CASE STUDIES IN LFT ABNORMALITIES

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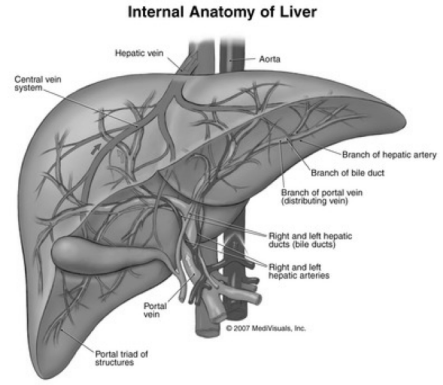
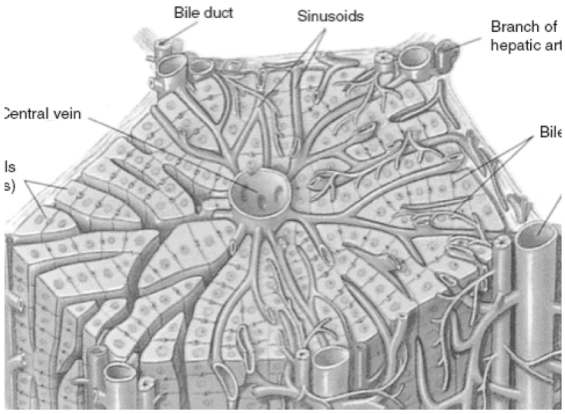
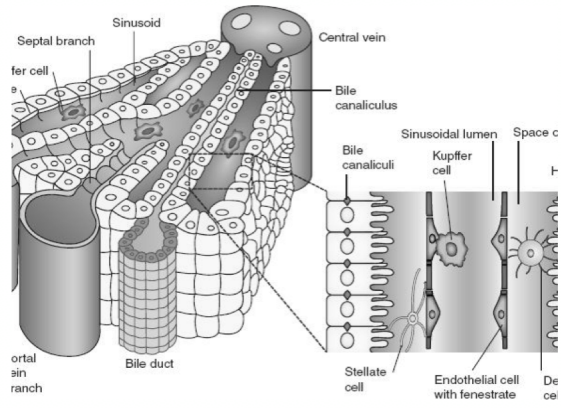
2020 CLINICAL UPDATE IN GERIATRIC MEDICINE







Functions of liver

- Biosynthesis:
  albumin, globuins, lipoproteins, etc.
- Metabolic regulation:
  plays a major role in carbohydrates, lipids and protein metabolism.
- Detoxification:
  endogenous and exogenous compounds.
- Secretion:
  water soluble end products, bile salts, etc.
- Storage:
  fat soluble vitamins and water soluble as B_{12}.

EFFECT OF AGEING ON THE LIVER

- **NO liver diseases specific to old age**
- **Traditional LFTs do NOT change w/ age**
- **Liver size decreases**
  - **37% from 20's to 90's**
  - **Comparable decr. In hepatic blood flow**

EFFECT OF AGEING ON THE LIVER

- **Liver metabolic function slows**
  - **Decr. cyto P 450 drug metabolism**
  - **Decr. urea synthesis/hepatic nitrogen clearance**
  - **Decr. response to stress/slower repair and regeneration**

*** Incidence/severity of comorbidities increases.**

EVALUATING LIVER INJURY

CLASSIC LFTs

- AST (SGOT)
- ALT (SGPT)
- Bilirubin
- Alkaline Phosphatase

- These are liver INJURY tests

TRANSAMINASES

- AST
  - Found in liver, heart + skeletal muscle, RBC's, kidney, and brain
  - 2 forms: mitochondrial and cytosolic

- ALT
  - Found primarily in liver; more specific
  - Limited to cytosol

TRANSAMINASES

- Levels do not predict histology
  - TRENDS help follow progression
    - Decr. Level = improving acute injury OR overwhelming necrosis

- Pattern is helpful
  - AST:ALT > 2:1 → alcohol
  - AST:ALT > 1 → think cirrhosis (flip)
  - AST:ALT < 1 → viral, chronic hepatitis

BILIRUBIN

- Direct = Conjugated = water-soluble (urinary)
- Indirect = unconjugated = water-insoluble
- Most serum bili is unconjugated
  - Direct fraction usu. <20%
- Delta bili – direct; bound to albumin;
  - NOT excreted in urine

DIRECT HYPERBILIRUBINEMIA

- >50% serum bili being Direct
- Seen in:
  - Extrahepatic obstruction
  - Decr. Intrahepatic excretion of bili
    - Dubin-Johnson
    - Rotor

ALKALINE PHOPHATASE

- Located on external surface of bile canalicular membrane
- Suggests cholestasis
  - Increase is due to incr. synthesis, NOT impaired bile excretion
- Also found in bone, placenta, kidney, intestine, WBCs
  - Incr'd in pregnancy (placenta)
  - Intestinal type incr. in CRF, DM, liver dz, blood type O and B, ABH red cell antigen

LABS ARE GREAT, BUT…

RULE # 1: DO A GOOD H+P

GENERAL APPROACH TO EVALUATION

- **A good history is critical:**
  - **ROS: fatigue, N, V, F/C, wt. loss, malaise, anorexia**
  - **FHx**
  - **Medications (Rx and OTC)**
  - **Alcohol use**
  - **Illicit drug use**
  - **Sexual and menstrual hx**
  - **Work hx**
  - **Travel hx**
  - **Past surgery**
  - **Viral hep risk factors (IV/INDA, tattoo, piercing, trf's)**

