ULTRASOUND OF LIVER AND GALL STONE

(LECTURE 2)

Radiology

Objectives:

- Introduction to US.
- Indications of liver and gall bladder US.
- Normal anatomy and radiological appearance.
- Pathology of liver and gall bladder.
- Common pathological cases.

INTRODUCTION TO US

Definition:

- a diagnostic technique in which ULTRA=high-frequency sound waves penetrate the body, bounce around, and produce multiple echoes; these echo patterns can be viewed as an image on a computer screen.

- Frequency ranges used in medical Ultrasound imaging are 2 - 20 MHz

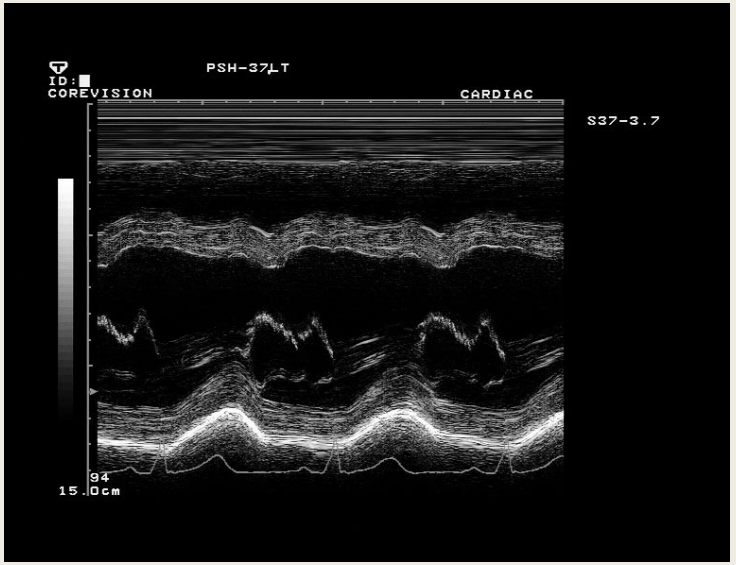
US machine

MACHINE

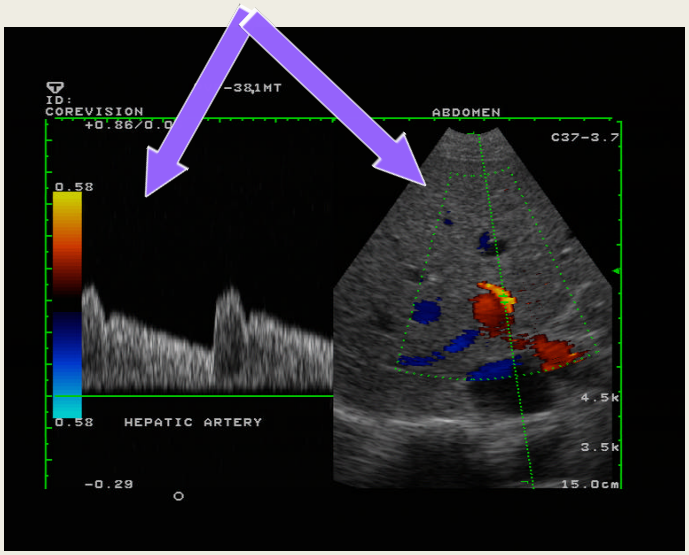
ROBES

B- MODE.

M- MODE.



DUPLEX



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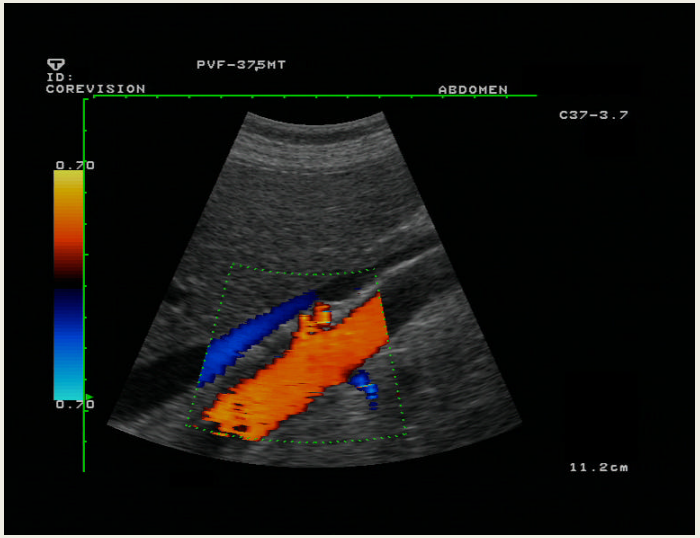


Advantages of US

- **noninvasive**
- inexpensive.
- Easy and available.
- Safe and **non-ionizing.**

Disadvantages of US

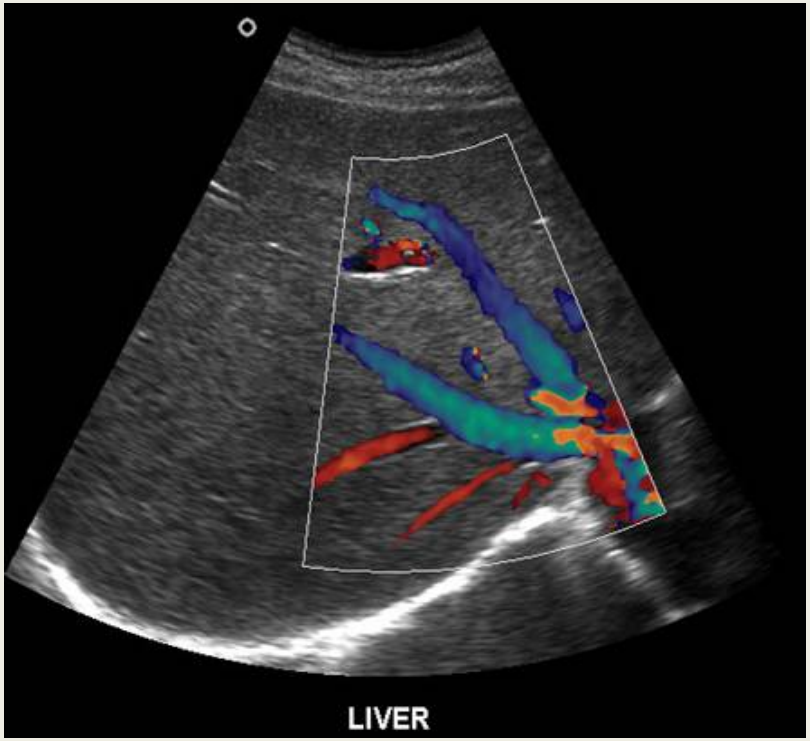
- Inability to penetrate gas or bone.
- Operator dependant.
- Less sensitive in some situations.

