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Point-Of-Care-Ultrasound in liver disease

The essentials

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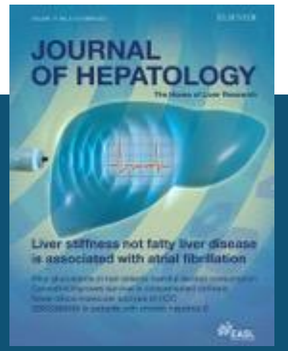
Patient care: liver diseases & liver transplantation
Ultrasound: Director Abdominal Sonography program
Research: Viral hepatitis, MASLD, Patient profiling for data driven drug prescription
Society journal: Editor-in-chief MAGMA
Co-Director of the residential training program in Gastroenterology & Hepatology
EASL Educational Committee, member



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Disclosures

Honoraria for consulting or speaking (last 5 years):
AbbVie, Bracco, Echosens, Gilead, Janssen-Cilag, Madrigal

Research contracts/grants (last 5 years):
Bracco, Echosens, GSK, Janssen-Cilag

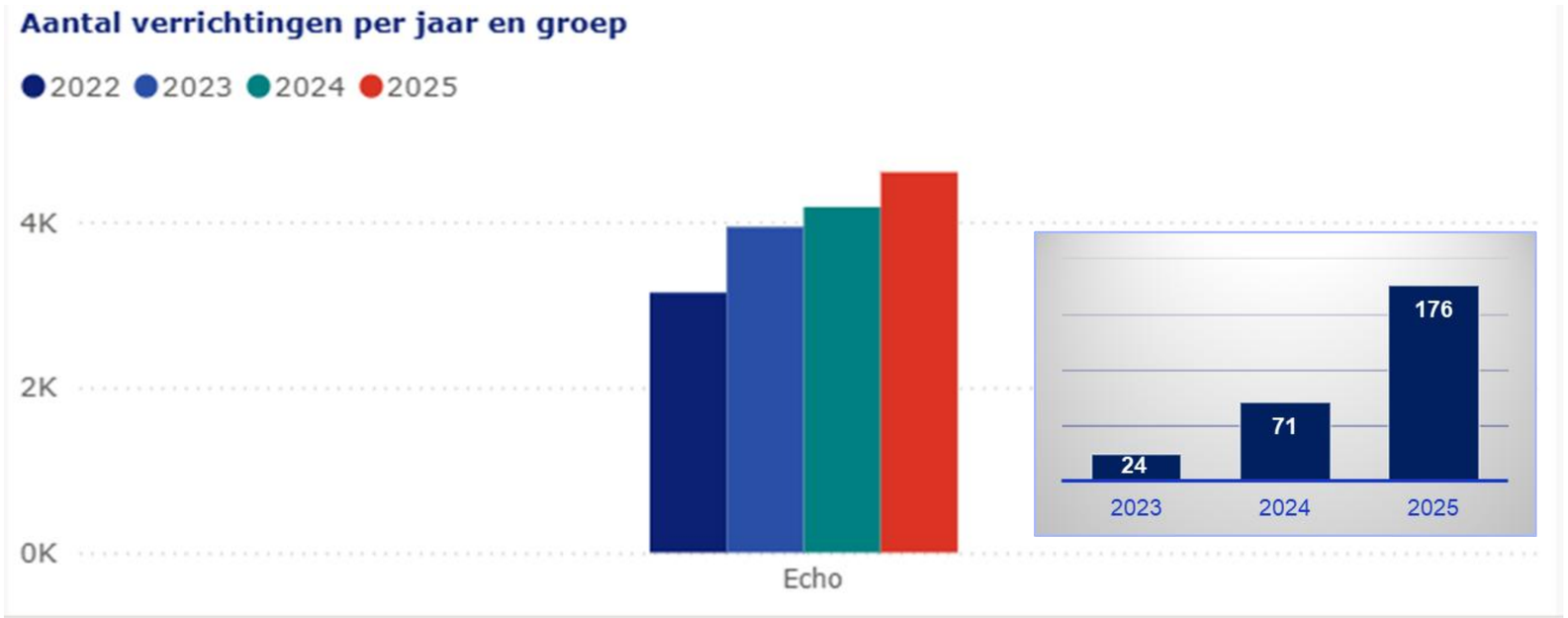
Abdominal Ultrasound by Gastroenterologists and Hepatologists:

- Standard in many countries
- The Next Frontier in other countries

Point-Of-Care-Ultrasound in Gastroenterology and Hepatology

- Quick focused complete abdominal scan
- Target-scan, restricted slices concept
- Liver Ultrasound vs. Gastro-Intestinal Ultrasound

The Erasmus MC Ultrasound Program, Gastroenterology & Hepatology



Abdominal ultrasound

- Any doubt about liver ultrasound?
- Any doubt about gastrointestinal ultrasound?

- Ultrasound is reliable, reproducible, immediate availability of results, patient friendly

- But: heavily investigator dependent (courses, training, experience)

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What is the difference between abdominal ultrasound by radiologists vs. gastroenterologists/hepatologists?

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Radiologists describe anatomy, we add measurements.

Grading and staging in gastroenterology & hepatology

- Cause, etiology, disease, toxin

- Inflammation

- Fibrosis

- End-stage disease

Grading and staging in gastroenterology & hepatology

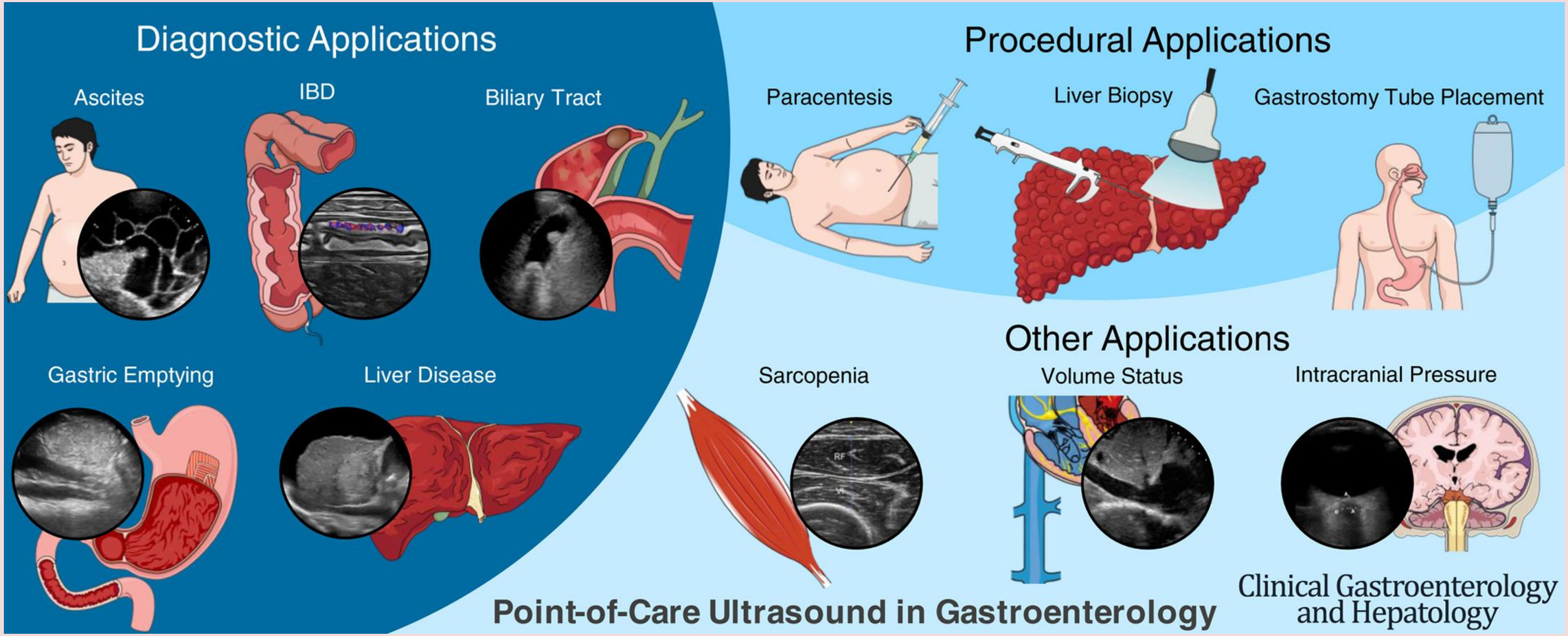
- Cause, etiology, disease, toxin: HEPATITIS, ENTERITIS

- Inflammation: EDEMA, FATTY INFILTRATION

- Fibrosis: BRIDGING FIBROSIS/CIRRHOSIS, STRICTURES/PRESTENOTIC DILATATION

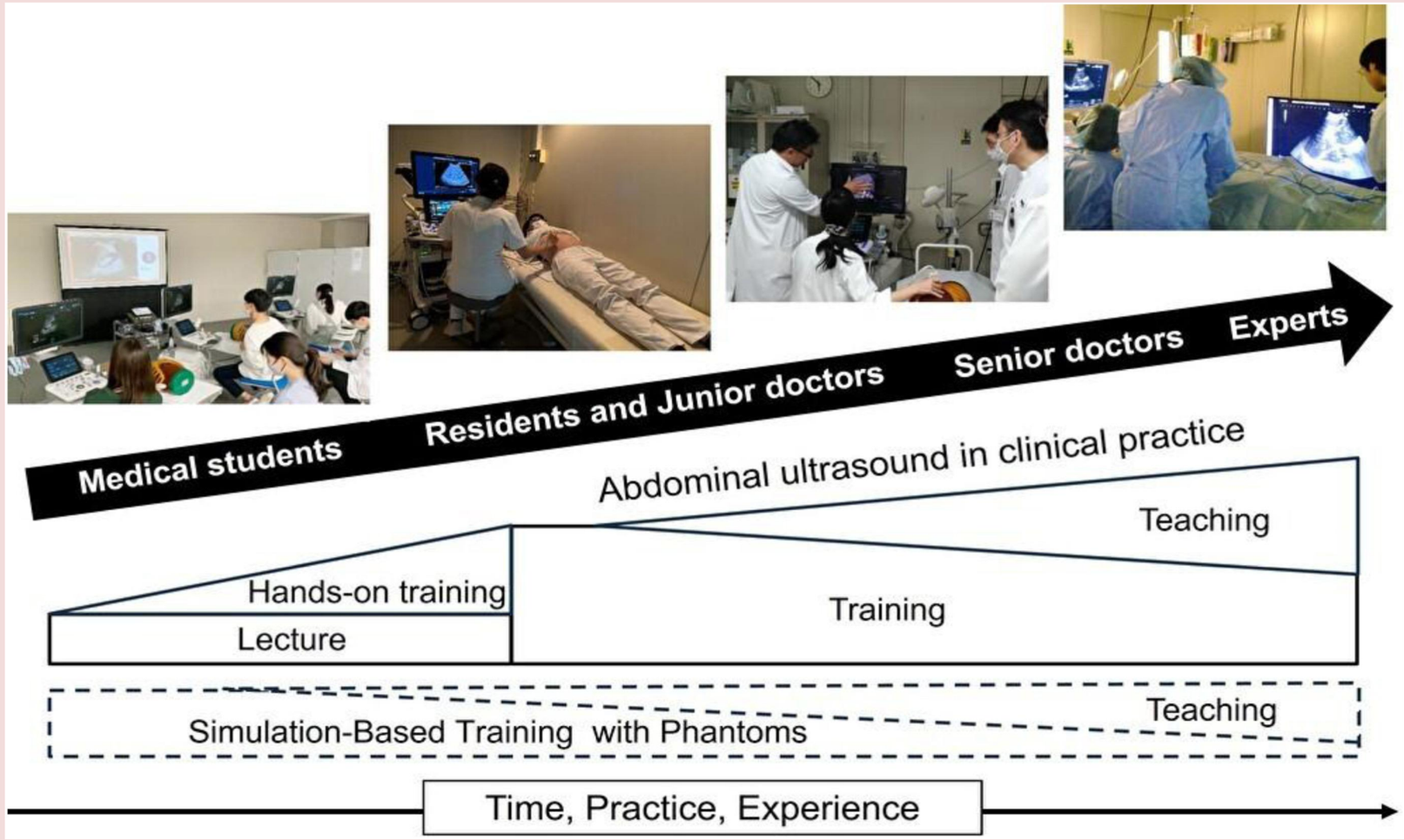
- End-stage disease: DECOMPENSATED LIVER DISEASE, PHLEGMONE/ABCES/PERFORATION

POCUS, diagnostic and procedural applications

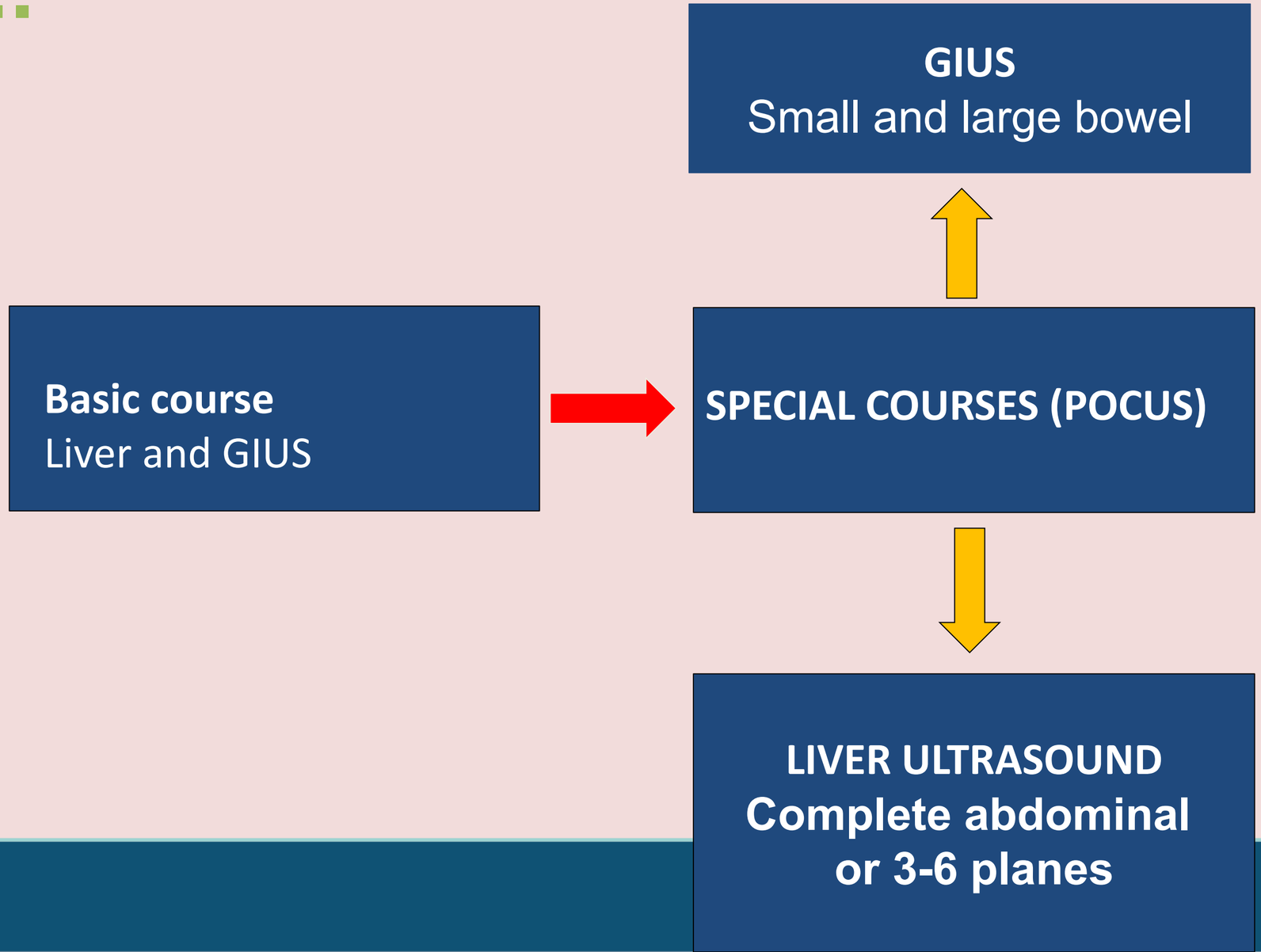


Shankar N., et al. Clin Gastro Hepatol 2025;23:1277-1290

Training


Medical students
Residents and Junior doctors
Senior doctors
Experts
Abdominal ultrasound in clinical practice
Teaching
Hands-on training
Lecture
Training
Teaching
Simulation-Based Training with Phantoms
Time, Practice, Experience

