Lecture 11 :

US OF LIVER AND GALL STONE

OUTLINE:

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

DIFINITION OF US:

- a diagnostic technique in which

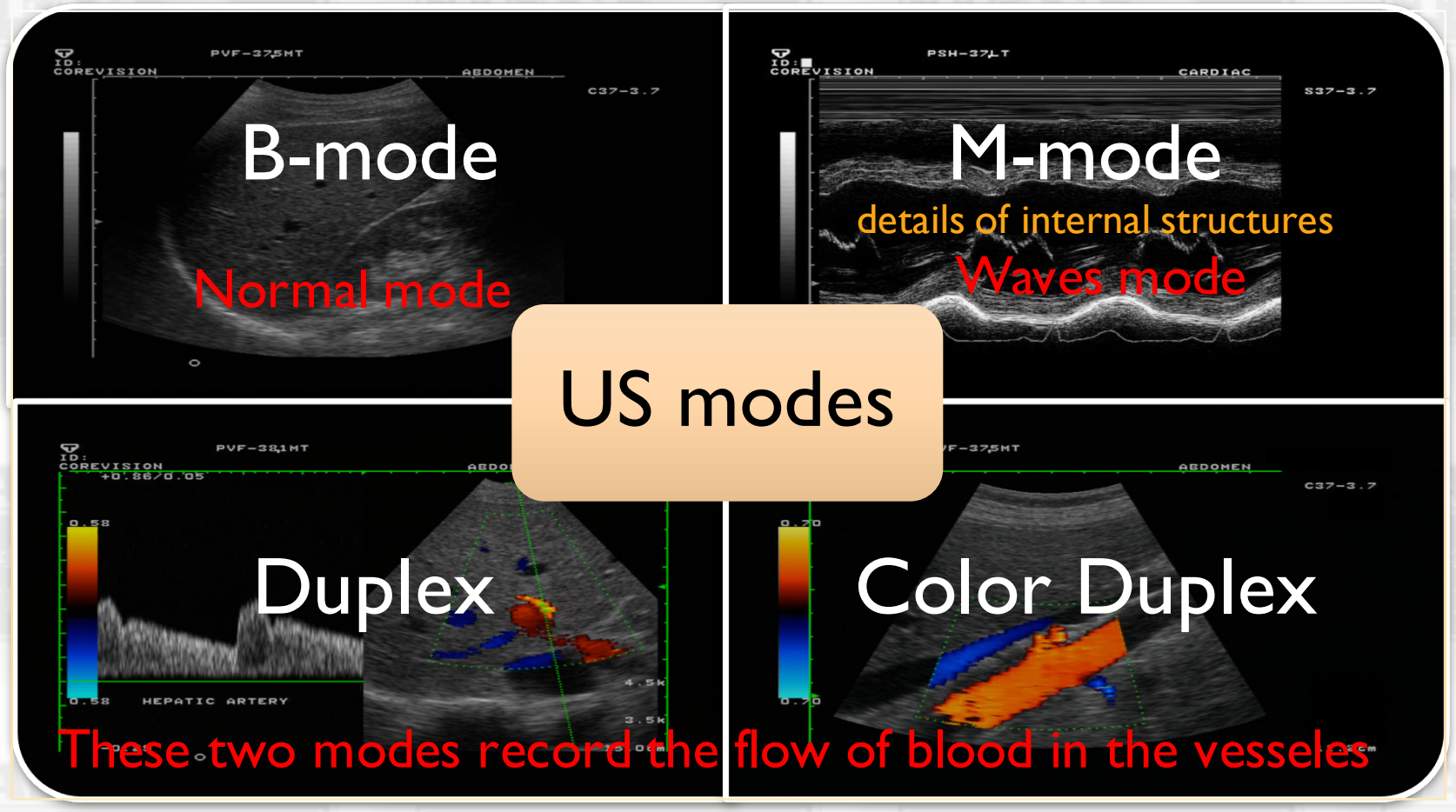
ULTRA=high-frequency sound waves penetrate the body, bounce around, and produce multiple echoes; these echo patterns can be viewed as an image on a computer screen.