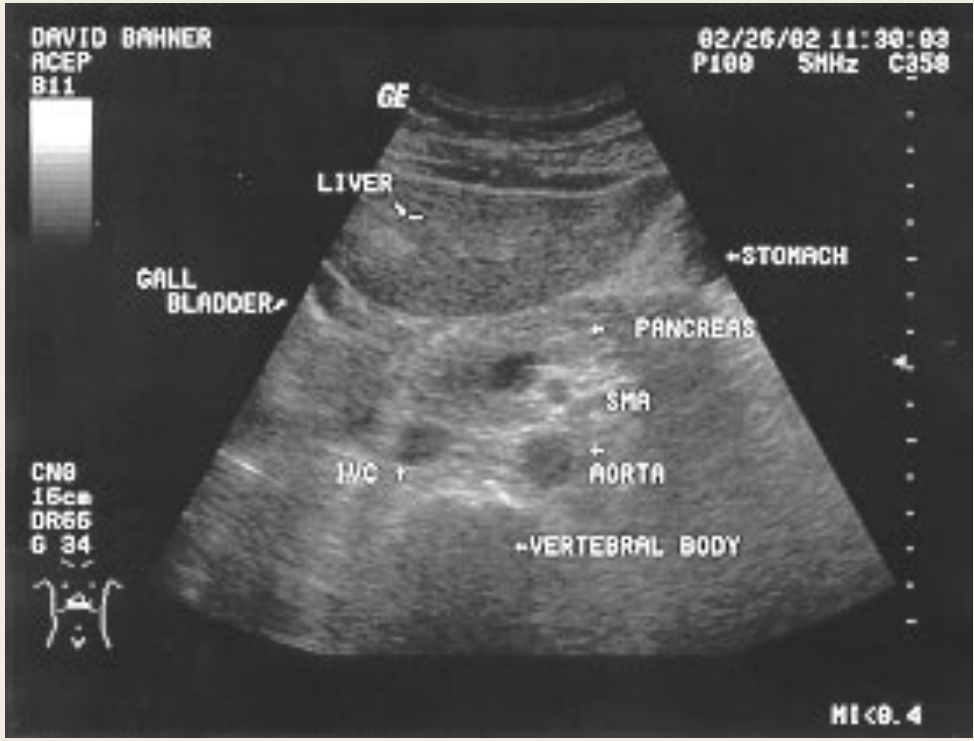
Indications of liver and gall bladder US

- Right upper quadrant pain.
- Jaundice.
- High liver function test.
- Fever work up.
- Screening for metastasis.

Normal anatomy and radiological appearance

Cont.


LIVER

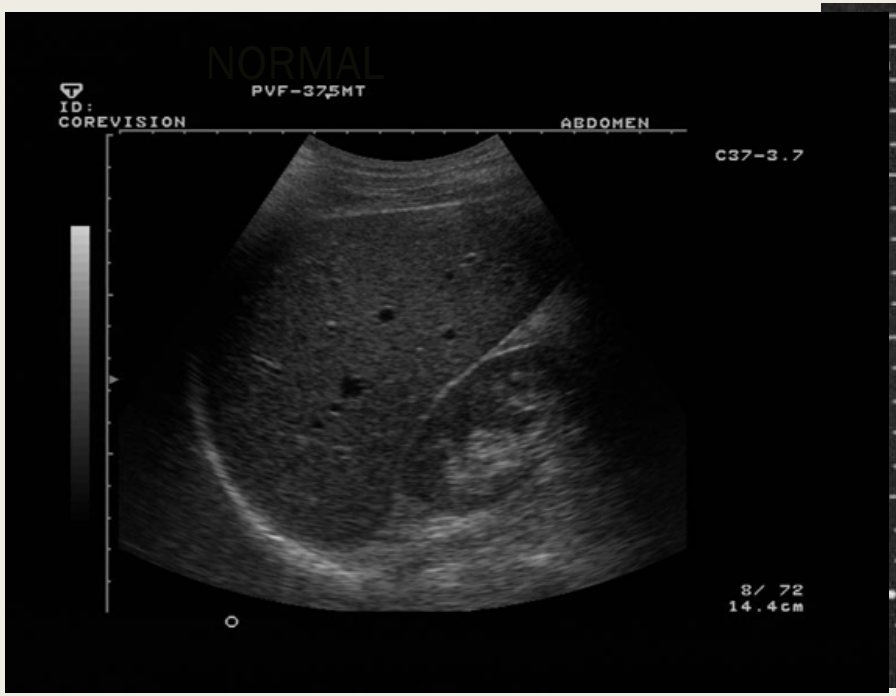

DAVID BAHNER
ACEP
B11
02/26/02 11:30:03
P100 5MHz C358
GE
LIVER
STOMACH
GALL BLADDER
PANCREAS
SMA
IVC
AORTA
VERTEBRAL BODY
CN8
16cm
DR66
G 34
MI<0.4

Pathology of the liver:

- Size.
- Diffuse liver disease.
- Focal liver disease.
- Hepatic vascularity.
- Biliary system obstruction/pathology.

Size abnormality

- Normal liver size:



- Myeloproliferative disorder eg. Polycythaemia rubra vera.