Courses in abdominal ultrasound, Netherlands



Liver ultrasound

Training

Needs to be developed, for both gastroenterologists/hepatologists and trainees

NVH or NVMDL

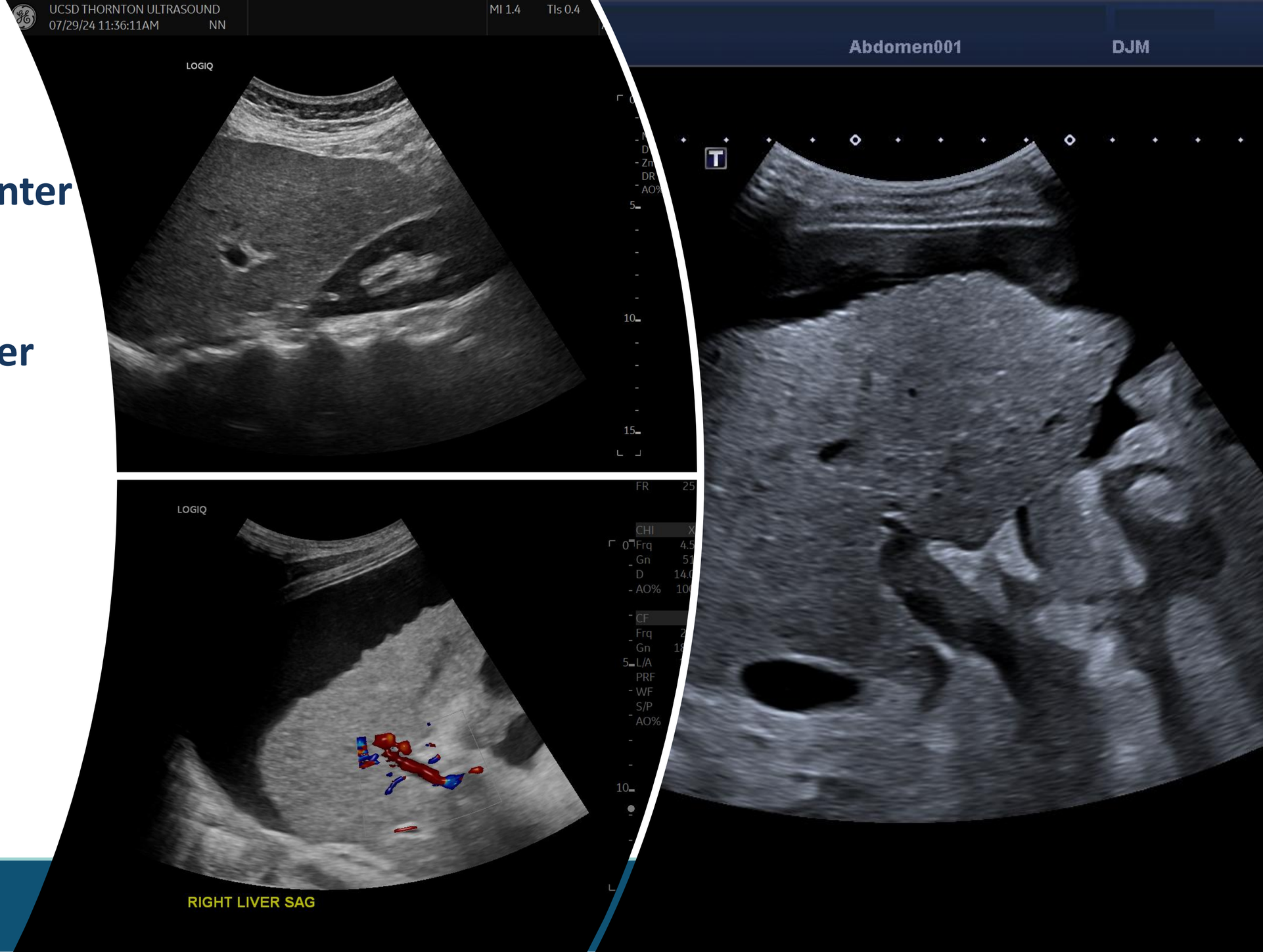
- **Through our societies**

Type of ultrasound

Complete abdominal ultrasound including surveillance hepatocellular carcinoma or Point of Care Ultrasound with 3-6 planes ?

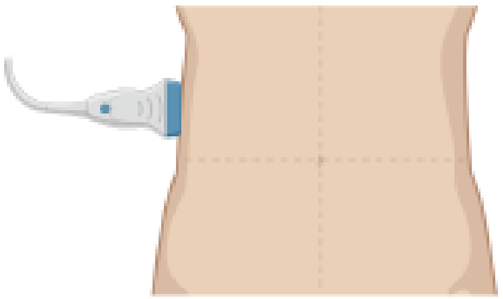
Liver POCUS

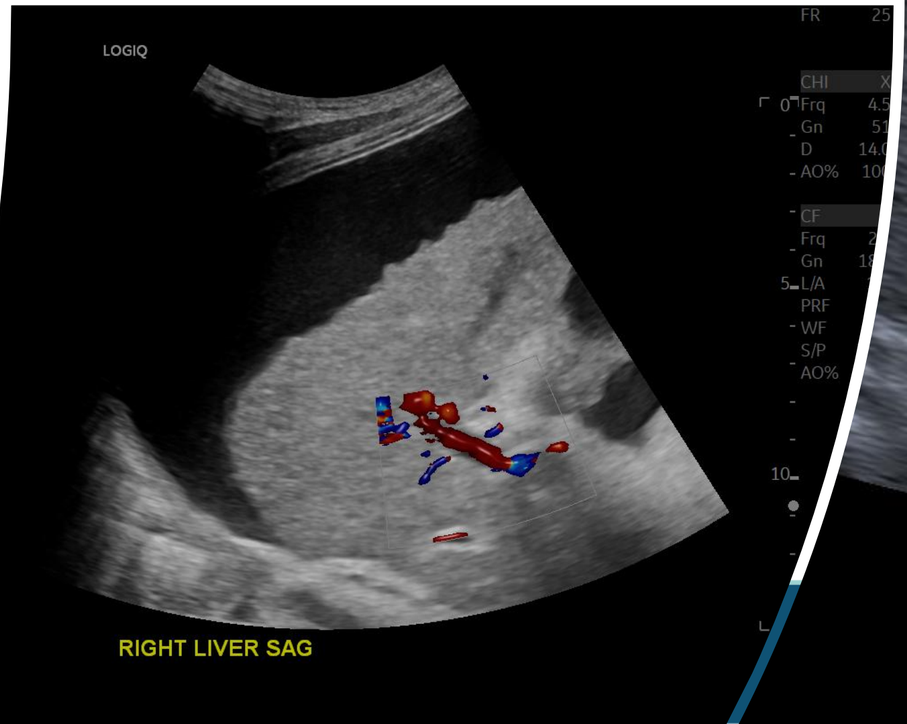
-what do we encounter
-what are the most important abnormalities in liver disease

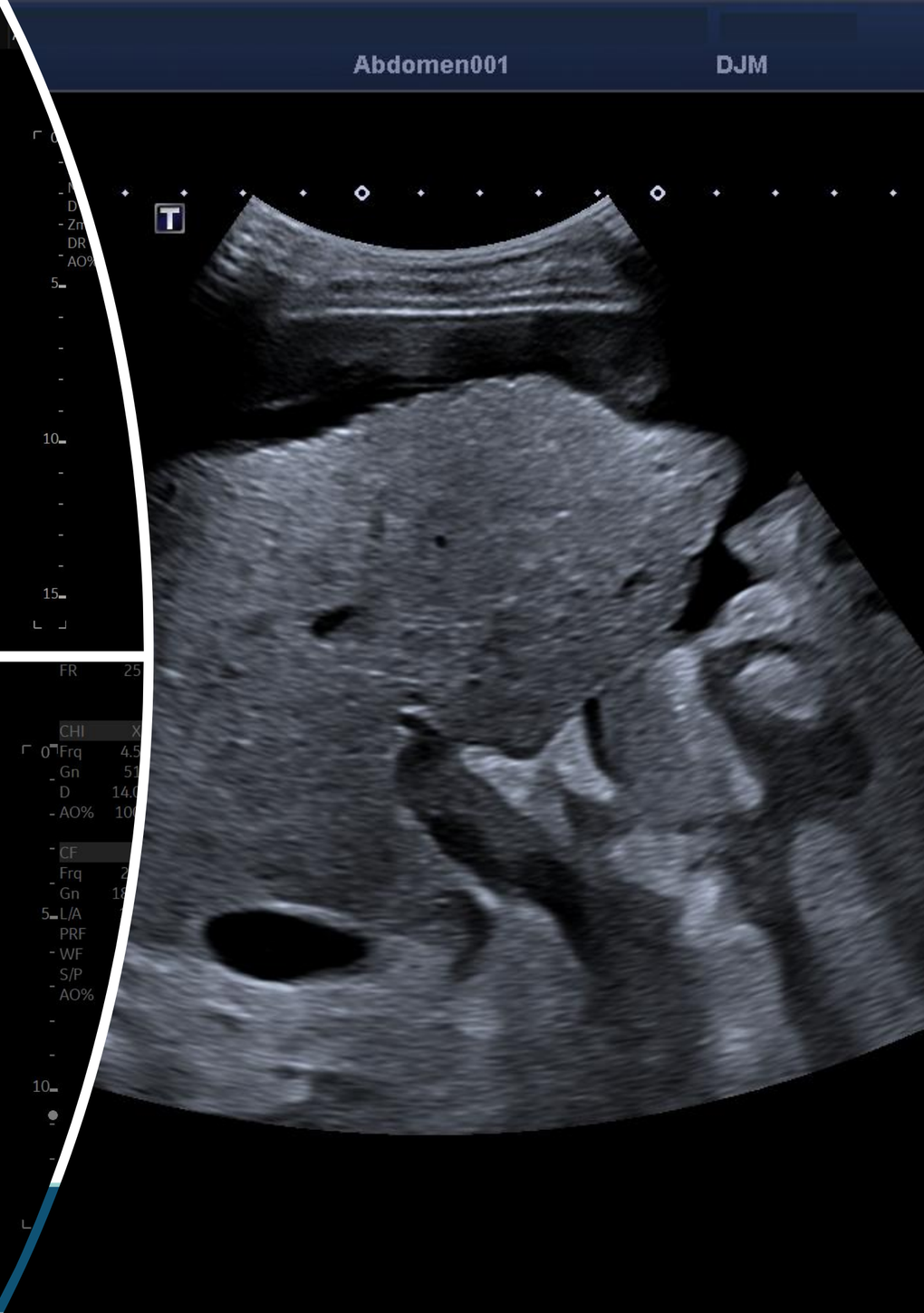


Liver POCUS
- most important abnormalities in liver disease

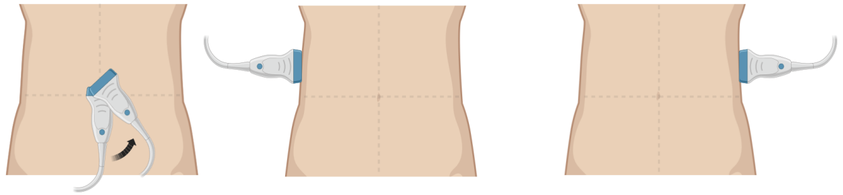
Liver POCUS
- probe position

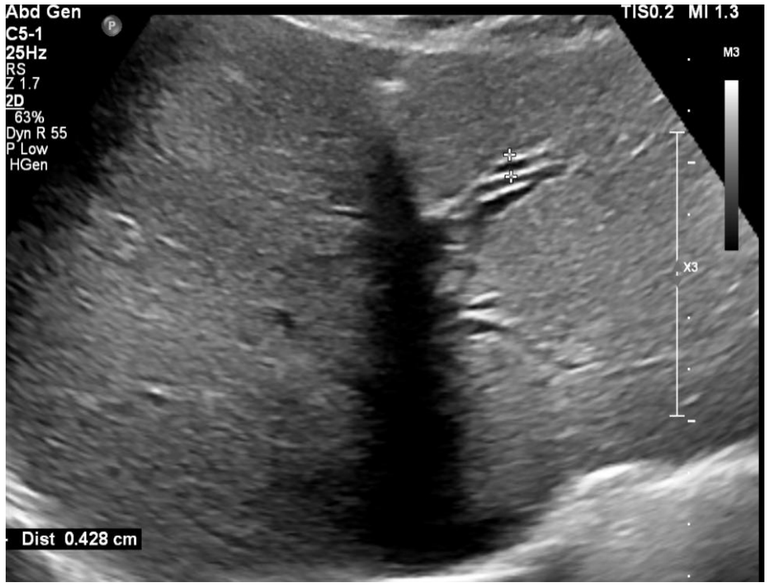




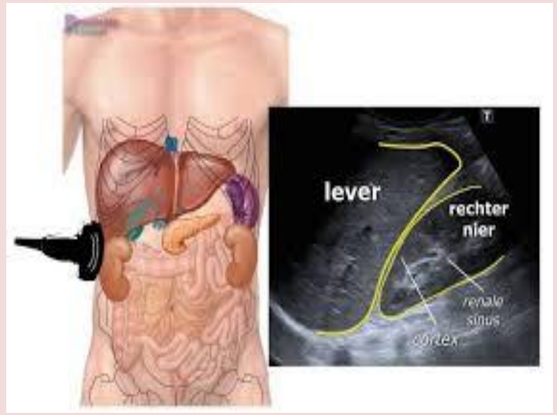


Liver POCUS
-probe position

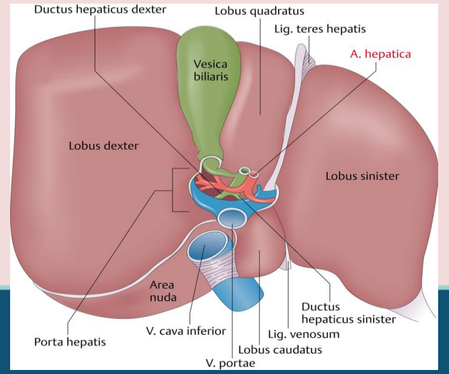


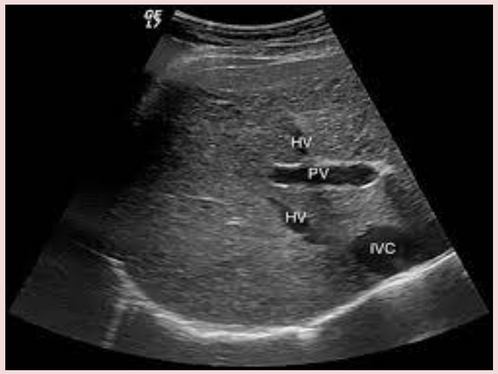


Based on 3-plane concept AASLD

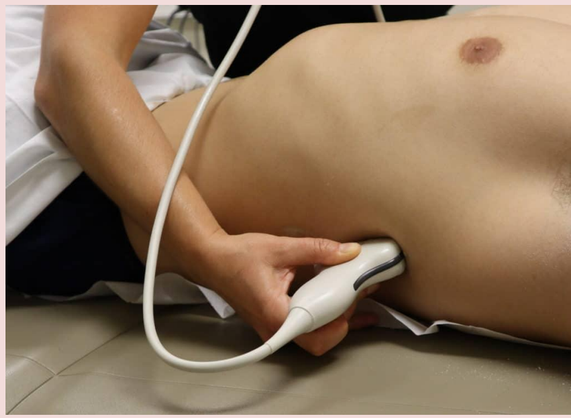


Right side: liver, right kidney





Thanks to: Jose Debes, Yuko Kono, Amir Gougol, Michael Dolinger and W. Ray Kim



Left side: spleen, left kidney

Subcostal: liver veins, portal vein branches, galbladder

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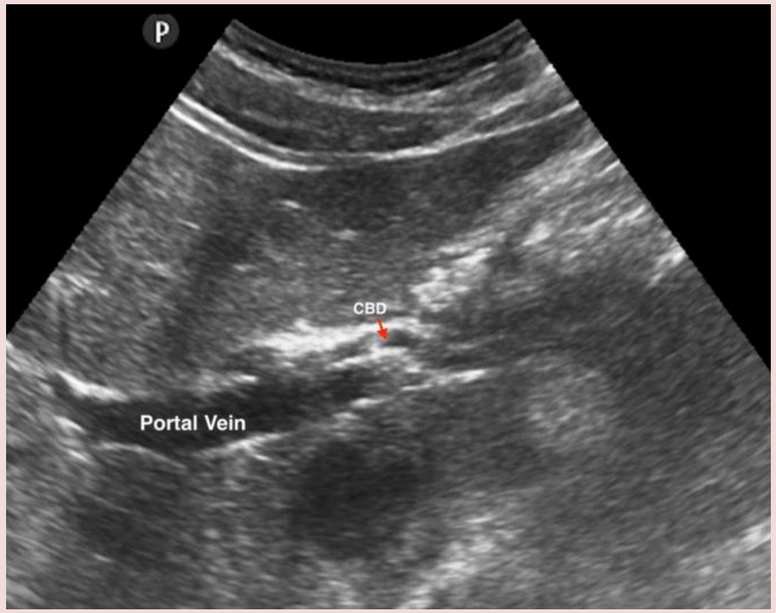
POCUS LIVER

