VIRAL HEPATITIS

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Hepatitis
Diagnose based on LFT result
Example 1
Example 2
- Albumin 36
- Bilirubin 14
- ALT 140
- Alk Phos 105
- Mild hepatitis

- Albumin 30
- Bilirubin 63
- ALT 1400
- Alk Phos 360
- Severe hepatitis

An inflammatory condition of the liver leading to degeneration/ destruction of liver cells

Liver Functions
- Synthesis
- Glucose regulation
- Storage
- Excretion and detoxification

Liver Functions - Excretion
- Excretion
- Bilirubin
- Bile acids
- Ammonia
- Cholesterol
- Hormones

Liver Function test - BLOOD test
- Total proteins
- Albumin
- Bilirubin
- Alkaline Phosphatase
- Alanine transaminase (ALT or SGPT)
- Aspartate transaminase (AST or SGOT)
During Hepatitis, ALT and AST will rise...

ALT (OR SGPT)

- Normal Liver Cell
- Liver Cell with Hepatitis

Causes of Hepatitis

- Many causes, including:
  - Viruses
  - Drugs
  - Alcohol
  - Auto-immune

How do we diagnose hepatitis?
Do a liver function test (LFT)

What happens to blood tests in hepatitis?

- Liver cell damage (Immediate)
  - ALT levels rise
  - AST levels rise

- If significant number of liver cells damaged
  - Bilirubin (yellow toxin) levels rise

- If liver decompensates / failure occurs (over time)
  - Albumin levels fall
  - Prothrombin (PT) time increases
  - Glucose levels drop

What is Viral Hepatitis?

- Hepatitis due to Virus infection

Types of Viral Hepatitis?

There are at least 6 types of viral hepatitis specific to Liver:
Hepatitis A, B, C, D, E, G.

Hepatitis due to non-liver specific viruses:
- Dengue
- Leptospirosis

Hepatitis | How Do You Get It?
--- | ---
A | Oral via contaminated food or water
B | Blood/body fluids & mother-to-child
C | Blood/body fluids & mother-to-child
D | Blood/body fluids (only found with hepatitis B virus)
E | Oral via contaminated water
G | Blood

A - SE Food handling - acute
B C D - all liver
G
HEPATITIS B

HBV disease burden
- Diverse and variable spectrum of natural history and chronic disease

Liver stays normal for many years

Normal 60%

Chronic HBV infection 40%

Cirrhosis

Cirrhosis/Endo
Cancer

HCC (hepatocellular carcinoma)

Is HBV a serious disease?
- YES
- Why?
- Main complications
  - Cirrhosis
  - End stage liver disease
  - Cancer

Hepatitis B – Key Statistics
- More than 2 million deaths a year are directly related to hepatitis B infection
- Hepatitis B is 100 times more infectious than the human immunodeficiency virus (HIV)
- 75% cases of Hepatitis B are in Asia
- 1-2 million die each year from HBV infection

Advanced Liver Disease
- Fatigue
- Difficulty thinking clearly or concentrating
- Yellow jaundice
- Swelling
- Fluid in the abdomen
- Gastrointestinal bleeding
- Poor blood clotting
Prevalence (%) of HBsAg in Asia:
- China: 12%
- Japan: 2%
- Korea: 12%
- Taiwan: 15%
- Hong Kong: 12%
- Philippines: 10%
- India: 4%
- Malaysia: 5%
- Indonesia: 10%
- Myanmar: 16%
- Thailand: 7%

How do patients present?
- No signs or symptoms
  - Went for blood test/donation and found to be positive
  - Maybe I am overworked
  - Over stressed

Vague symptoms & signs:
- Lethargy
- Nausea
- Fever
- Tea-like color urine
- Yellowing of the skin and eyes
- Loss of appetite

Who can get Hepatitis B:
- Transfused and transplant recipients
- Individuals with multiple sexual partners
- Intravenous drug users
- Healthcare workers
- Prisoners and other institutionalized people