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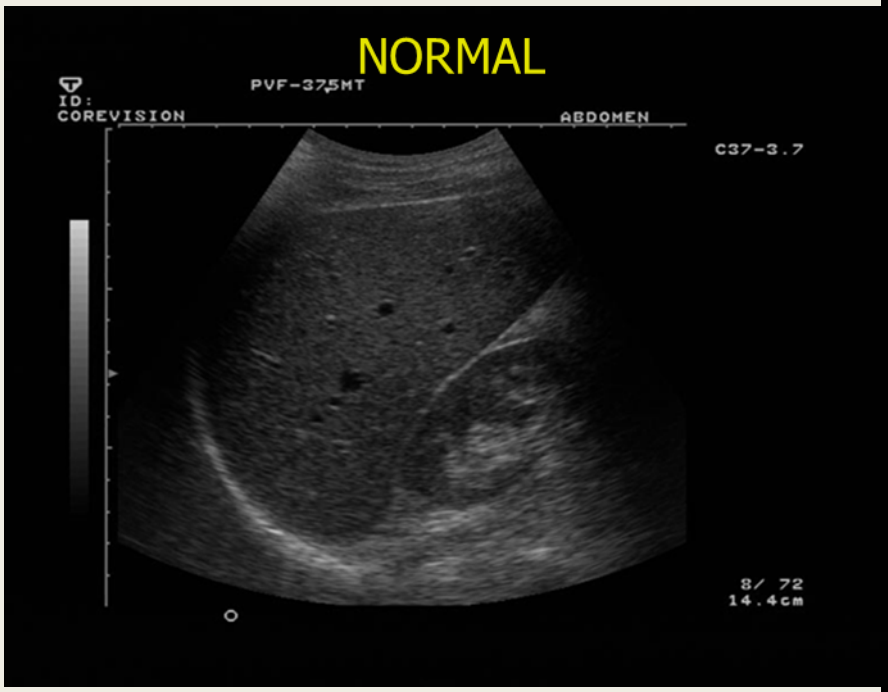


► +- focal lesion.

Diffuse abnormality

- Diffuse increase parenchymal echogensity

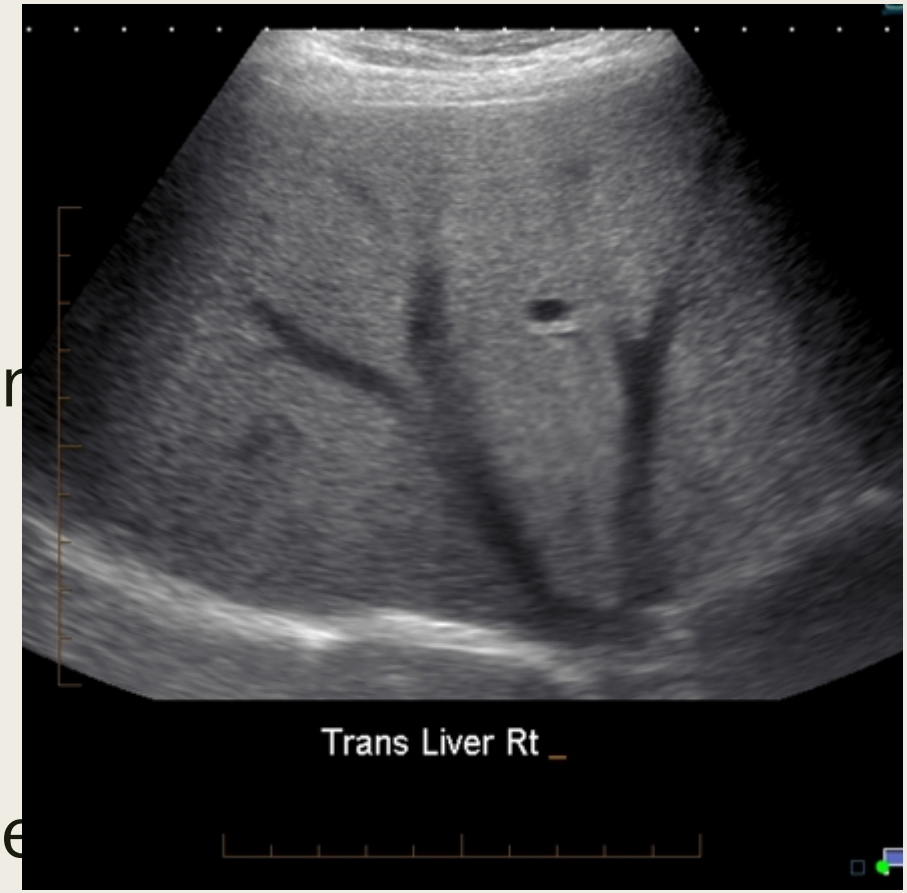
(whiter than normal)

- Diffuse fatty infiltration
- Other infiltrative:

Malignant

Infectious

Glycogen storage disease

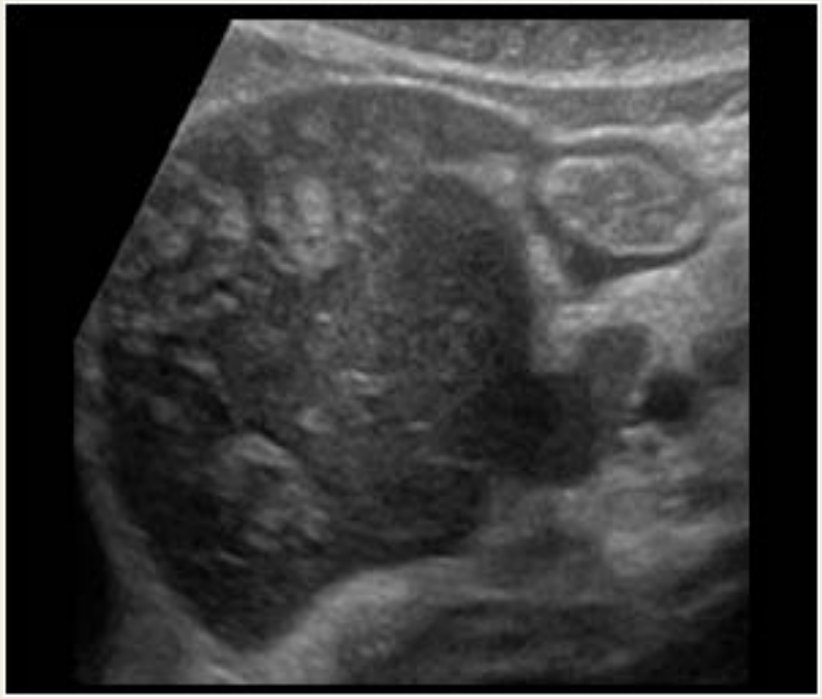


Cont.