2 additional planes, +liver surface

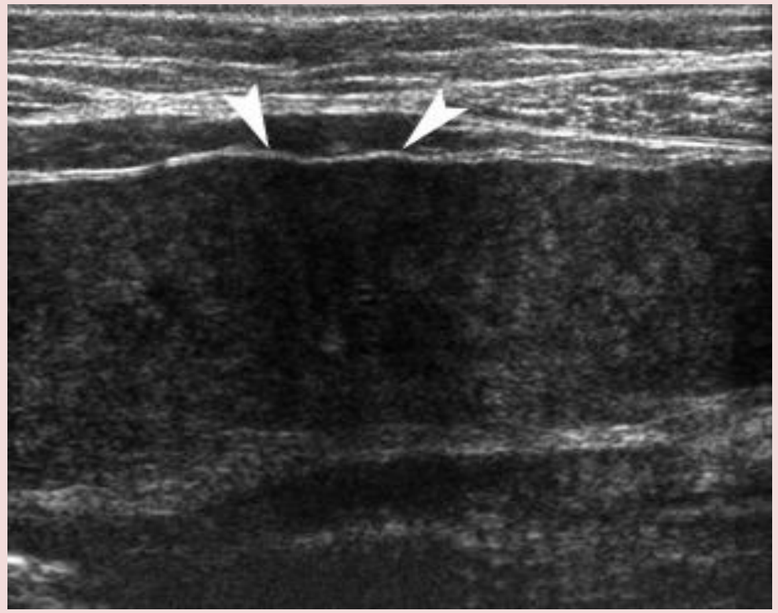
Left liverlobe, longitudinal:

Segments 2+3, caudate lobe



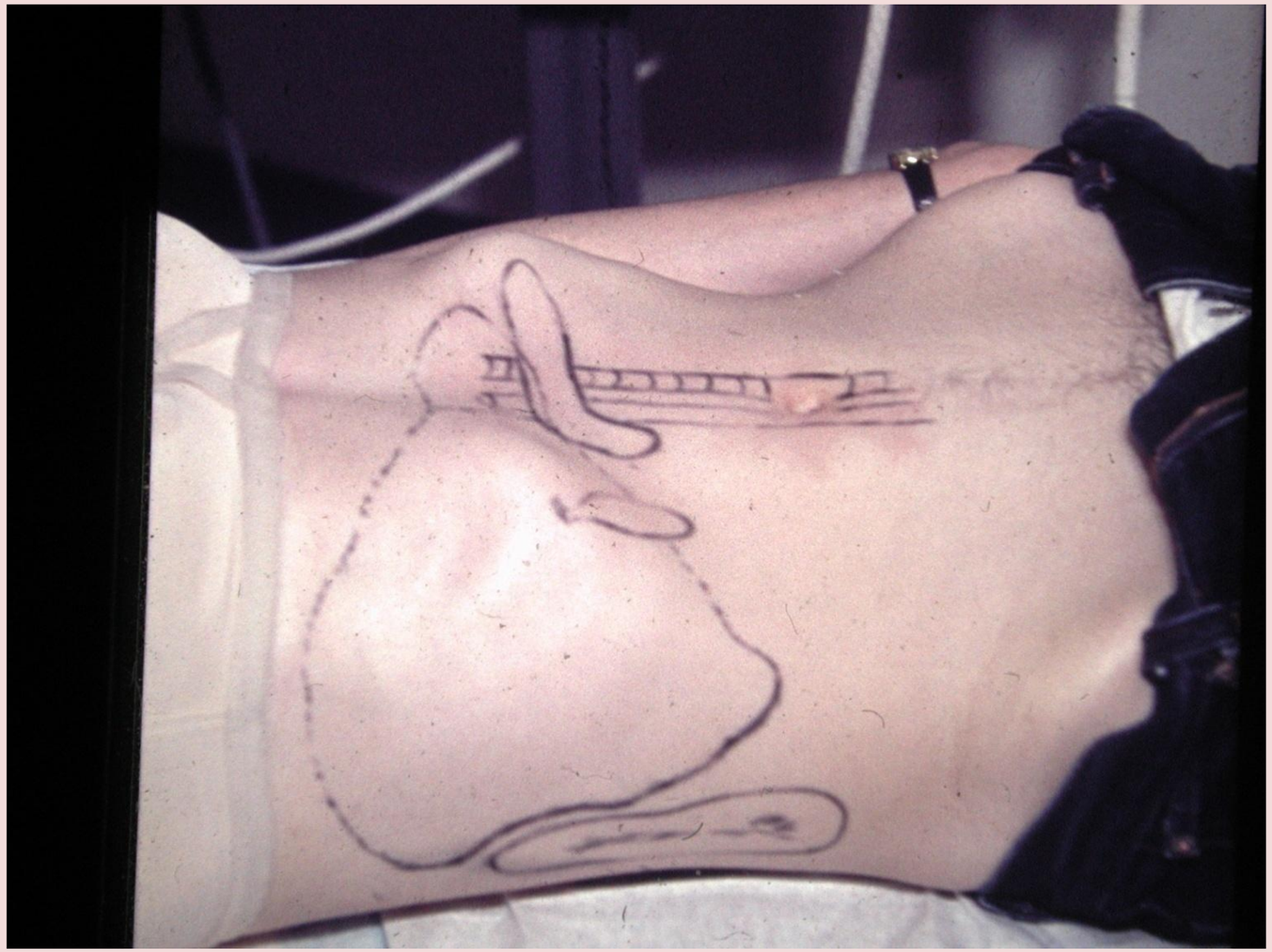
Right shoulder/umbilical plane

or 11 o’clock plane: DHC, CBD, PV

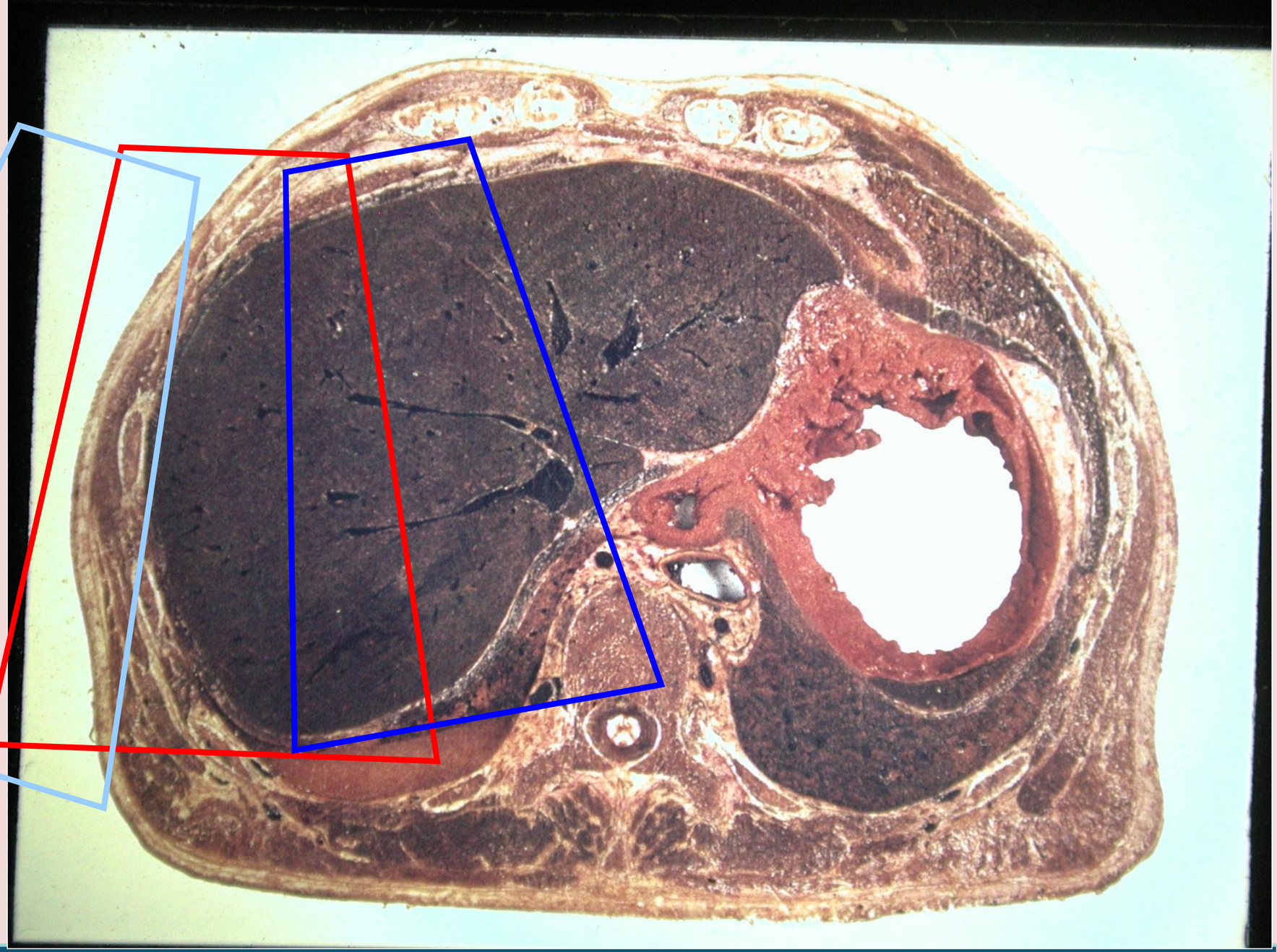


Linear probe: for liversurface left lobe

Quick complete scanning of all organs



Imagine a coffee filter



Diffuse liver disease

1. Cardiac disease
2. Steatotic Liver Disease
3. Acute and chronic hepatitis
4. Liver cirrhosis
5. Budd Chiari Syndrom/vascular liver disease

PORTAL HYPERTENSION - *Ultrasound evaluation*

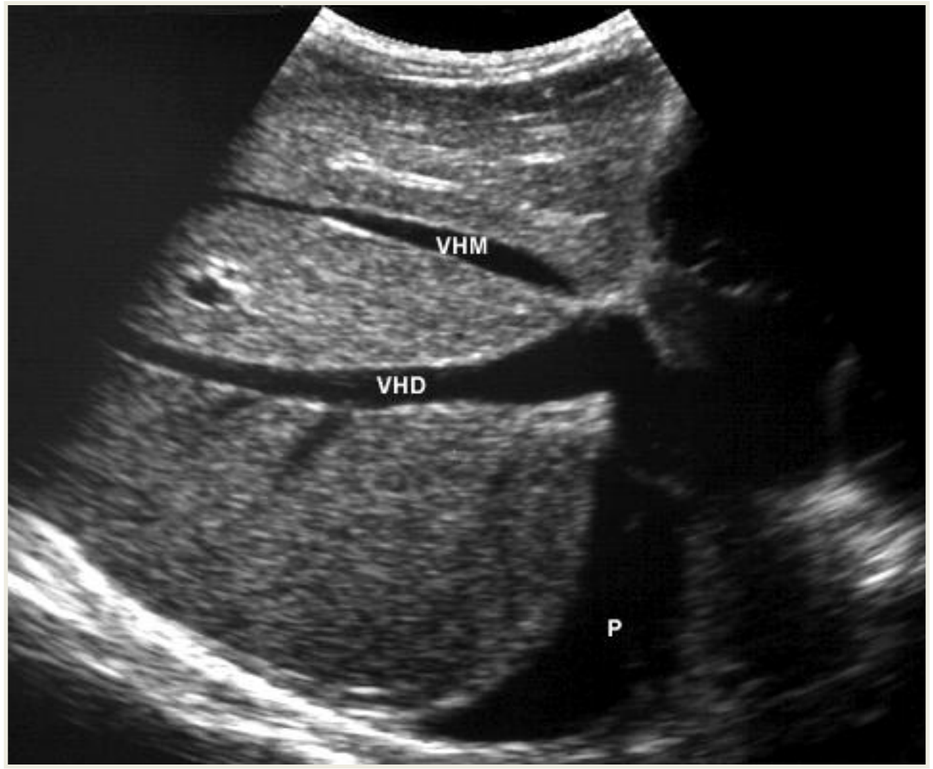
B-mode:

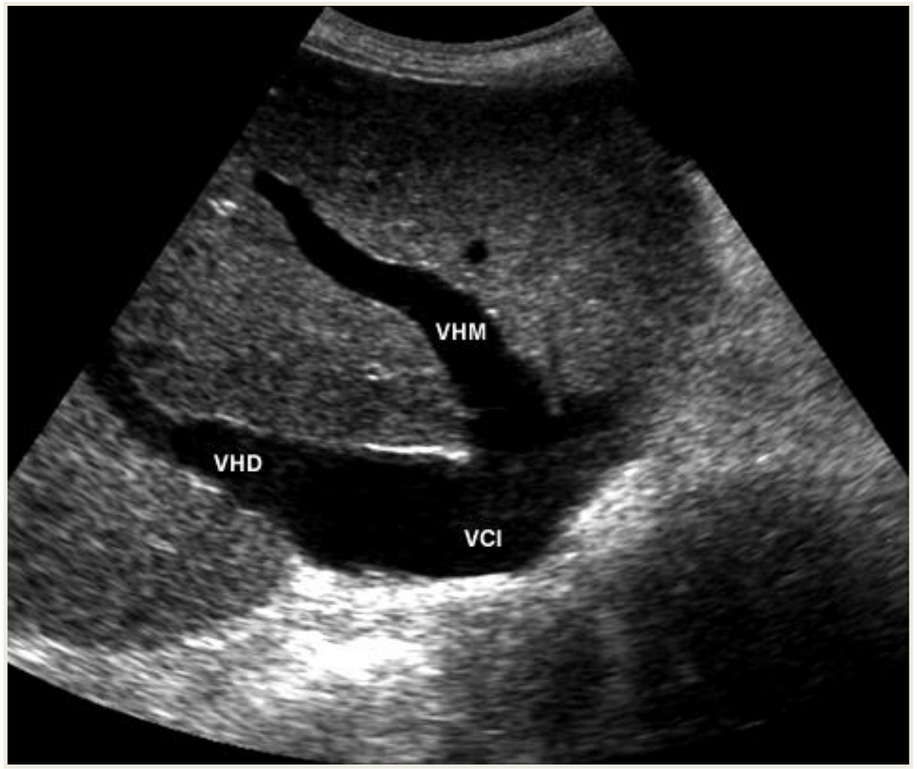
1. Portal system enlargement
2. Splenomegaly
3. Ascites
4. Collateral vessels
5. Dilatation VP, VL and VMS

Echo-Doppler:

