

Managing LFT's in General Practice

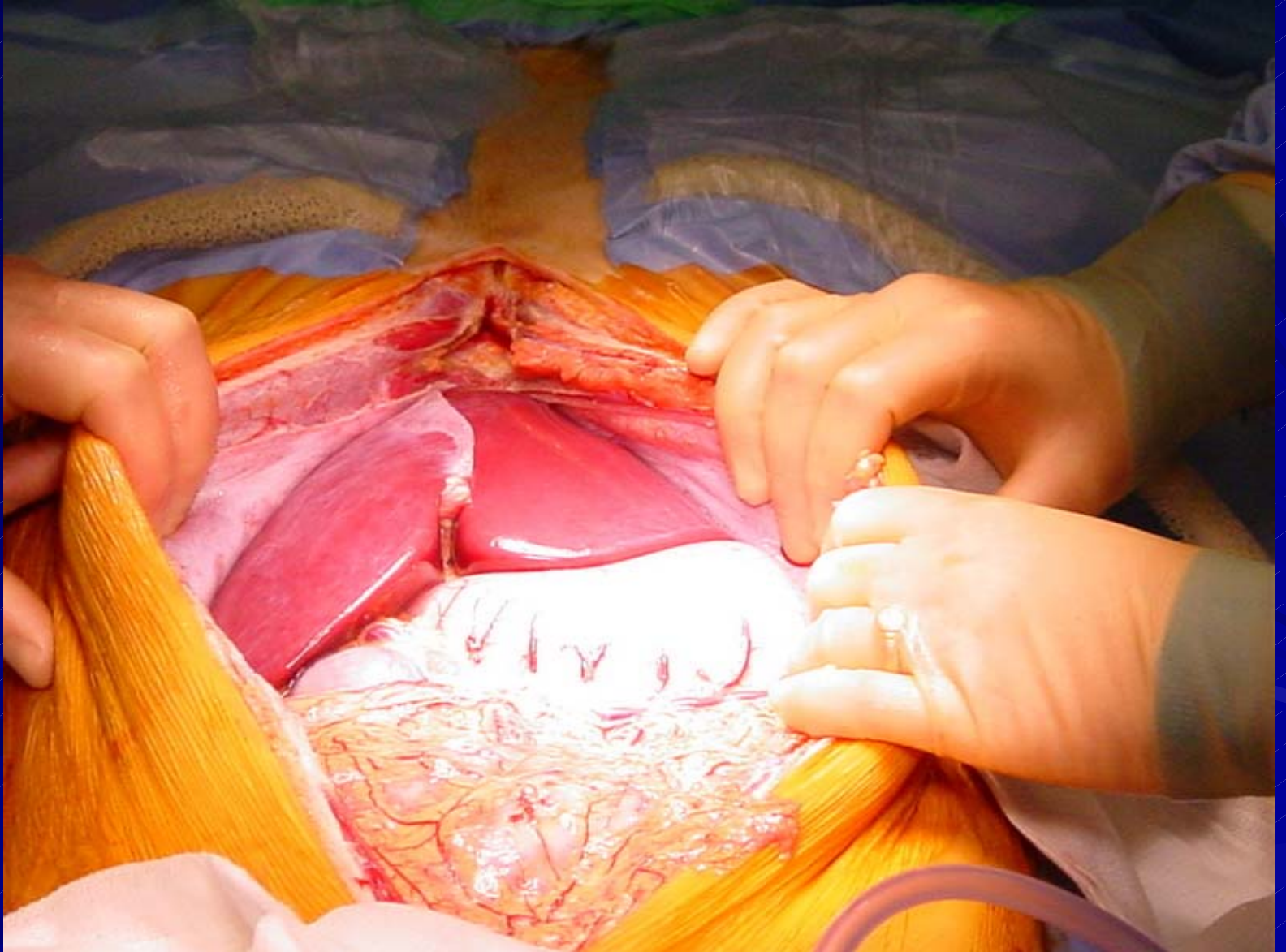
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The normal liver



Managing LFT's

- History and examination
- Investigations
- When to refer

Managing LFT's

- Understanding LFT's
- Interpreting abnormal LFT's
 - In relation to common causes of liver disease
- Cases
 - Who to refer

Understanding LFT's

- LFT's

- Synthetic function

Liver (mal)Function Tests

- Bilirubin

- ALT

- Alkaline Phosphatase – ALP

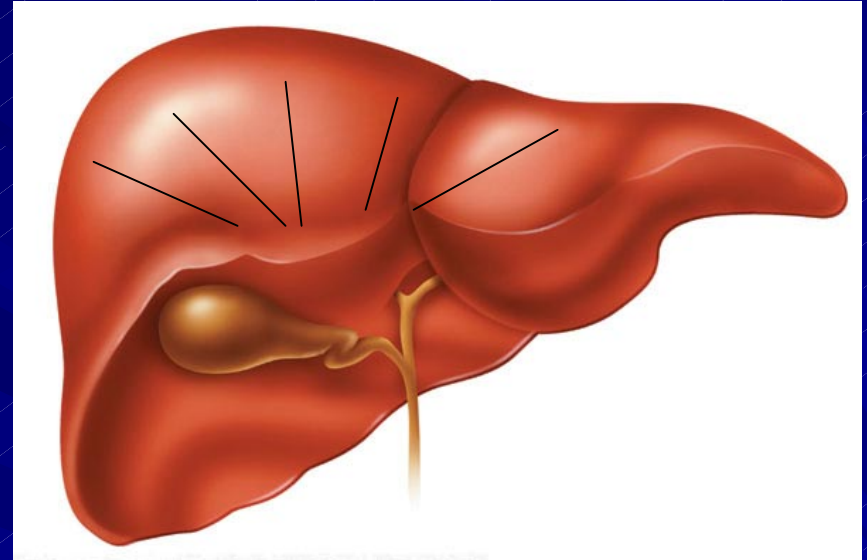
LFT's - source

- Bilirubin – breakdown of haemoglobin
 - Spleen
 - Bilirubin transported attached to albumin
 - Uptake by liver
 - Conjugated and excreted in bile
 - Stercobilinogen and urobilinogen

LFT's - source

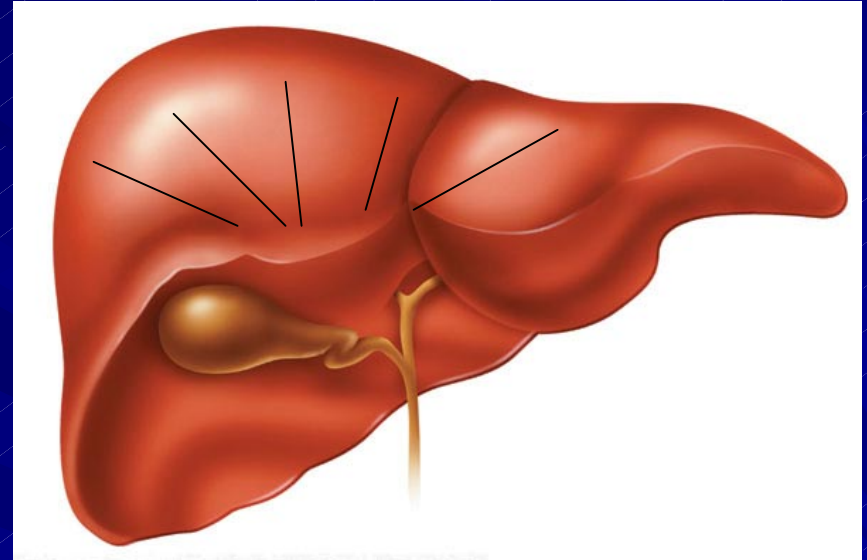
■ Bilirubin

■ ALT - hepatocytes



LFT's - source

- Bilirubin
- ALT - hepatocytes
- Alkaline Phosphatase – ALP
 - Biliary system



LFT's - source

- Bilirubin

- ALT

- Alkaline Phosphatase – ALP

 - Biliary system

 - Bone

 - Placenta

LFT's – other tests

- Bilirubin
- ALT
- Alkaline Phosphatase – ALP

- γ GT
- AST

LFT's – other tests

- Bilirubin
- ALT
- Alkaline Phosphatase – ALP

- γ GT
 - biliary system
 - alcohol

LFT's – other tests

- Bilirubin
- ALT
- Alkaline Phosphatase – ALP

- γ GT
- AST – hepatocyte
 - Used as AST/ALT ratio mainly
 - AST/ALT > 2 suggestive of alcohol liver disease

