

MSC Med.Microbiology

HEPATITIS VIRUSES

Hepatitis means inflammation of the liver

Viral hepatitis means there is a specific virus that is causing liver to inflame (swell or become larger than normal)

Medically important hepatitis . (liver)are 5 types :-

1-HAV 2-HBV 3-HCV

4-HDV 5- HEV 6-HGV

A: fecal-oral transmission (Vaccine Preventable) .

B: sexual fluids & blood to blood((parenteral route) (Vaccine Preventable) .

C: blood to blood(parenteral route)

D: travels with B(parenteral route)

E: fecal–oral transmission

Hepatitis A (infectious hepatitis)

BASICS structure :- enterovirus, Naked ,genome SS RNA with Icosahedral nucleocapsid .Replication occurs in the cytoplasm of the cell ,Single serotype

Worldwide distribution. Humans are the only reservoir.

TRANSMISSION

-Fecal-oral ,Contaminated raw seafood- e.g ,Day-care center outbreaks

-Rarely transmitted via blood because the level of viremia is low

Epidemiology

Over 100,000 infections/ year in US Much higher prevalence in 3rd world .Children are the most frequently infected group.

Clinical features

-Incubation period 30 day (2-7 weeks)

-Jaundice is common in adults and rare in young children .

Incubation period is the time elapsed between exposure to a pathogenic organism and when symptoms and signs are first apparent. In a typical infectious disease, incubation period signifies the period taken by the multiplying organism to reach a threshold necessary to produce symptoms in the host

Long-term effects

- There is no chronic (long-term) infection
- Lifelong immunity after infection- i.e no repeats infection

Diagnosis

- Hep A IgM antibody: usually present when symptoms occur
- four fold rise in IgG indicate current infection
- IgG: suggests prior infection (followed by 1-3 wks) or vaccination

Treatment :- Supportive- no antiviral therapy

Prevention

- Hepatitis A vaccine (formalin inactivated) is the best protection
- Two doses(Vaccine dosed at 0, followed by a booster 6-12months) later .
- Protection begins 4 weeks post vaccine .
- Protection probably at least 20 years (likely lifelong)-no need for repeating .
- Twinrix vaccine (for both HAV/HBV).
- Short-term protection against hepatitis A is available from immunoglobulin .It can be given before and within 2 weeks after coming in contact with HAV
- Good hygiene- hand washing, etc

VACCINE RECOMMENDATIONS

- Vaccine is recommended for the following persons 2 years of age and older :
- Travelers to areas with increased rates of hepatitis A
- Men who have sex with men
- Injecting and non-injecting drug users •
- Persons with clotting-factor disorders (e.g. hemophilia)

-Persons with chronic liver disease

-Children living in areas with increased rates of hepatitis A

Hepatitis B (serum hepatitis)

Structure

This virus can be found in the blood of patients who are infected. It consists of a double-layered coat which contains an important glycoprotein called hepatitis B surface antigen (HBsAg), which is often used to detect whether or not a patient has been exposed to the virus. Inside the coat is another glycoprotein called the hepatitis core antigen (HBcAg). There is another antigen from the virus called hepatitis Be antigen (HBeAg) which is used to assess whether a patient has active disease.

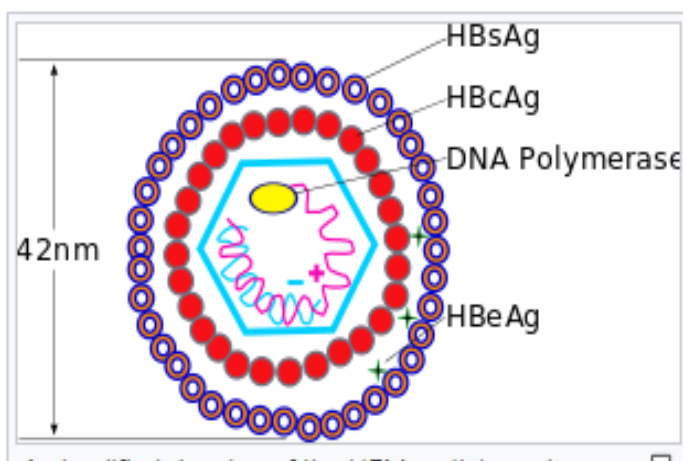
The period taken from inoculation of this virus to the development of symptoms is long and can be up to 8 weeks.

_The majority of patients (over 60%) who contract hepatitis carry it asymptotically and eventually overcome the disease

Even though they may be asymptomatic, HBsAg and HBeAg can be detected in their blood.

_Patients who develop symptoms may become chronic carriers develop cirrhosis or have acute illness and, in a minority of cases, die.