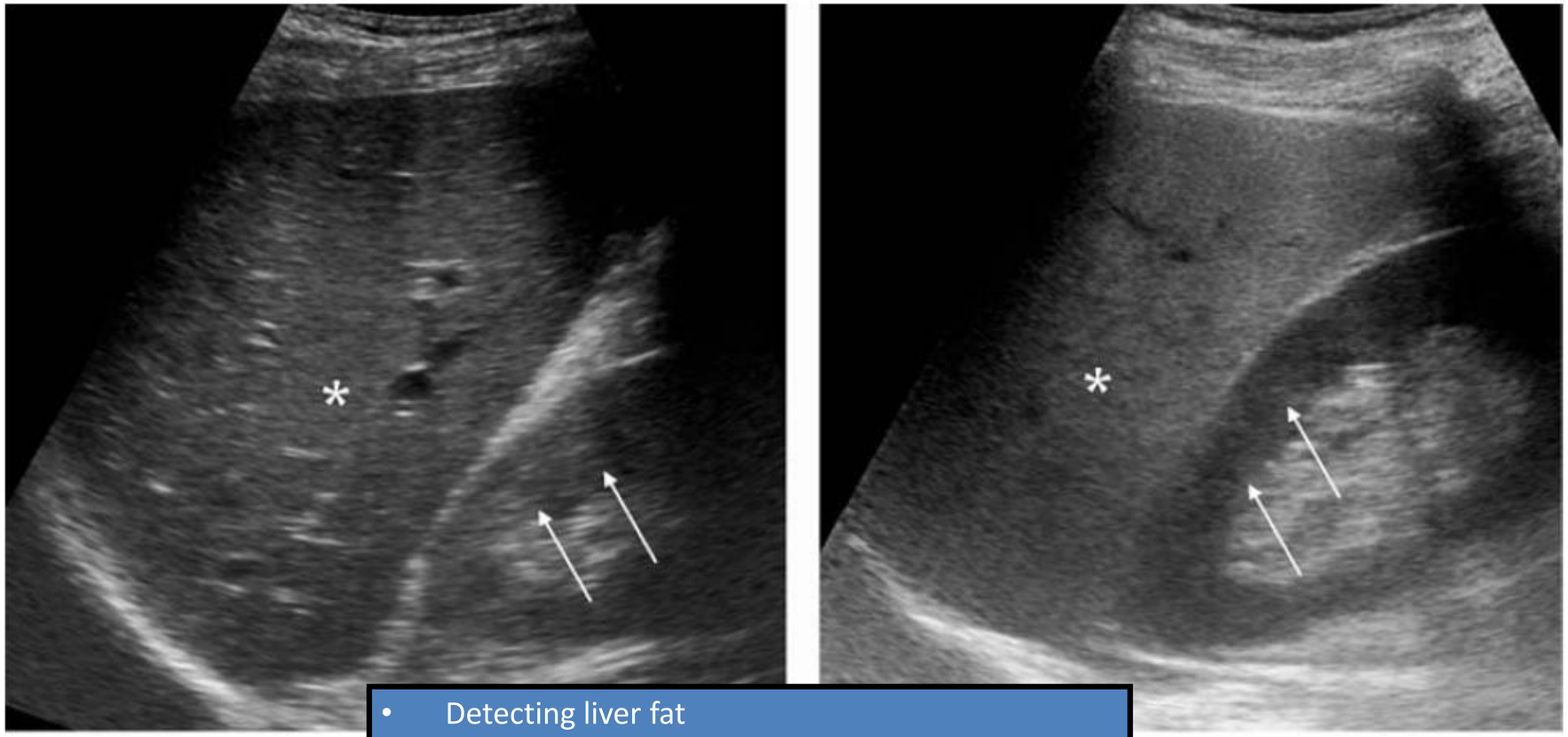
1. VP Thrombosis
2. Retrograde portal flow
3. Slower portal flow

Cardiac liver

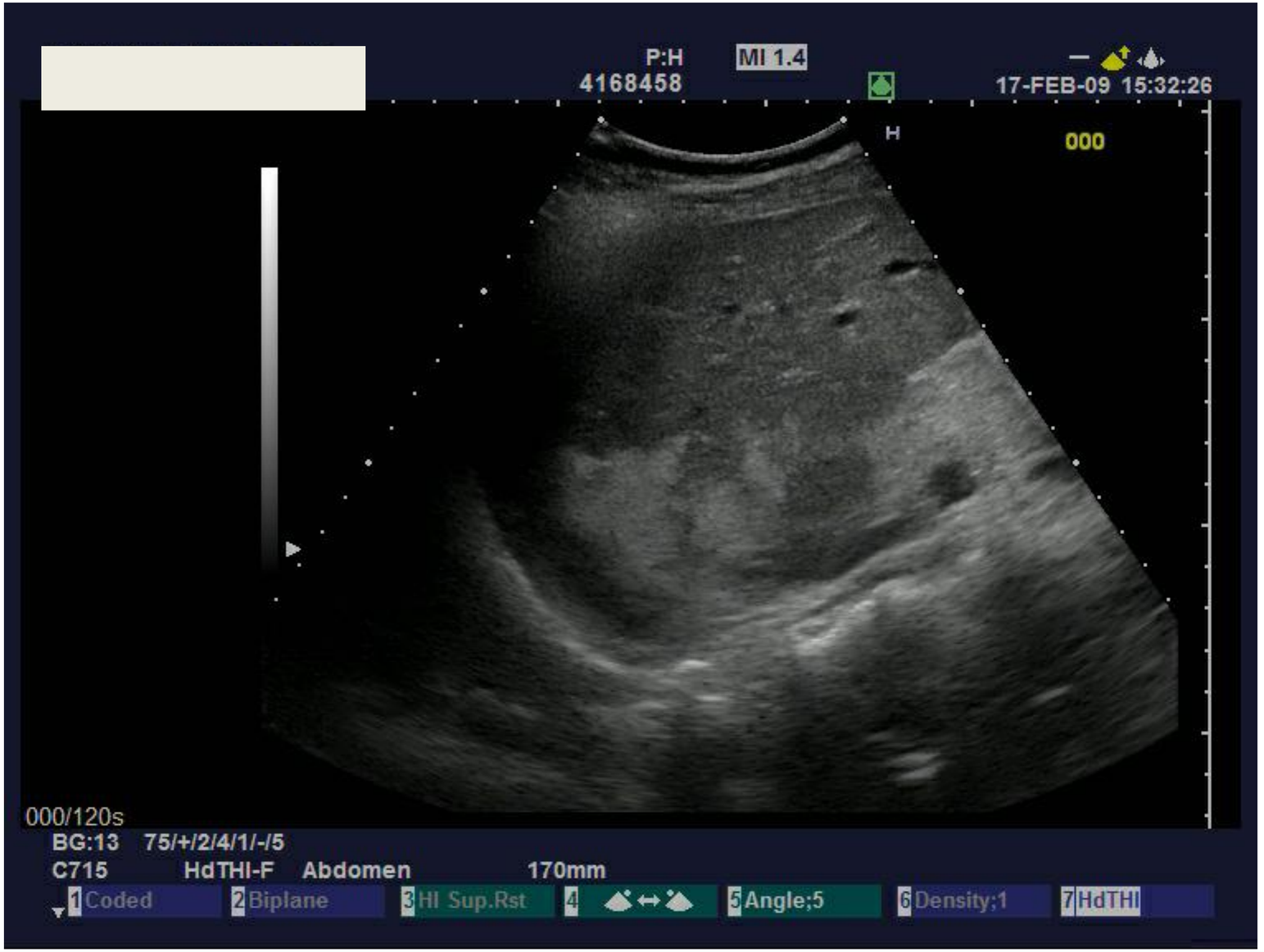




Fettleber



- Detecting liver fat
  - Sensitivity: 60-94%
  - Specificity: 66-95%
- US CAN NOT DIFFERENTIATE BETWEEN STEATOSIS AND FIBROSIS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C715 HdTHI-F Abdomen 170mm
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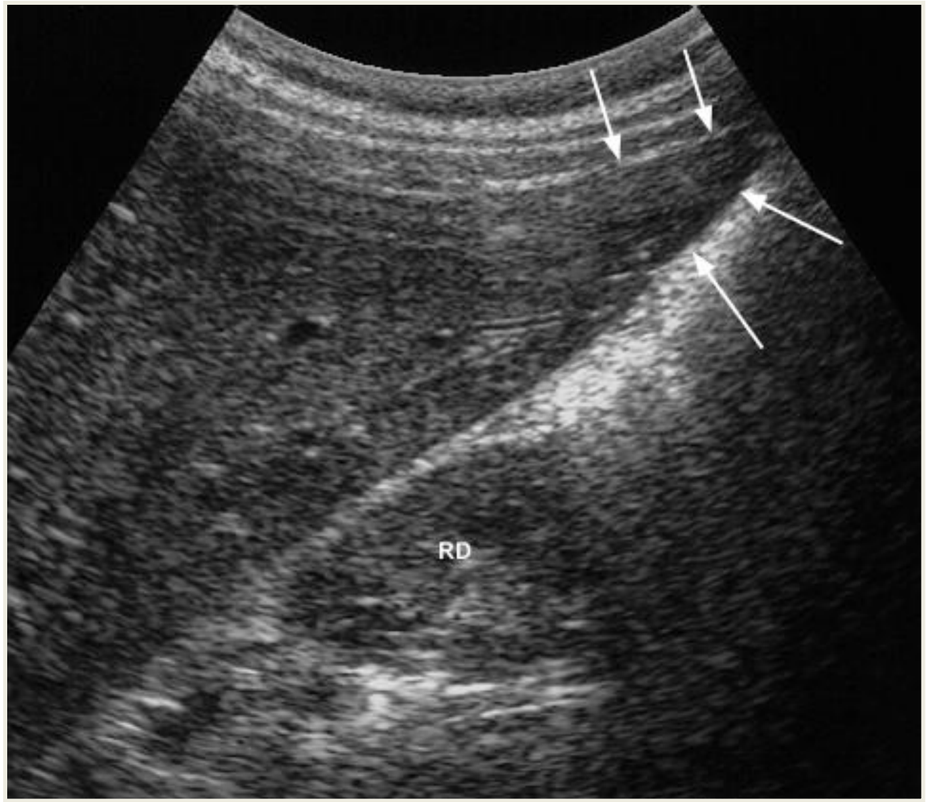
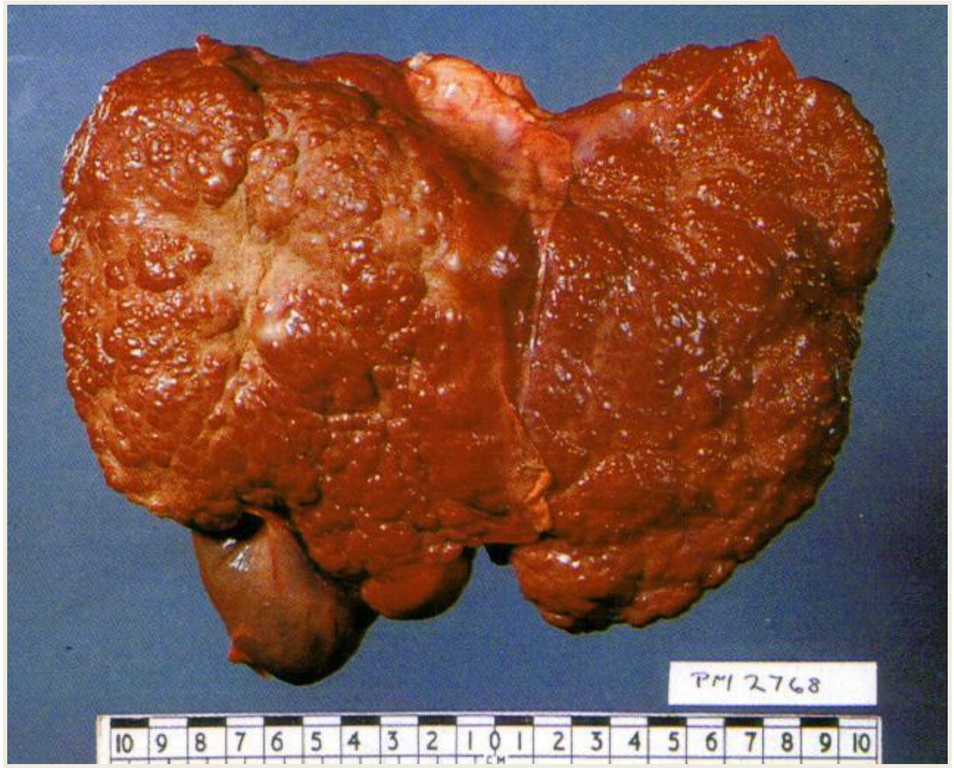
2 Biplane
3 HI Sup.Rst
4
5 Angle;5
6 Density;1
7 HdTHI