Synthetic function

- Albumin

- Prothrombin Time - PT

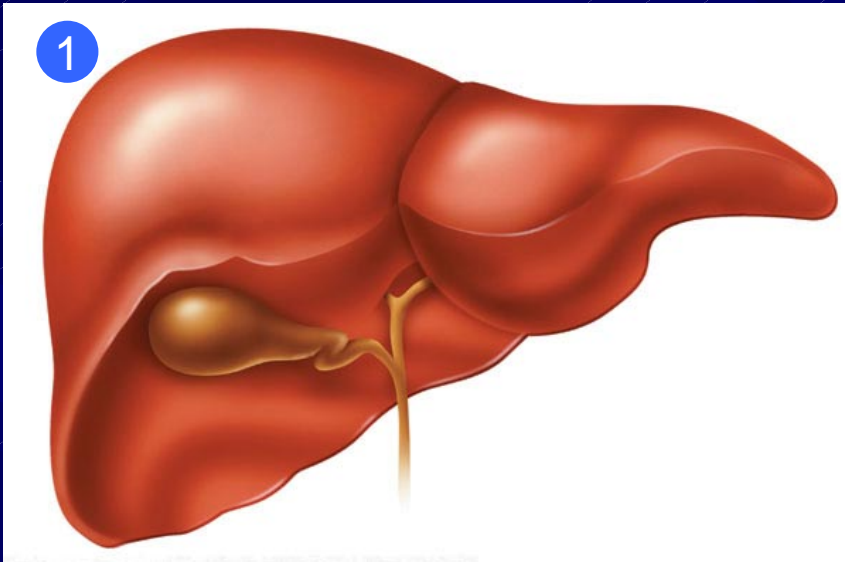
Deranged LFT's

- Raised bilirubin – jaundice
- Raised ALT/ALP in isolation
- Dissociated transaminitis

Deranged LFT's

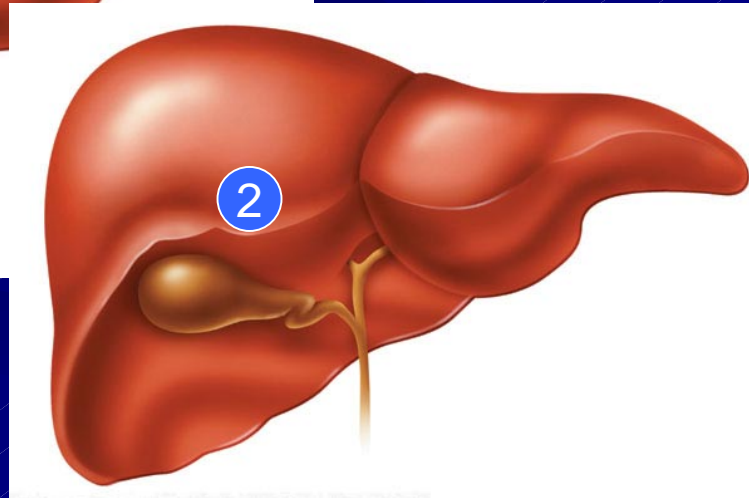
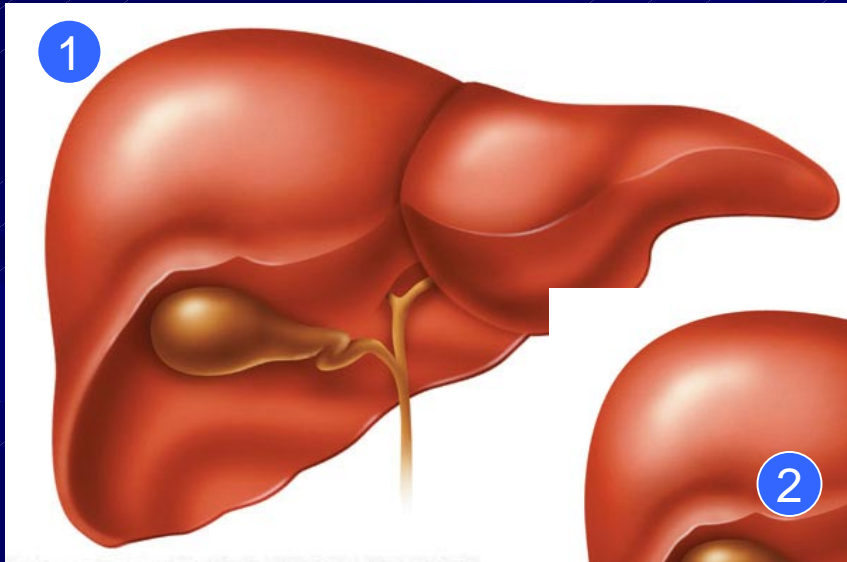
- Raised bilirubin – jaundice

Jaundice - causes



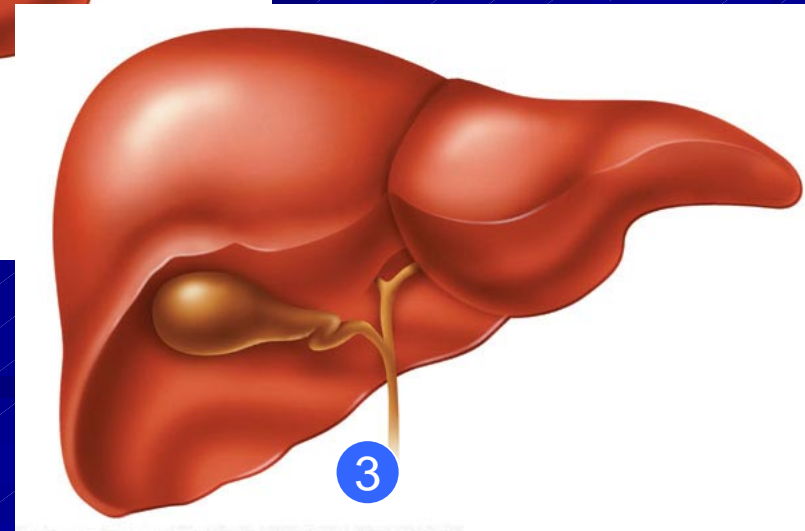
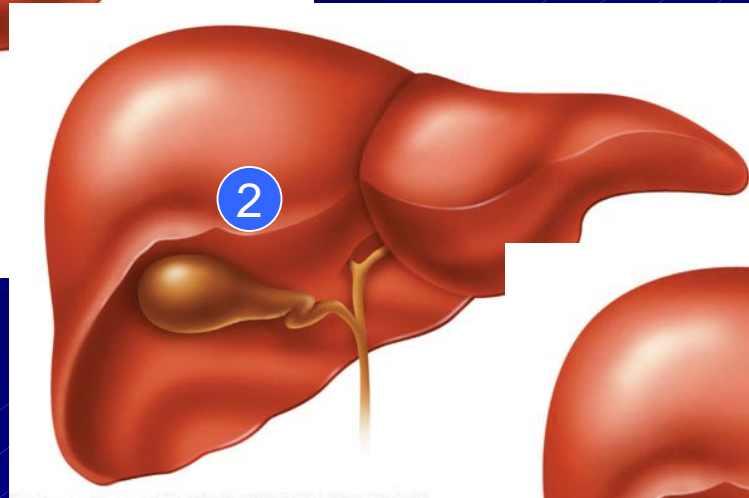
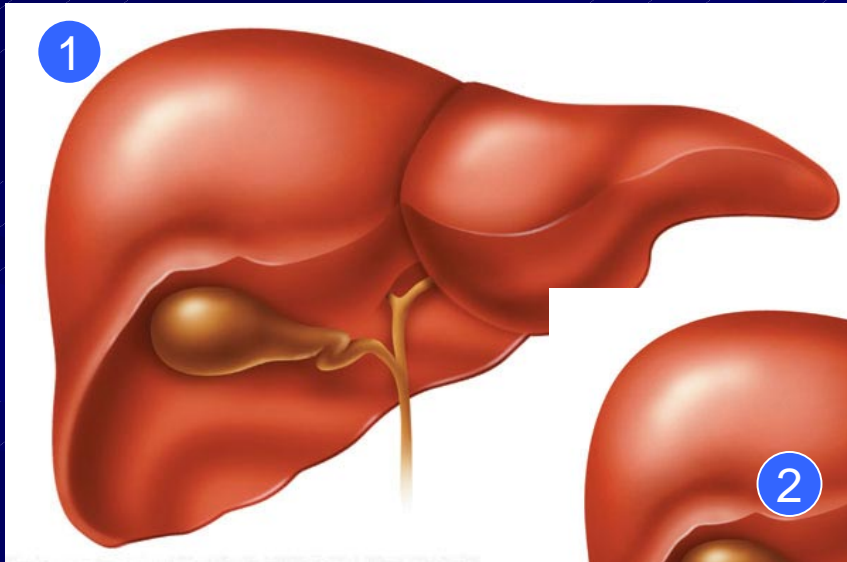
Pre-hepatic

