Abnormal liver function test: STEPWISE APPROACH.....

STEP 1: HISTORYAND PHYSICAL EXAMINATION

‘‘One good feel of the liver is worth any 2 LFTs” (F.M. Hanger Jr., 1971)

A tender liver would suggest acute enlargement secondary to congestion, hepatitis, or cholangitis.

STEP 2: LABORATORY EVALUATION FOR ETIOLOGY

(AST) : liver / cardiac muscle/ skeletal muscle/ kidneys,/brain, pancreas, lungs, and erythrocytes.

elevated alkaline phosphatase hepatobiliary origin/ bone /intestinal source (in particular in patients with blood type O or B after the ingestion of a fatty meal).Therefore, the serum alkaline phosphatase level is best determined in the fasting state.

The best approach to an isolated LFT abnormality such as alkaline phosphatase would be to order isoenzymes fractionation

Evaluation of the pattern of the initial LFT panel in association with serum prothrombin time and platelet count is key.

The first determination is whether the pattern is more characteristic of “hepatitis” or cholestasis.
The predominant “hepatitis” pattern with alanine aminotransferase (ALT) and AST elevation out of proportion to alkaline phosphatase is characteristic of viral hepatitis, nonalcoholic steatohepatitis, and alcohol- and drug-induced liver disease.
If the pattern is cholestatic, then it is important to differentiate extrahepatic biliary tract obstruction from intrahepatic cholestasis.

Aijaz A, Keeffe EB.. Liver Chemistry and function tests. In: Feldman, Friedman, Brandt, editors. Sleisenger & Fordtran's:

- ✓ Hepatocellular :

Ischemia,& Toxins: Aminotransferases 50–100 times, Alk phos 1–3,Bilirubin 1–5
Viral Hepatitis :Aminotransferases 5–50times,Alk phos 1–3,Bilirubin 1–30

- ✓ Biliary:

Complete: Aminotransferases 1-5 times, Alk phos2-20 times ,Bilirubin 1–30
partial:Aminotransferases 1-5 times, Alk phos2-10 times ,Bilirubin 1–5

- ✓ Infiltrative Disease: Aminotransferases 1-3 times, Alk phos1-20 times ,Bilirubin 1–5

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- ✓ Prothrombin time Prolonged and unresponsive to vitamin K in severe disease: Hepatocellular . Responsive to SQ vitamin K: biliary .

- ✓ Albumin Decreased chronic disease .

- ✓ Platelet count Decrease suggests stage III/IV with portal hypertension and secondary hypersplenism

- ✓ Jaundice in the face of a high platelet count is suggestive of acute liver disease or metastatic cancer/lymphoma involving liver

- ✓ Subcutaneous vitamin K will normalize the prothrombin time in patients with extrahepatic biliary obstruction but usually not with intrahepatic cholestasis.

R ecommended Initial Testing:

1.Toxicology testing (in emergency room/ day 1 of hospitalization)
Urine and blood toxicology screens

2.Hepatitis A antibody (IgM)
Hepatitis B surface antigen, hepatitis B core antibody total, and surface antibody
Hepatitis C antibody

3.If hepatitis B surface antigen positive:
Hepatitis viral B DNA (PCR)
Hepatitis B antigen and antibody

If hepatitis C antibody positive:
Hepatitis viral C RNA (PCR) and genotype

If immunosuppressed (future: microarray panel testing):
Cytomegalovirus antibody (IgM)
Epstein-Barr viral antibody (IgM)
Herpes simplex antibody (IgM)

4.Auto antibodies:
Antinuclear antibody
Antismooth muscle antibody
Antimitochondrial antibody
Perinuclear anti-neutrophil cytoplasmic antibody (atypical)

5.Metabolic:
Ceruloplasmin (serum), urine for 24-h copper
Ferritin, iron, total iron-binding capacity
Fasting insulin, lipid profile, hemoglobin A1c

Noninvasive Evaluation Techniques:

USG:

A}patients with significant cirrhosis of the liver,
especially due to primary sclerosing cholangitis or primary biliary cirrhosis, may have less biliary tract dilatation than would normally be expected with acute biliarytract obstruction

B}Ultrasound/Doppler ultrasound Abdominal ultrasound (US), with or without a Doppler
ultrasound (DUS) component, is usually the initial imaging test in the evaluation of hepatobiliary disease.

