

## OUTLINE OF PRESENTATION OF HEPATITIS B IN PERSONS WITH DEVELOPMENTAL AND INTELLECTUAL DISABILITIES

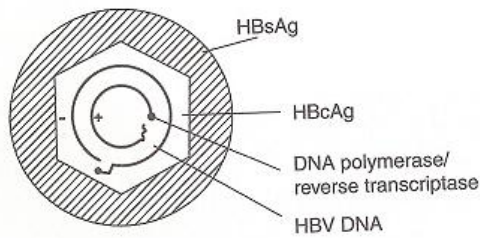
Clyde E Rapp Jr.MD

Many illnesses, including viral respiratory infections, produce changes in liver enzymes. You will frequently find these enzymes slightly elevated when searching for something else in a person with intellectual or developmental disabilities, only to have the enzymes return to normal. Many of the diseases are easily spread through an institutionalized population, however, and many can be cured or improved. Of course, persons with Down syndrome are more susceptible to hepatitis B, and persons in the carrier state may have contracted hepatitis B (probably when they were young). The carrier state, which is more infectious than HIV, comes to a halt in some patients, but to not a complete halt. You need to understand its genesis and how to recognize it. Evaluation of LFTS is a frequent necessity in this group.

I. This presentation will cover the following information about hepatitis B:

- Etiology and pathophysiology
- Definition of terms (antigens and antibodies)
- History of discovery of virus
- Epidemiology
- Signs and symptoms
- Diagnosis
- Differential diagnosis
- Associated conditions (e.g., arthritis)
- Sequelae (e.g., hepatic cell carcinoma)
- Prevention of spread
- Vaccine
- Treatment of spread to staff and patient
- Treatment of primary hepatitis B hepatic carcinoma
- Congenital conditions that include hepatic involvement in adolescents and adults (e.g., tuberous sclerosis and Smith–Lemli-Opitz syndrome) if time allows
- Discussion of clinical scenarios

II) Clinical scenarios(I)



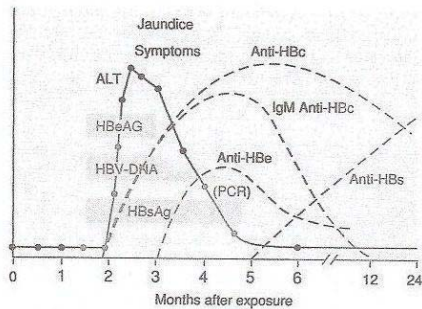
### III) Etiology

#### a) Viral structure

**HBsAg-surface antigen, HBcAg –antigen produced by core of virus and indicates current or past infection. DNA polymerase helps polymerize DNA and begin the infectious process, reverse transcriptase helps transfer information to viral DNA), HBV DNA count indicates sign of infection or degree of propensity to spread(this is usually less than  $10^5$  power in the carrier state.)**

(From Blumberg, Baruch S. The hunt for the killer virus: Hepatitis B. Princeton University Press, 2002 with permission)

#### b.) Time course of serological markers in acute hepatitis B



(From Semin. Liver Disease 11: 1991; 83-93. With permission as with other figures).

### III) History of Discovery of Virus

#### a.) Discovery of Australia antigen and association with hepatitis B by Baruch Blumberg

b.) Separation of long term incubation (serum or hepatitis B) from short term (infectious or hepatitis A) through experiments on human intellectually disabled volunteers(?) by Dr Sol Krugman at Willowbrook School.

#### IV) Epidemiology

a.) In the world in general, the prevalence varies from 8-20% in China, Asia and Africa to 2% in North America and Europe (from Alter HJ et. Al., Ann Intern Med 1972;77(5);691-699.)

b.) Perinatal transmission is responsible for transmission in most of above cases but blood and semen is responsible in others, including the intellectually disabled (often it is forgotten that the carrier state is infection). Perinatal transmission is not a major factor in hepatitis B in the intellectually disabled.

c.) Down syndrome patients have a higher prevalence of hepatitis B and a lower response to vaccine due to immunological factors

d.) In the institutionalized intellectually disabled, the infection depends on age and duration of residence as well as the presence of Down syndrome. The prevalence in patients with Down syndrome varied from 8.3% to 53.8% and 4.2% to 13.5% in patients with other intellectual disabilities based on 27 studies from North and South America and Western Europe. (from The Journal of Intellectual Disability Research 1999;43(6); 1365-2788).