Jaundice - causes



Hepatic

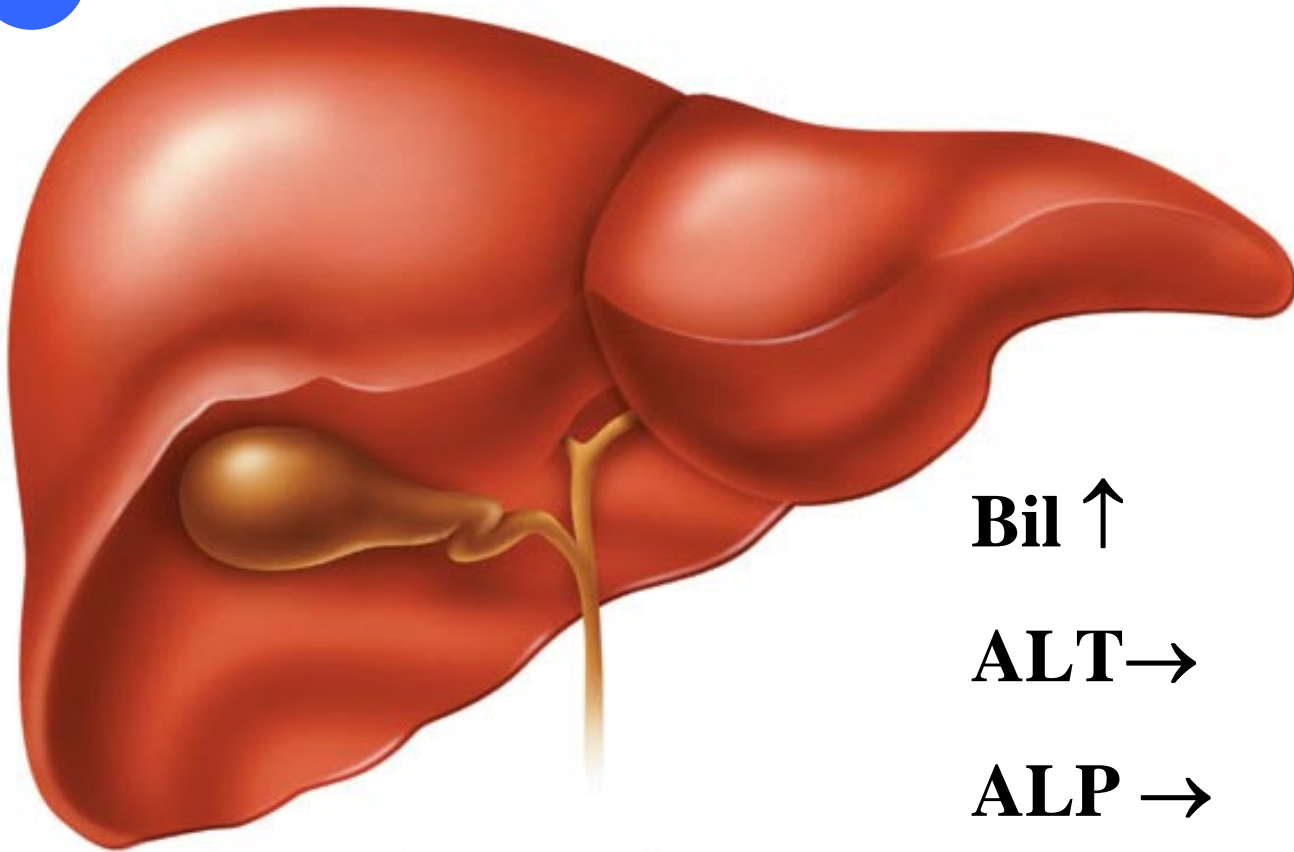
Jaundice - causes



Obstructive

Pre-hepatic jaundice

1



Bil ↑

ALT →

ALP →

Isolated Raised Bilirubin

- Increased bilirubin production
 - Haemolysis
- Decreased uptake in the liver
 - Inborn problems

Isolated raised bilirubin

Investigations

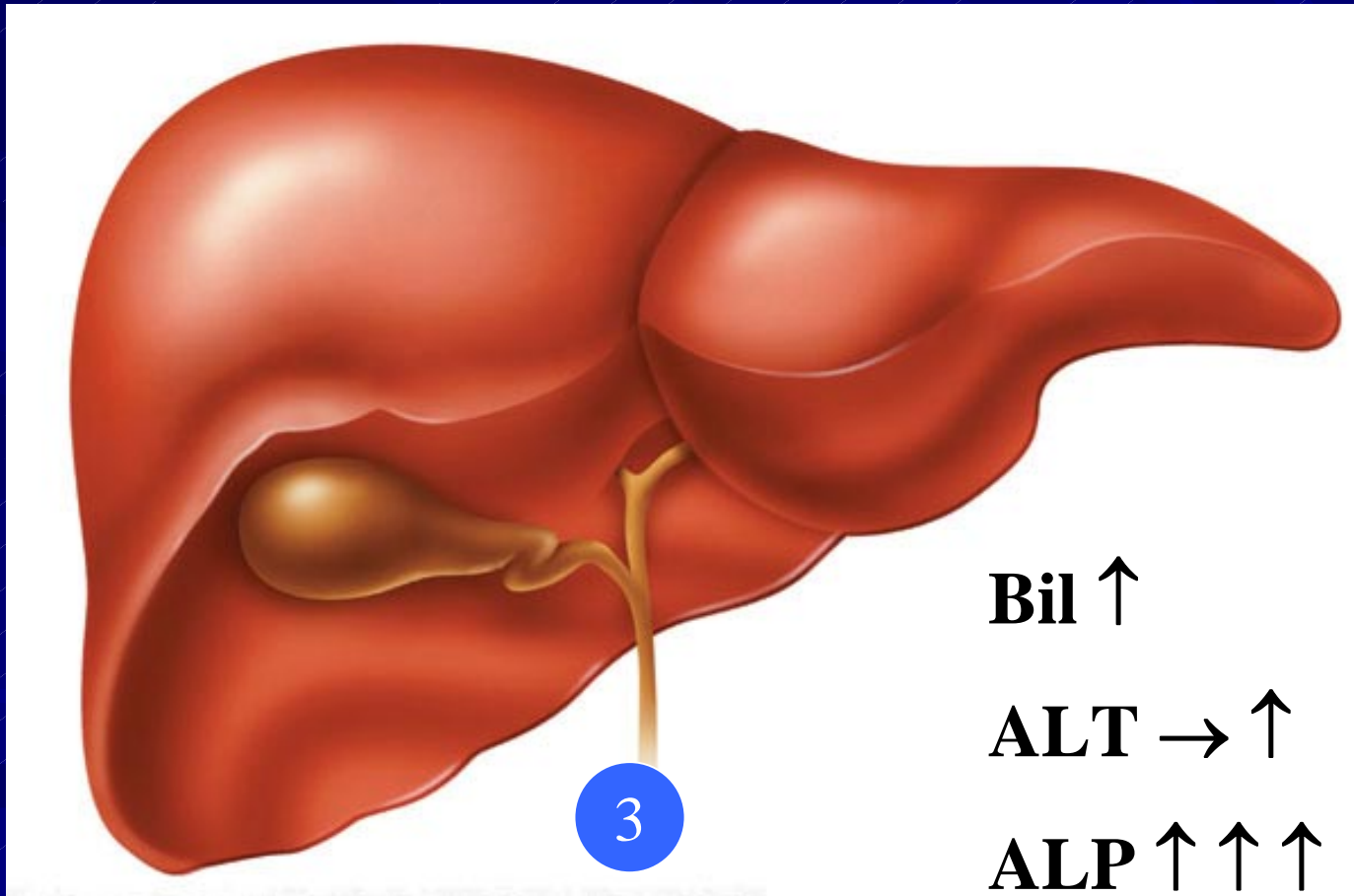
- Split bilirubin – conjugated/unconjugated
- Reticulocyte count

