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**ACG 2023**  
OCTOBER 20-25, 2023 | VANCOUVER, CANADA

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Virtual Grand Rounds

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## Participating in the Webinar

All attendees will be muted and will remain in "Listen Only Mode"

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.

A handout with the slides and room to take notes can be downloaded from your control panel.

Moderator:  
Zaigham Abbas, MBBS, FCPS, FRCP, FRCPI, FACP, FACG

Exit

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# ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!



### Week 31 – Thursday, August 3, 2023

American College of Gastroenterology Guidelines Update:  
Diagnosis and Management of Celiac Disease

Faculty: Benjamin Lebwohl, MD, MS

Moderator: Carol E. Semrad, MD, FACC

At Noon and 8pm Eastern



### Week 32 – Thursday, August 10, 2023

Unleashing the Power of AI in Gastroenterology: Going Beyond Lesion Detection to Transform  
Clinical Tasks and Everyday Practice

Faculty: Sravanthi Parasa, MD

Moderator: Vladimir Kushnir, MD, FACC

At Noon and 8pm Eastern

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# Practical Management of Focal Liver Lesions in 2023



ACG International Grand Rounds  
August 1, 2023

Joseph Ahn, MD, FACP  
Professor of Medicine  
Section Head of Hepatology  
Oregon Health & Science University



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## Focal Liver Lesions (FLL) ~ Benign Liver Masses

### Learning Objectives

Introduction



Management Approach



Case Review

- *Clinical Context*
- *Imaging Characteristics*
- *DDx*
- *When to Biopsy*
- *When to Resect*

Not for Radiologists  
But Clinicians

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## Case 1- PCP referral

55 yo M with DM, obesity, abdominal pain

US- 4 cm solid hepatic mass

**What are the next best steps?**

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## Why?

Patients worry  
about having:  
Cancer

Providers worry  
about missing:  
Cancer

Patient want to  
know  
“What is it?”

Providers worry  
about being  
SUED

Nguyen, J Am Col Rad 2017;14:324

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## Increase in Diagnoses of Unsuspected Liver Lesions

1996 ----- 2010

- CTs tripled
- MRIs quadrupled
- US doubled
- PET scans increased

➔

Increase in Liver Lesions being Discovered

CT Chest obtained for lung cancer screening  
**2.1%** had incidental hepatobiliary findings

JAMA 2012; 307

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## Practice Guideline

nature publishing group
PRACTICE GUIDELINES 1

### ACG Clinical Guideline: The Diagnosis and Management of Focal Liver Lesions

Jorge A. Marrero, MD<sup>1</sup>, Joseph Ahn, MD, FACP<sup>2</sup> and K. Rajender Reddy, MD, FACP<sup>3</sup> on behalf of the Practice Parameters Committee of the American College of Gastroenterology

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Marrero, Ahn, AJG 2014; 109: 1328

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## More Guidelines


Digestive and Liver Disease 54 (2022) 1614–1622



Contents lists available at [ScienceDirect](#)

### Digestive and Liver Disease

journal homepage: [www.elsevier.com/locate/dld](http://www.elsevier.com/locate/dld)



Guidelines


Manager

**Benign liver lesions 2022: Guideline for clinical practice of Associazione Italiana Studio del Fegato (AISF), Società Italiana di Radiologia Medica e Interventistica (SIRM), Società Italiana di Chirurgia (SIC), Società Italiana di Ultrasonologia in Medicina e Biologia (SIUMB), Associazione Italiana di Chirurgia Epatobilio-Pancreatica (AICEP), Società Italiana Trapianti d'Organo (SITO), Società Italiana di Anatomia Patologica e Citologia Diagnostica (SIAPEC-IAP) – Part II - Solid lesions**

Maurizio Pompili<sup>a,\*</sup>, Francesco Ardito<sup>a</sup>, Enrico Brunetti<sup>b</sup>, Giuseppe Cabibbo<sup>c</sup>, Fabrizio Calliada<sup>d</sup>, Umberto Cillo<sup>e</sup>, Ilario de Sio<sup>f</sup>, Rita Golfieri<sup>g</sup>, Mauro Grova<sup>c</sup>, Salvatore Gruttadauria<sup>h</sup>, Maria Guido<sup>h,o</sup>, Massimo Iavarone<sup>j</sup>, Tommaso Manculli<sup>k</sup>, Duilio Pagano<sup>m</sup>, Irene Pettinari<sup>g</sup>, Francesco Santopaolo<sup>a</sup>, Maurizio Soresi<sup>l</sup>, Agostino Colli<sup>n</sup>

European Association for the Study of the Liver<sup>a</sup>

Incidental



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## Overview

1. Introduction
- 2. Management approach**
  - Understand the Clinical Context
  - Know your Differential Diagnosis
  - Make Practical Management Decisions
3. Case review

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## Clinical context

### Study indication

- Incidental finding
  - **Most are asymptomatic**
- Directed evaluation
  - Elevated AFP
  - Abdominal pain
  - HCC surveillance
  - Abnormal LFTs
  - Weight loss

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## Clinical context

### Risk Factors

- Chronic liver disease → HCC
  - Viral hepatitis, NASH
  - Cirrhosis
- Cancer history → Metastatic Cancer
- OCP, HRT, anabolic steroid exposure, PCOS, Glycogen storage disease
  - Hepatocellular Adenoma

#### Rule of Thumb

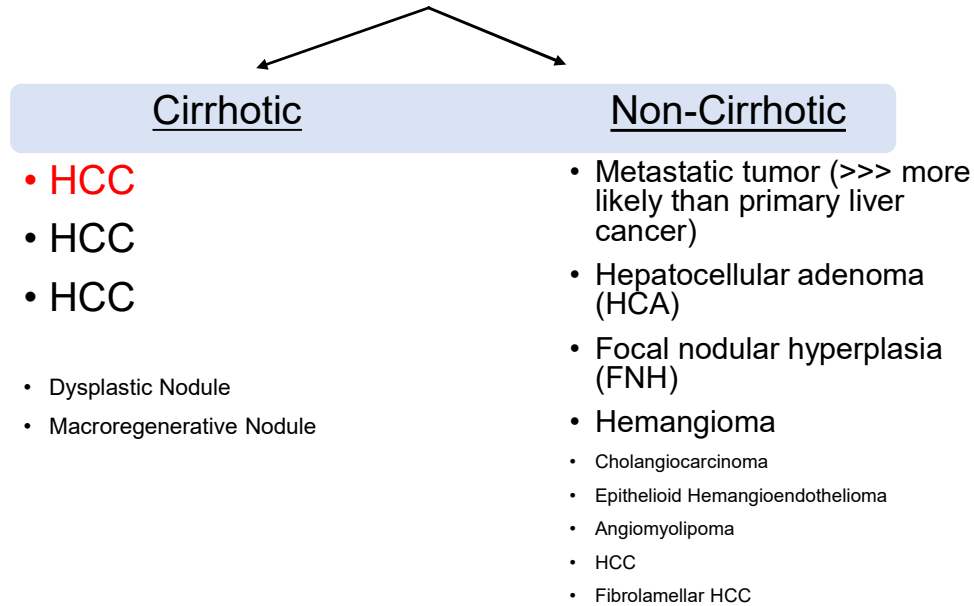
< 1 cm ~ almost always benign in those without risk factors