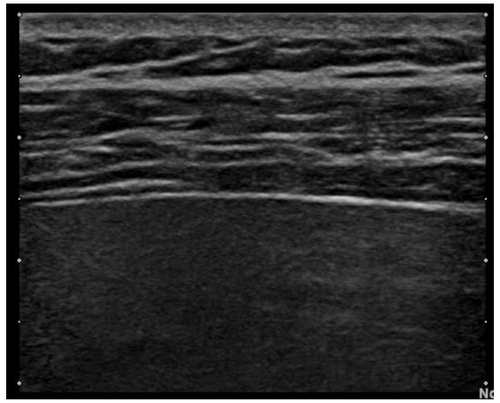
Liver cirrhosis: rounded edge

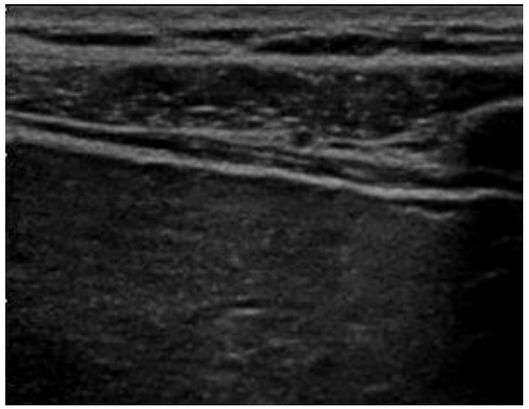


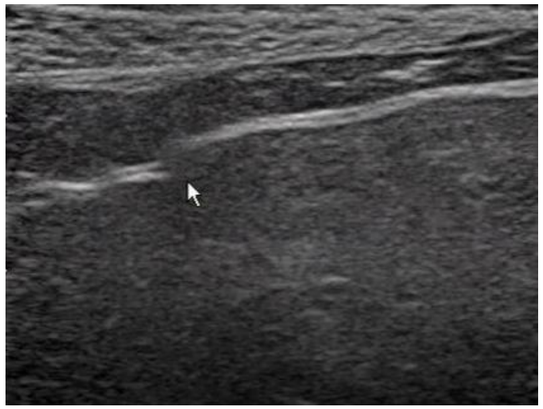
Liver cirrhosis: Noduli



HF probe: diagnosis micronodular cirrhosis

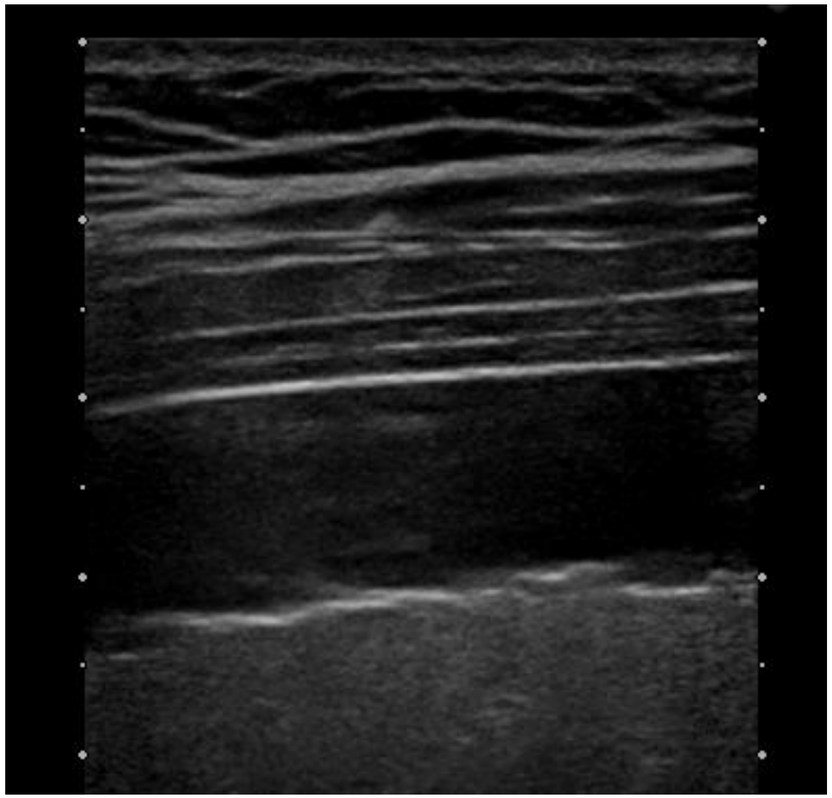


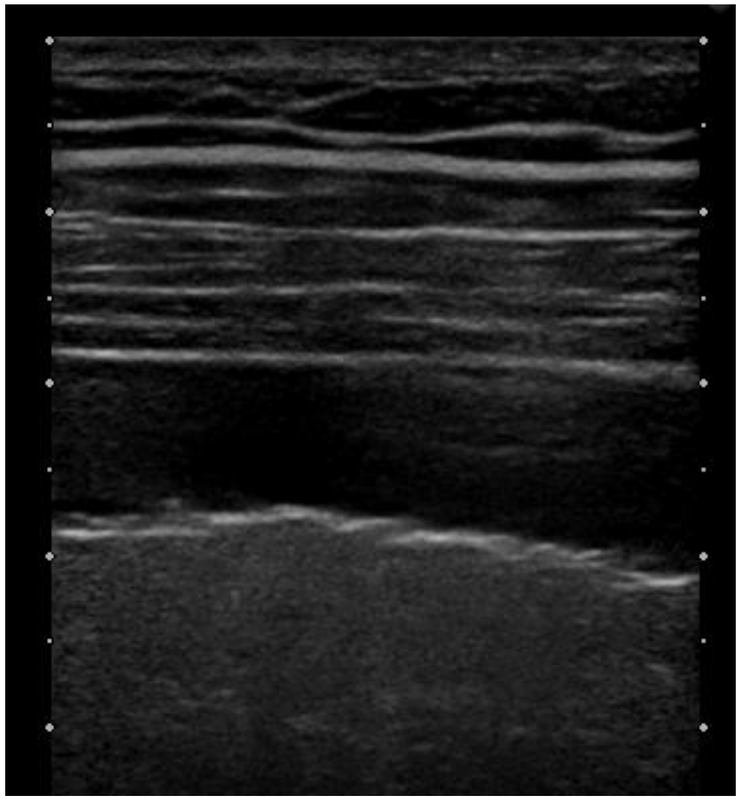




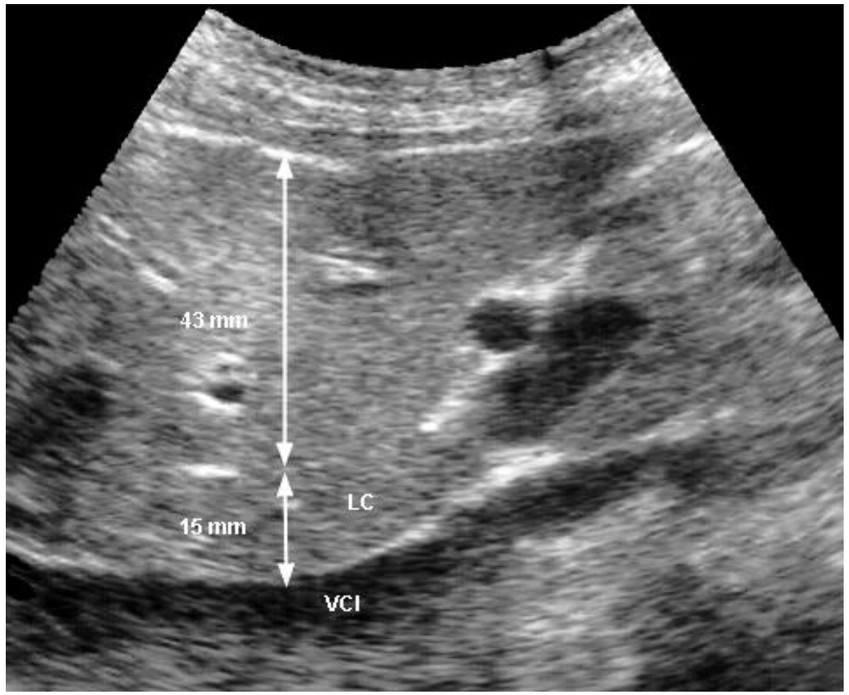
Sensitivity: 91,1%	PPV: 93,2%
Specificity: 93,5%	NPV: 91,5%

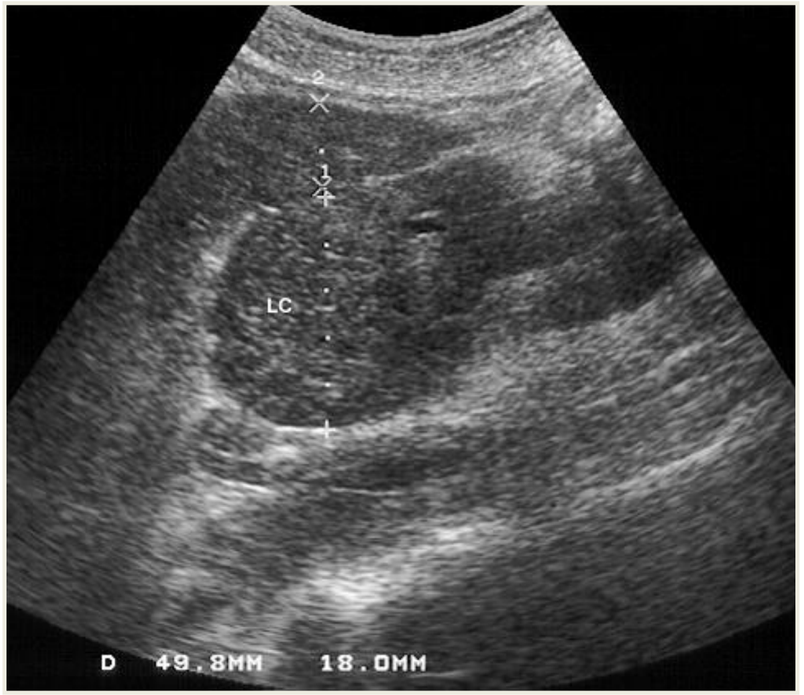
Acute liver failure: same changes as in liver cirrhosis



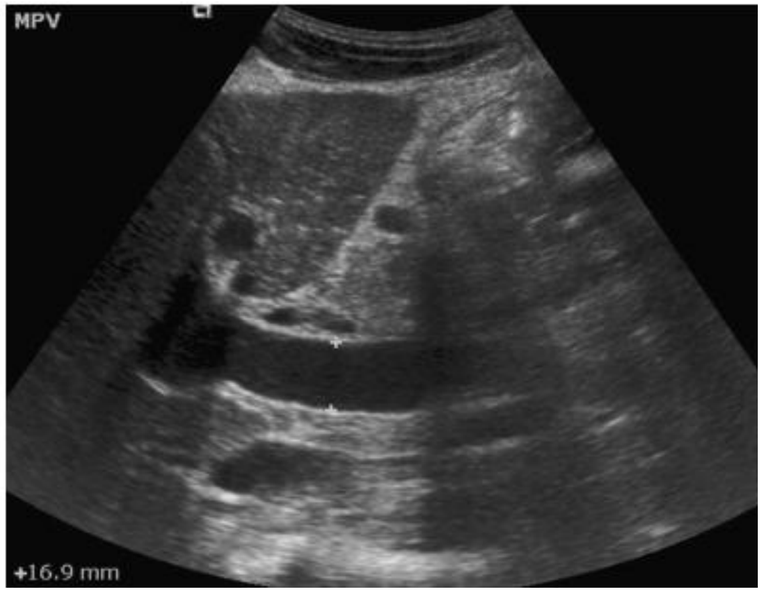


Lobus caudatus, measurements

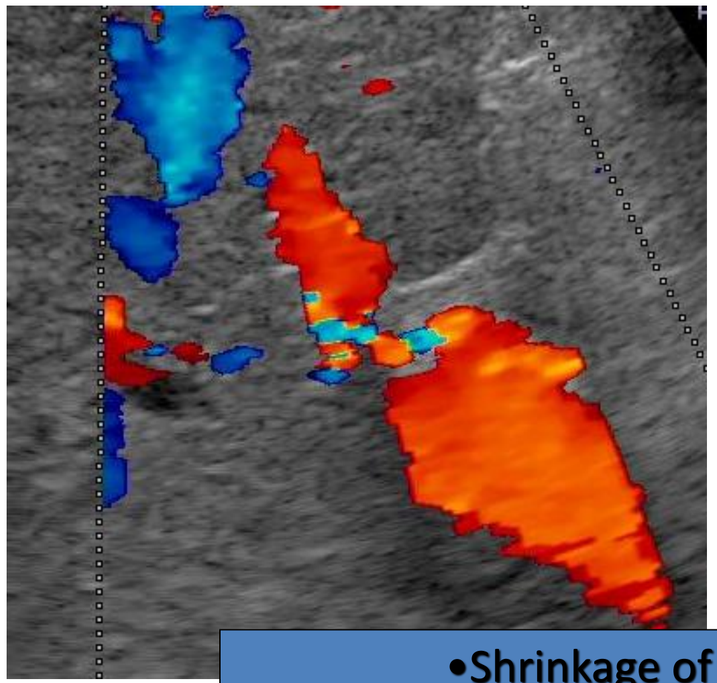


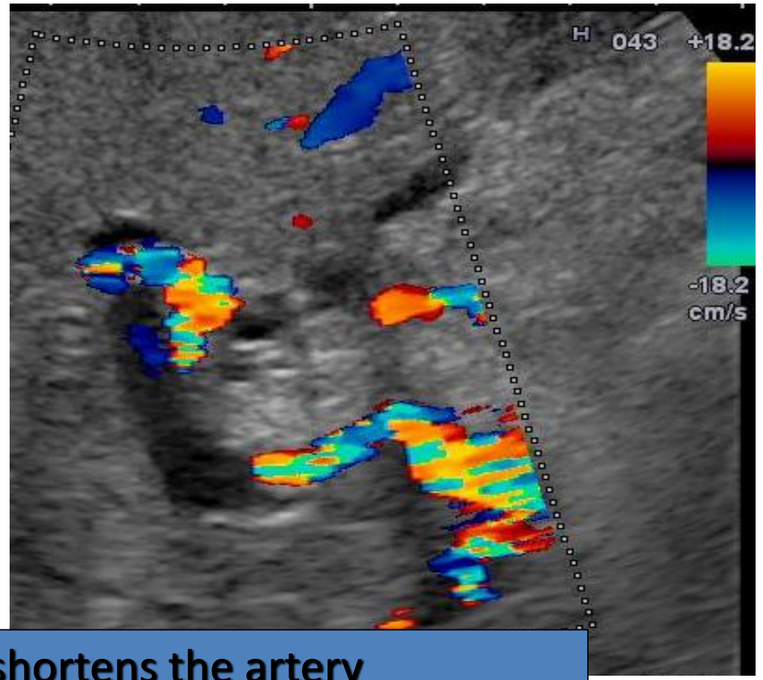


Portal vein dilatation



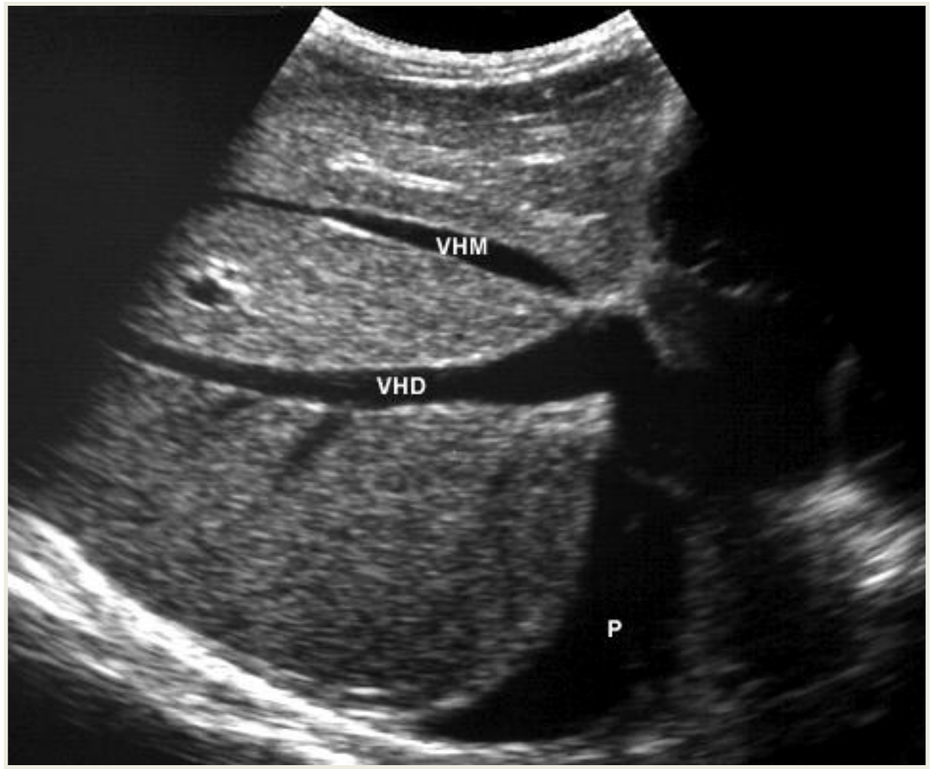
Cirrhosis: corkscrew arteries

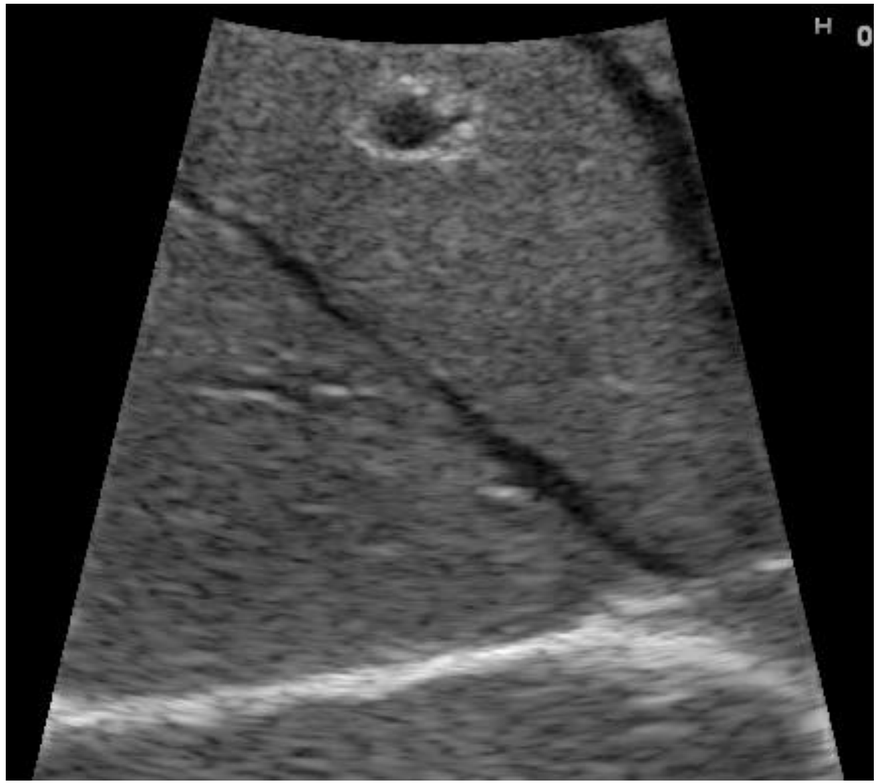




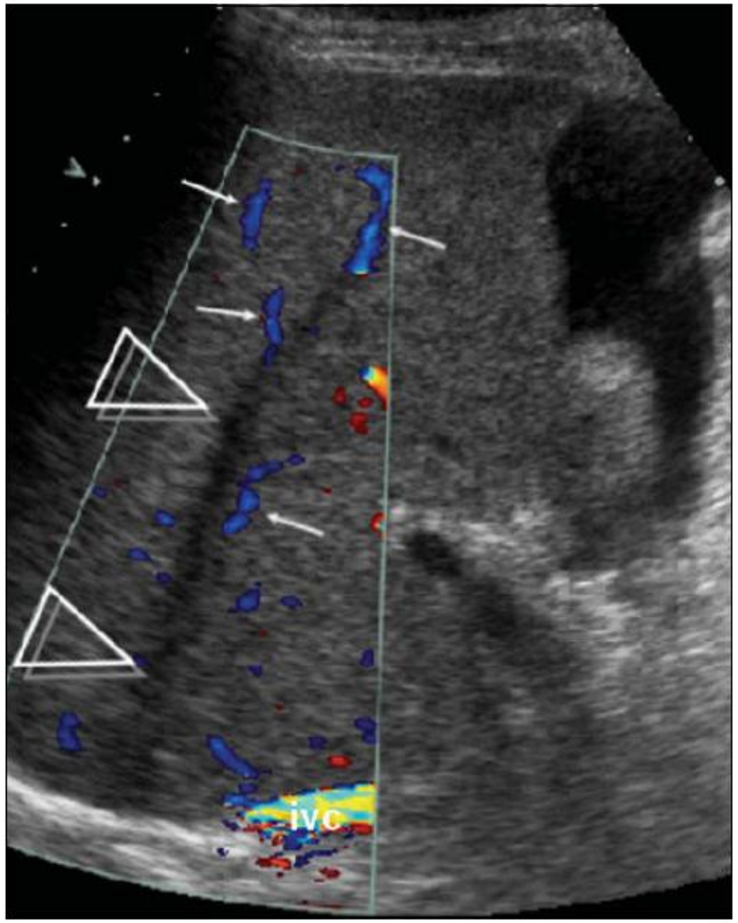
- Shrinkage of liver foreshortens the artery
- Increased arterial flow due to decreased portal flow
- Higher velocity (aliasing)