Isolated raised bilirubin

- Split bilirubin – conjugated/unconjugated
- Reticulocyte count

- Gilbert's syndrome
- Crigler-Najar type II

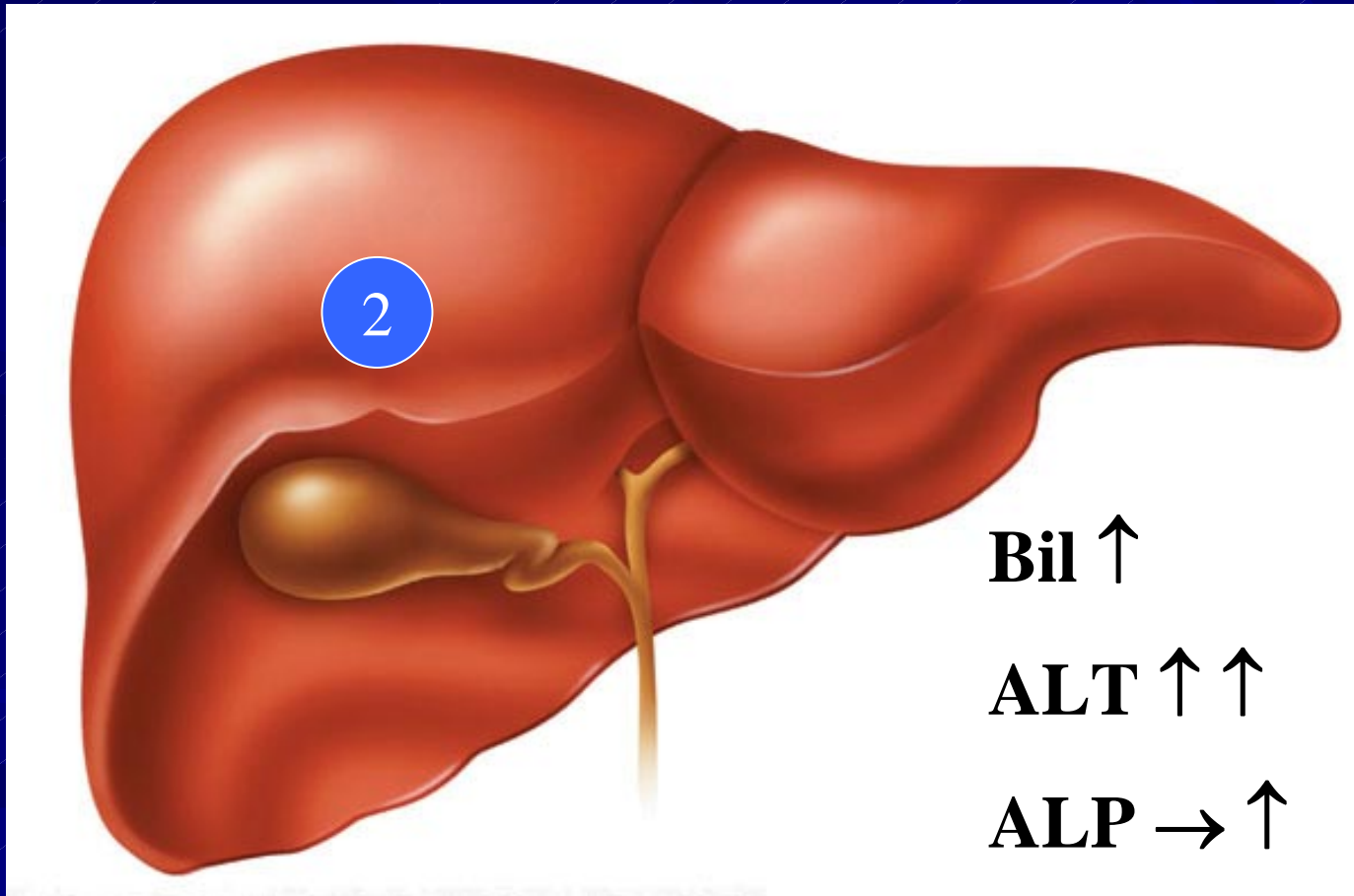
Obstructive Jaundice



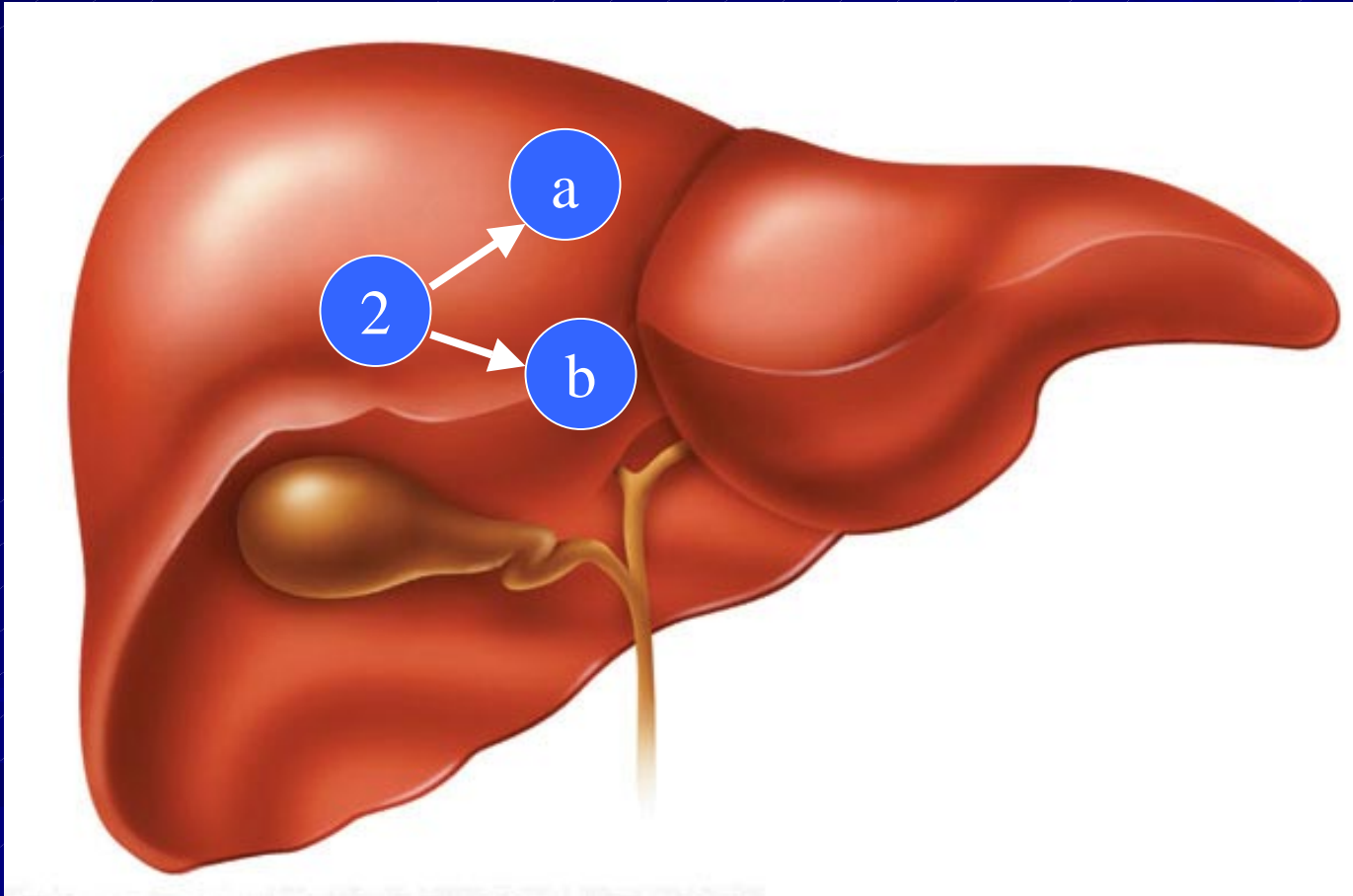
Causes of Obstructive Jaundice

- Gallstones short/painful history
- Ca Pancreas indolent painless Hx
- Ultrasound scan