Gore, JACR 2017

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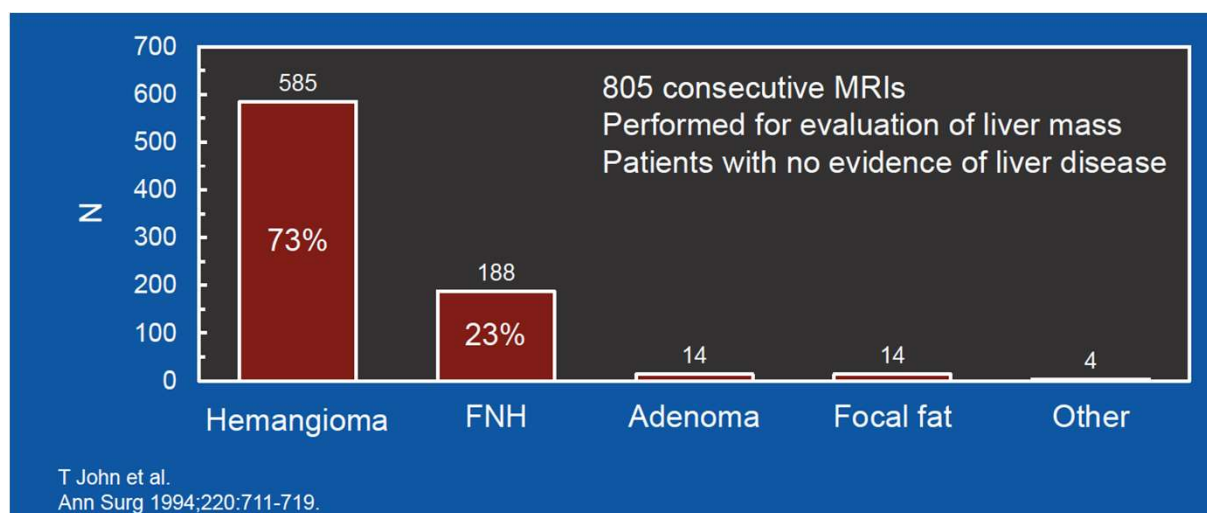
## Differential Diagnosis Stratification



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## Distribution of Liver Masses



Courtesy of Dr. Mitch Shiffman

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## Make Practical Decisions

### Characteristics

- Solid vs. Cystic
- Single vs. Multiple
- Size
- Margin- smooth vs. irregular
- Location- central vs. peripheral
- Growth
- Contrast Enhancement

## Formulate the (Differential) Diagnosis

### Further Imaging Needed?

Study Adequacy?

### Biopsy?

Decisive referrals (MDLT, surgery, IR) vs. Explicit (non) Monitoring Plans

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## Ultrasound

### Pros

- No ionizing radiation
- No contrast
- Safe in pediatric population, women of child-bearing age
- **Inexpensive**
- Real-time images
- Dopplers can show blood flow
- **Widely available**
- **Good overall beginning study**

### Good Terms

- Hyperechoic

### Cons

- Technique, Operator dependent
- Limited if gas in abdomen
- Limited in obese individuals
- Dome lesions are less well seen

### Bad terms

- Focal irregularity

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## CT

### Pros

- Detailed view of many types of tissues
- Painless, noninvasive, accurate
- **Fast**, simple (usually < 5 min)
- Guide for radiation therapy, needle biopsies
- Arterial and portal venous phases may be obtained to delineate blood supply of liver masses, assesses thrombosis
- More widely available and usually **easier to schedule** than MRI

### Favorable Terms

- Without washout
- Peripheral enhancement
- Hypoenhancing
- Central scar

### Cons

- Significant **radiation**
  - Radiation dose: 10 mSv
  - Background radiation dose received over 3 years
- **Contrast** allergy risk
- Contrast renal risk
- May need to **repeat** in multiphase because often single phase obtained in ED

### Bad terms

- Nodular liver
- Delayed rim enhancement
- Enlarging mass

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## MRI

Best- if you ask Radiologists  
Worst- if you ask Patients

### Pros

- Clear, detailed images
- More sequences/data
- Enhanced soft tissue contrast
- Very few allergies to gadolinium contrast
- No radiation
- Can obtain MR Elastography concomitantly

### Favorable Terms (similar to CT)

### Cons

- **Not as widely available**
- **Cost**
- Longer exam time
- Need for breath-holding
- Claustrophobia risk
- Undetected metallic implant may affect magnetic field
- Nephrogenic systemic fibrosis

### Bad terms (similar to CT)

Gore, JACR 2017; 14: 1429

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## Contrast Enhanced Ultrasound (CEUS)

### Pros

- Similar to Ultrasound
- Microbubble contrast agent-ok in renal failure, cirrhosis
- Incorporation into LIRADs in 2018
- Consider when CT, MRI are indeterminate, not available, or not obtainable

### Good Terms

- Hyperechoic

### Cons

- Similar to Ultrasound
- Technique, Operator dependent
- Limited in obesity, steatosis
- Needs target lesion within 10 cm of transducer
- Limited availability

### Bad terms

- Focal irregularity

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## Practical Pearls

Get prior imaging for comparison

Talk to your Radiologist  
Better yet- look at the imaging with them  
Ask- "What scan do you recommend?"

Know your contrast agents

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## Contrast Agents

- Anuric, on dialysis- CT IVC ok, contrast MRI avoid
- **ACR Manual Classification of Gadolinium-Based Agents Relative to Nephrogenic Systemic Fibrosis**

**TABLE 1** | The categories of extracellular contrast agents in clinical practice.

Category	Specificity	Class	Classical agents	Featured purposes	Modality
Extracellular agent	Non-specific	Gadolinium chelates	Gadopentetic acid (Gd-DTPA)	Tumor imaging; blood pool imaging	T1 agent for MRI
Reticuloendothelial system (RES) agent (Kupffer cells included)	RES specific	Iron oxide	Ferucarbotran (Feridex)	Liver tumor imaging	T2 agent for MRI
		Microbubbles	Perfluorinated butane (Sonazoid)	Liver tumor imaging; blood pool imaging	Ultrasound contrast agent
Hepatobiliary agent	Hepatobiliary specific	Manganese-based compound	Mangafodipir (Mn-DPDP)	MR cholangiography; liver function indicator	T1 agent for MRI
			Gadobenate dimeglumine (Gd-BOPTA); gadoxetic acid (Gd-EOB-DTPA)	Liver tumor imaging	T1 agent for MRI

Zhang, Frontiers in Oncol 2022

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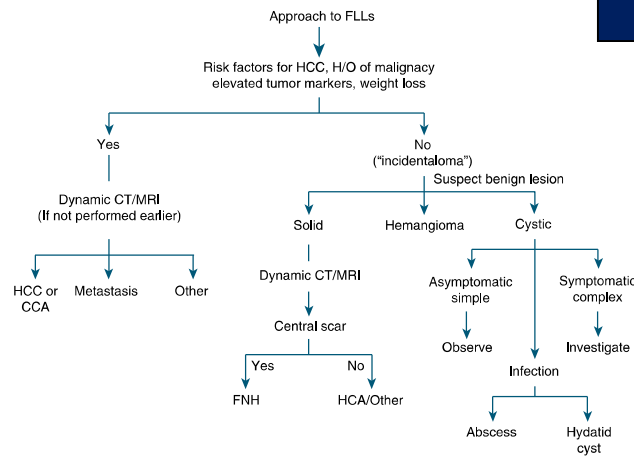


## Practical Biopsy Approach

- Early Biopsy if:
  - Equivocal imaging
  - Cannot exclude malignancy
  - Consider concomitant assessment of uninvolved parenchyma for fibrosis/cirrhosis
- Know when NOT to Biopsy:
  - Obvious diagnosis by imaging
  - Most FLL have characteristic MRI/CT to obviate Bx
- Risks
  - Biopsy- bleeding, pain, seeding, false negative
  - No biopsy- uncertainty, ongoing imaging

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# Practical Diagnostic Approach



Obtain CT or MRI

Marrero, Ahn, AJG 2014; 109: 1328

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# Practical Diagnostic Approach

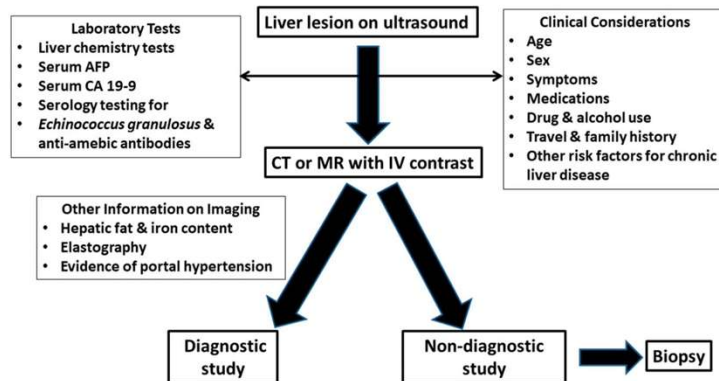


Figure 1. Algorithm for the evaluation of an incidental liver lesion. AFP,  $\alpha$ -fetoprotein; CT, computerized tomography; IV, intravenous; MR, magnetic resonance.