GENERAL APPROACH TO EVALUATION

- **PE/Stigmata of liver dz:**
  - **Spider angiomata**
  - **Palmar erythema**
  - **Gynecomastia**
  - **Caput medusa**
  - **Dupuytren's contractures**
  - **Parotid enlargement**
  - **Testicular atrophy**

RULE #2: HAVE **ALL** THE LABS

GENERAL APPROACH TO EVALUATION

- **The following complete panel should be obtained routinely to eval. a liver dz:**
  - **AST**
  - **ALT**
  - **Alkaline Phosphatase**
  - **Total AND Direct Bilirubin**
  - **Total Protein**
  - **Albumin**
  - **Protime/INR !!!!**

GENERAL APPROACH TO EVALUATION

- A single test is rarely useful
  - Consider non-hepatic causes in this case
- Multiple LFT abnormalities have high sens.and specif. for liver dz
- Patterns/trends are important:
  - So have ALL the labs EVER

RULE #3: FIGURE OUT THE PATTERN

GENERAL APPROACH TO EVALUATION

- Next, differentiate further:
  - Hepatocellular (AST, ALT)
    - Acute
    - Chronic
  - Cholestatic (Alk Phos, Bili)
    - Intrahepatic
    - Extrahepatic

ACUTE HEPATOCELLULAR INJURY

- Think:
  - **Drug / toxin**
  - **Virus**
  - Ischemia
  - Trauma
  - Autoimmune Hepatitis
  - Wilson's disease

CHRONIC HEPATOCELLULAR INJURY

- Think:
  - Virus
  - NASH
  - Autoimmune Hepatitis
  - Wilson's disease (hemolysis, decr. uric acid)
  - Hemochromatosis
  - α_1-antitrypsin deficiency
  - +/- drug

TRANSAMINASE PATTERNS

- Rise 1 month after starting drug, think drug
- Rapid high rise with rapid fall, think ischemia
- AST, ALT > 300, NOT alcohol-related
  - If 2:1 ratio preserved, think EtOH + Tylenol
    - (Ex. AST = 2000, ALT = 800)

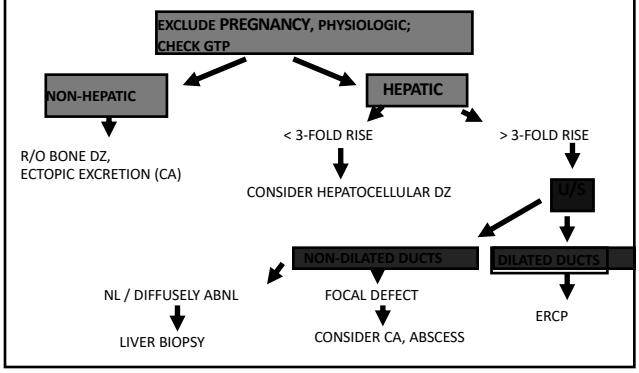
TRANSAMINASE PATTERNS

- Historically, AST and ALT elevations <300 had "little diagnostic benefit", and pursuing further w/u was controversial.
- Most common finding on LBx in asx-matic pt with moderate elevations = steatosis.
- 2 dz's necessitated change in thinking:
  - Chronic hepatitis C
  - NASH

CHOLESTASIS

- No lab/sign/sx is pathognomonic for intra- vs. extra-hepatic dz. NEED IMAGING
- Bili >> Alk Phos suggests intrahepatic
- Suggestive of extrahepatic cause:
  - H/O biliary tree surgery
  - Abdominal pain
  - Wt loss
  - Palpable gall bladder or abdominal mass
  - Fever
  - Incr. amylase

WORK-UP OF ELEVATED ALKALINE PHOSPHATASE



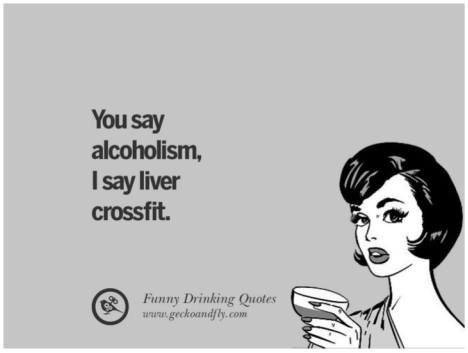
SAMPLE CASES

- A 72 yo man with no prior h/o liver disease was found down in the field, found pulseless, and received CPR. He was resuscitated, brought to your ER, and is on 2 pressors. Initial labs reveal AST 2800, ALT 1200. The next day, AST 1000, ALT 800. Ultrasound is normal.
- ?Dx

- A 24yo female presents to your office c/o 3 weeks crampy lower abdominal pain. She has multiple tattoos, mild chronic constipation, no other health issues. No fatigue. CMP includes: AST 15, ALT 18, Tbil 0.8, Alk Phos 240.
- ? How do we start to assess her lab abnormalities

- A 55 yo male presents for first visit with you, for routine check up. No complaints. H/O hyperglycemia, hyperlipidemia, HTN. Takes metformin, lipitor, amlodipine. Drinks 3 drinks per week. Used cocaine briefly in college. Married 25 yrs. FH of diabetes, no liver dz. Normal exam. Labs include AST 44, ALT 52, Tbil 1, alk phos 80, INR 1, CBC nl (plt 255). Labs 2 yrs ago included AST 46, ALT 55.
- ? How do you think this through
- ? DDx

- A 52yo white female presents c/o several months generalized mild but persistent fatigue. No significant PMH,PSH, no meds. FHx of thyroid dz. PEx normal, tho some mild excoriations on her arms and shoulders; she admits to some itchiness. CBC, BMP nl. AST 22, ALT 24, Tbil 1.2, alk phos 266. Liver u/s is normal.
- ?DDX, ? First tests



THANK YOU