- Diffuse decrease in parenchymal echogensity.

(darker than normal)

- Acute hepatitis.
- Other:
- Malignant infiltration.

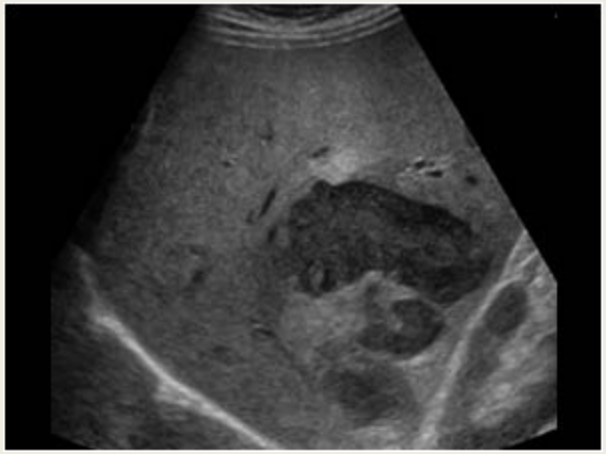


Focal liver lesions

- **Benign tumor:**
  - Hemangioma.
- **Malignant tumor:**
  - Primary eg. Hepatocellular carcinoma.
  - Secondary metastasis eg. Colon breast.
- **Infective:**
  - Abscess
  - hydated cyst.
- **Congenital:**
  - Hepatic cyst.

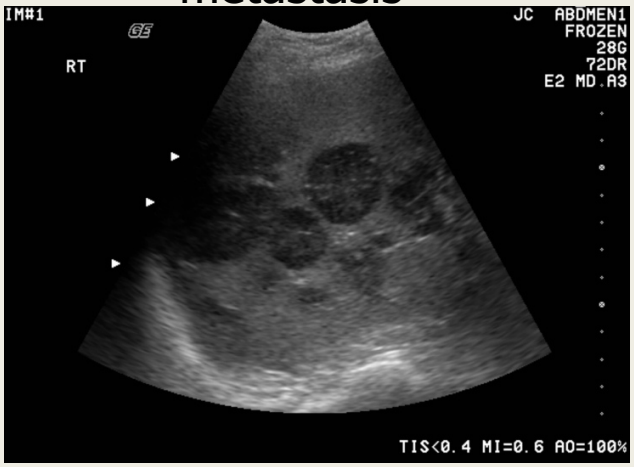
Cont.