Yataco, AJG 2021; 116:855

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## Practical Challenges

### Don't Miss Malignancy!

- Metastatic disease
- HCC
- CCA

### Recognize Benign Lesions!

- Simple Cysts
- Hemangioma
- FNH
- Perfusion, focal fat

Deal with  
Indeterminates!

When to Stop Imaging?

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## Practical Management

- Repeat imaging
  - (Often done when unsure of what to do)
- MDLT, Surgical, IR referral
  - Uncertainty
  - Symptomatic
    - First, exclude other causes of symptoms
  - Growing
  - Bleeding
  - Size > 5 cm

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## Case 1- Follow-up

55 yo M with DM, obesity, abdominal pain  
US- 4 cm mass

MRI- 3.6 cm hemangioma

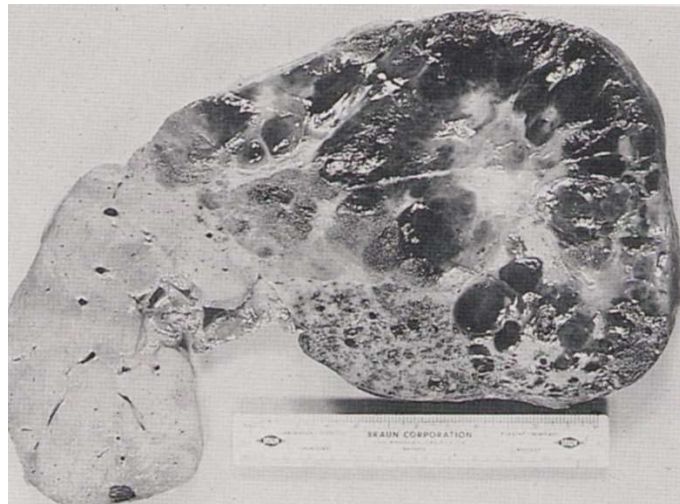
No biopsy, no referral out, no long term monitoring;  
Workup for other causes of pain

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## Hepatic Hemangioma (HH)

- Solid
- Solitary in 70-90%
- Size usually < 5 cm
- Asymptomatic- incidental finding
  - Nonspecific abdominal discomfort
- No association with chronic liver disease
- Most common benign FLL



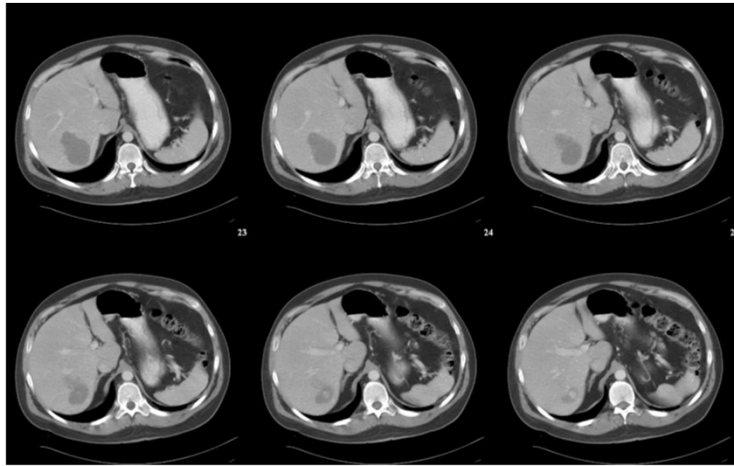
Rungsinaporn, J Med Thai 2008

30



# Hepatic Hemangioma

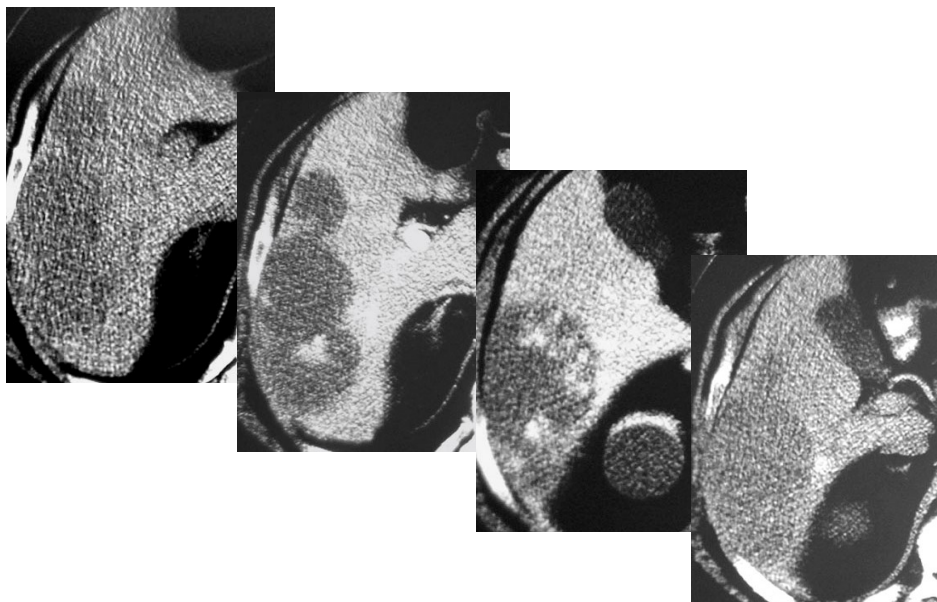
- MRI or CT to confirm Dx
  - Peripheral early enhancement → Centripetal fill-in (large HH may not fill in centrally)



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# Hepatic Hemangioma

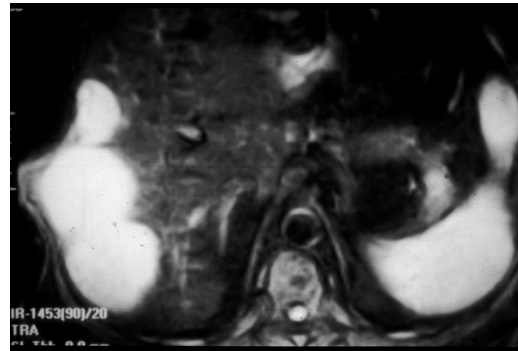
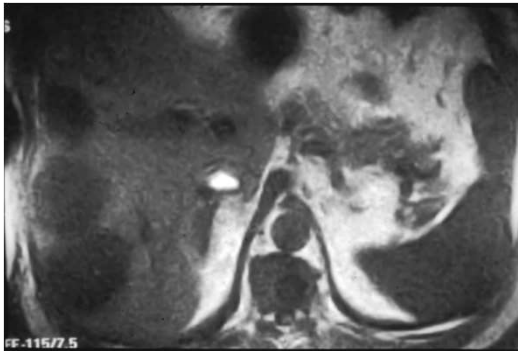


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## Hepatic Hemangioma



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## HEMANGIOMA SIZE VERSUS IMAGING FINDINGS

### SMALL HEMANGIOMA (< 1.5 CM)

- May not show globular peripheral enhancement

### GIANT HEMANGIOMA (> 10 CM)

- May not progress to uniform enhancement

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## Hepatic Hemangioma Management

**Avoid  
Biopsy**

**No  
contraindication to  
OCP**

**No  
contraindication to  
pregnancy**

**No Routine  
Intervention**

**Intervene ONLY  
If symptoms,  
growth,  
hemorrhage**

**Monitoring  
NOT  
indicated**

Marrero, AJG 2014; 109: 1328

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## Case 2- Oncology referral