Cirrhosis: hepatic vein border irregularities



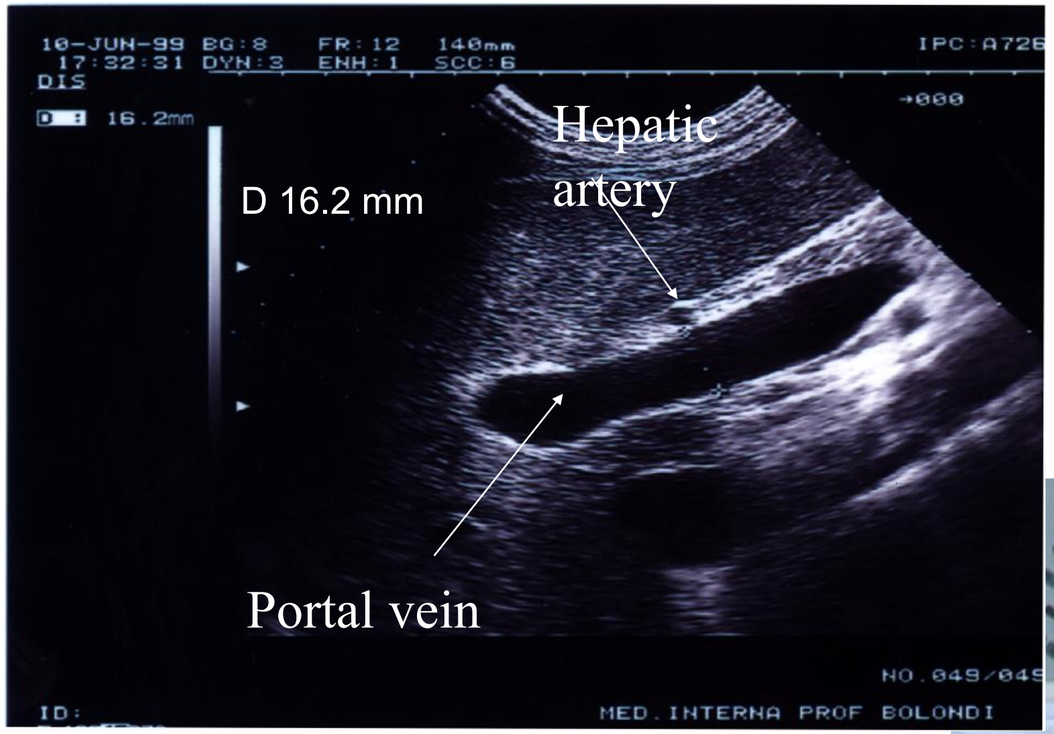


Acute BCS

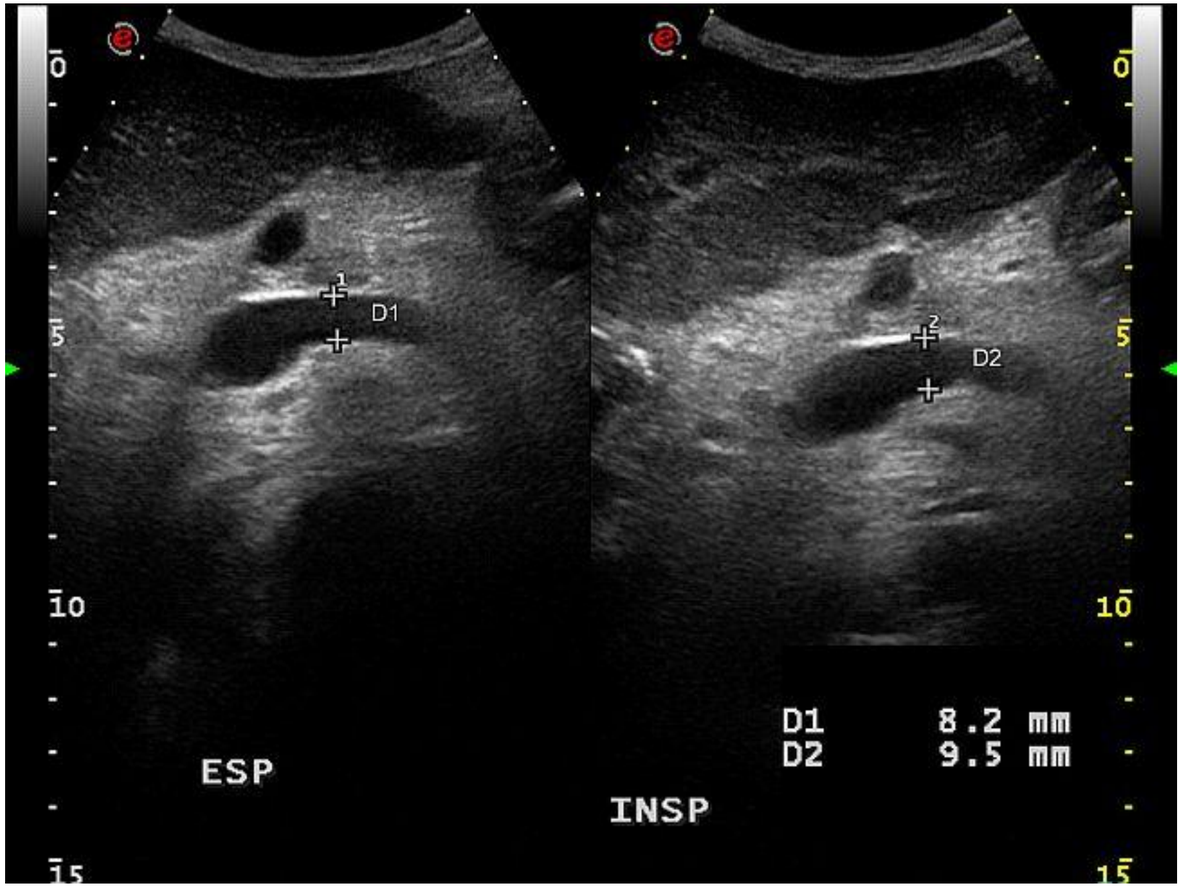


- Acute BCS:
  - Right hepatic vein filled with fine echoes
  - Fine perivenous vessels

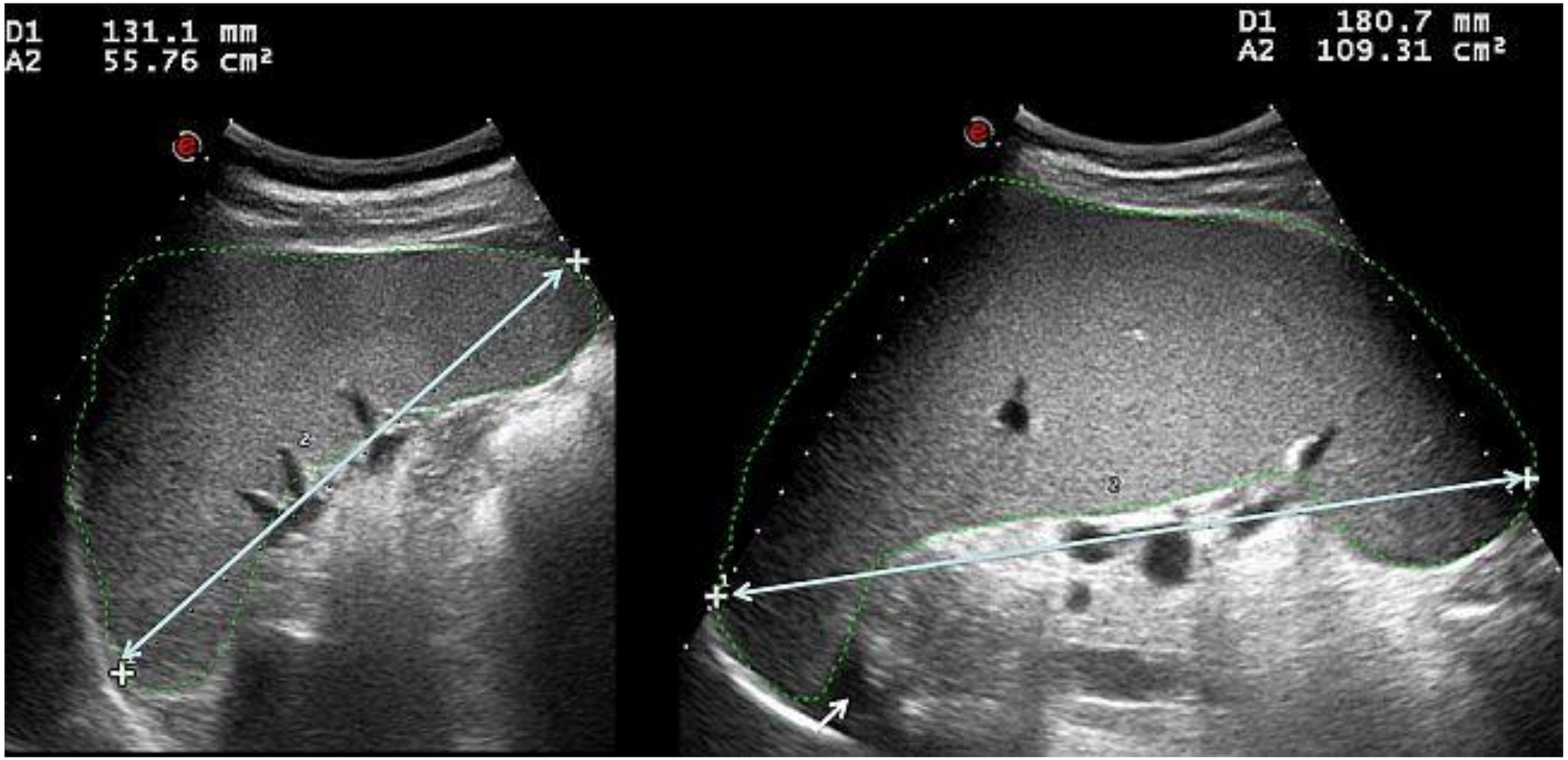
Enlarged portal vein



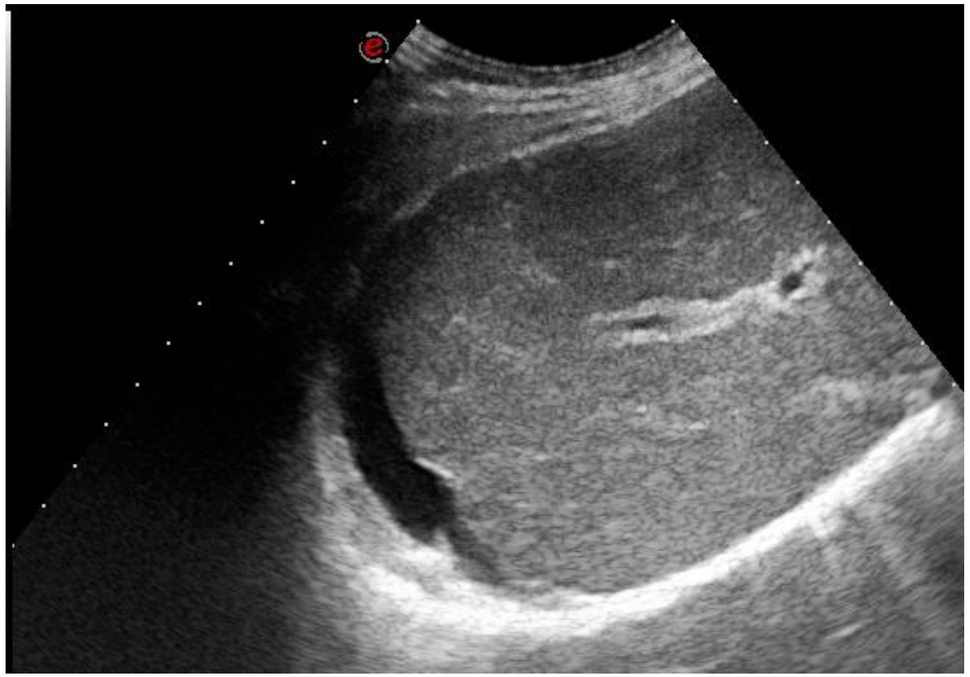
2. Portal system stiffness – *Portal hypertension*

