

INTERPRETATION OF LIVER FUNCTION TESTS.

Waceke Kombe
Paediatric Gastroenterology,
Aga Khan University Hospital

outline

- ▶ Basics on liver function tests.
- ▶ Examples of results for interpretation

Liver function tests

- ▶ Liver function tests include:-
 - ▶ Bilirubin
 - ▶ Aspartate transaminase (SGOT)
 - ▶ Alanine transaminase (SGPT)
 - ▶ Gamma-glutamyl-transpeptidase
 - ▶ Alkaline phosphatase
 - ▶ Total Protein
 - ▶ Serum albumin
 - ▶ Coagulation screen.
 - ▶ Lactose dehydrogenase *

- ▶ Only GGT is liver specific.
- ▶ Total protein, Albumin and Coagulation screen assess the synthetic function. Liver function not complete without these.

Non hepatic sources of lab tests. ¹

Table 1: Nonhepatic Sources of Abnormalities for Select Laboratory Tests

Test	Nonhepatic Source
Bilirubin	Red blood cells (e.g., hemolysis, intra-abdominal bleed, hematoma)
AST	Skeletal muscle, cardiac muscle, red blood cells
ALT	Skeletal muscle, cardiac muscle, kidneys
LDH	Heart, red blood cells (e.g., hemolysis)
Alkaline phosphatase	Bone, first trimester placenta, kidneys, intestines

- ▶ Liver Diseases categorized into three broad groups.
 - ▶ Hepatocellular injury- primary injury is to the hepatocytes
 - ▶ Cholestatic injury- primary injury is to the bile ducts
 - ▶ Infiltrative injury- liver is invaded or displaced by non-hepatic substance eg neoplasm or amyloid.

- ▶ Viral hepatitis- disproportionate elevation of AST/ ALT over ALP.
- ▶ Common causes of mild increases in AST and ALT levels include non-alcoholic fatty liver disease (NAFLD), hepatitis C, alcoholic fatty liver disease, and medication effect (e.g., due to statins).
- ▶ ALP is most densely represented near the canalicular membrane of the hepatocyte. Diseases that predominately affect hepatocyte secretion (e.g., obstructive diseases) will be accompanied by elevations of alkaline phosphatase levels e.g Bile-duct obstruction, primary sclerosing cholangitis, and primary biliary cirrhosis

- ▶ Direct hyperbilirubinemia. > 20% of the total is direct bilirubin.
- ▶ Autoimmune hepatitis
 - ▶ AST/ALT ~7-10times ULN
 - ▶ ALP 1-3 times ULN
- ▶ Primary Biliary Cirrhosis
 - ▶ AST/ALT 1-3times ULN
 - ▶ ALP 2-10 times ULN
- ▶ Both autoimmune conditions will have an elevation of the gammaglobulin gap. N<35.

Signature disease	Drugs causing the feature
Acute hepatitis	Acetaminophen, isoniazide, nevirapine, ritonavir, troglitazone
Chronic hepatitis	Dantrolene, diclofenac, methyldopa, minocycline, nitrofurantoin
Acute cholestasis	ACE inhibitors, amoxicillin/clavulanic acid, chlorpromazine, erythromycin
Mixed pattern or atypical hepatitis	Phenytoin, sulphonamides
Non- alcoholic steatohepatitis	Amiodarone, tamoxifen
Fibrosis/Cirrhosis	Methotrexate
Microvesicular steatohepatitis	NRTIs, Valproic acid
Venoocclusive disease	cyclophosphamide

- ▶ The exhausted liver
 - ▶ Raising bilirubin
 - ▶ Dropping transaminases.
 - ▶ **This is an ominous sign.**

EXAMPLE

9 year old girl with 3 month history of abdominal swelling and 2 weeks history of jaundice.

LFTs.

Total protein 78.5(66-83), Albumn 25.7 (35-52), ALP 1071, GGT 396, AST 616(<40), ALT 277(<40), SBR 125.8/11

Coagulation profile

APIT 304, 18.8, INR 1.58

- ▶ Gammaglobulin gap
- ▶ Comment on the transaminases
- ▶ Comment on the ALP and GGT.

SUMMARY

- ▶ Conduct complete liver tests including assessment of synthetic function.
- ▶ There are three main patterns of liver injury
 - ▶ Hepatocellular
 - ▶ Cholestatic
 - ▶ Infiltrative.
- ▶ Different drugs injury the liver in specific ways.

REFERENCES

- ▶ Liver Test Interpretation - Approach to the Patient with Liver Disease: A Guide to Commonly Used Liver Tests Arvind R. Murali, MD, [William D. Carey, MD](#)