#### V) Signs and symptoms

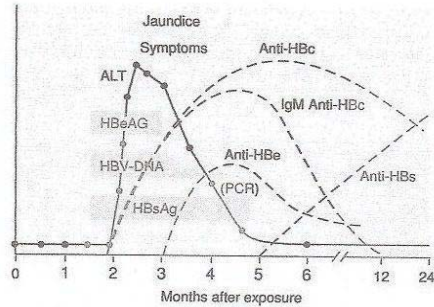
a.) The incubation period of acute hepatitis B is usually but not always 1-4 months. During this period the patient may experience serum sickness like symptoms, (arthritis, rash, glomerulonephritis).

b.) After the conclusion of this period, the patient experiences a period of prodromal symptoms (fatigue, etc) for one to two weeks. Alterations in taste and smell may accompany the fatigue (I had a patient who lost his taste for hoagies which was almost as depressing to him as the fact that he had hepatitis). After the end of this period, he developed jaundice which persisted for four months and then the hepatitis resolved and the hoagies returned.

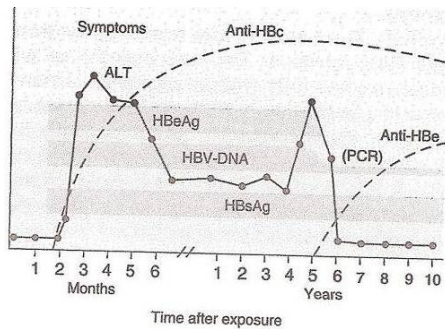
c.) On physical exam, the patient has a soft and normally sized liver which is slightly tender liver after the above prodromal period. Mild palmar erythema, and spider nevi are rarely present. May present as fulminant hepatitis where the liver essentially entirely necrosed so only cure is transplant or it may present as anicteric hepatitis.

#### VI) Diagnosis

a.) Serologic changes in acute hepatitis B



b) Serologic changes in chronic hepatitis B



c) Discussion of serological changes

HBsAg-indicates acute or chronic hepatitis B (acute becomes chronic hepatitis B in 6 months) There are very rare cases of disappearance.

HBsAb-indicates immunity to hepatitis B (lifelong)

Combination of positive HBsAg and positive HBsAb means an antibody to a spurious protein and immunity in most cases

HBeAg-indicates high levels of infectivity {but can be absent in chronic hepatitis B}

High levels of hepatitis B DNA mean acute or chronic hepatitis B (lower levels can be found in carrier state-  $<10^5$  power).

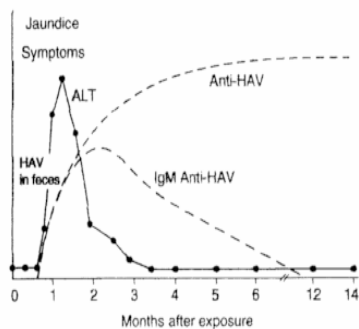
The inactive carrier state consists of a positive HBsAg, a negative HBsAb, a negative HBeAg and usually a very low level of HBV DNA-THIS IS THE TYPE OF PATTERN USUALLY SEEN IN THE INTELLECTUALLY DISABLED. Conversion to chronic hepatitis by carriers is extremely rare

Alanine aminotransferase levels are the result of hepatocyte infection and this must always be kept in mind-they vary with time with chronic infection .If the patient has been Ag positive with normal enzymes for several years and the enzymes continue to be WNL then one need not worry(especially if he or she has been well). New patients where the history is not known and the Au antigen is positive should have enzyme and serologic tests three times during the first year because of the variation in enzyme levels before they are classified as acute or chronic hepatitis or as carriers. HBcAb is always positive in acute, resolving,or chronic hepatitis or the carrier state.