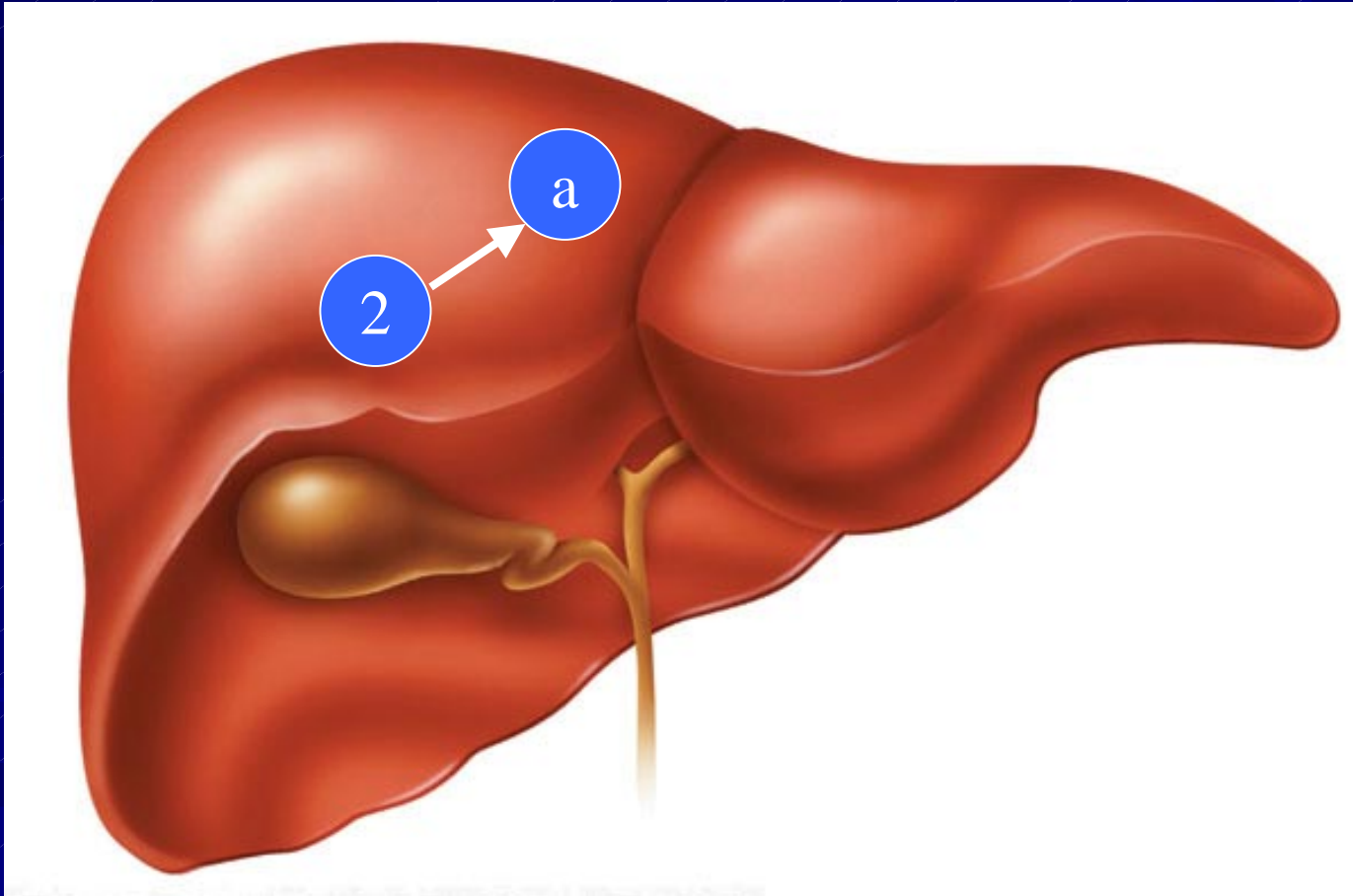
Hepatic Jaundice



Hepatic Jaundice



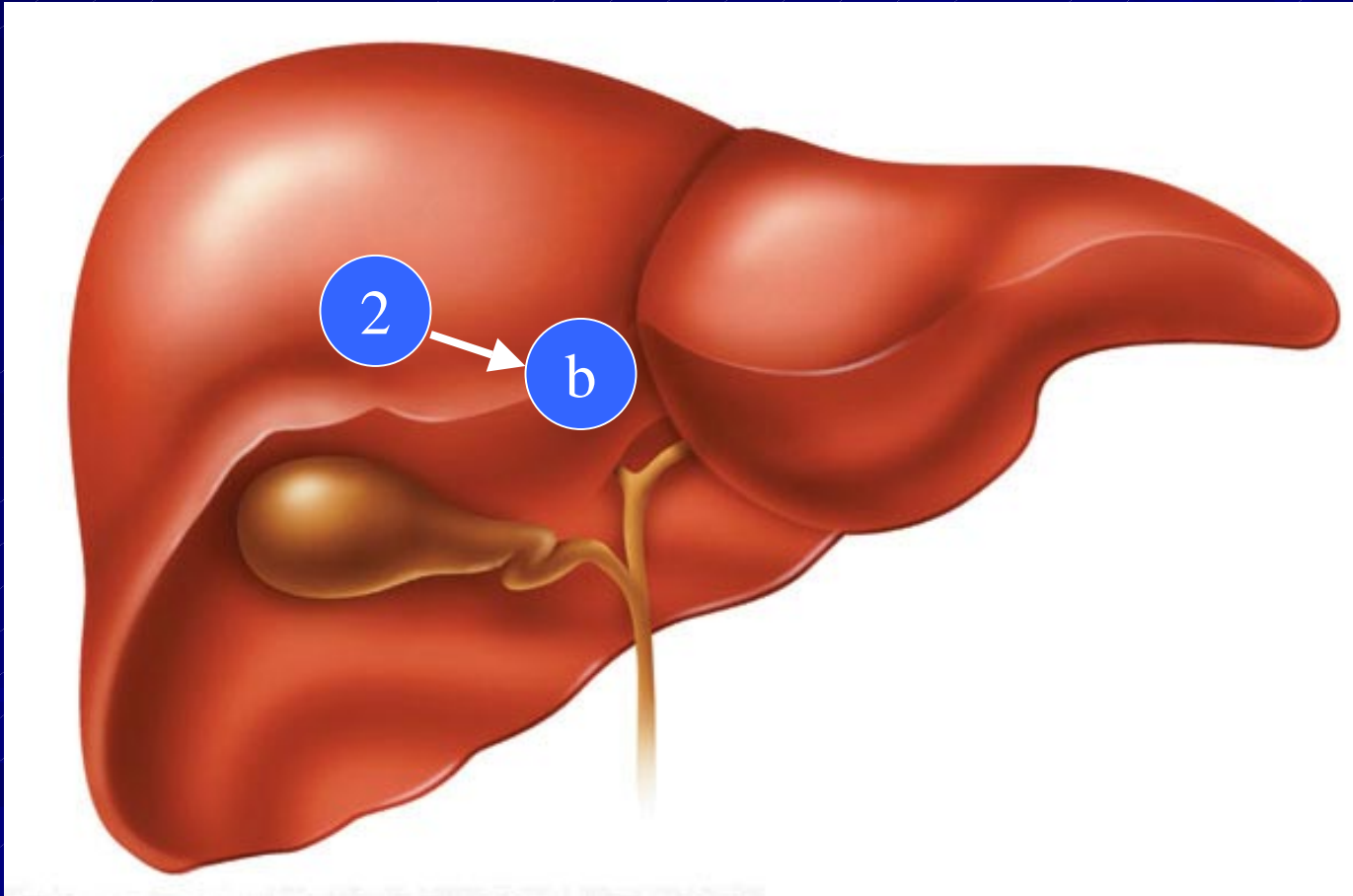
Hepatic Jaundice



2a – Acute Hepatitis

- Short History
- No signs of CLD
- Causes
 - Hepatitis A/B
 - EBV
 - CMV
 - Paracetamol overdose
 - Autoimmune
 - Pregnancy