- Frequency ranges used in medical Ultrasound imaging are 2 - 20 MHz
- Best modality to assess liver and gall bladder is Ultrasound (US).
- MRI is good but takes long :me and expensive

ULTRASOUND LANGUAGE

Hyper-echoic = White (solid organs, and visa versa.)
Hypo-echoic = Light Grey (Liver appear gray in ultrasound normally, color changes with diseases).
An-echoic = Black

Advantages	Disadvantages
Inexpensive	Inability to penetrate gas or bone
Easy and available	Operator dependent.
Safe and no radiation	Less sensitive in some situations.



Ultrasound Uses

Cardiology Echocardiography is an essen:al tool in cardiology, valvular heart disease.

Emergency Medicine For Trauma pa:ent and acute abdomen

Gastroenterology In abdominal sonography, the solid organs of the abdomen such as the pancreas, aorta, inferior vena cava, liver, gall bladder, bile ducts, kidneys, spleen and appendix.

Gynecology Assess female pelvic organs, uterus ovaries

Neonatology Basic assessment of intracerebral structural abnormali:es, bleeds, ventriculomegaly or hydrocephalus.

Ultrasound Uses

Neurology Assessing blood flow and stenoses in the caro:d arteries (Carotid ultrasonography)

Obstetrics Sonography is commonly used during pregnancy for the development of the fetus.

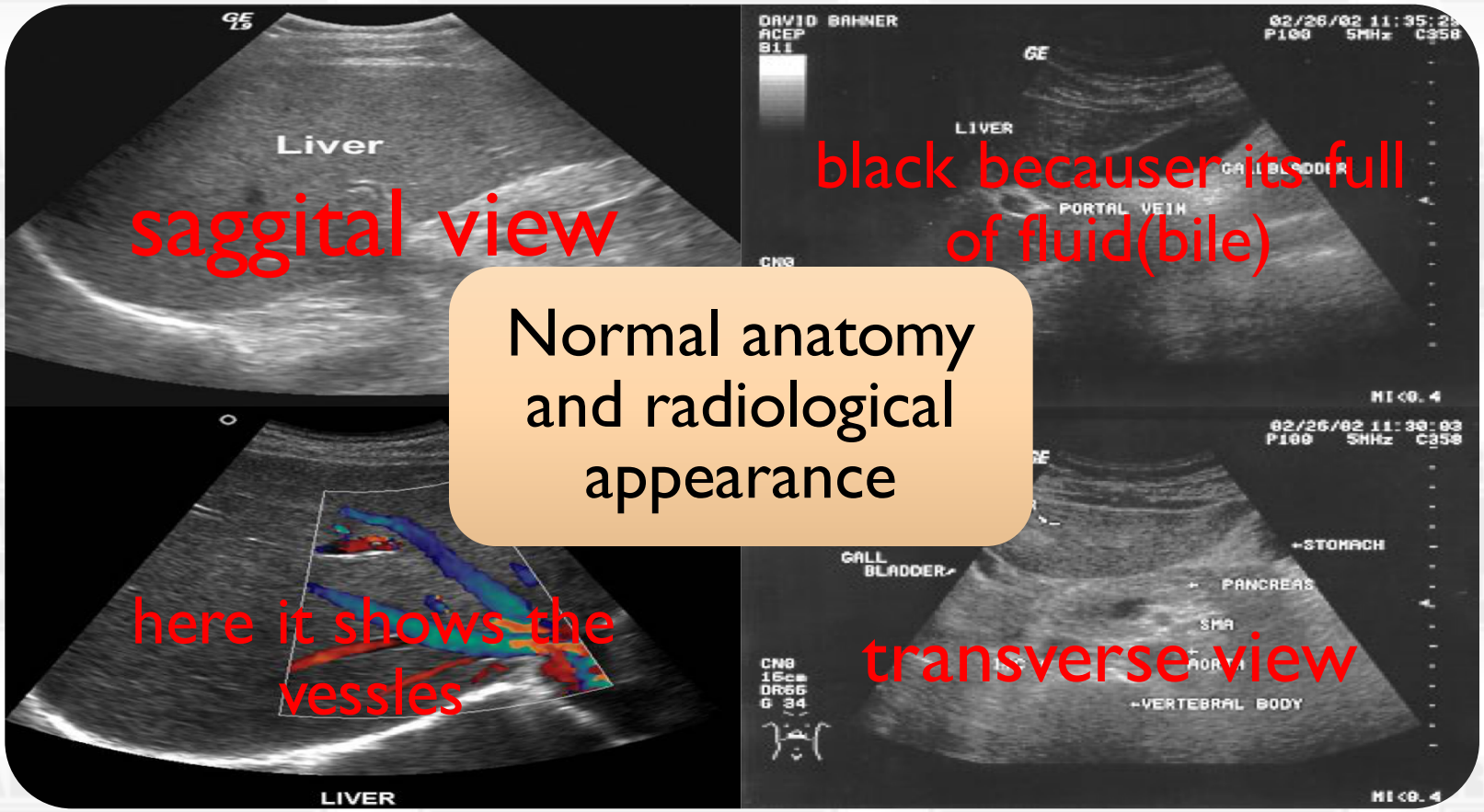
Urology
To study a pa:ent's bladder, prostate or testes.