Liver abscess

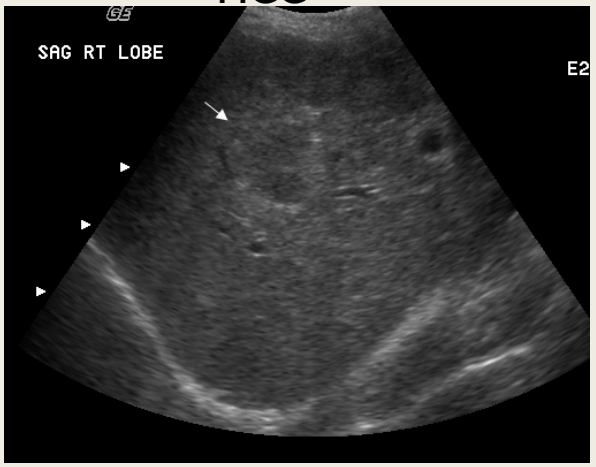


hemangiomas

metastasis



HCC



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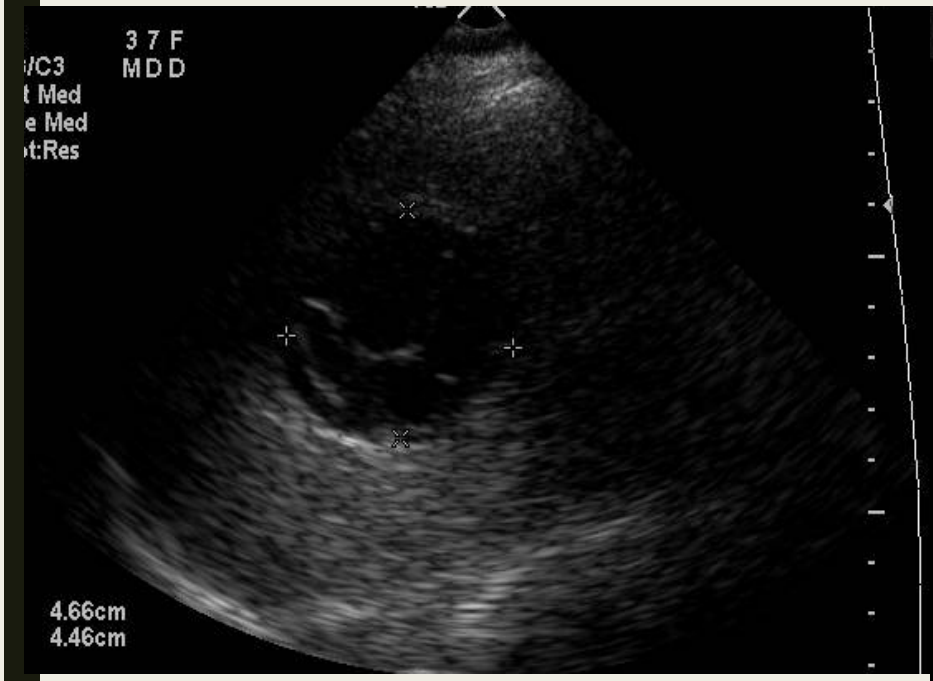
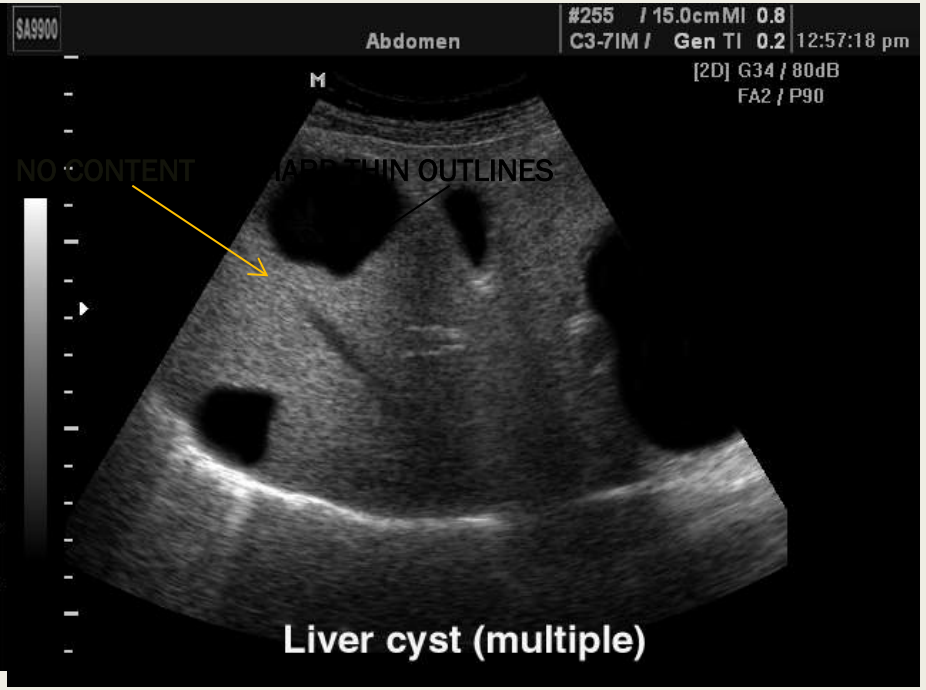


Hydatid cyst

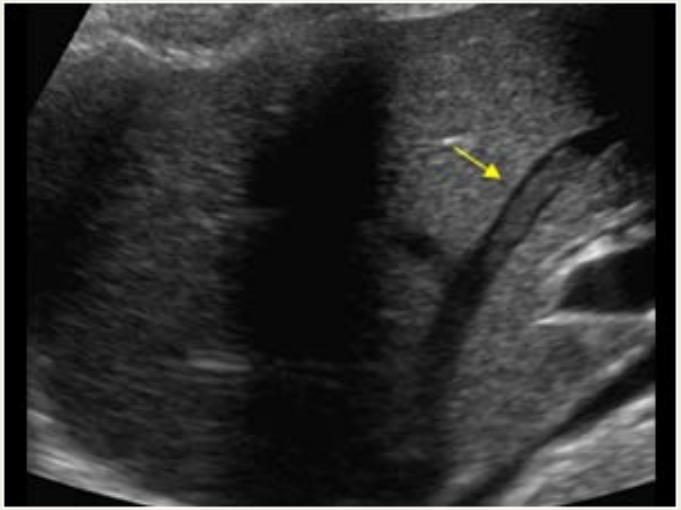


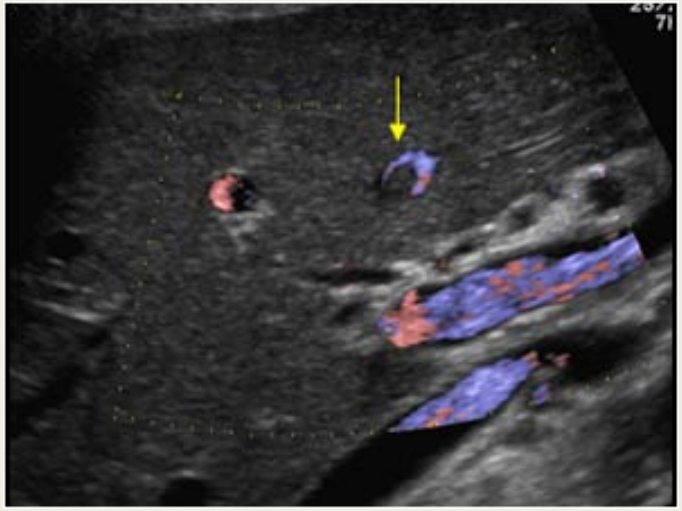
Vascular abnormality

- **Portal venous system:**
  - thrombosis.
  - Portal hypertension.

- **Hepatic venous system:**
  - Thrombosis
  - (Budd Chiari syndrome).

Cont.





Hepatic vein thrombosis

PV thrombosis

Biliary abnormality

- Intra-hepatic biliary radicals.

Less than 3mm

- Extra-hepatic “CBD”

Less than 8mm

- Causes of dilatation & obstruction:

o Intra-luminal:

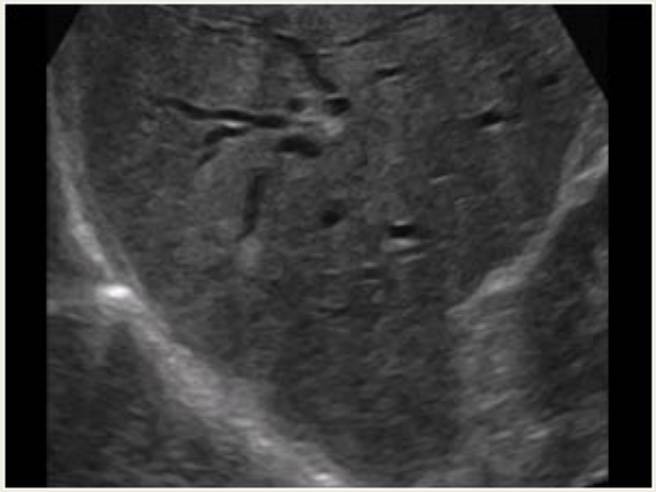
✓ Stone & mass.