Tests to order:
- Liver function test
- HBsAg and anti-HBs
- HBeAg and Hbc
- HBV DNA
- Ultrasound abdomen
- Alpha fetoprotein
- If drug addict should test for co-infection for HCV and HIV

Natural History of Chronic HBV Infection:
- Acute infection
  - Chronic Hepatitis
  - Cirrhosis
  - Liver Cancer
- Resolution
- Stabilisation
- Compensated Cirrhosis
- Decompensated Cirrhosis (Death)

Adapted from Pathak, V. (2014)
TREATMENT OPTIONS AVAILABLE

- Lamivudine
- Pegylated Interferon-sometimes used
- Entecavir (BARA CLUDE)
- Tenofovir (TENVIR)

Vacination

- Prepared from non-infectious outer surface of virus HBsAg.
- Plasma derived and recombinant equally effective.
- Dose 10-20µg (1 ml) IM at 0, 1 and 6 months.
- Sufficient to respond in 90% healthy individuals.
- Anti-HBs measured 1-3 months after last dose.
- Non responders - peak anti-HBs < 10 IU/l and lack protection.
- Low responders - peak anti-HBs level of 10-100 IU/l and lack detectable antibodies in 5 to 7 years. Respond to further booster of double dose (20µg).
- Good responders - peak anti-HBs > 100 IU/l and have long-lasting immunity.
- Poor responders - immunocompromised. HBV. Give 20 µg doses.
- 5-10% of normal persons have absent or poor response. May respond to second doses of vaccination.

IF YOU ARE A HEPATITIS B CARRIER:

- Do not donate blood, organs.
- Do not share toothbrushes, nail-clippers, and shaving equipment.
- Separate utensils NOT necessary.
- Healthy normal diet, regular exercise.

points to ponder ...

- Person(s) who has previously been infected with HBV is immune to reinfection and do not require Post Exposure Prophylaxis.
- A responder is a person with adequate levels of serum antibody to HBsAg (i.e., anti-HBs >10mIU/mL).
- A non-responder is a person with inadequate response to vaccination (i.e., serum anti-HBs <10mIU/mL).

Vaccination Against Hepatitis B Cannot Protect You Against Hepatitis A

Hepatitis C

- Identified in 1989
- Blood test became available in 1992
- Used to be known as "non-A, non-B" hepatitis
- Spread through blood-to-blood contact
- No vaccine available to prevent hepatitis C.
How Do People Become Infected With Hepatitis C?

**High Risk:**
- Blood products
- Blood transfusions before 1992
- Other blood products before 1987
- Current transfusions no longer a major risk factor
- Injection (IV) drug use — 60% of all new infections

**How Do People Become Infected With Hepatitis C?**

**Lower Risk:**
- Snorting cocaine or other drugs
- Occupational exposure
- Body piercing & acupuncture with unsterilized needle
- Tattooing

**Hepatitis C is NOT Spread By:**
- Sneezing
- Coughing
- Food or water
- Sharing drinking glasses or eating utensils
- Handsheaks
- Holding hands
- Hugging
- Kissing on the cheek
- Playing with children

**Hepatitis C**
- Estimated prevalence worldwide: 22-90 million (0.5-2%)
- Average sero-prevalence of anti-HCV in Asia: 1% in healthy adults
- 80% will develop chronic infection
- 20% progress to cirrhosis over 10-20 year period
- 1-5% develop HCC over 10-20 year period
- HCC invariably follows cirrhosis

**Hepatitis C**
- 2nd most common cause for end stage liver disease in USA (what is 1st?)
- Blood-borne illness
- Usually persists to chronic state
- No vaccine currently available
**HCV Has Broad Global Prevalence**

- Low risk: 0-1%
- Moderate risk: 2-5%
- High risk: 5-15%
- Very high risk: >15%

**How do I know that I am infected?**

- **No symptoms in most patients**
- **Acute symptoms:** jaundice, fever, muscular aches, dark urine, nausea
- **Chronic symptoms:** Fatigue, muscle wasting, fluid retention, abdominal pain, weight loss