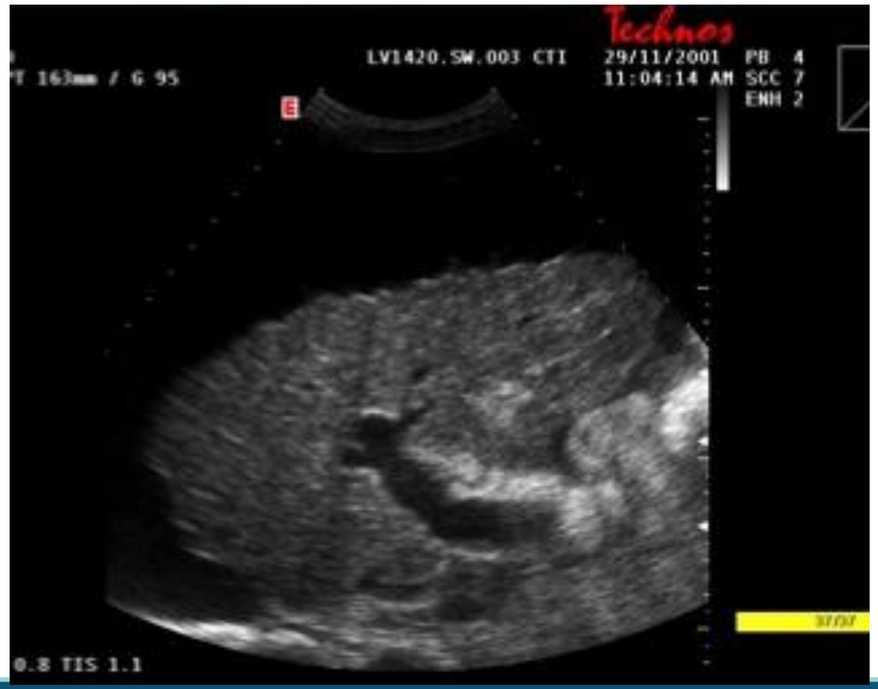


Splenomegalie



Aszites

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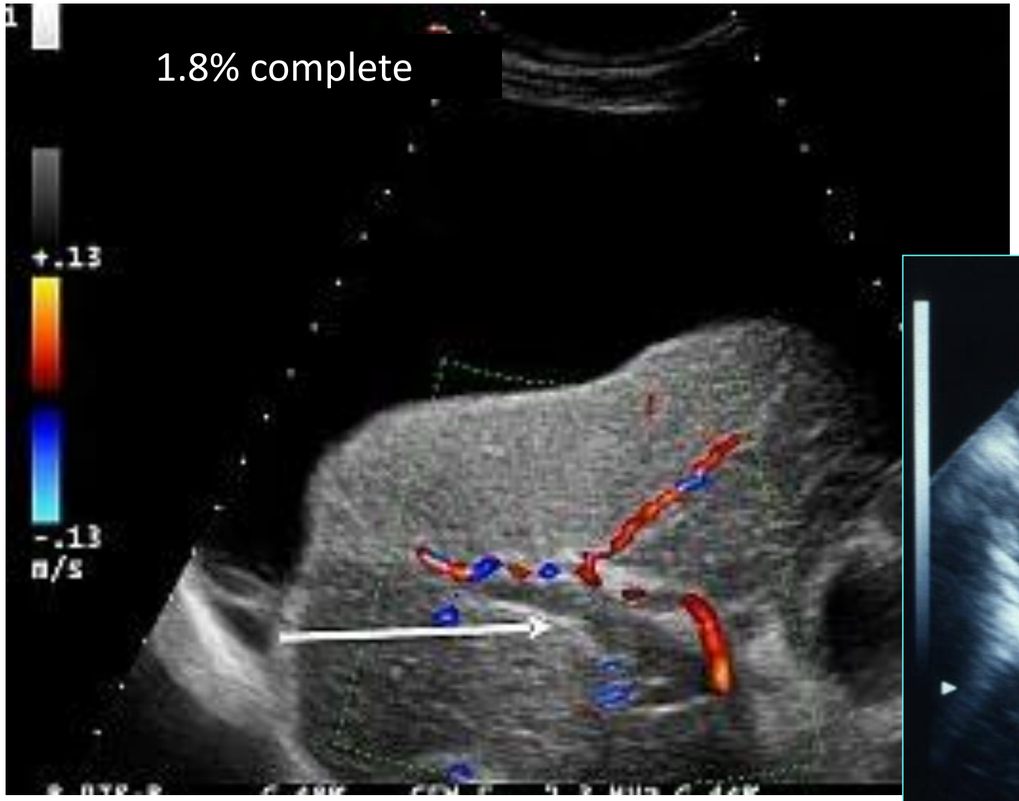
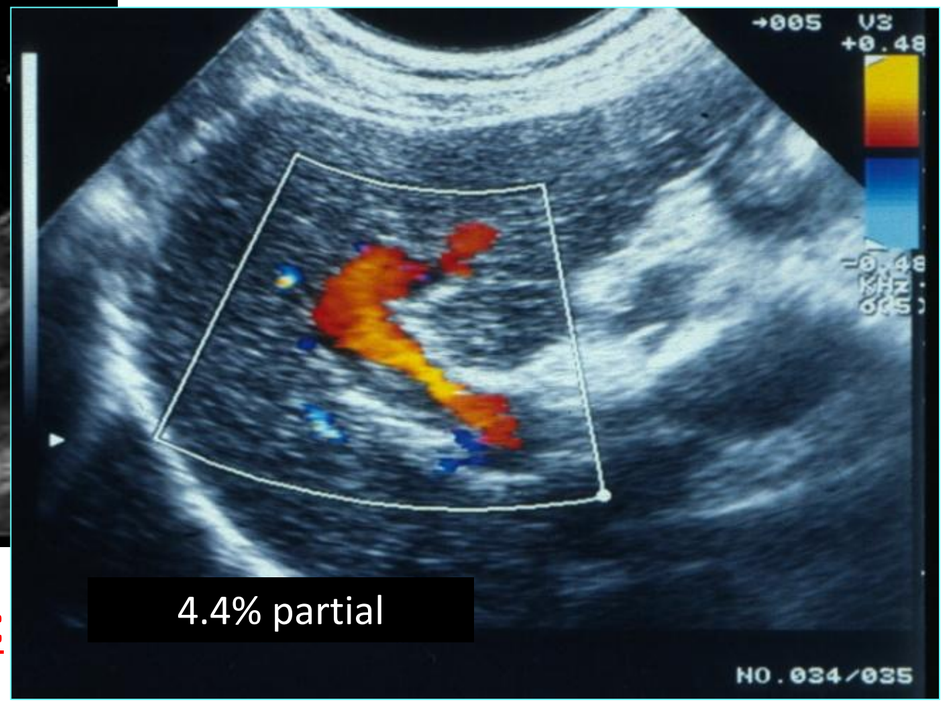
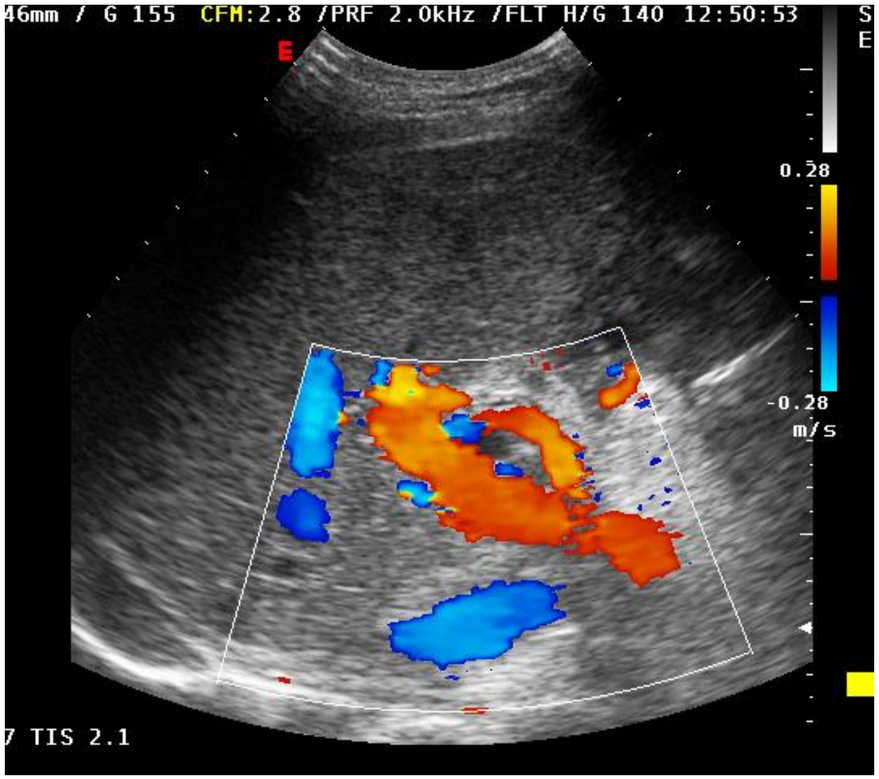
Vena portae Thrombose

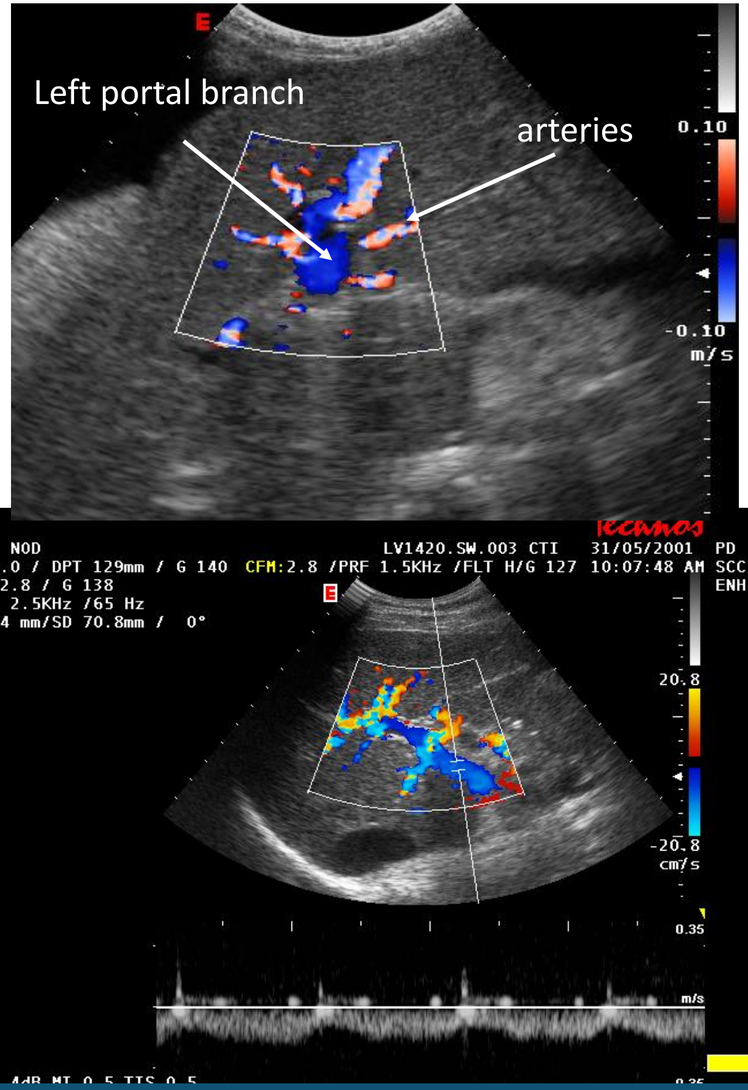




Portal vein thrombosis is a specific sign of portal hypertension.

Retrograde portale Flow





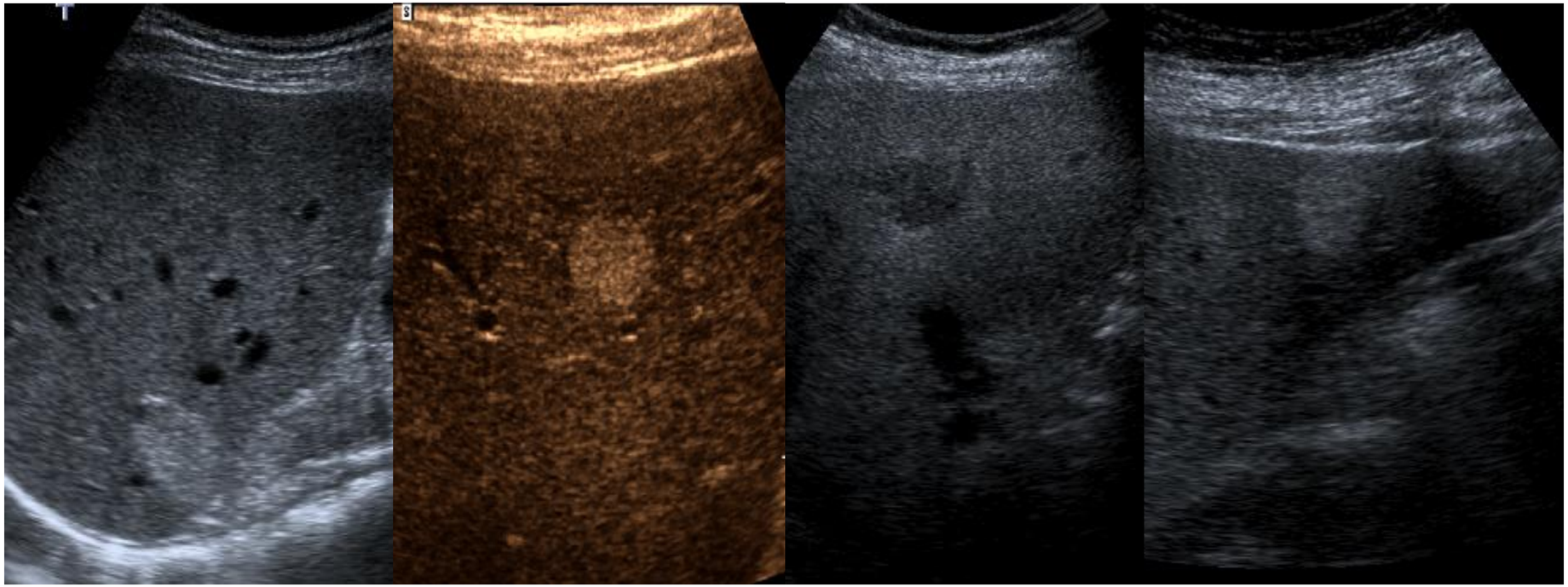
Characteristics of common benign liver lesions

	Haemangioma	FNH	HCA
Estimated prevalence	Common ~5%*	Less common 0.03%	Rare ≤0.004%
Age	30–50 years	20–40 years	All ages
Gender	F > M	F ~ M	F >> M
US	Hyperechoic	Varied	Varied
CT	Centripetal enhancement	Central scar	Varied
MRI	Centripetal enhancement Hyperintense T2-w	Central scar	Varied
Calcification	Yes	No	No
Rupture	Rare	No	Yes

*Estimated prevalence in imaging series; has been reported to be as high as 20% in autopsy series

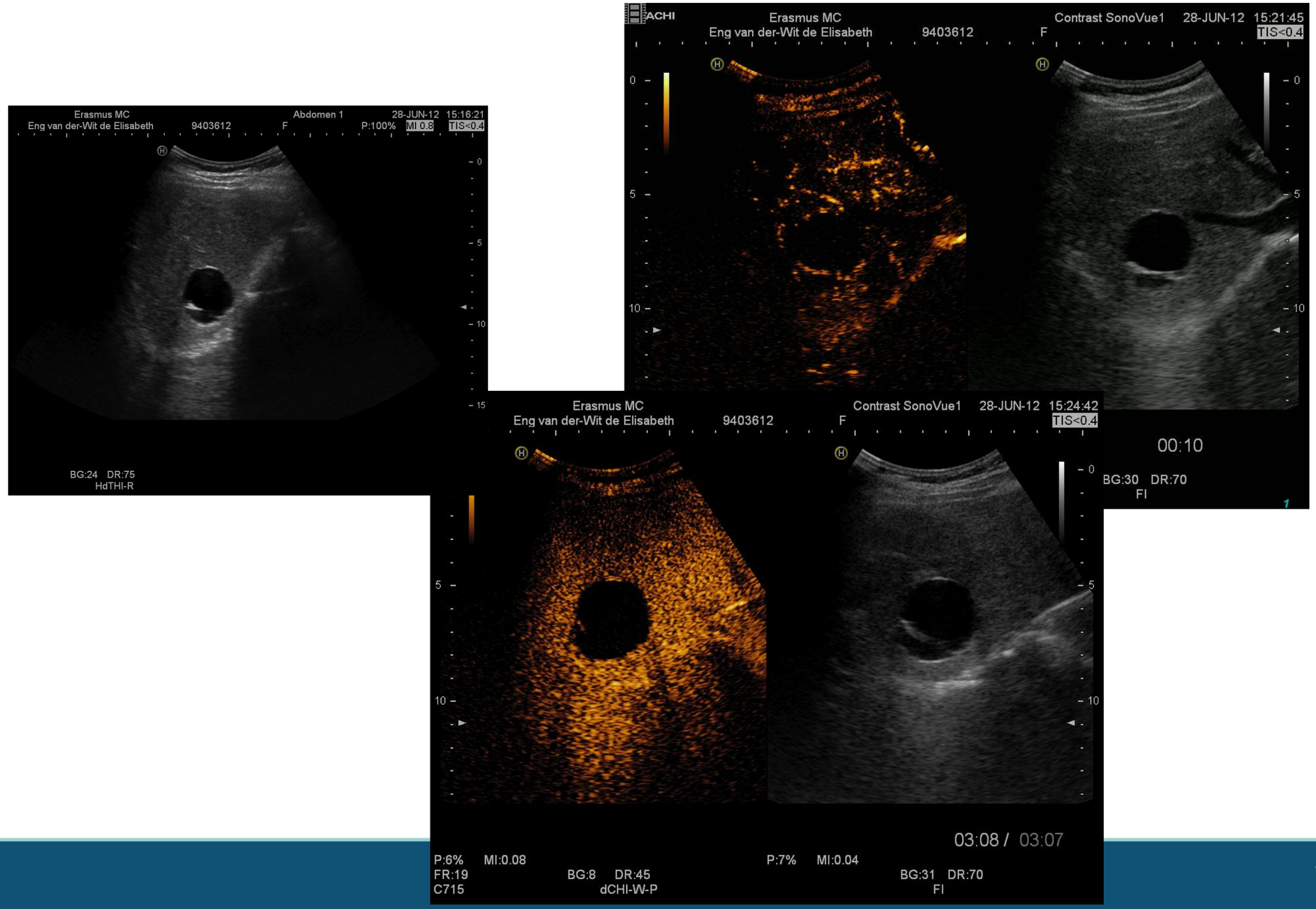
Bahirwani R, Reddy KR. Aliment Pharmacol Ther 2008;28:953–65; EASL CPG benign liver tumours. J Hepatol 2016;65:386–98

Liver Tumors (benign)