o Mural:

✓ stricture (benign & malignant)

o Extrinsic:

✓ Compression mass & Lymph node



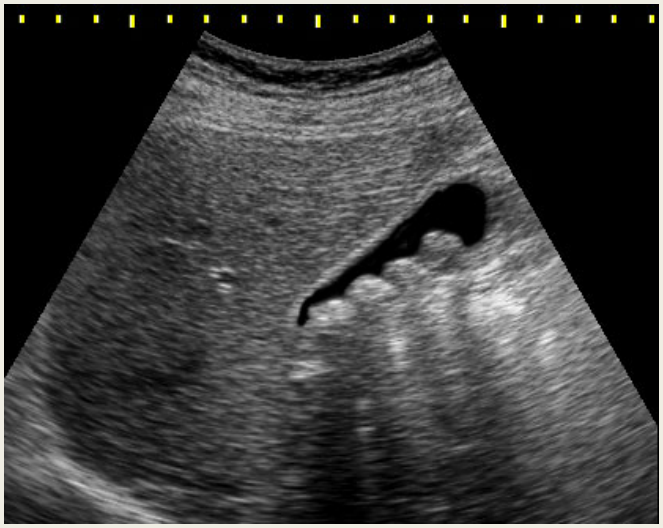
Pathology of gall bladder

- Intra-luminal pathology.
- Mural pathology.

Intra-luminal pathology

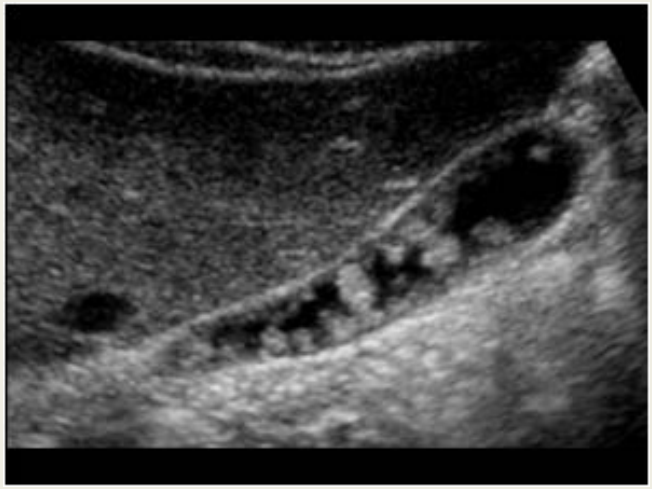
► Gall stone:

Acoustic shadowing



► Polyps

No acoustic shadowing.



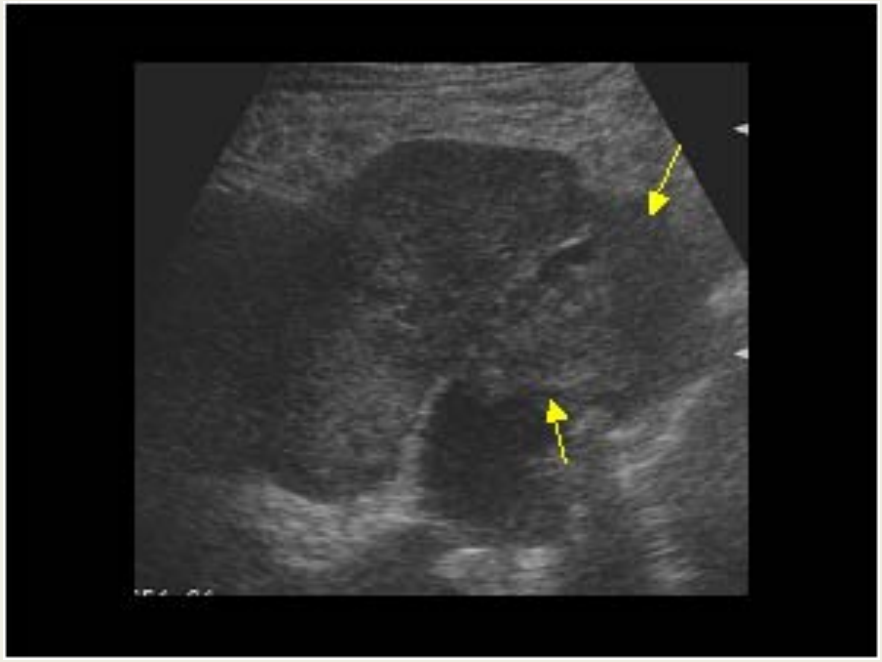
Cont.

► Intraluminal:

Mass lesion

+- invasion

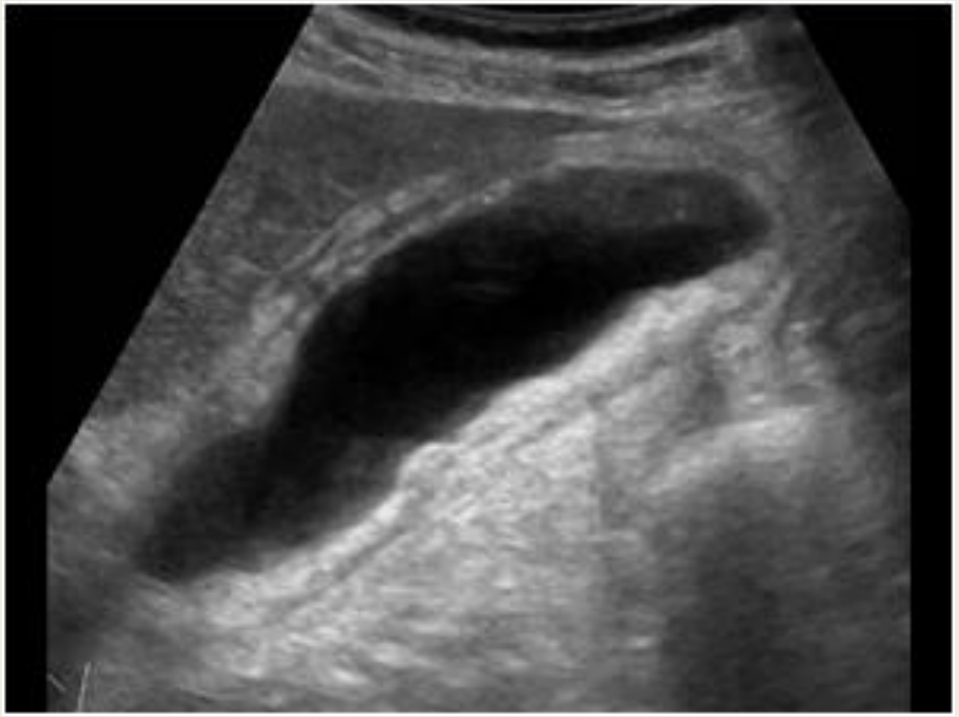
Gall bladder carcinoma.