Musculoskeletal For assessing tendons, muscles, nerves,ligaments, soft tissue masses, and bone surfaces

vascular system To assess patency and possible obstruc:on of arteries Arterial doppler, diagnose DVT venous doppler and determine extent and severity of venous insufficiency

INDICATIONS OF LIVER AND GALL BLADDER US:

- Right upper quadrant pain.
- Jaundice.
- High liver function test.
- Fever work up.
- Screening for metastasis. → if he has colon cancer



INDICATIONS OF LIVER AND GALL BLADDER US:

Pathology of the Liver	Pathology of the Gall Bladder	Mural pathology
• Size • Diffuse liver disease • Focal liver disease • Hepa:c vascularity • Biliary system obstruc:on/pathology	• Intraluminal pathology. • Mural pathology	• **Primary:** Cholecys::s. • **Secondary:** Cardiac Failure, Cirrhosis, Asci:s, Renal failure, Hypoalbuminaemia

PATHOLOGY OF THE LIVER:

1. Size.
2. Diffuse liver disease.
3. Focal liver disease..
4. Hepatic vascularity.
5. Biliary system obstruction/pathology.

1-Size abnormality

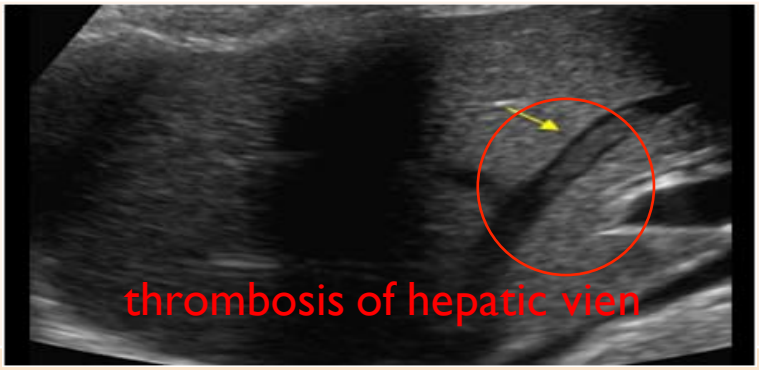
Normal: 9 -15 cm at Mid Clavicle Line (MCL)
(Hepatomegaly) > 15 cm Small < 9 cm
Small shrunken liver:
Late cirrhosis:
Shrunken liver with irregular outline
Ascites
Portal hypertension.
+- focal lesion.

