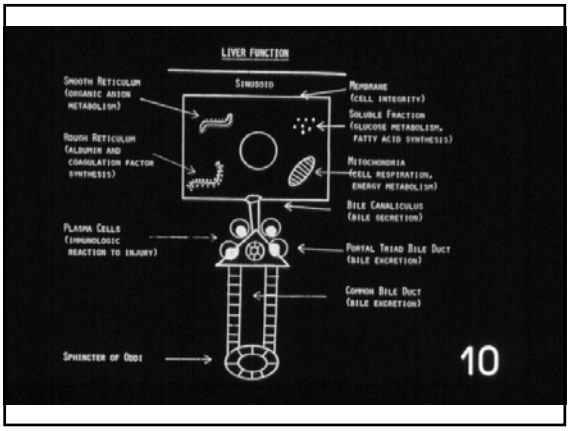


Hepatic Function Tests

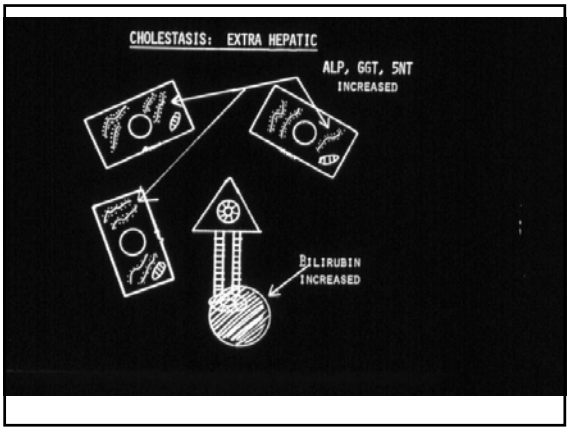
"FUNCTION"	TEST(S)
Necrosis	ALT, AST, AST:ALT
Cholestasis	ALP, GGT, bilirubin
Viral Markers	hepatitis markers
Protein Synthesis	albumin, PT, PTT
Reaction to injury	immunoglobulins
Tumor Markers	LDH, AFP, CEA

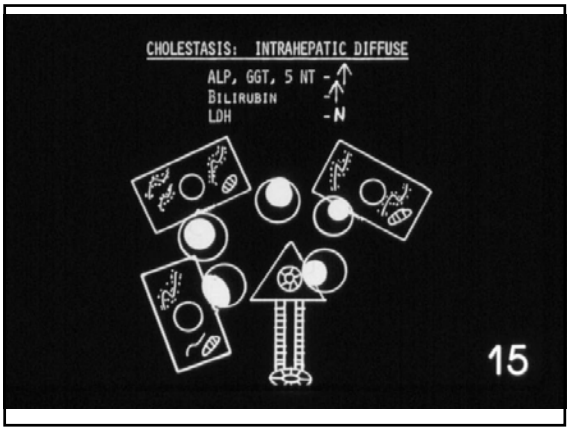
CMS approved Hepatic Function Panel

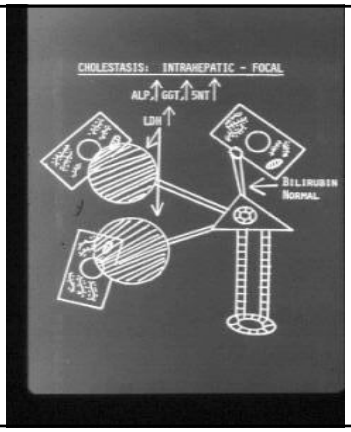
- Total protein
- Albumin
- AST
- ALT
- ALP
- Total Bilirubin
- Direct bilirubin

Hepatic Disease

- NECROSIS
  - Acute
    - viral, toxic, hypoxic
  - Chronic
    - carrier state, chronic activity
- CHOLESTASIS
  - Intrahepatic
    - Diffuse: drug-induced, PBC
    - Focal: tumor, granuloma, stone
  - Extrahepatic: stone, tumor







Indicators of Necrosis

- normal ALT and inc AST: nonhepatic
- AST:ALT > 2: acute alcoholic hepatitis
  > 1: in chronic disease: alcoholic
  < 1: in acute viral hepatitis
- in acute alcoholic hepatitis:
  - AST & ALT < 250 U/L
- Abrupt increases to > 10,000 U/L occur in hypoxia, acetominophen, herpes simplex
- predominance of ALT/AST over ALP/GGT favors necrosis over cholestatsis

Indicators of Cholestasis

- increases in ALP and GGT: Hepatic
- increases in ALP and normal GGT: Bone
- increases in ALP and normal bilirubin: mean focal intrahepatic cholestasis
- blood group O and B secretors may increase intestinal ALP postprandially
- predominance of ALP/GGT over ALT/AST favor cholestasis over necrosis
- Isolated slight increases in GGT
  - alcohol, anticonvulsants, diabetes, hyperthyroidism weeks after acute MI

Bilirubin

- Increased T. Bilirubin < 5.0 mg/dL with D. Bilirubin < 20% of total indicates hemolysis or Gilbert syndrome
- In extra-hepatic obstruction T. Bilirubin rarely exceeds 25 mg/dL

Indicators of Protein Synthesis

- decreased albumin in a non-acutely ill patient means a chronic illness
- Albumin may decrease quickly in an acutely ill patient in negative nitrogen balance
- PT is a more sensitive index of synthesis than albumin
- both albumin and PT are better indices of severity and prognosis of liver disease

Indicators of Reaction to Injury

- autoimmune hepatic disease indicated by:
  - immunoglobulins > 3.0 g/dL; ANA > 1:160, homogeneous; positive smooth muscle antibody, Type I L-K microsomal antibody
- PBC: Increased IgM & antimitochondrial antibody in >90%
- in chronic hepatic disease, increase in globulin indicates activity

Hepatic Function: References

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- Burke, MD: Liver function:test selection & interpretation of results. Clin Lab Med 2002; 22:377-90