Mural pathology

- ❑ Mural thickening:
- ➢ Primary:

Cholecystitis.



- ➢ Secondary:
- ✓ Cardiac failure.
- ✓ Cirrhosis.
- ✓ ascites
- ✓ Hypoalbuminaemia
- ✓ Renal failure.

COMMON PATHOLOGICAL CASES

Case one

- Middle age women presented to ED with fever, RUQ pain
- On exam

She looks ill, febrile and on pain

Abdomen: RUQ tenderness

- Lab high LFTs & WBC.

Cont.

- Thickening of GB wall >3mm.
- Distended GB
- Pericholecystic fluid.
- Hyperemia.
- Gall stone
- Acute calcular cholecystitis.

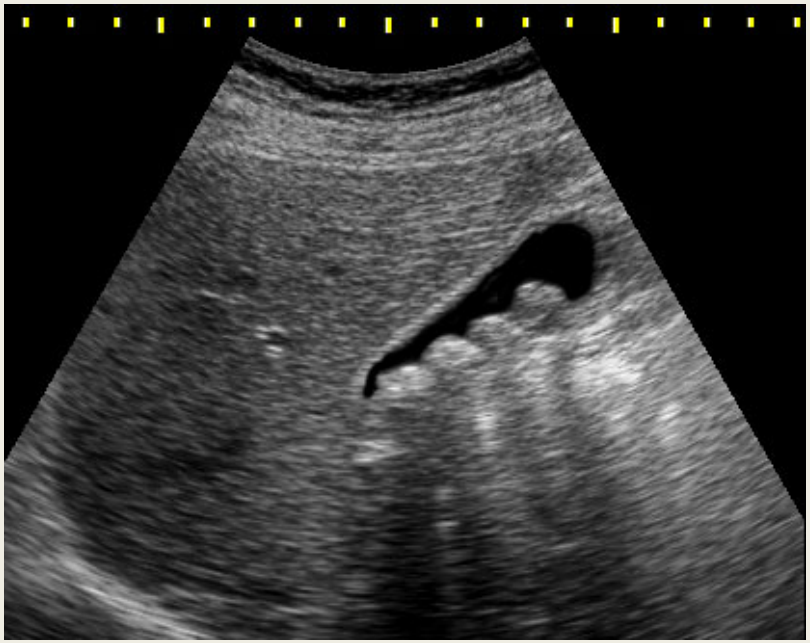
Case two

- Middle age women presented to surgical out patient clinic with 2 years history of recurrent RUQ pain mild to moderate in severity radiated to the right shoulder aggravated by fatty meal.
- On exam:

obese lady well not distressed, febrile or jaundiced.

- Lab LFTs normal.

Cont.



- Multiple oval shaped echogenic structures seen within GB causing acoustic shadowing
- GB stones

Case three

- Middle age man presented to ER with severe RUQ pain and yellowish discoloration of skin and sclera.
- On exam:

he looks ill, jaundiced and on pain but not febrile

- Lab high LFTs.

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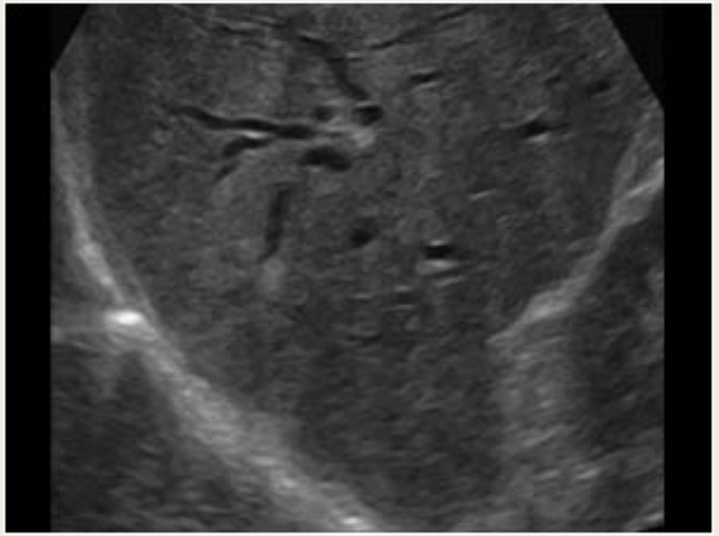


- Dilated intra-hepatic and extra-hepatic biliary system
- Echogenic structure seen within CBD
- CBD stone causing biliary obstruction.

