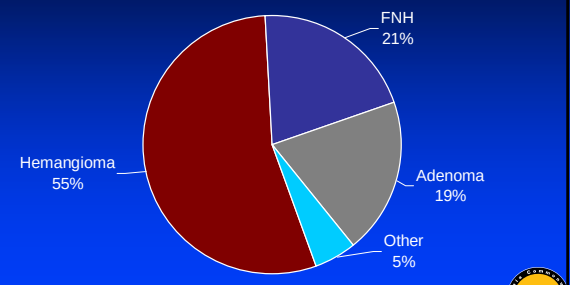
What's the Best Approach to Evaluate the Liver Mass?

PATIENTS WITHOUT LIVER DISEASE
DISTRIBUTION OF LIVER MASSES



T John et al.
Ann Surg 1994; 220:711-719.

PATIENTS WITHOUT LIVER DISEASE
BENIGN LIVER LESIONS



KR Reddy et al.
Ann Surg 2001; 67:173-178.

BENIGN LIVER MASSES
HEMANGIOMA

- Most common lesion found in persons without liver disease
- Most common benign liver lesion
- 0.4-20% of persons
- 60-80% found in women
- 1-20 cm in diameter
- Symptoms: rare, variable, unrelated to size
- Bleeding exceedingly rare even in patients with large hemangiomas
- Do not allow radiologist to embolize

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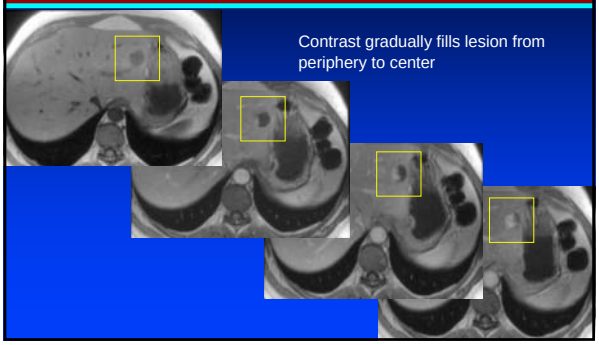
HEMANGIOMA
CHARACTERISTIC ENHANCEMENT



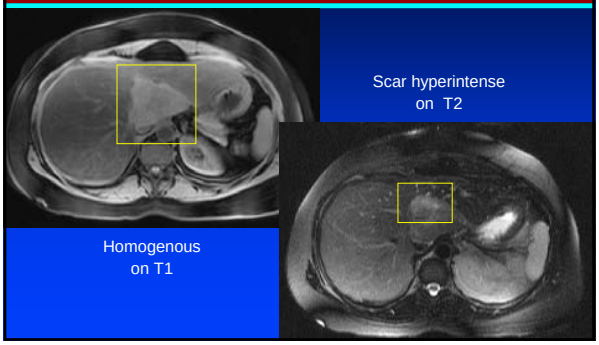
BENIGN LIVER MASSES
FOCAL NODULAR HYPERPLASIA

- Second most common lesion found in persons without liver disease
- 0.4-0.6% of persons
- 20-50% found in women
- 60% less than 5cm in diameter
- Asymptomatic
- May increase in size over time
- Unclear if growth affected by oral contraceptive use
- OCP need not be discontinued
- No malignant potential

FOCAL NODULAR HYPERPLASIA
PATHOGENESIS

- Focal congenital malformation of the hepatic vasculature
- Increased local blood flow and hyperplasia of normal liver tissue around the vascular lesion
- Central artery appears as “scar” on imaging and is diagnostic
- MRI is best diagnostic test:
  - Homogenous on T1
  - Scar hyperintense on T2
  - Uniformly hyperintense with contrast

FOCAL NODULAR HYPERPLASIA
MRI FEATURES



BENIGN LIVER MASSES
HEPATIC ADENOMA

- Most commonly found in women over 30 years of age
- More than 5 years of OCP use
  - No OCP: 1 - 1.3 per million
  - OCP: 3.4 per 100,000
- Other conditions:
  - Pregnancy
  - Diabetes Mellitus
  - Glycogen storage disease (males)