**55 yo F with breast cancer and FMH CRC**

**US- multiple nonspecific lesions in liver**

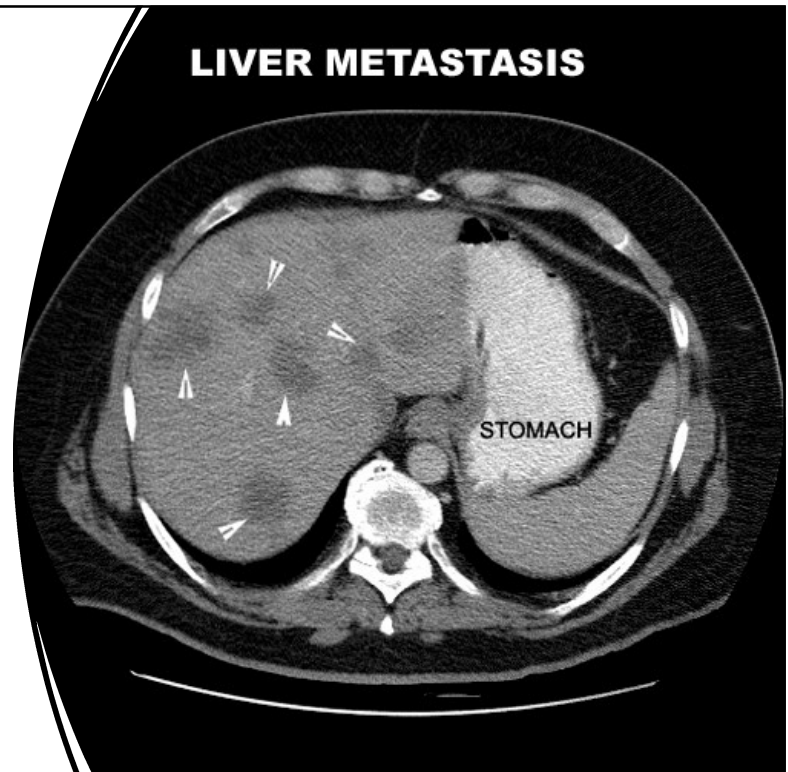
**CT- multiple hypovascular lesions  
throughout the liver**

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# Metastatic Cancer

- Solid
- Usually multiple
- Hypovascular
  - Colorectal
  - Lung
  - Pancreatic
- Hypervascular
  - Melanoma
  - Renal cell carcinoma
  - Neuroendocrine tumor



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# Metastatic Cancer

**Most commonly involved site in  
GI tract cancer metastases**

Most frequent site of blood-born metastases  
irrespective of whether the primary is drained  
by the systemic or portal veins

Involved in ~ 1/3 of all cancers  
Including up to 50% of stomach, breast, lung, colon cancers

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# Diffuse Metastases



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# Metastatic Cancer can Mimic HH



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## Case 2- Follow-up

55 yo F with breast cancer and FMH CRC

Colonoscopy negative

US-guided biopsy of the FLL → breast cancer mets

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## Case 3- OB referral

26 yo F, prior OCPs + HCA

US- 3.5 cm lesion in R lobe  
Gallbladder sludge; LFTs normal

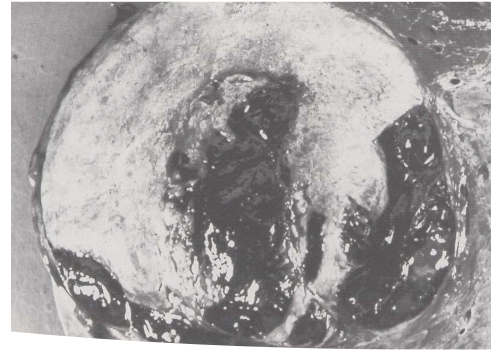
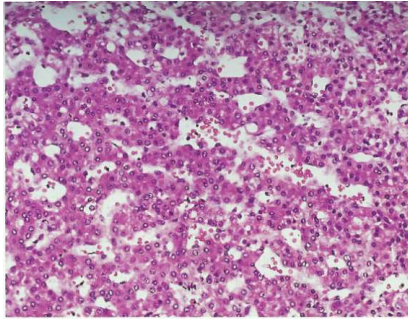
**What are the next best steps?**

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## Hepatocellular Adenoma (HCA)

Hepatocytes arranged in cords  
(no vessels, bile ducts)



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## Hepatocellular Adenoma

- Solid
- Solitary in 70-80%
- Size- usually < 5 cm
- Incidental in 12-25%
- Asymptomatic vs. Chronic RUQ pain
  - Rupture
- Multiple (Usually > 10) ~  
Hepatic adenomatosis



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## Hepatocellular Adenoma (HCA)

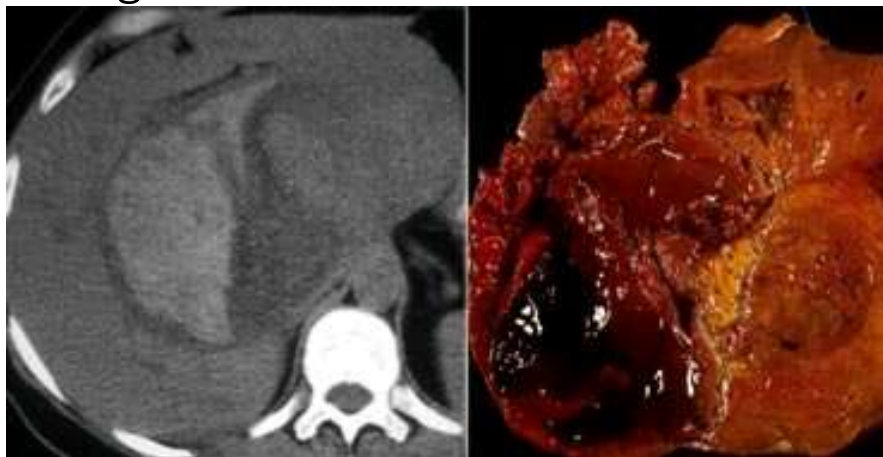
- RF- OCP (30-40x risk), anabolic steroids, Glycogen storage diseases
  - (Association with NAFLD)
- Potential rapid growth in pregnancy
- Risk of hemorrhage with growth, trauma
- **Malignant potential (5-10%)**



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## Hepatocellular Adenoma- Intra-lesion Hemorrhage