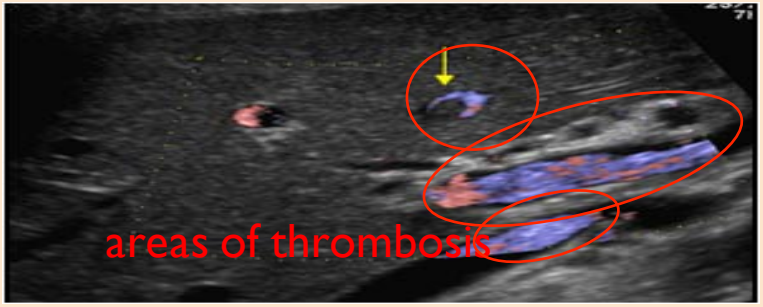
- **Hepatomegaly:**
- Infection: eg viral hepatitis
- Neoplasm (tumor): eg. Metastasis (Liver nodules in patient with colon cancer)

• Cirrhosis: early phase • Metabolic: Amyloidosis /fat • Drugs/toxins: alcohol
• Others: Budd Chiari syndrome

2-Vascular abnormality

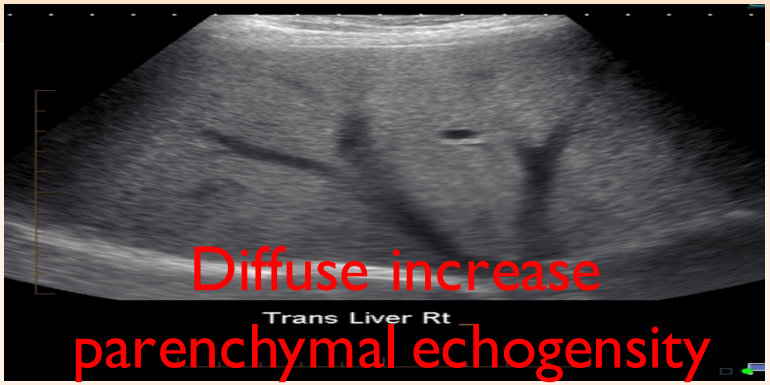
❑**Portal venous system:**
thrombosis.
Portal hypertension.
❑**Hepatic venous system:**
Thrombosis
(Budd Chiari syndrome).

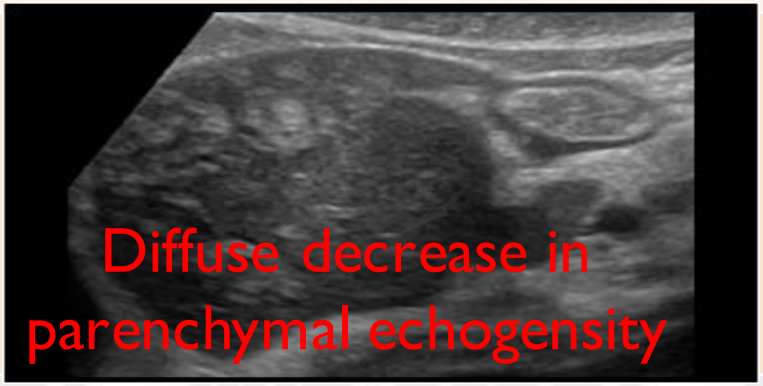




3-Diffuse abnormality

- **More than normal (more white)** e.g. Diffuse fatty infiltration
- **Less than normal (more black)** e.g. infection: Acute hepatitis