HEPATIC ADENOMA
MALIGNANT POTENTIAL

- Adenomas can continue to grow in pregnancy and with OCP
  - Discontinue OCP
  - Monitor lesion every 6 months with imaging until stable
  - Lesions may shrink and disappear when OCP discontinued
- Growth of lesion is concern – resection
- Lesions > 5 cm diameter increased risk of malignancy
  - Resection if does not decrease in size when OCP stopped

MULTIPLE HEPATIC ADENOMAS
MANAGEMENT

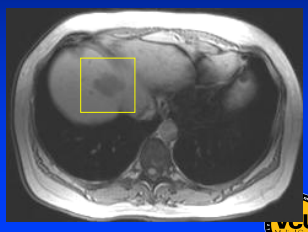
- Rare
- Associated with > 5 years OCP use
- Numerous adenomas of varying sizes
- Discontinue OCP
- Monitor lesions every 6 months with imaging
- Consider for liver transplantation if:
  - Numerous large (>5 cm) lesions
  - Do not decrease in size when stop OCP
  - Any single lesion increasing in size

BENIGN LIVER MASSES
NODULAR REGENERATIVE HYPERPLASIA

- Seen with:
  - Autoimmune disorders
  - Myeloproliferative syndromes
  - Anti-neoplastic medications
- Vascular injury causing remodeling of surrounding tissue into a nodule
- Nodule composed of normal liver cells
- No fibrosis
- May appear like cirrhotic nodules on imaging studies
- No risk of malignant transformation
- Cause of non-cirrhotic portal hypertension

BENIGN LIVER MASSES
FOCAL FATTY CHANGE

- Localized areas of steatosis
- May be misinterpreted as neoplasia
- Seen with:
  - Alcohol
  - TPN
  - Metabolic syndrome
  - HIV
- MRI – increased intensity on T1



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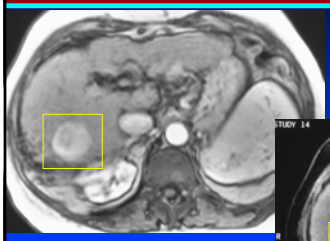
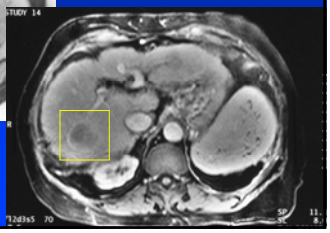
MASSES IN PATIENTS WITH CIRRHOSIS
HCC



Hyperintense on
With contrast

Rim enhancement with
Delayed phase

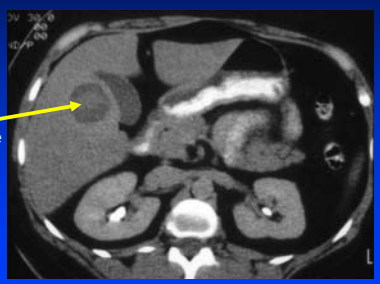


LIVER MASSES
SEVERE RUQ PAIN

- Large adenoma or metastatic mass with hemorrhage
  - Lesion has outgrown blood supply
  - Center of lesion ischemic and/or necrotic
  - May be associated with hemorrhage
- Large hemangioma
  - Thrombosis within lesion
  - Bleeding rare

LARGE ADENOMA
CENTRAL HEMORRHAGE

Central
hemorrhage



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LIVER MASS WITHOUT LIVER DISEASE
APPROACH

- Very unlikely to be HCC
- Check AFP
- Check for other tumor markers (CEA, PSA)
- MRI or triple phase CT usually diagnostic
- Repeat scan in 3-6 months to ensure stability
- If uncertain repeat scans at less frequent intervals until you are certain - then stop scanning!
- Avoid the radiology cycle
- Avoid biopsy

LIVER MASSES
ACCURACY OF IMAGING

	Accuracy	Specificity	Positive predictive value	Negative predictive value
Benign lesion	99%	100%	100%	99%
HCC	99%	99%	99%	100%
Metastatic lesion	99%	99%	97%	100%

G Torzilli et al
Hepatology 1999;30:889-93

LIVER MASS
CIRRHOSIS vs NO CIRRHOSIS

Chronic Liver Disease or Cirrhosis	NO Chronic Liver Disease or Cirrhosis
HCC until proven otherwise	Hemangioma Focal nodular hyperplasia Adenoma Nodular regenerative hyperplasia Focal fat

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