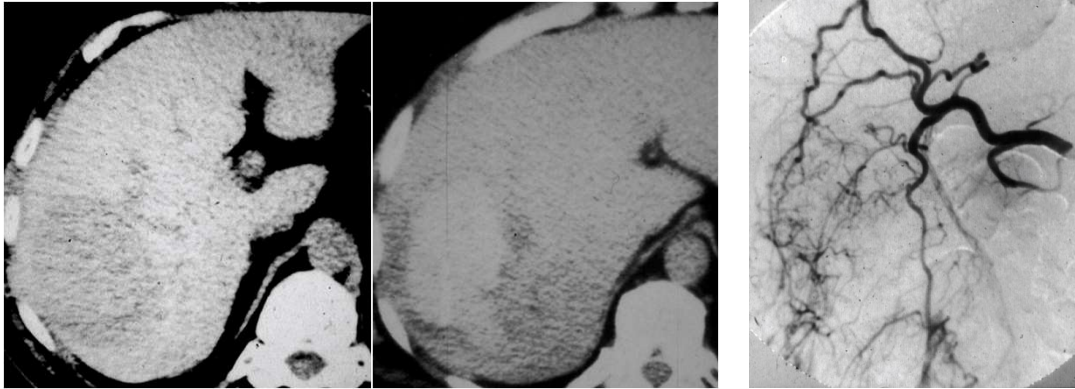


Risk- Subcapsular location, size, long duration of OCP

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# Hepatocellular Adenoma



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# Hepatocellular Adenoma



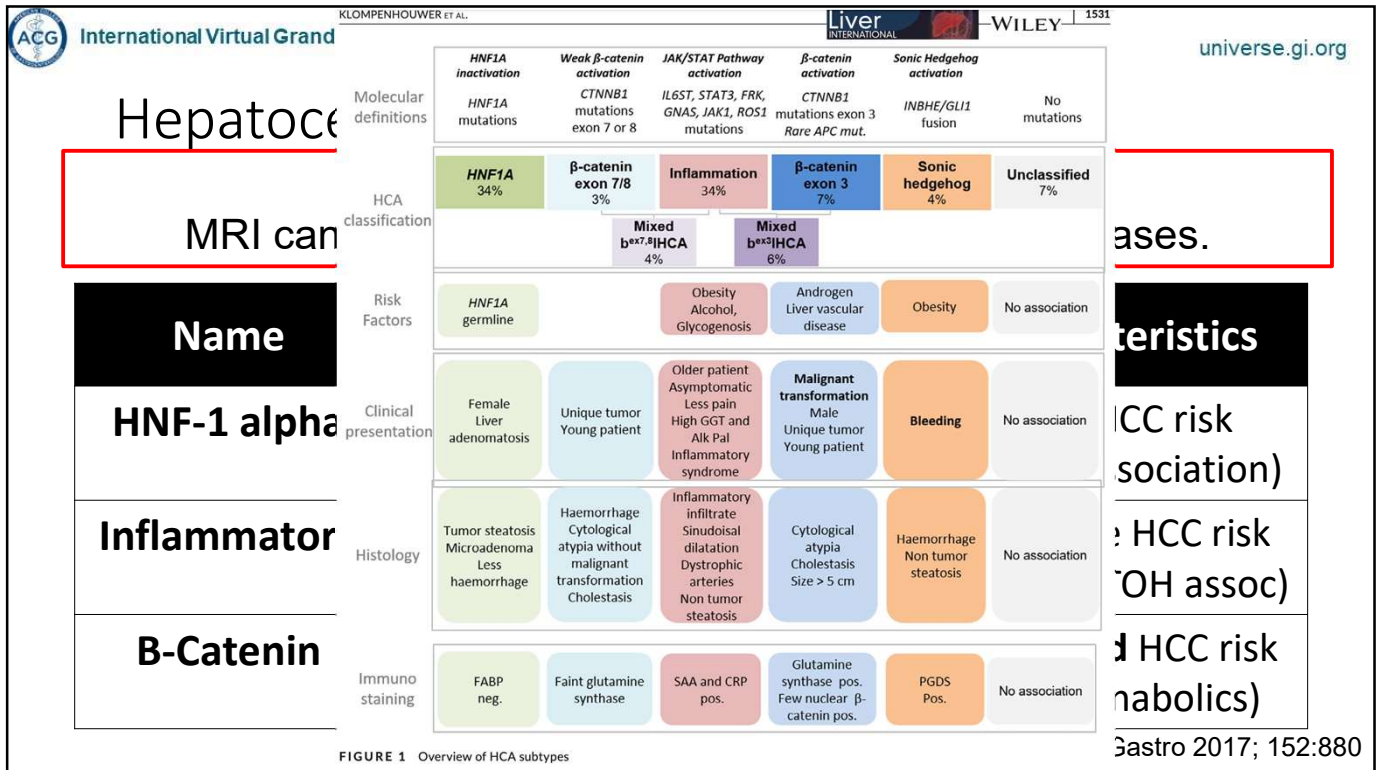
CT with IV contrast



MR T1 Early arterial enhancement

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# Hepatocellular Adenoma

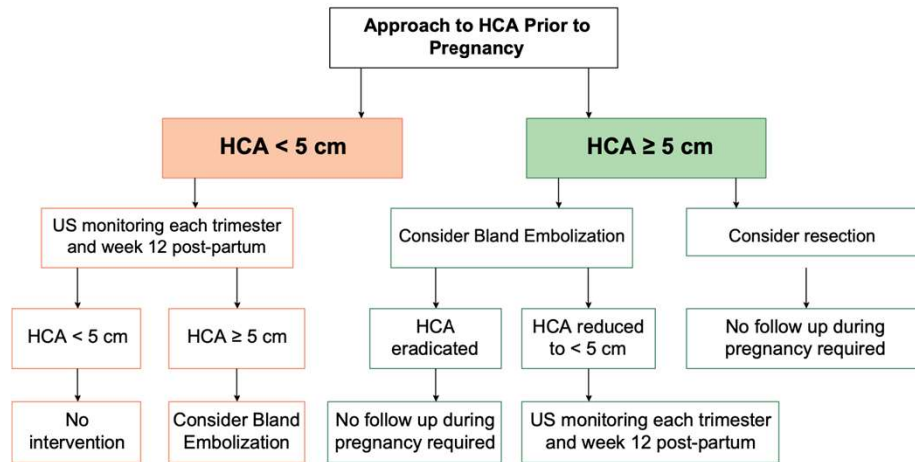
- Biopsy only in inconclusive cases
- Discontinue OCP, anabolic steroids, Wt loss- may regress (6 mo f/u)
- Pregnancy **NOT** contraindicated if < 5 cm
- **> 5 cm, symptomatic, ♂, increase in size (20-25%), B-catenin** → resection > TA embolization (nonsurgical candidates)
- HCA should be monitored q 6 mo for 1-2 years then annually depending on stability, growth pattern

Marrero, AJG 2014; 109: 1328  
EASL PG 2016  
Klompouhouer, AJG 2019; 114:1292

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## HCA & Pregnancy- AASLD Guidance 2021

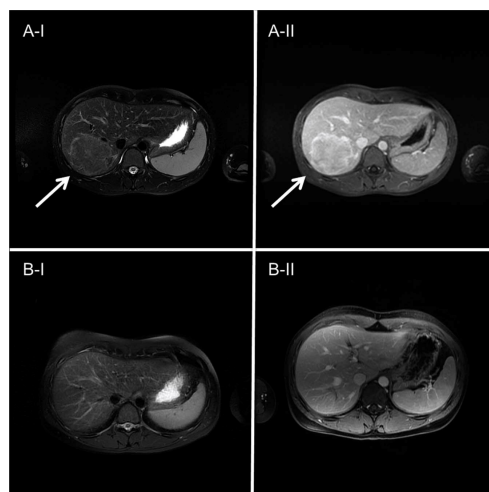


Sarkar, Hep 2021

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## Hepatocellular Adenoma Regression with OCP withdrawal



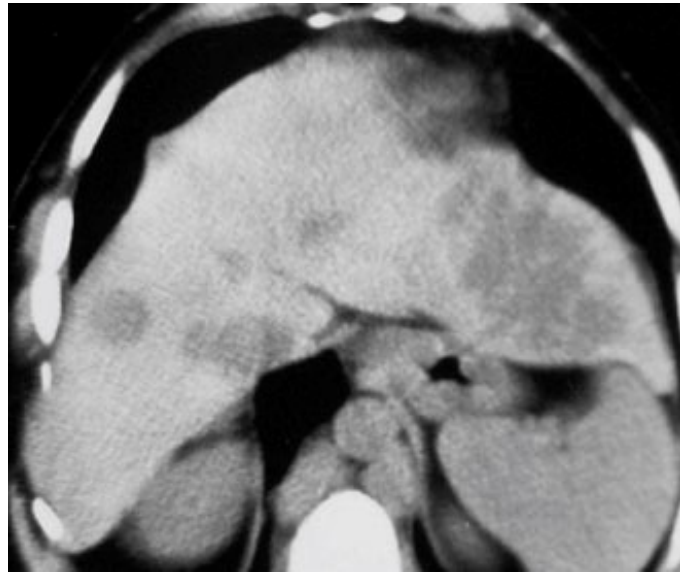
Kompenhouwer, AJG 2019

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## Hepatic Adenomatosis

- Glycogen Storage Disease
- Associated with fatty liver & obesity
- Bx largest one (all tend to be same subtype)
- Higher risk of complications
- But liver transplant not routinely recommended for multiple or unresectable HCA



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## Case 3- Follow-up

26 yo F with small HCA-  
Pregnancy is not generally contraindicated

US- 3.5 cm lesion in R lobe  
MRI- suggests steatotic, HNF-1 alpha subtype

Asymptomatic HCA < 5 cm, can be observed

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## Case 4- Urgent Care Referral