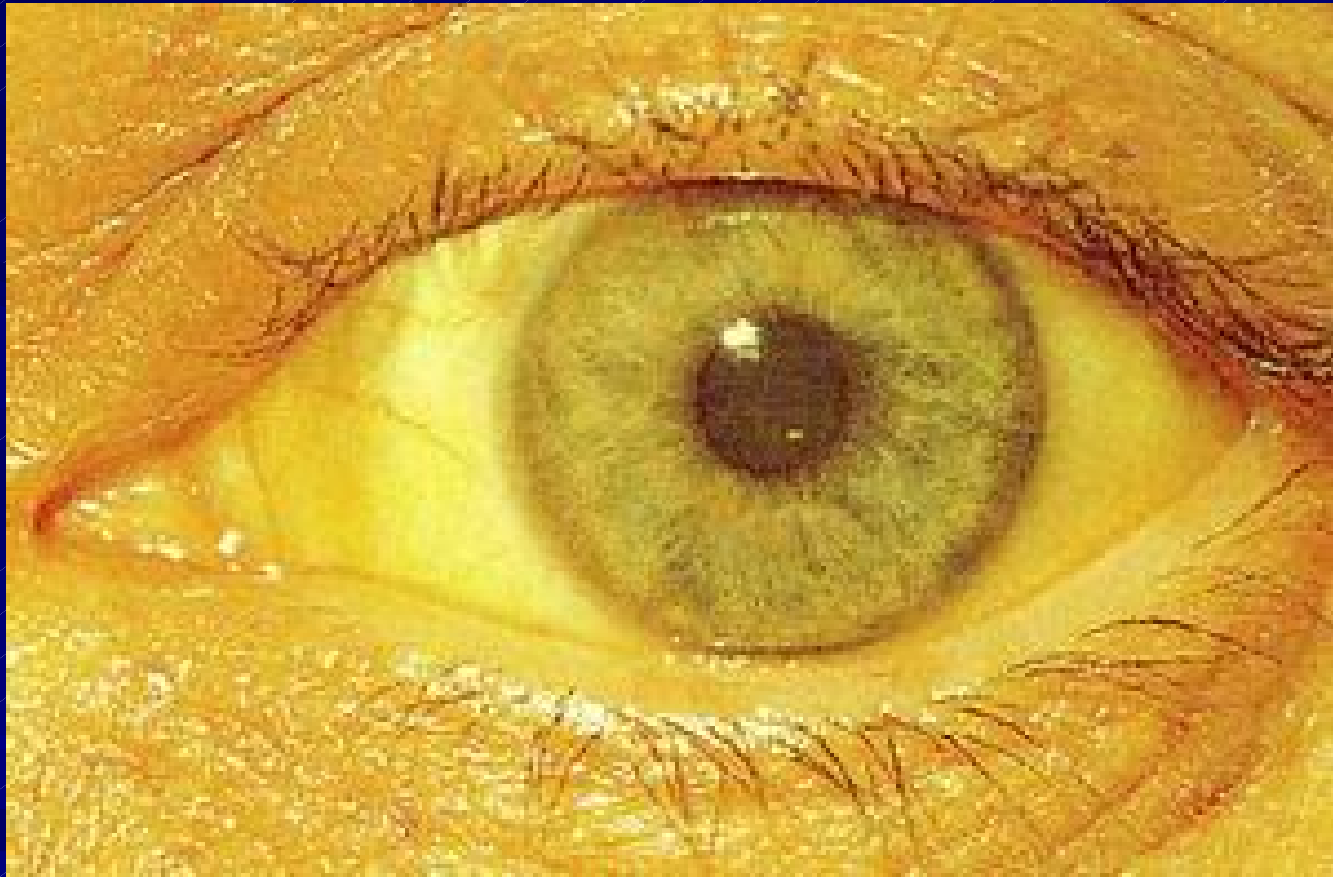
Hepatic Jaundice



2b – Decompensated cirrhosis

- Less acute Hx (less acutely ill)
- Signs of chronic liver disease
- Causes of cirrhosis

Signs of CLD



Signs of CLD

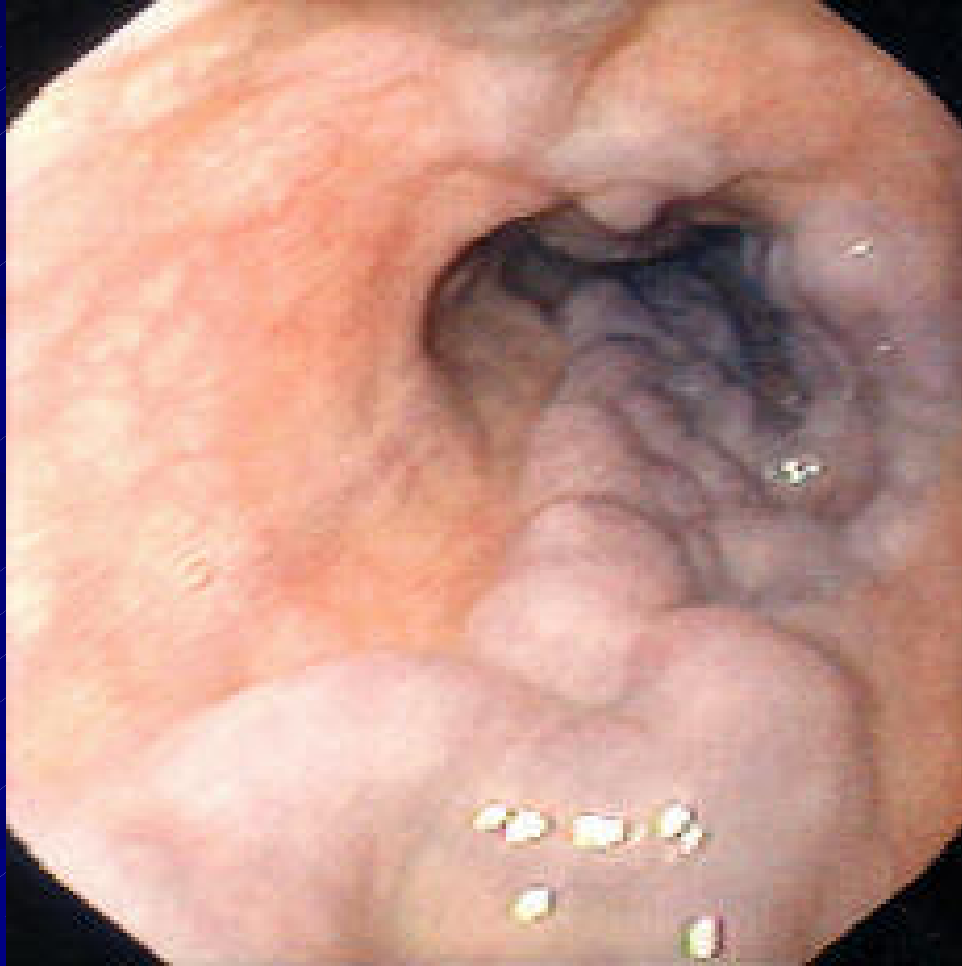


Signs of CLD



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Varices



Cirrhosis

- Alcohol
- Hep B/C
- Autoimmune hepatitis
- Haemochromatosis
- PBC
- PSC
- Wilson's
- Others