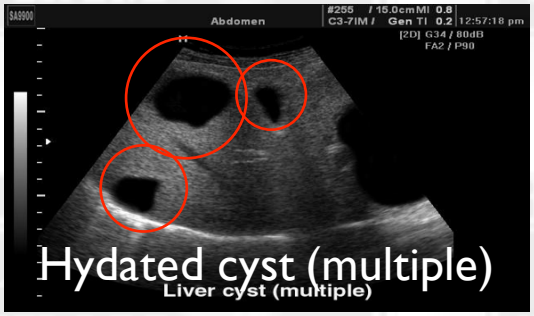


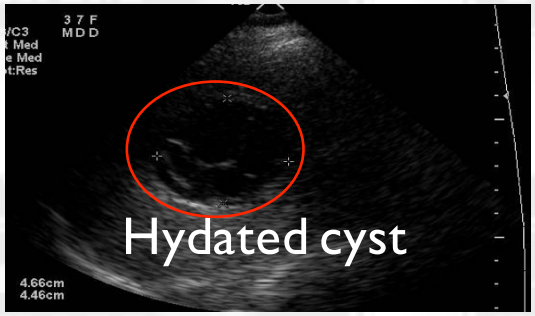
4-Biliary abnormality

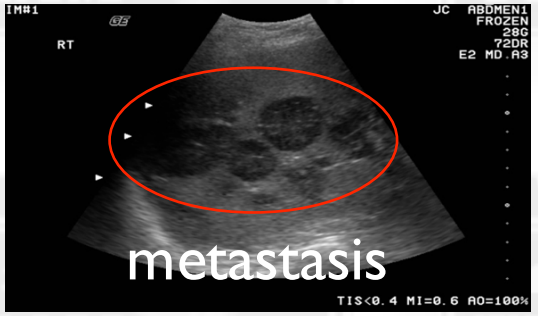
❑ Intra-hepatic biliary radicals.
Less than 3mm
❑ Extra-hepatic "CBD"
Less than 8mm

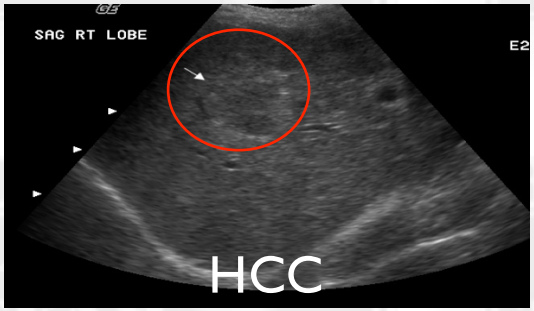
Intra-luminal:
✓ Stone & mass.
Mural:
✓ stricture (benign & malignant)
Extrinsic:
✓ Compression mass & Lymph node

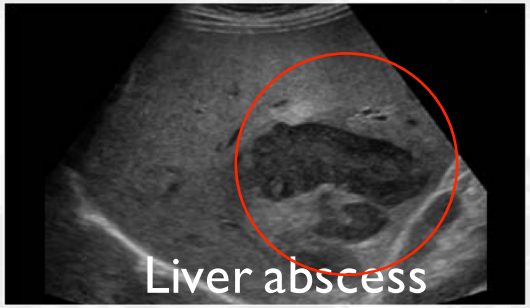
4-Focal liver lesions

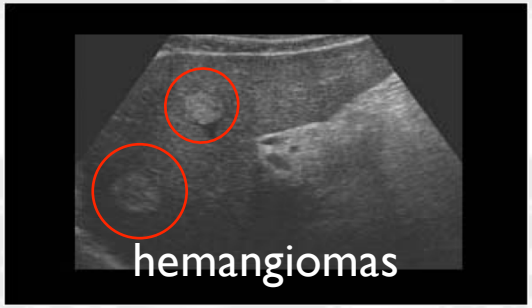












❑**Benign tumor:**
Hemangioma.

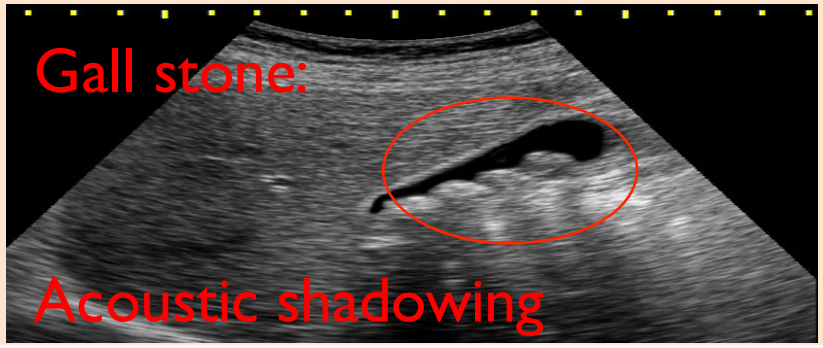
❑**Malignant tumor:**
Primary eg. Hepatocellular carcinoma.
Secondary metastasis eg. Colon breast.