Case four

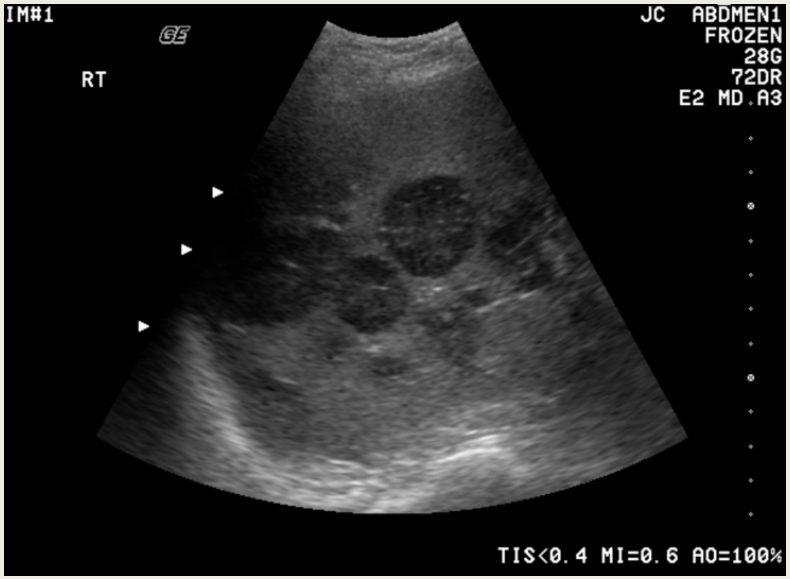
- Old man recently discovered to have colonic cancer presented to primary health care clinic with vague upper abdominal pain
- On exam:

he was thin, ill not febrile or jaundiced.

Mild abdominal tenderness enlarged liver with irregular outline.

- Lab mildly elevated LFTs.

Cont.



- Multiple hypoechoic focal hepatic lesions

- Metastatic liver lesions.

Case five

- Middle age man known case of HCV+ for 10 years presented to GI out patient clinic with history of weight loss, indigestion and mild abdominal pain. No fever.
- On exam:

he was ill, slim ,mildly jaundice not febrile.

Abdomen: bulging flanks, dilated tortuous vessels around umbilicus. Mild diffuse abdominal tenderness.

- Lab high LFTs.

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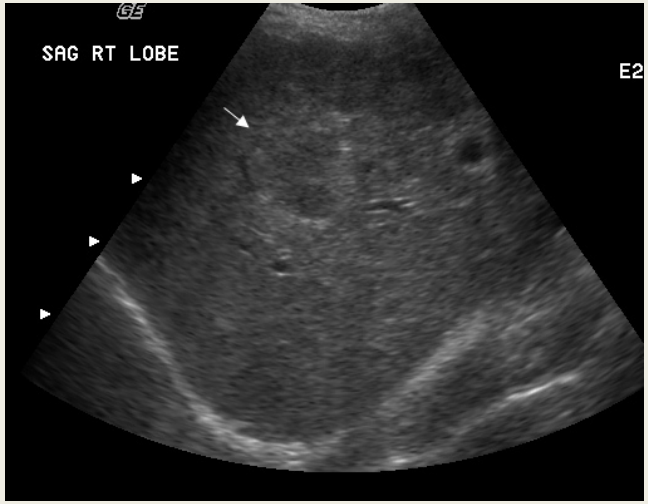

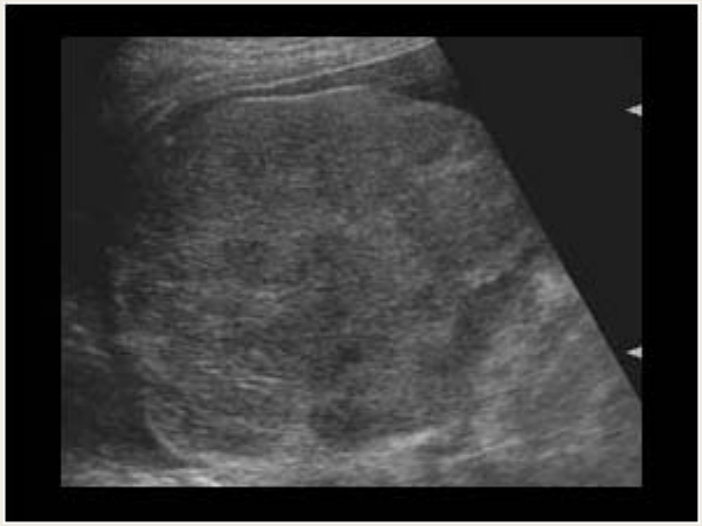

- Shrunken liver with irregular outline.
- Heterogeneous appearance.
- Focal hypoechoic lesion.

- Cirrhotic liver with HCC.

Case six

- Young man known IV drug addict presented to ER with high fever, chills, upper abdominal pain and vomiting
- On exam:
- He looks very ill, febrile and on pain.
- Abdomen: RUQ tenderness.
- Lab high LFTs & WBC.

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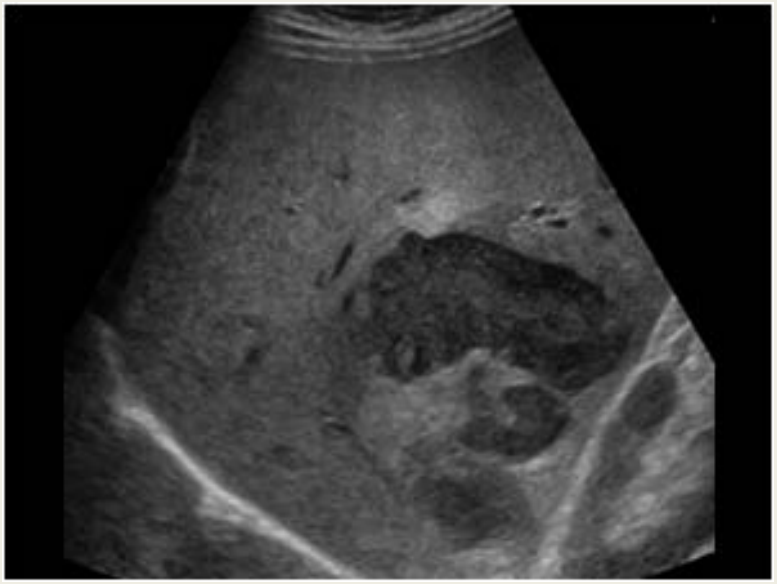

- Focal hypoechoic liver lesion with ill defined outline.

- Liver abscess.


thankyou
Radiology:
The Eye of
Medicine