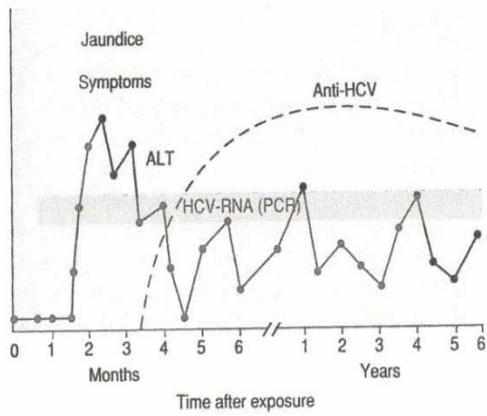
## VII) Differential Diagnosis

### Alphabet hepatitis

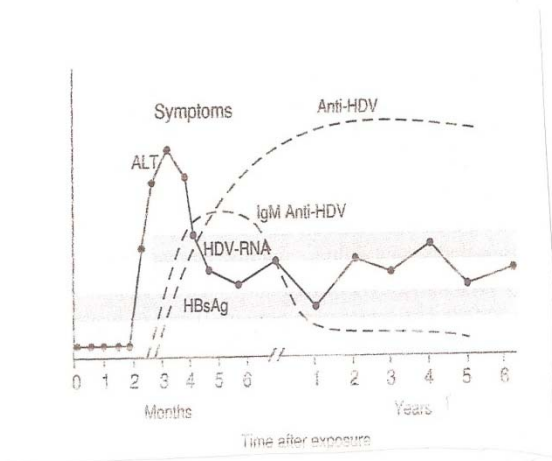
#### a.) Serologic changes in hepatitis A



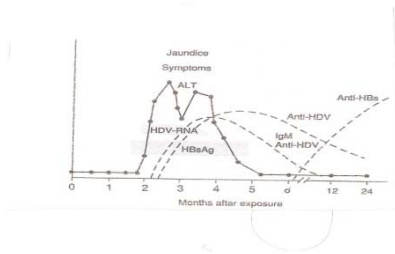
#### b) Serologic changes in hepatitis C



c) Serologic changes ihepatitis D



c) Hepatitis D(superinfection)



#### **d) Hepatitis E**

#### **e) Other diagnostic considerations**

**Wilson's Disease**

**Alpha 1 antitrypsin disease**

**Gall bladder disease (more common in Down syndrome and Williams syndrome)**

**Alcoholic liver disease**

**Metastatic lesions of the liver**

**Liver toxicity due to medications (consider anticonvulsants)**

**Biliary cirrhosis**

**Autoimmune liver disease**

**Fatty liver**

**Scerosing cholangitis**

**Cirrhosis from causes other alcohol**

**V.iral and bacterial infections and sepsis(including mononucleosis without pharyngitis)**

**Carinoma of the head of the pancreas**

**Hepatic carcinoma**

**Elevated alanine transaminase in coeliac disease (more common in DS, bowel sx may be minimal)**

**Liver dysfunction as a part of the genetic syndrome (e.g tuberous sclerosis)**

**Other infiltrative liver disease(lymphoma, sarcoid and Tbc)**

**(There are many other causes of liver dysfunction –I suggest consulting Schiff's diseases of the liver for more information)**

**f) Laboratory results**

**Laboratory results usually demonstrate an alanine transaminase in the 200-2000 level in acute infectious hepatitis (usually they are at the lower limit of this range). There are very few conditions that demonstrate such dramatic elevations—they include liver toxicity from medications or other toxins, very severe congestive failure, and sepsis. They are considerably lower (and fluctuate) in chronic hepatitis and usually normal in the carrier state. The degree of alkaline phosphatase level is not helpful but a level higher than 3 times normal should provoke suspicion of an obstructive process. Alkaline phosphatase can come from bone, intestine, brain, RBCs and is high in adolescence and the second trimester of pregnancy. Gamma glutamyl transferase levels that are significantly elevated indicate a hepatic origin. Not all patients are visibly jaundiced and even in acute hepatitis, they are rarely higher than 20 mg/dl (the normal range is 0.3-1.1 mg/dl) and usually toward the lower end of the abnormal range and the majority of the bilirubin is in the conjugated form.**

**VIII) More questions**

**IV) Associated conditions—usually before the acute symptoms. These include arthritis, skin rash and glomerulonephritis**

**V) Sequelae—rare in our population**

**A) Hepatic cell carcinoma**

**B) Cirrhosis**

**VI) Treatment—prognosis and efficacy of transplant and chemotherapy in chronic hepatitis B and hepatic cell carcinoma.**

**VII) Prevention of spread to staff and other patients particularly by carriers**

**VIII) Treatment of staff and patients after needle stick injuries, trauma, known sexual contact or eye splashes.**

**IX) Answers to questions**

**IX) The future**

d.) Variations of serological findings which R/O or indicate(or usually indicate) hepatitis B :

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He or she has been well) . New patients where the history is not known should have enzyme and sserology levels every four months for a year if the history is not known.

HBc(IgM) is always positive in acute hepatitis B and HBc(IgG) is always positive whether the patient has late acute, chronic or resolved hepatitis or is a carrier.

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