Cirrhosis

■ Alcohol	History/ γ GT
■ Hep B/C	Serology
■ Autoimmune hepatitis	AutoAb /ASMA
■ Haemochromatosis	Ferritin/TS
■ PBC	AMA/Ig's
■ PSC	ANCA
■ Wilson's	Caeruloplasmin
■ Others	TFT's/Coeliac/ α 1AT

The Liver Aetiology Screen

- FBC/Ferritin/B12/Folate/Clotting
- U&E's/LFT's/TFT's
- AutoAb screen – ANA/AMA/ASMA
- Ig's
- α FP
- Caeruloplasmin/ α 1AT
- HepB/C serology
- USS – size of liver and focal lesions

Isolated Transaminitis

No Jaundice

- ALT

- ALP

Isolated raised ALT

- Most likely fatty liver/alcohol
- Needs complete liver aetiology screen
- Check AST/ γ GT
- USS
- Biopsy if ALT > x2normal

Isolated Raised ALP

- Ensure origin
 - ALP isoenzymes
 - γ GT
- USS
- If of bony origin
 - Ca/Vitamin D/PTH

Medication

- Any medication can cause an elevation of liver enzymes
 - NSAID's
 - Flucloxacillin
 - Statin
 - Anti-epileptic
 - TB drugs

Causes and Mechanisms of Drug-Induced Liver Injury

Predictable

17-alpha alkyl steroids (2,6)
Acetaminophen (1)
Ergot (10)
Ethanol (1,2,3,4)
Tetracycline (4)
Vinyl chloride (6,7)

Idiosyncratic

Methyldopa (1,3)
Aspirin (1)
Phenytoin (1)
Halothane (1)
Isoniazid (1,3)
Chlordiazepoxide (1)
Methotrexate (1,3,4)
Nitrofurantoin (1,2,3)
Phenothiazines (1,2)
Phenylbutazone (1,2,5)
Sulindac (1,2)
Sulfonamides (1,2)
Valproic acid (1)

Chronic disease

Methyldopa (1,3)
Isoniazid (1,3)
Methotrexate (1,3)
Nitrofurantoin (1,2,3)

Neoplasia

Vinyl chloride (6,7)
Sex hormones (6,7,8,9)

1 Hepatocellular necrosis
2 Cholestasis
3 Fibrosis
4 Steatosis

5 Granulomas
6 Peliosis hepatis
7 Angiosarcoma

8 Focal nodular hyperplasia
9 Hepatic adenoma
10 Ischemic necrosis

Mixed Transaminitis

- ALT/ ALP ratio
 - ALT e.g. X10 normal
 - ALP e.g. X1.5 normal
- Trends over time

Not to miss

- Acute liver failure

Acute Liver failure - Diagnosis

■ Jaundice

■ Encephalopathy

■ Coagulopathy



ALL 3

Encephalopathy

- Grade 1: Mild confusion, slowing of ability to do mental tasks e.g. serial 7's
- Grade 2: Drowsiness, inappropriate behaviour
- Grade 3: Somnolent but rousable, marked confusion
- Grade 4: Coma

Causes of Acute Liver failure

- Paracetamol overdose
- Viral: Hepatitis A/B; HSV
- Acute fatty liver of pregnancy
- Autoimmune hepatitis
- Budd-Chiari syndrome
- Acute Wilson's disease

OLT criteria

- Liver Transplant (paracetamol)
 - Arterial pH <7.30 after rehydration
 - or all three of the following:
 - Prothrombin time >100secs
 - Creatinine >300umols/l
 - Encephalopathy of Grade III or IV

OLT criteria

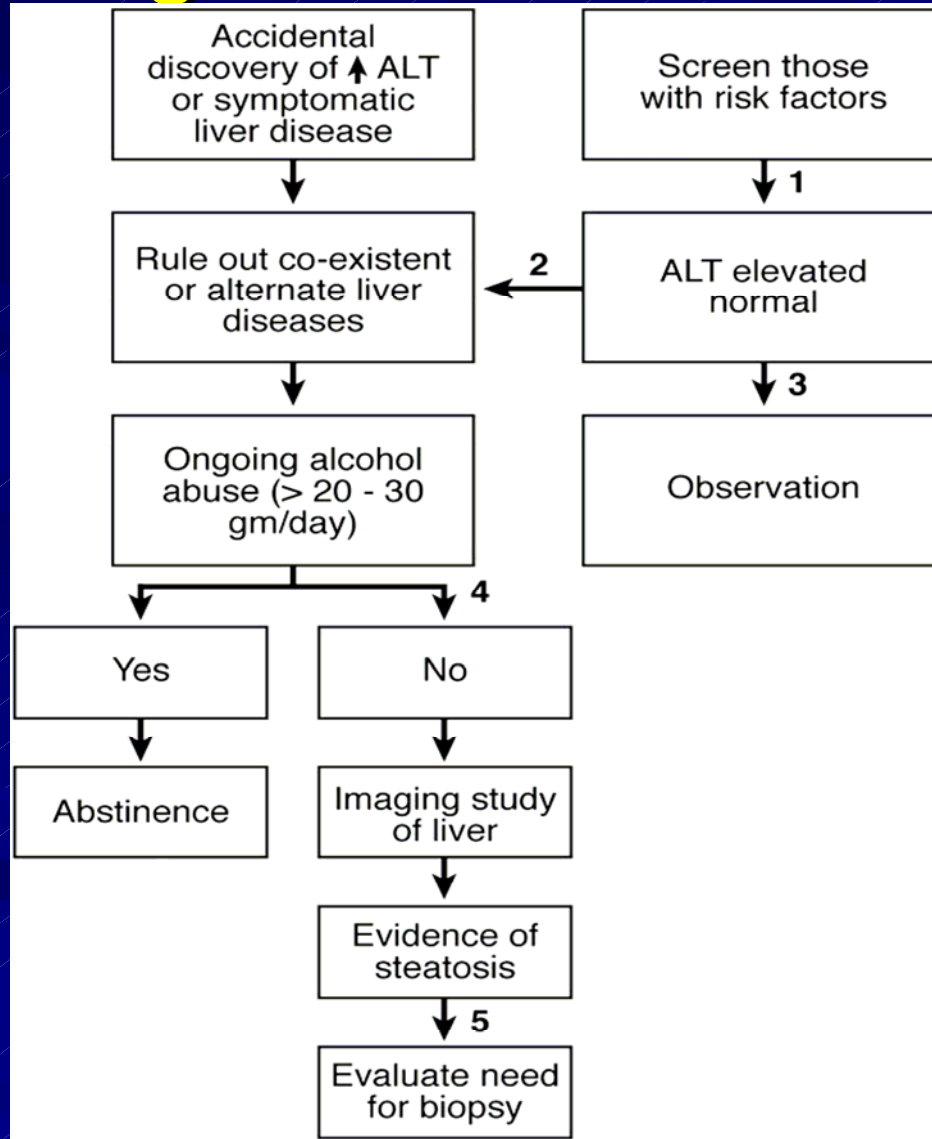
- Liver Transplant (non – paracetamol)
 - Prothrombin time >100secs
 - Or any three of the following:
 - NonA-NonB aetiology
 - Jaundice to encephalopathy time of >7days
 - Age <10 or >40 years
 - Prothrombin time >50 seconds
 - Serum bilirubin >300umols/l