**How is Hepatitis C Diagnosed?**

- Blood testing
  1. Hepatitis C antibody test
  2. Hepatitis C PCR test to find virus in blood
  3. HCV Genotype
- Liver function tests
  - US abdomen
  - Alpha fetoprotein

- 18 year old drug addict
  - JAundice
  - Albumin 43
  - Bilirubin 199
  - Alkaline phosphatase 119
  - AST 900
  - ALT 3000
  - Anti HCV Ab reactive
  - HCV RNA detected

**What is Your Hepatitis C Genotype?**

8 different genotypes of hepatitis C

- Genotype 1:
  - Most common in U.S.
- Genotypes 3:
  - Most common in Malaysia

**Hepatitis C Virus**

*Genotypes in the USA*

- Type 1: 72%
- Type 2: 17%
- Type 3: 10%
- All others: 1%
**Goals of Treatment**

- Clear all the hepatitis C virus from the body ("sustained response")
- Slow or stop damage to the liver
- Help decrease symptoms

**Treatment of HCV**

- Two regimens approved
  - Combination therapy: Peg-interferon + ribavirin
  - Directly acting Antivirals (DAA) – Best treatment

**What Happens to People With Hepatitis C Virus?**

- Infected With Hepatitis C: 100
  - No Chronic Disease: 15
    - Chronic Disease: 17
      - Cirrhosis: 2
      - Liver Cancer: 1

**Will you recover from Acute Hepatitis C?**

- Only 15% will recover after 6 months
- 85% will have their infections continue without symptoms
- Chronic Hepatitis C and complications

**What About Alcohol?**

Chance Of Getting Cirrhosis

- Non-Drinker
- Hepatitis C: Non-Drinker
- Drinker Without Hepatitis C
- Drinker With Hepatitis C
Interferon (IFN)
- Given subcutaneously, self-administered
- Pegylated IFN once a week injection
- Treatment can be 6 months to 1 year
- Interferon – side effects, need a fridge

Ribavirin
- Daily oral tablets, causes anemia

Does Treatment Work?
- Interferon alone:
  - 10 – 15% chance of clearing the virus from the blood
- Interferon & ribavirin:
  - Up to 40% chance of clearing the virus
- Pegylated interferon alone:
  - About the same as interferon & ribavirin 40%
- Pegylated interferon & ribavirin:
  - Up to 50% chance of clearing the virus

Side Effects of Interferon & Ribavirin
Common Side Effects:
- Flu-like symptoms
  - Headache
  - Fatigue
  - Muscle & joint aches
  - Fever, chills
- Psychiatric symptoms
  - Depression
  - Difficulty sleeping
  - Difficulty concentrating
  - Irritability

New DAA therapy (Direct acting antivirals)
- Best therapy
- Oral once or twice per day
- 2-3 types of tablets
- Minimal side effects
- 3 months course
- No need to check blood
- RM $180,000 last year

HCV Life Cycle and DAA Targets
- Adapted from Manaari MM et al. Hepatotheg Blog Featru; 2017
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Liver Transplant
- May be needed for patients who develop liver failure or liver cancer
- About 50% of all U.S. liver transplants result from liver damage caused by hepatitis C
- *Most patients with hepatitis C will never need a liver transplant*

Needlestick Injury and HCV
- Immediately test blood for patient for anti-HCV Ab (and HCV RNA - cost/availability)
- HCV - test for anti HCV Ab
- After 10-14 days consider testing for HCV RNA
- Treatment with interferon may achieve up to 90% eradication if early, now oral drugs (DAA) even better

What About Vitamins and Herbs?
- Iron supplements not recommended
  - They may increase the rate of liver scarring
- Milk thistle is safe, BUT not shown to improve liver disease
- Talk with your medical care provider before starting any new medication or supplement

To recap we briefly talked about
- Liver basics
- HBV
- HCV

Thank You