Abnormal Liver Function Tests

Blood tests in liver disease

Many patients have asymptomatic abnormalities in liver function tests. "Normal" values are within ± 2 SD meaning that 2.5% of a healthy population will have abnormal LFTs.

Assessing liver function

- Albumin - sensitive marker of chronic hepatic function, but long half life (20 days).
- Bilirubin.
- Prothrombin (INR) - sensitive marker of acute hepatic synthetic function.

Other markers of liver disease: liver enzymes

- Alanine aminotransferase (ALT) - Mainly found in the liver
- Alkaline phosphatase (ALP) - Related to the bile ducts
- Aspartate aminotransferase (AST) - Found in the liver and heart
- Gamma-glutamyl transferase (GGT) - Also related to the bile ducts

How to approach abnormal liver function tests

- ↑Bilirubin alone - ? unconjugated or conjugated hyperbilirubinaemia.
- (↑ALP & ↑GGT) > (↑AST & ↑ALT): obstructive picture or cholestasis. (↑Bil too)
- (↑AST & ↑ALT) > (↑ALP & ↑GGT): hepatitic picture. Acute viral hepatitis AST:ALT<1, in non-alcoholic cirrhosis AST:ALT>1, & in alcoholic liver disease AST:ALT>2.
- Isolated rise in individual enzymes e.g. ALP (r/o bone dz) and GGT (alcohol).
- Occasionally the liver enzymes e.g. ALP, GGT, AST or ALT all be similarly elevated

Causes of abnormal liver function tests

- Consider drug toxicity in all cases.
- Rise in bilirubin alone
    - Unconjugated -
        - Haemolysis
        - Drugs
        - Gilbert's syndrome
        - Crigler-Najjar syndrome
    - Conjugated -
        - Dubin-Johnson syndrome
        - Rotor syndrome
        - Chronic liver disease, (usually associated with other LFT abnormalities)
- Obstructive or cholestatic picture
    - Intrahepatic -
        - primary biliary cirrhosis
        - drugs
    - Extrahepatic -
        - Gallstone in common bile duct
        - Head of pancreas neoplasm
        - Drugs e.g. erythromycin, TCAs, flucloxacillin, OCP and anabolic steroids
        - Cardiac failure - improves with treatment
        - Primary biliary cirrhosis - commoner in women and first sign is a rise in ALP
        - Primary sclerosing cholangitis
        - Neoplasm - primary (rarely) and secondaries
        - Familial (benign)

- Hepatitic picture i.e. rise in aminotransferases (AST and ALT)
    - Alcohol - fatty infiltration and acute alcoholic hepatitis Cirrhosis of any cause - alcohol being one of the commonest.
    - Medications e.g. Phenytoin, carbamazepine, isoniazid, statins, methotrexate, amanita phalloides, paracetamol OD, amiodarone. (AST, ALT may be >1000 IU/l).
    - Chronic hepatitis B and C.
    - Acute viral hepatitis e.g. hepatitis A, B and C and CMV infection.
    - Autoimmune hepatitis.
    - Neoplasms - primary or secondaries.
    - Haemochromatosis.
    - Metabolic - Glycogen storage disorders, Wilson's disease.
    - Ischaemic liver injury e.g. severe hypotension
    - Fatty liver disease (mild elevation in transaminases <100 IU/l).
    - Non-hepatic causes: Coeliac disease, haemolysis and hyperthyroidism.
- Isolated rise in GGT
    - Ethanol intake (see below).
- Isolated rise in ALP
    - If isolated rise in ALP consider other sources e.g. bone or kidney
    - Growth in childhood
    - 3rd trimester of pregnancy (comes from the placenta - a normal finding)

More definitive tests i.e. to aid identification of underlying cause

- Viral serology e.g. hepatitis B and C, CMV and EBV
- Auto-Ab screen e.g. anti-mitochondrial Ab, anti-smooth muscle Ab and anti-nuclear Ab
- Immunoglobulins
- Serum ferritin and transferrin saturation
- α-fetoprotein
- Copper / caeruloplasmin
- α1-antitrypsin
- Imaging: ultrasound is non-invasive and helpful to detect structural abnormalities

History and examination of a patient whose liver function tests are abnormal

Full history:

- Recent travel
- DM, obesity, hyperlipidaemia (all associated with fatty liver disease)
- Drugs including paracetamol overdose and herbal remedies
- Unprotected sexual intercourse
- Transfusions & Tattoos
- Alcohol & drug history (including herbal remedies)
- Occupation
- Family history

Full examination:

- Stigmata of chronic liver disease e.g. icteric skin and mucous membranes, palmar erythema, bruising, spider naevi, gynaecomastia
- Hepatomegaly +/- splenomegaly
- Ascites or features suggestive of hepatic encephalopathy
- Obesity (associated with a fatty liver).
- Any clues to underlying cause e.g. lymphadenopathy