37 yo M with anxiety, RUQ pain  
AST 80, ALT 40, TB 1, + ETOH

US- 5 cm lesion in R lobe  
CT- enhancing lesion with central scar

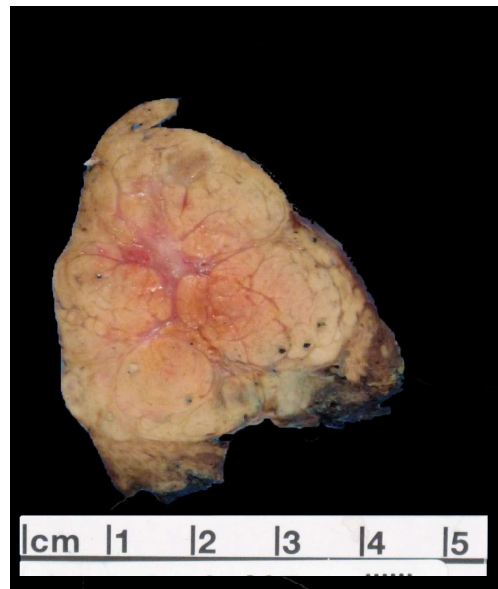
**What are the next best steps?**

55

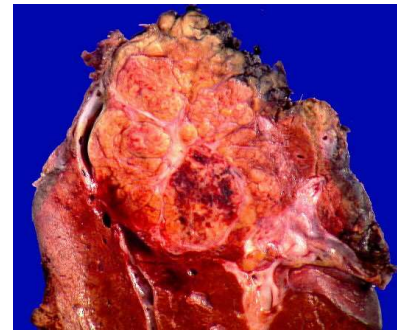
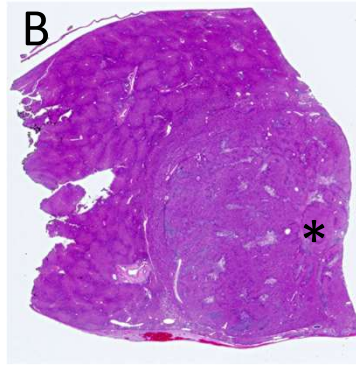
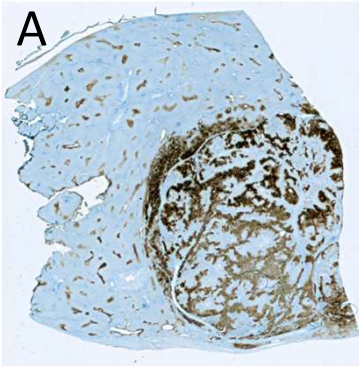


## Focal Nodular Hyperplasia (FNH)

- Solid
- Solitary in 70-90%
- Size usually < 5 cm
  - May increase in size over time
- Asymptomatic- incidental finding
  - Nonspecific abdominal discomfort- poor correlation with symptoms
- **No** association with OCP, chronic liver disease
- **NO malignant potential**



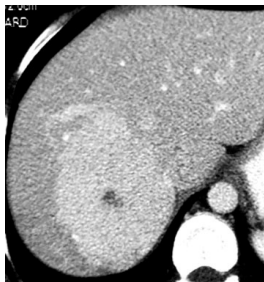
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## Focal Nodular Hyperplasia Pathology

- Well defined unencapsulated mass in a non-cirrhotic background liver.
- There is a central scar, from which fibrous septa radiate outward and separate the lesion into small lobules.

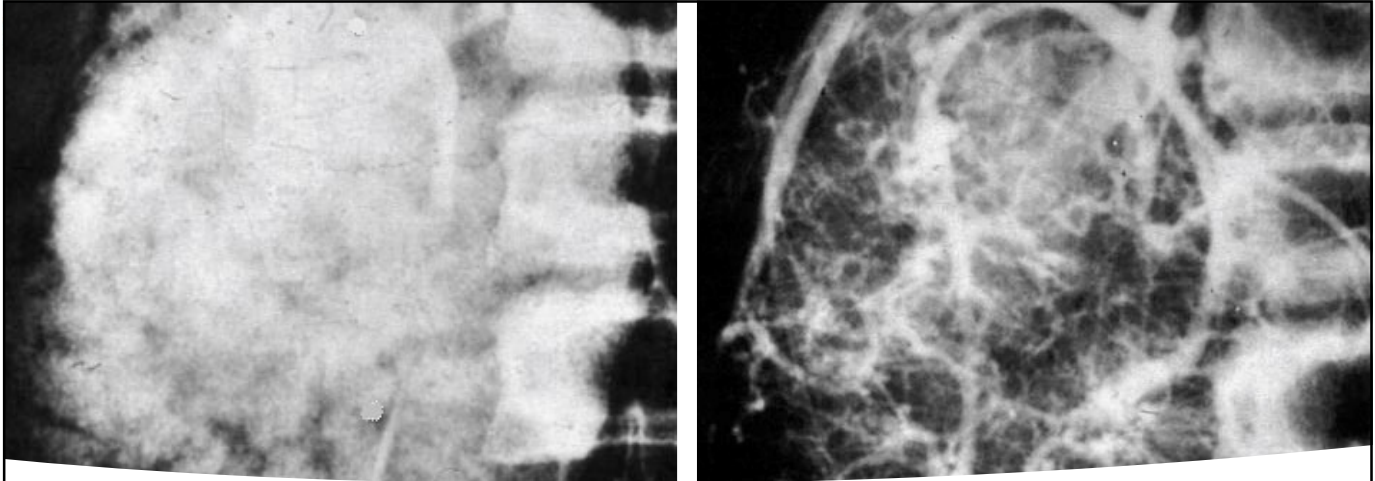
57



## Focal Nodular Hyperplasia

- **UNENHANCED**
  - UNIFORM, LOW DENSITY MASS
  - LOWER DENSITY CENTRAL SCAR IN 1/3
    - SMALL SIZE IN FNH, LARGER (> 2 CM) IN FIBROLAMELLAR CARCINOMA
    - FIBROLAMELLAR CA HAS FIBROTIC CENTRAL SCAR WHICH OFTEN CALCIFIES
    - THE CENTRAL SCAR OF FNH RARELY CALCIFIES
- **ENHANCED**
  - RAPID INCREASE IN DENSITY
  - HOMOGENEOUS ENHANCEMENT
  - LESS DENSE CENTRAL SCAR BECOMES VISIBLE
    - ENHANCEMENT OF CENTRAL SCAR MAY BE DETECTABLE
    - ENHANCEMENT MAY ALSO OCCUR IN FIBROLAMELLAR CARCINOMA
  - IN PORTAL PHASE LESION BECOMES ISODENSE WITH THE LIVER

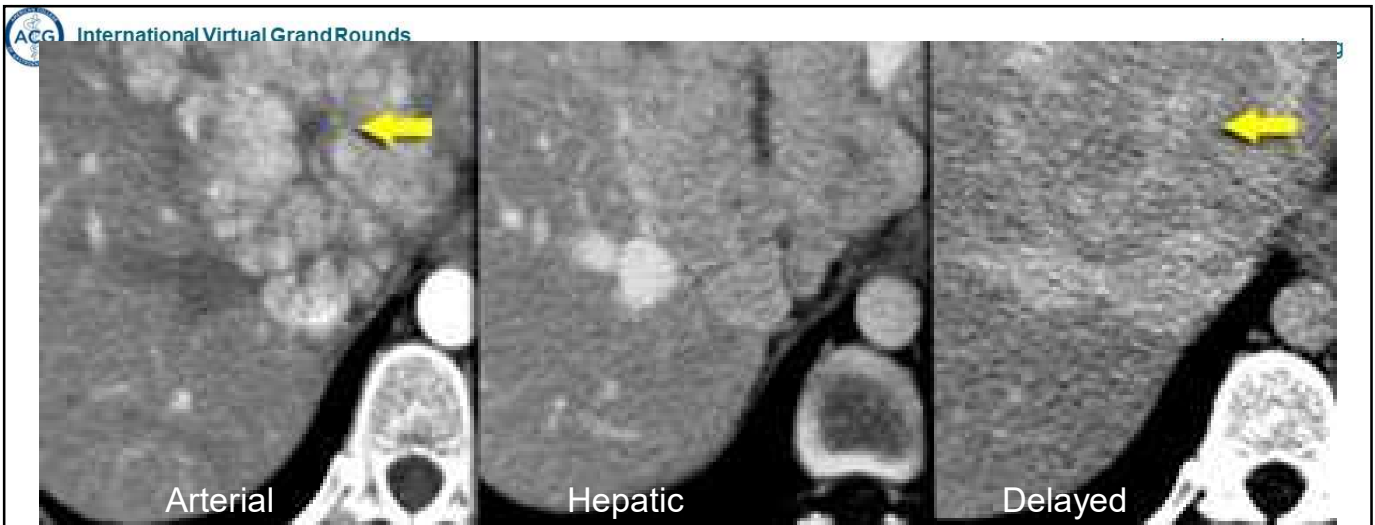
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## Focal Nodular Hyperplasia Angiography