CT/MRI :

A} magnetic resonance cholangiopancreatography
(MRCP) is clearly superior to CT in the evaluation of the biliary
system and determining the cause of possible obstruction.
B}The contour of the liver, in particular the presence of modularity as well as caudate
lobe enlargement, correlates with the presence of cirrhosis on liver biopsy.

C}The presenceof splenomegaly, dilatation of the portal vein, paraesophageal, and/or gastric
varices can also be useful to suggest the presence of portal hypertension.

Nuclear medicine:

A}it is no longer recommended as an initial examination.
B} accurate informationfrom a DISIDA scan is limited to patients with a serum bilirubin level less than 20
mg/dL.
C}The DISIDA scan remains sensitive, however, for the evaluation of the presence of acute cholecystitis or for a potential bile leak after biliary tract surgery or an endoscopic retrograde cholangiopancreatography (ERCP) sphincterotomy.

D}Liver spleen scans Ninety percent of sulfur colloid tagged with technetium-99 m is removed by the liver, with the remaining particles extracted by the spleen and bone marrow. The ratio of the sulfur colloid clearance by the spleen and bone

marrow increases in proportion to that by the liver with worsening liver function: fallen out of favor with better imaging of liver by CT and MRI scans.

EUS:
has a sensitivity and specificity similar to those of MRCP
the advantage of permitting biopsy of suspected areas

ERCP:
invasive procedure with a risk of complications both related to performance of endoscopy as well as specific to the injection and manipulation of the biliary tree and pancreatic duct.

STEP 3: EVALUATION OF SEVERITY

King's College Criteria
Child-Turcotte-Pugh:
Surgery is always contraindicated
in patients with Child's class C cirrhosis unless a life-threatening indication is present, such as bowel infarction, gangrenous cholecystitis, or incarcerated hernia.
MELD Score
PELD Score

STEP 4: EVALUATION FOR COMPLICATIONS

Acute Liver Failure
.Chronic Liver Disease.

CASES:

Acute biliary tract disease:
1.early in acute biliary obstruction, the AST and ALT may transiently rise as high as 10 to 20 times the upper limit of normaLized

2.US is sensitive in the presence of biliary dilatation; however, it is much less sensitive in the presence of
a nondilatedbile duct.
3.Confirmatory investigations include EUS, MRCP, and ERCP.
4. A National Institutes of Health consensus statement concluded that the EUS, MRCP, and ERCP have comparable sensitivity and specificity in the detection of common bile duct stones

Standard LFTs do not discriminate between primary and metastatic carcinomas.

Predictable hepatotoxicity:DRUG:
the presentation is directly related to the dose of thedrug received
tends to develop almost immediately with necrosis in zone 3 of the liver.

Idiosyncratic (unpredictable) hepatotoxicity: DRUG:
more common after multiple exposures, and is unrelated to the dose of the drug.
Associated with fever, rash, and eosinophilia.
ALF due to idiosyncratic drug reactions clearly has had a more dismal prognosis.

The best way to determine whether a medication is responsible for the abnormal LFT is to stop that particular medication and determine if the LFTs return to normal. liver biopsy may be necessary to help identify which drug is most likely responsible.

Ischemic hepatitis is a common cause within the hospital of extremeAST elevation greater than 2000 U/L It is not uncommon for the prothrombin time to
be acutely prolonged over a rapid return to normal within the space of 2 to 3 days, followed by the serum aminotransferase levels within 7 to 10 days.

Postoperative jaundice is often multifactorial.
abnormal LFTs can occur in almost 25% to 75% of patients postsurgery