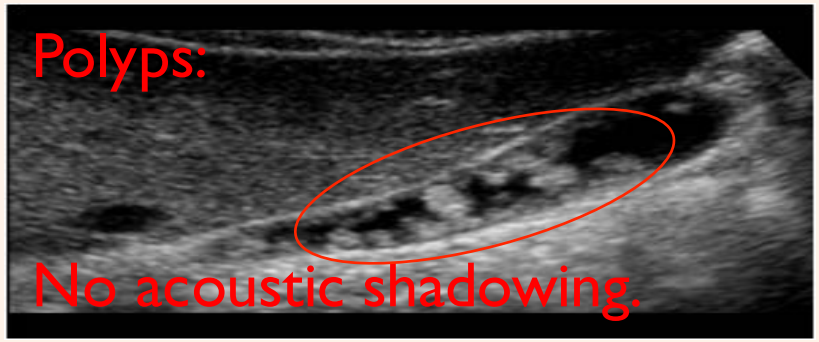
❑**Infective:**
Abscess
hydated cyst.

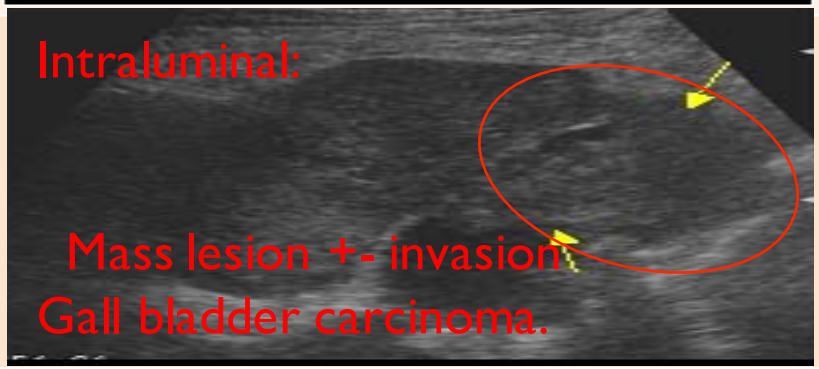
❑**Congenital:**
Hepatic cyst.

PATHOLOGY OF GALL BLADDER

Intra-luminal.

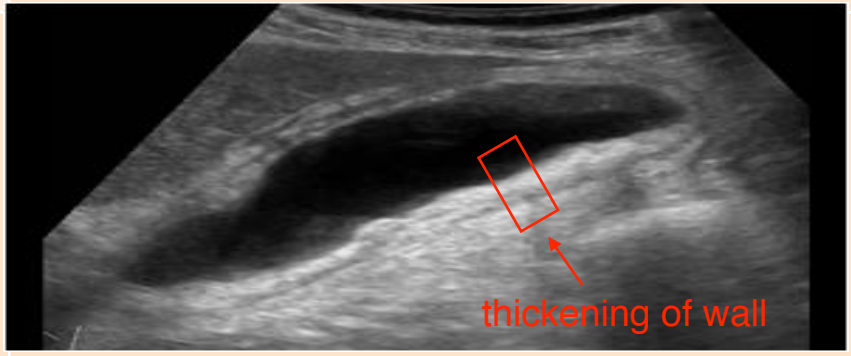




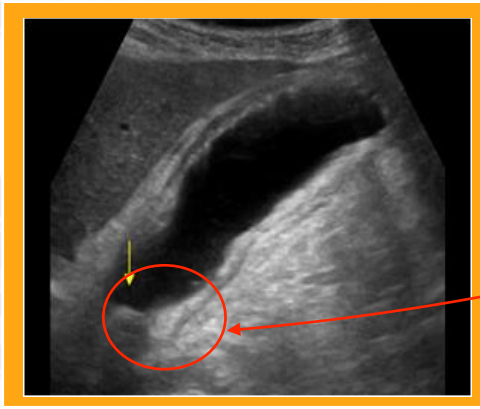


Mural

- Mural thickening:
  - Primary: Cholecystitis.
  - Secondary:
    - ✓ Cardiac failure.
    - ✓ Cirrhosis.
    - ✓ ascites
    - ✓ Hypoalbuminaemia
    - ✓ Renal failure.