- HYPERVASCULAR TUMOR
  - CENTRIFUGAL "SPOKE WHEEL" VASCULAR PATTERN IN 2/3
    - LARGE PERIPHERAL VESSELS PENETRATE MASS
    - DIVIDE INTO SMALLER RADIATING VESSELS IN THE MASS
- CAPILLARY PHASE
  - UNIFORM BLUSH, NO AVASCULAR AREAS

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## Focal nodular hyperplasia

- MRI > CT to confirm Dx
  - Homogeneous enhancement, central non-enhancing scar, pseudocapsule
  - MRI most sensitive
- Biopsy **not** routinely indicated unless can't distinguish b/w HCA, HCC

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## Focal Nodular Hyperplasia

- Pregnancy and OCP not contraindicated
- No intervention for asymptomatic FNH
  - Slight incidental increase in size is NOT concern
  - Resection can be considered for symptoms, uncertain diagnosis
- **Stop** monitoring for stable, asymptomatic FNH

Marrero, AJG 2014; 109: 1328

EASL PG 2016

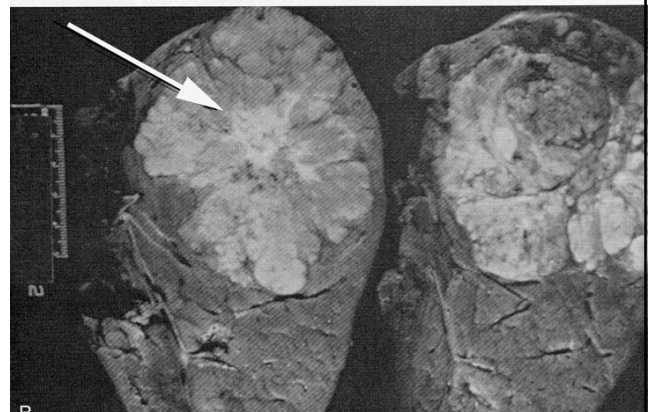
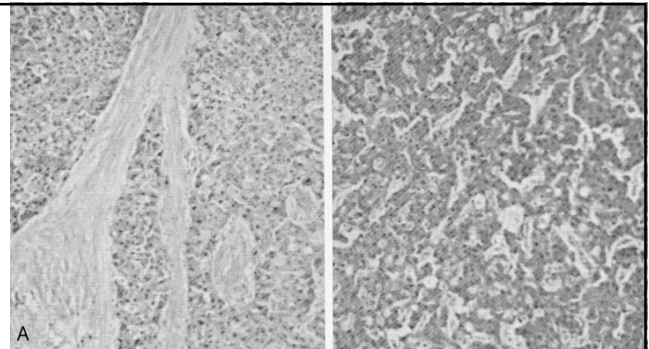
Sarkar, Hepatology 2021

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## Lesions with Central Scars

- **COMMON**
  - FOCAL NODULAR HYPERPLASIA
  - HEMANGIOMA
- **UNCOMMON**
  - FIBROLAMELLAR CARCINOMA
  - CHOLANGIOCARCINOMA
  - HEPATIC METASTASES
  - HEPATOCELLULAR CARCINOMA



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# FIBROLAMELLAR HEPATOMA GROSS SPECIMEN



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## Case 4- Follow-up

47 yo M with RUQ Pain

MRI- FNH

ETOH rehabilitation  
Surgical resection NOT recommended at this time  
Monitor in 6 mo

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## Case 5- General Surgery Referral

34 yo M with anorexia, chills, RUQ pain

CT prelim report- "multiple liver cysts"

What are the next best steps?

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## Cystic Liver Lesion- Differential Diagnosis

Simple Hepatic Cyst

Polycystic Liver  
Disease

Hepatic Abscess

Parasitic  
Cyst

Intraductal Papillary  
Neoplasm of Bile  
Ducts ~ Biliary  
Cystadenoma

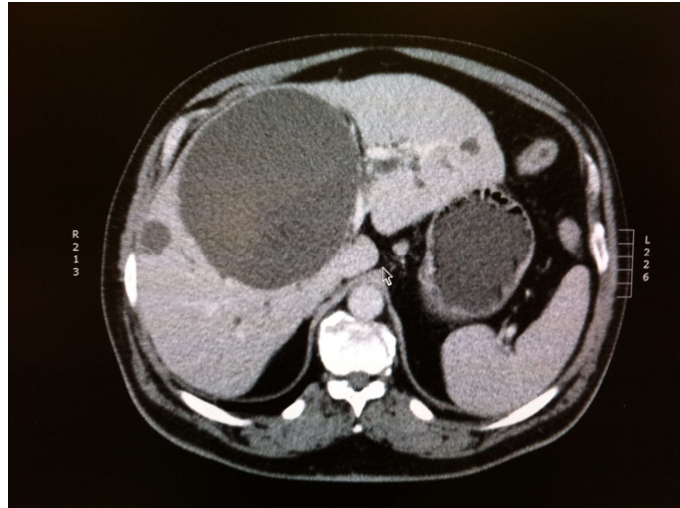
Intraductal Papillary  
Carcinoma of Bile  
Ducts- Biliary  
Cystadenocarcinoma

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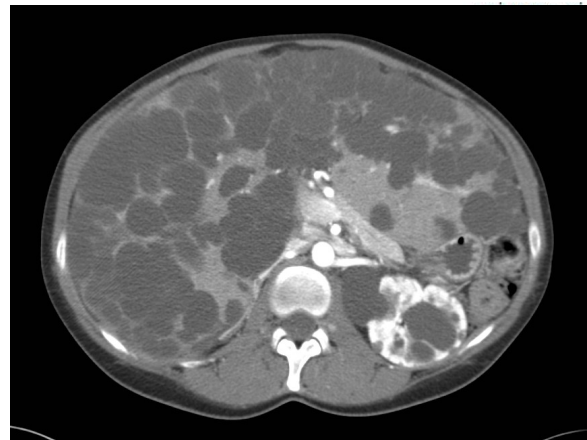
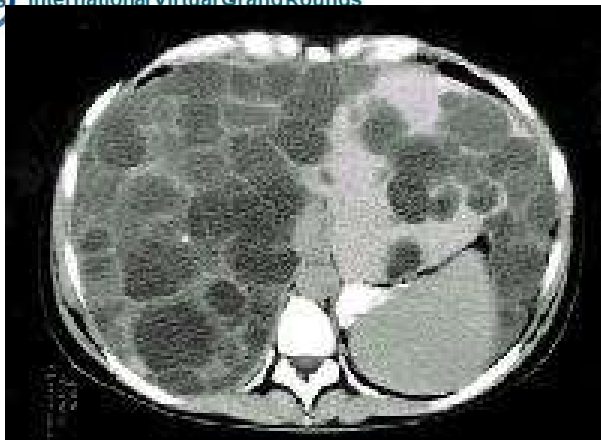


## Simple hepatic cyst

- Incidental, asymptomatic
- Common (up to 15%)
- F:M- 5:1
- Rare complications- pain, infection, hemorrhage
- Imaging → fluid filled lesion
  - No or minimal septations
  - No fenestrations
  - No irregular walls
  - No calcifications