Patients who have hepatitis will release intact hepatitis B into saliva where it could potentially be a source of cross infection. It has been estimated that 0.0001 ml of blood could transmit the disease. The primary route of transmission of hepatitis B is sexual, but blood to blood transmission in unvaccinated persons has a 40% transmission An effective vaccine against this disease is available.



Persons at risk for HBV infection might also be at risk for infection with hepatitis C virus (HCV) or HIV.

I

Signs & symptoms

About 1/3 of persons have no signs or symptoms. Signs and symptoms are less common in children than adults. Chronic infection more common when infected at younger age and more likely in asymptomatic infection. I.P. = 10-12wks

fatigue ,abdominal pain loss of appetite nausea, vomiting joint pain

Long- term effects without vaccination

Chronic infection occurs in:-

-90% of infants infected at birth .

-30 % of children infected at age 1 - 5 years .

-6% of persons infected after age 5 years .

-Death from chronic liver disease occurs in 15-25% of chronically infected persons.

Vaccine recommendations

Hepatitis B vaccine available since 1982.The initial vaccine was prepared by purifying HBsAg associated with the 22-nm particles from healthy HBsAg-positive carriers and treating the particles with virus-inactivating agents.

HBV vaccine is recommended:

1- for all children as part of their regular immunization schedule (Routine vaccination of 10-18 years olds)

2-Vaccination of risk groups of all age.

PASSIVE IMMUNIZATION

Hep B immune globulin (high titer of HBsAb) should be given in addition to vaccine in exposures to known HepB

*infected patients/sources .

**New borne whose mother is HBs Ag +ve

(Give immune globulin preferably within (24 hours of exposure).

HEPATITIS D

Structure

Caused by delta agent- cannot infect without HepB unusual virus(defective virus)

it can't replicate by itself because it dose not have the gene for its envelope protein .

Hepatitis is more severe than those infected by HBV alone

Superinfection: infection of HDV in chronic Hep B. Hepatitis in chronic

carriers of HBV who become superinfected with HDV is much more

severe ,and the incidence of fulminant ,life threatening hepatitis, chronic

hepatitis and liver failure is higher.

DIAGNOSIS :-Detection of either delta Ag or IgM ab to HDV in patient serum.

Hepatitis C

Transmission

Recommendations for testing based on risk for HCV infection Occurs when blood or body fluids from an infected person enters the body of a person who is not infected

Persons at risk for HCV infection might also be at risk for infection with hepatitis B virus (HBV) or HIV.

PERSONS AT RISK OF INFECTION

High

Injecting drug users

Recipients of clotting factors made before 1987

Intermediate

Hemodialysis patients

Recipients of blood and/or solid organs .

People with undiagnosed liver problems .

Infants born to infected mothers

Low

Healthcare/public safety workers (Only after known exposure)

People having sex with multiple partners .

People having sex with an infected steady partner .

EPIDEMIOLOGY

Most infections are due to illegal injection drug use

;Transfusion-associated cases occurred prior to blood donor screening

now occurs in less than one per million transfused unit of blood

PATHOGENESIS

Damage and illness immune mediated

Can lead to HCC (Hepatocellular carcinoma)

Alcoholism is greatly enhances the rate of HCC

SIGNS & SYMPTOMS

I.P.= 8wks

80% of persons have no signs or symptoms. Most symptoms begin to show only when liver is more severely damaged. Those who do may develop :-

jaundice , fatigue , dark urine ,abdominal pain ,loss of appetite ,nausea

Long –Term effects

-Chronic infection: 75-85% of infected persons (is much higher than in HBV infection

-Chronic liver disease: 70% of chronically infected persons .

-Deaths from chronic liver disease: 1-5% .

Treatment

-Interferon and ribavirin are two drugs licensed for the treatment of persons with chronic hepatitis C .

Prevention

- Never share drug equipment ,needles, syringes, water, filter, cooker, pipes etc
- Never share tooth brushes/razors or any personal hygiene articles that have blood on them (even tiny amounts)

Hepatitis C and dentistry

**Saliva 50% of patient with acute or chronic Hepatitis C infection contain HCV •
(3-10%)Needle stick injuries are the most common way.**

Hepatitis E

- Similar to Hep A .
- Fecal-oral transmission .
- Higher mortality in pregnant women .
- No chronicity, no carrier cases. Diagnosis made by excluding HAV and other causes .
- NO antiviral drug, no vaccine .

Hepatitis G

- Member of flavivirus family; as HCV.
- Transmitted by blood &sexual .
- Unlike HCV, not cause acute &chronic hepatitis, or HCC .
- Patient infected with HIV &HGTV have lower mortality rate than those infected with HIV alone, it might interfere with the replication of HIV .

References:

1-Essential microbiology for dentistry 4th edition 2012

2-Oral Microbiology. 5 th edition