Fatty Liver

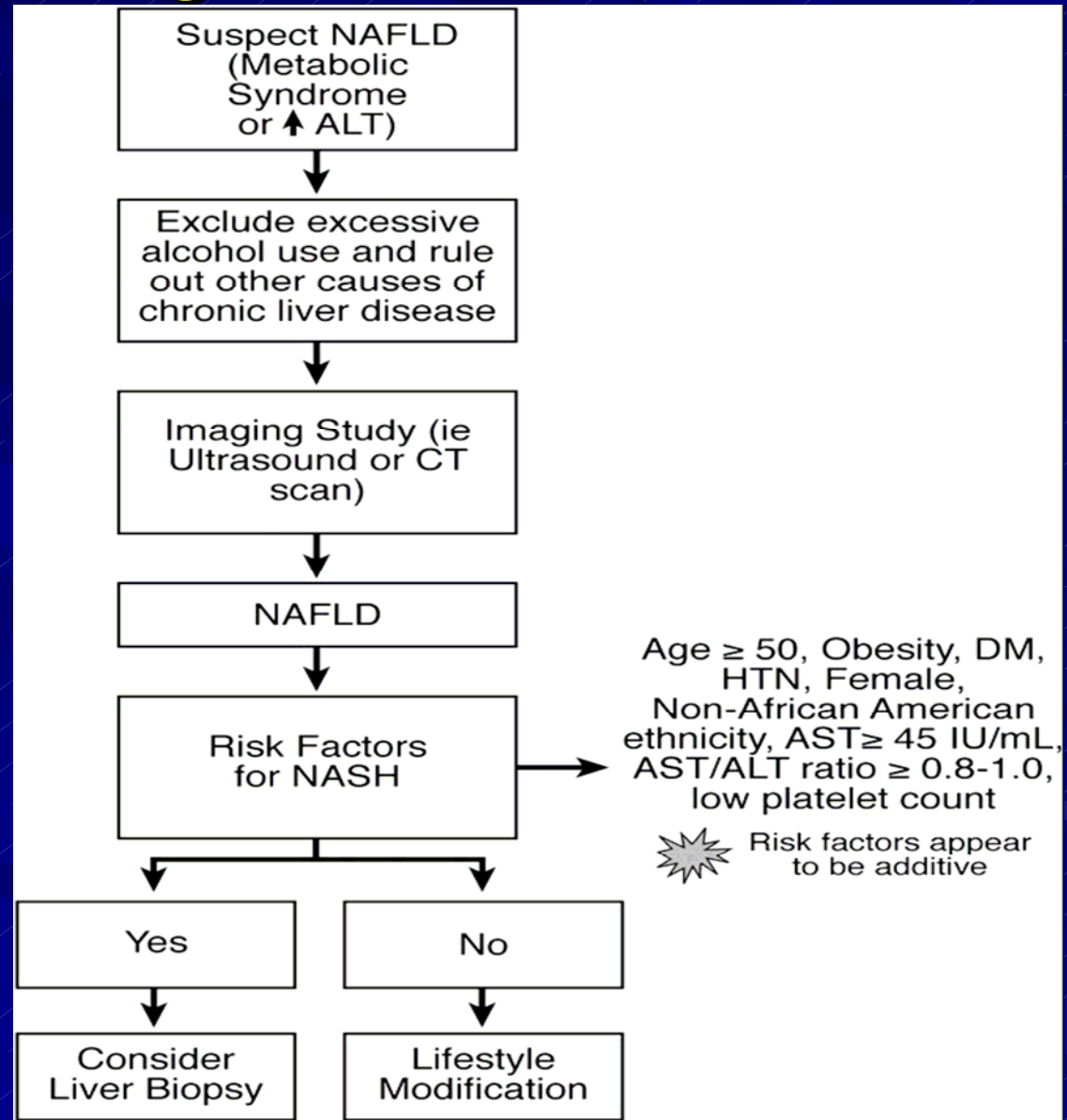
- NAFLD – Non alcoholic fatty liver disease
- NASH – Non alcoholic steatohepatitis

- Usually raised ALT
- But also raised ALP/GGT/Ferritin

Fatty Liver Management – AASLD 2002



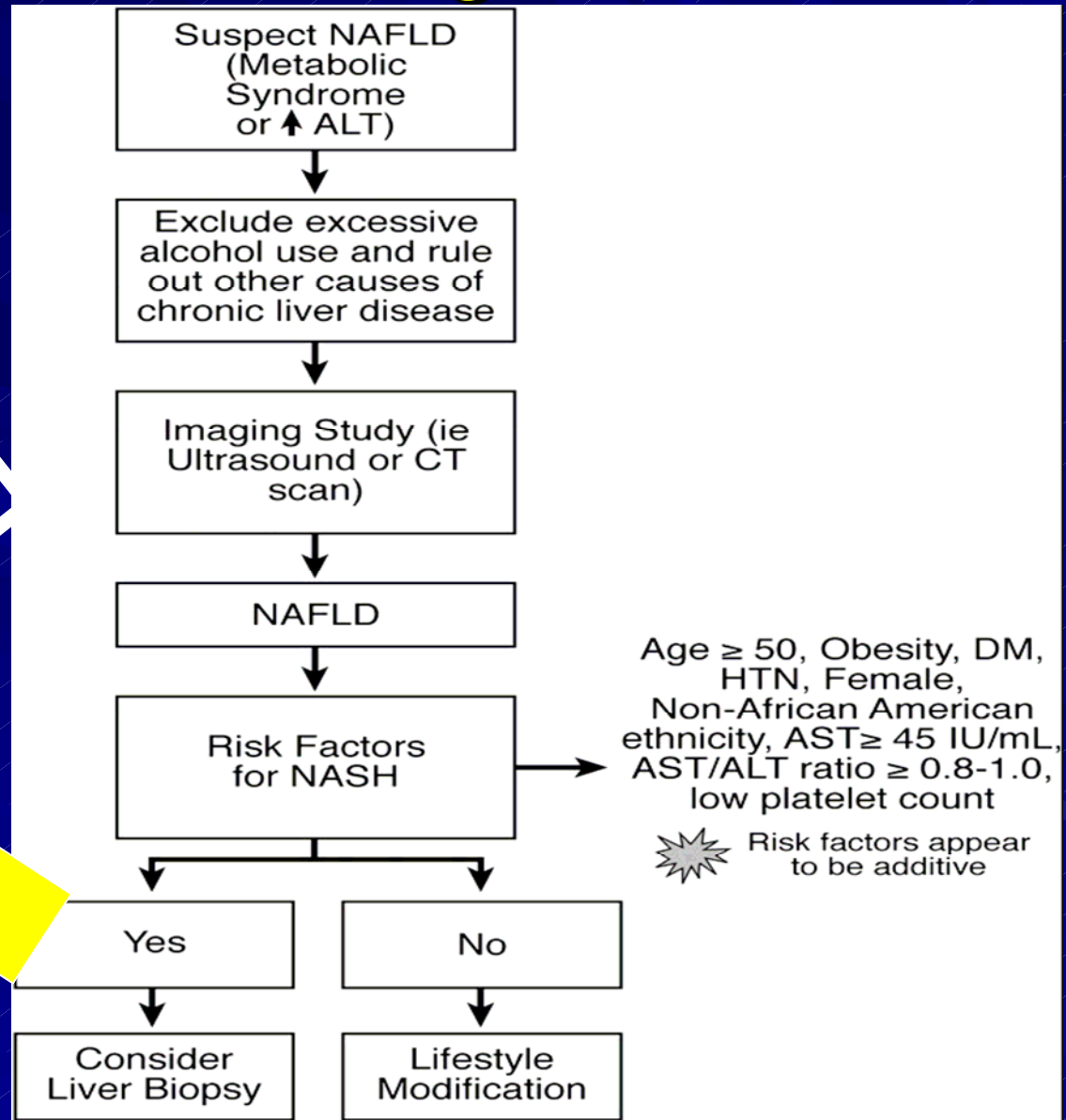
Fatty Liver Management 2007



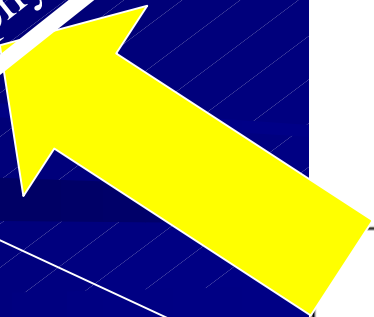
Risk factors for NASH cirrhosis

- Obesity
- Age 50 y
- Non–African American ethnicity
- Female gender
- Diabetes mellitus, type II
- Hypertension
- AST 45 U/L
- AST/ALT ratio 0.8–1.0
- Low platelet count

Fatty Liver Future Management



Fibrosis markers
+
Elastography (USS/MRI)



Who to refer?

- Liver failure – acute and chronic
- Any condition that can lead to cirrhosis
- Any cirrhotic

Any Questions?