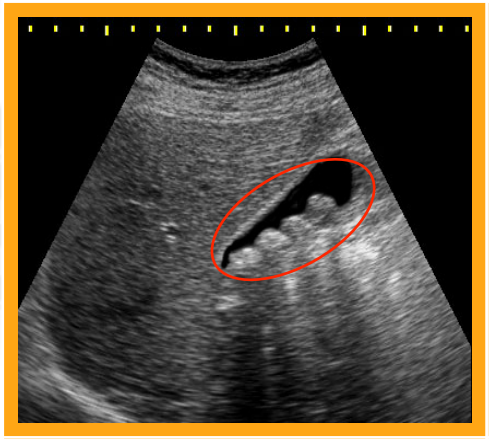
COMMON PATHOLOGICAL CASES



- 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.

Acute calcular cholecystitis.

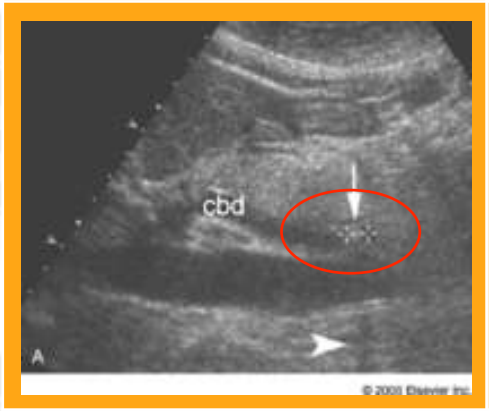
#-Thickening of GB wall >3mm. #-Distended GB Pericholecystic fluid. #-Hyperemia. #-Gall stone



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.

GB stones

Multiple oval shaped echogenic structures seen within GB causing acoustic shadowing

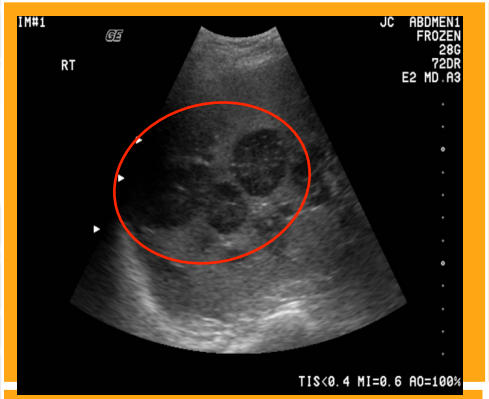


- Middle age man presented to ER with severe RUQ pain and yellowish discoloration of skin and sclera. On exam: he looks ill, jaundiced and on pain but not febrile Lab high LFTs.

CBD stone causing biliary obstruction.

Dilated intra-hepatic and extra-hepatic biliary system echogenic structure seen within CBD

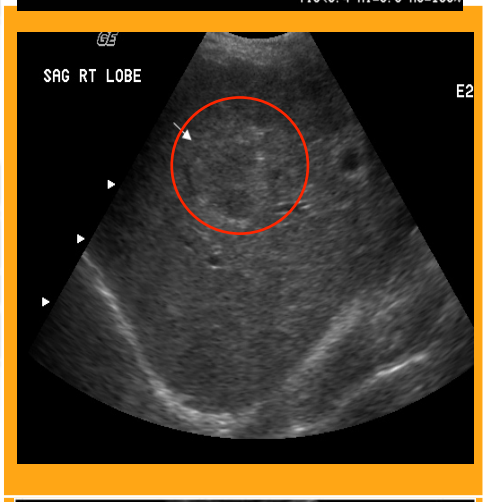
COMMON PATHOLOGICAL CASES



- 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.

Metastatic liver lesions.

Multiple hypoechoic focal hepatic lesions



- 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.

Cirrhotic liver with HCC.

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

- 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.

Liver abscess.

Focal hypoechoic liver lesion with ill defined outline.

Thank you for checking our team

Done by

- Lolowah Alghuson