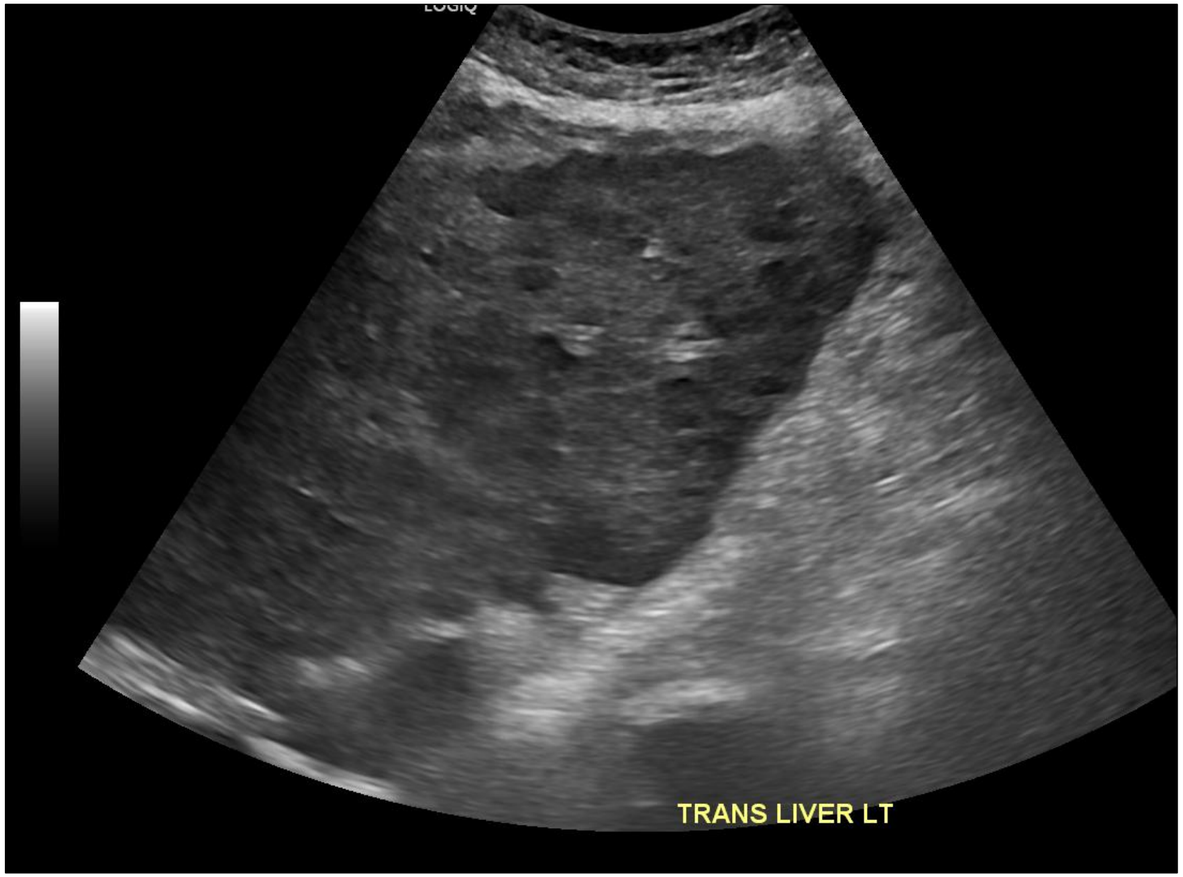


Hemangioma	**Hemangioma**	**Hemangioma**	**Adenoma**

Uncomplicated cyst

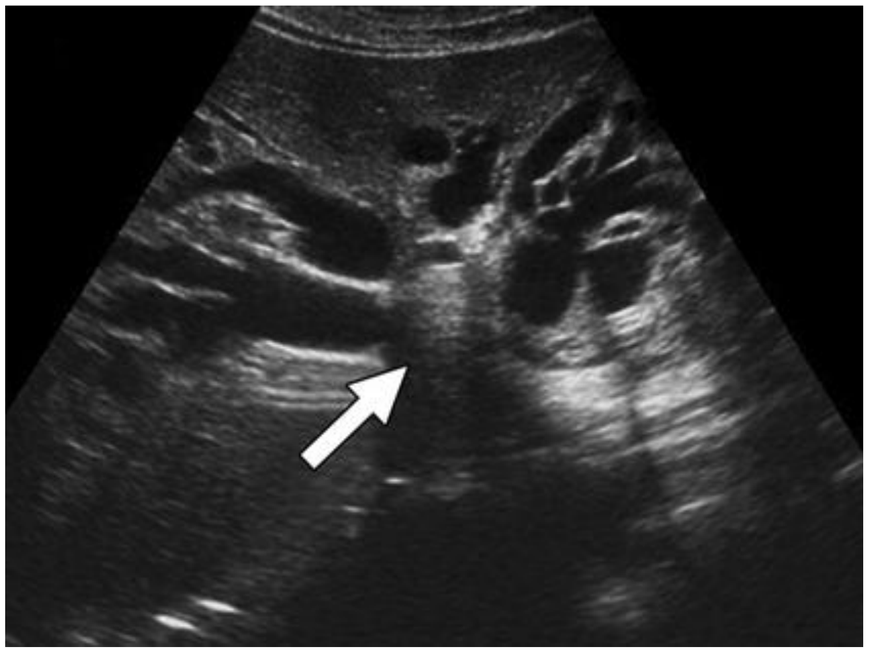


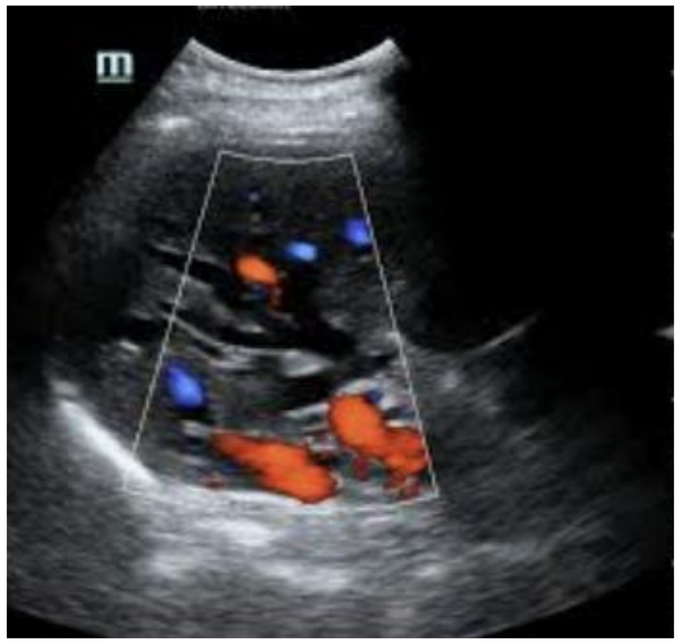
Cirrhosis



Nodular liver contour, coarse liver parenchyma, w/wo ascites, splenomegaly: right, mid scan

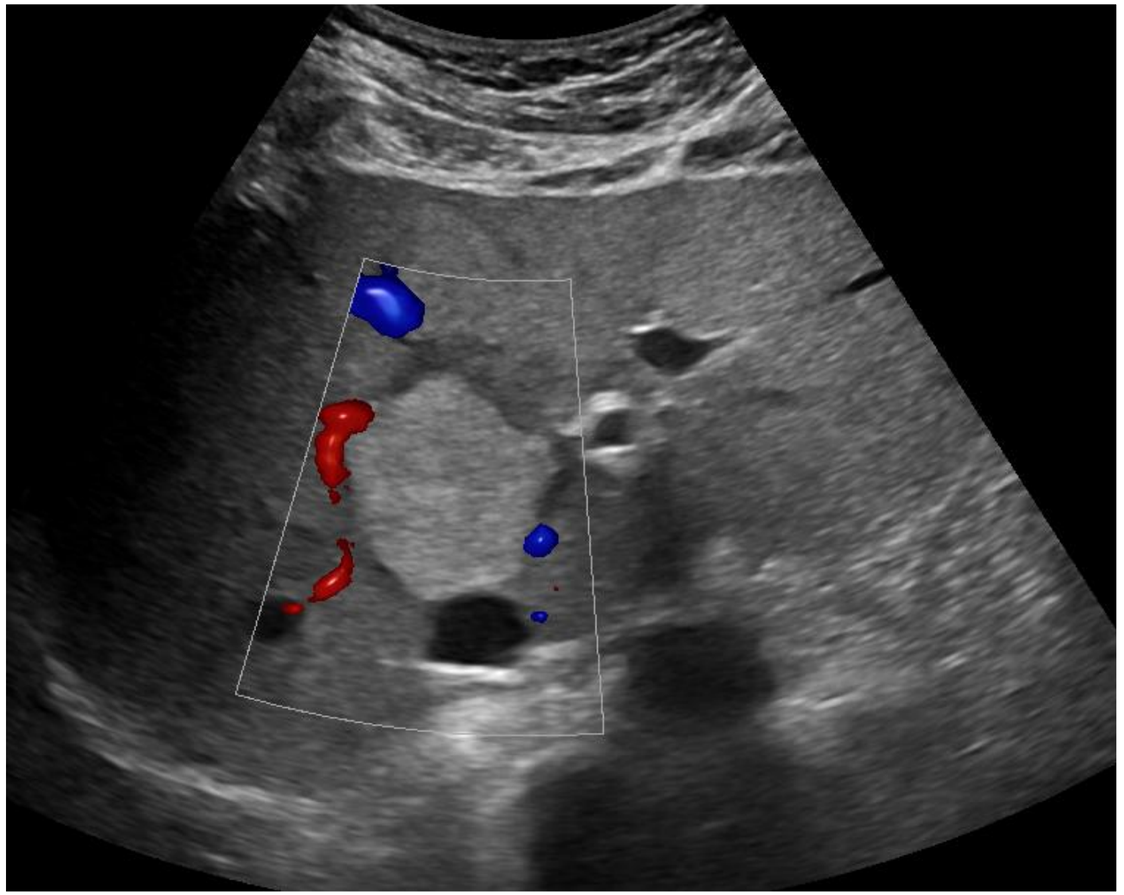
Biliary obstruction/dilatation





Too many anechoic tubular structures
(color Doppler is helpful)

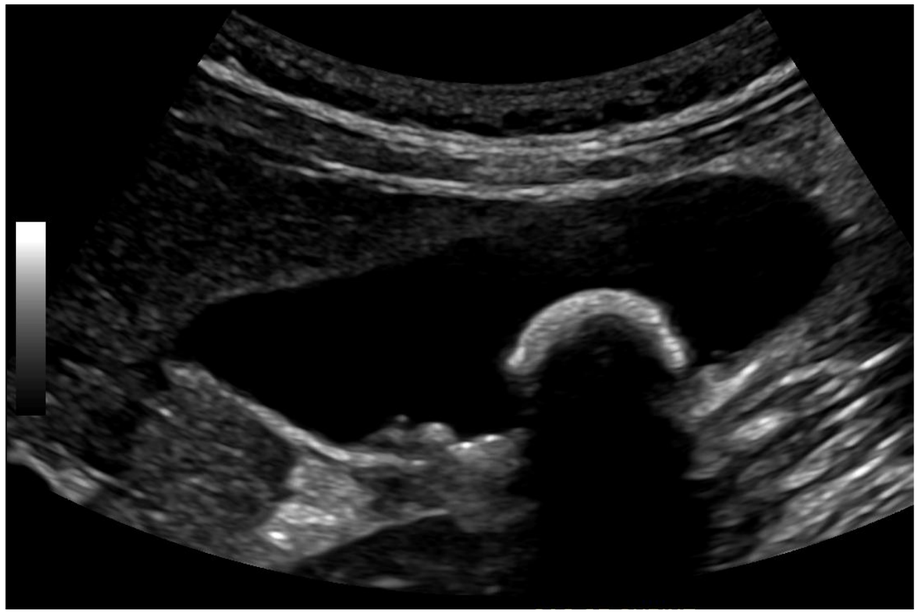
Liver Lesions



Hypoechoic, Hyperechoic, isoechoic

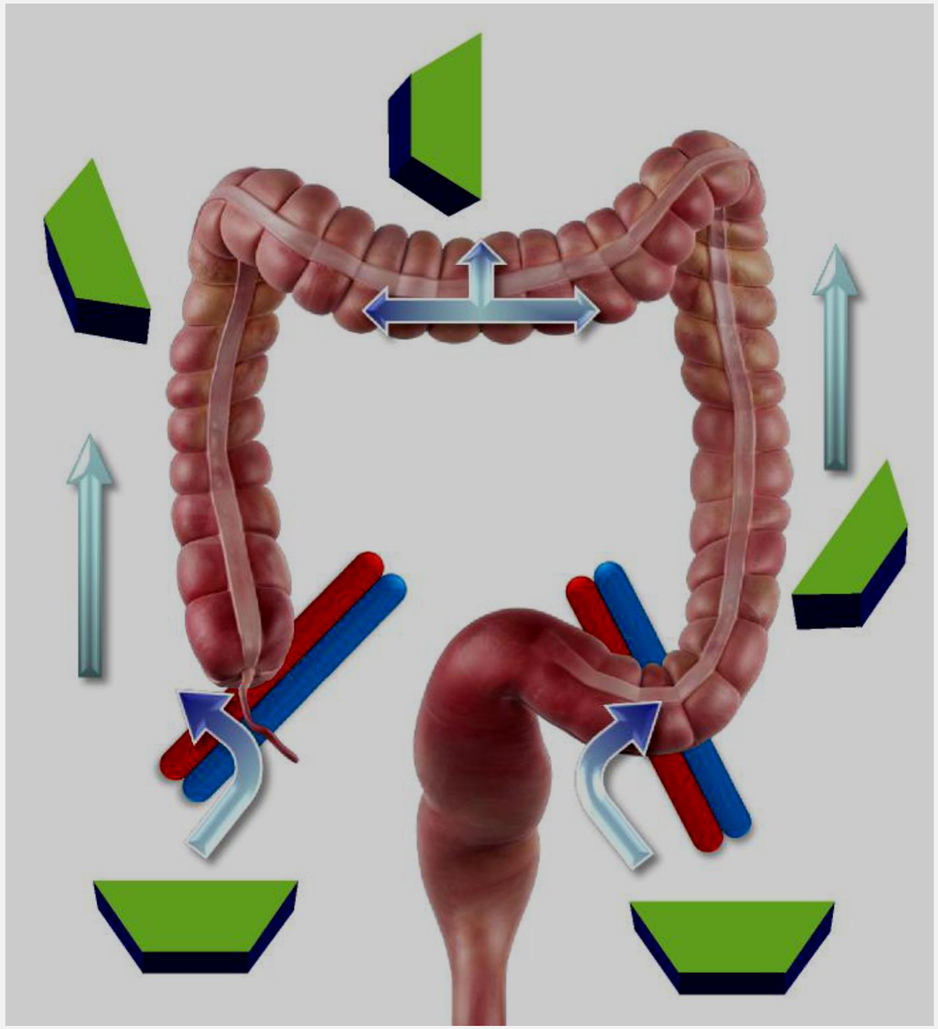
Gallbladder

Stones, sludges, wall thickening

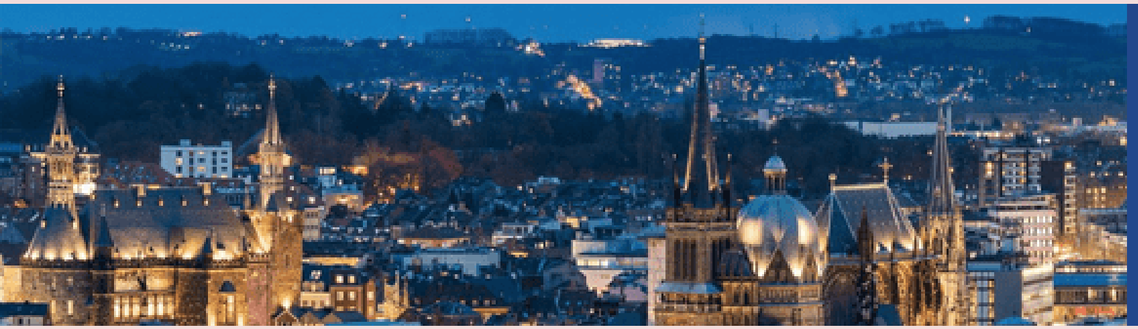


GIUS: different from LIUS

- Different dynamics: no planes, follow the intestine
- Primary orientation with convex probe
- Change to linear probe
- Complete continuous visualisation not feasible



Thank you for your attention!

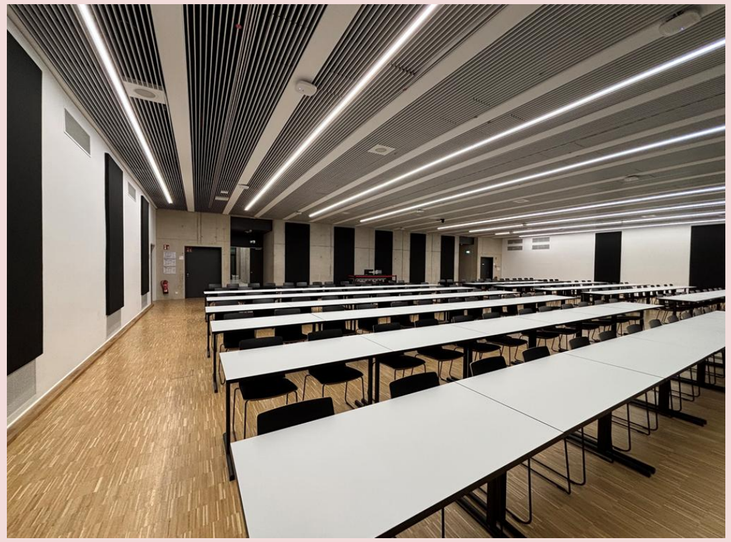


EUROSON SCHOOL: Abdominal Ultrasound Course

Basic & Advanced

Location: University Hospital RWTH Aachen, Aachen, Germany

26 - 29 August 2026



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