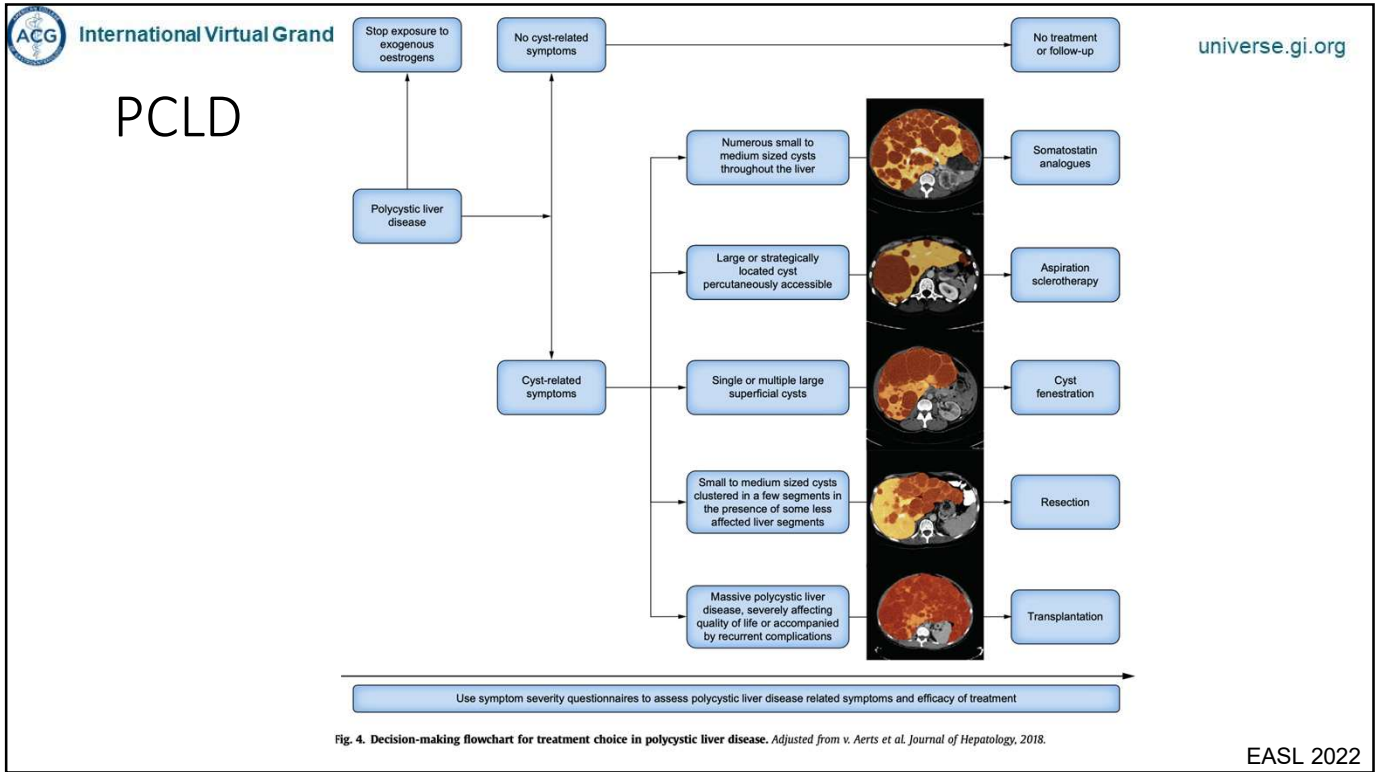


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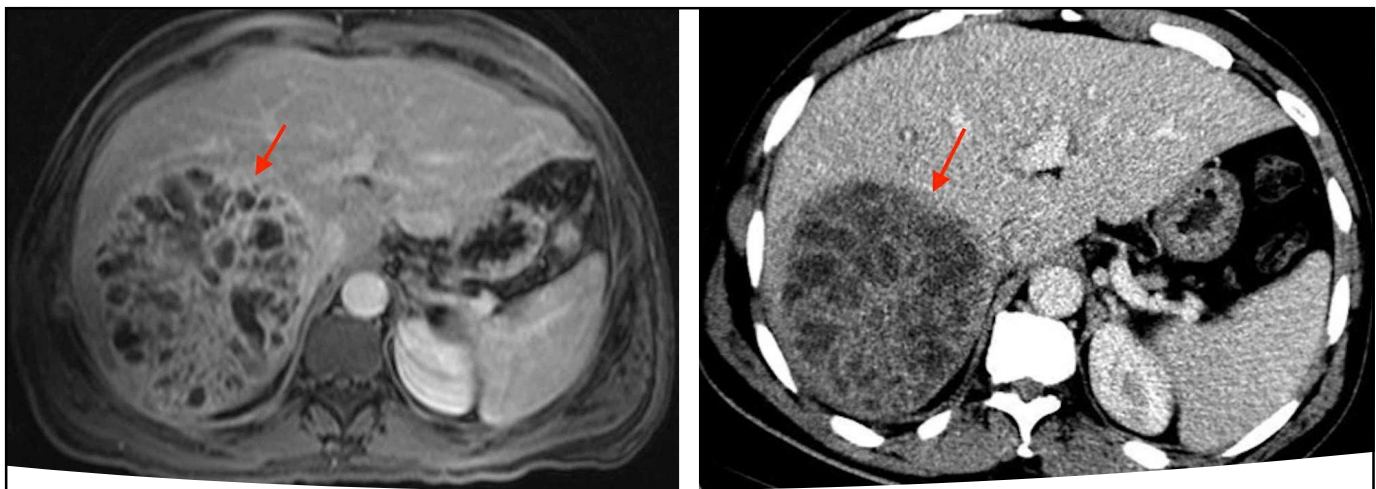


## Polycystic Liver Disease

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## Hepatic Abscess

- History of F, Pain
- Inc WBC, BCx+, Stool Cx+
- Rx- Antibiotics, drainage

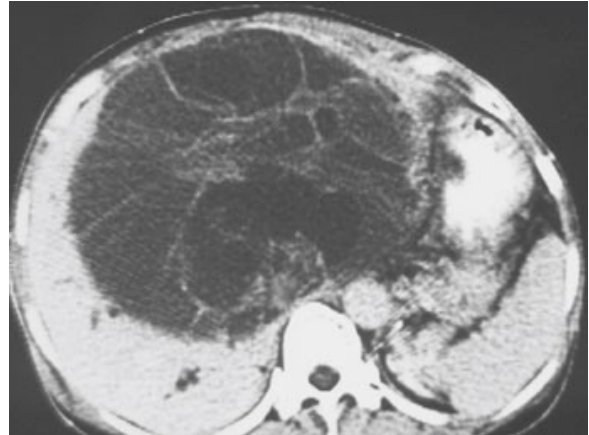
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## Intraductal Papillary Neoplasm of Bile Ducts (IPNs)

~ Biliary cystadenoma, cystadenocarcinoma

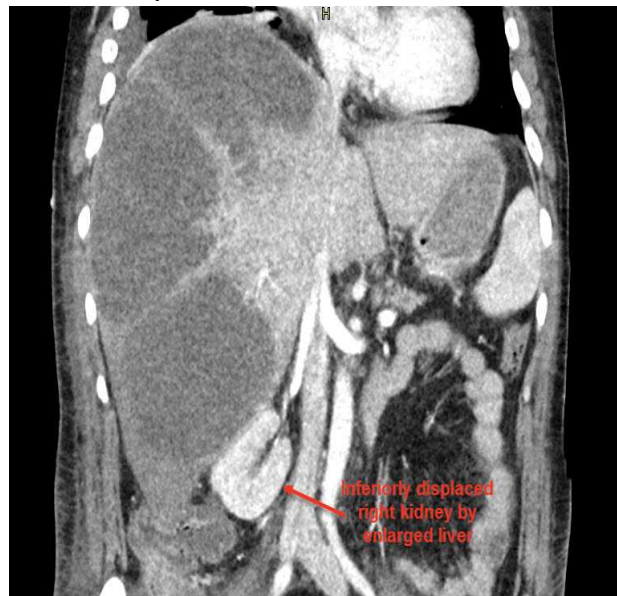
- Complexity
  - = Septations, Fenestration, Calcification, irregularity of walls
- No routine aspiration
  - Limited sensitivity
  - ? Dissemination risk
- Can't differentiate by imaging
- Surgical consultation



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## Case 5- Follow up



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## Entamoeba Histolytica Cyst

- CT- hypoechoic masses with peripheral enhancing rim
- E. histolytic antibody +
- Treatment
  - Metronidazole 750 mg TID x 10 days
    - Cure rate > 90%
  - Imaging guided aspiration



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## Take Aways

.org

FLL- common consultation

Know the DDx → Make the Dx  
HH, HCA, FNH, Cysts

Risks of Bx and NOT Bx

Reassurance in clearly benign cases=  
**Stop Imaging**

Don't miss **HCC, Mets**

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Questions?



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