

Hepatitis Viruses

Hepatocytes are the primary target of viruses

- Infectious or Cararrhal hepatitis (Type A)

- Acquired by the oral route (enteric), Incubation period 2-6 weeks. It is RNA virus of **picornaviridae**. Diagnosis easy by **serology**. Can not be propagated in usual cell culture. HAV is not a serious virus and has a vaccine

Serum Hepatitis: (Type B)

HBV spread by needle injection, blood transfusion and sexual contact. **Incubation period 2-5 months**. It is a **circular dsDNA virus** some 3.2 Kb in size. The genome is extremely compact has a complex organization with 4 overlapping open reading frames (ORFs). Because of these gene overlaps, the virus genome can code 50% more protein than would be expected from the genome size.

Discovery of RNA associated agent, **Delta virus (HDV) with HBV** called satellite which depends on HBV to synthesize its protein coat.

-Others are spherical or tubular 20-22 nm in diameter. The core of the virus particle is an icosohedral nucleocapsid symmetry. In highly epidemic areas HBV can be acquired by infants during or after birth.

The virus concentration is: high in blood and serum, moderate in sexual organs and saliva and low or undetectable in urine, feces, tears, sweat and milk breast. **There are 8 genotypes (A-H)** in the world:

Type A in Europe and Africa, B and C in Asia, D in the Mediterranean, E in Africa, F in south America, G in France and USA and H in Central America and India.

Laboratory diagnosis of HBV:

1 - The first test is for surface antigen. This Is normally done by ELISA.

For rapid cases, it can be done by reverse passive haemagglutination in which commercially available erythrocytes coated with anti-HBsAg which takes 20 minutes.

- 2- Latex slide test based on the same principle can be read in 5 minutes.
- 3- Test of viral DNA and DNA polymerase as a measure of virus replication.
- 4- Electron microscopy to test quickly both for HBsAg and infective Dane particles.
- 5- Using real time PCR to confirm virus genome

Hepatitis C Virus (HCV)

Hepatitis C is an inflammation of the liver caused by the hepatitis C virus. The virus can cause both acute and chronic hepatitis, ranging in severity from a mild illness to a serious, lifelong illness including liver cirrhosis and cancer

Hepatitis C Virus Transmission

Transmission means virus transfer from infected person (positive carrier) to a healthy person by certain means. **Parenteral (Injection)** exposure to the hepatitis C virus is the most efficient means of transmission.

The following possible routes of infection (starting with the highest risk):

- Injection drug use
- Blood transfusion
- Sex with an intravenous drug user
- Having been in jail more than three days
- Religious scarification
- Having been struck or cut with a bloody object
- Pierced ears or body parts

Immunoglobulin injection

Chronic Hepatitis progression

Chronic HCV progression may differ due to several factors such as the following:

- Age and gender: More rapid progression is seen in males older than 40-55 years, while a less rapid progression is seen in children.
- Ethnic background: A slower progression has been noted in African-Americans.

- HCV-specific cellular immune response: Genetic determinants like human leukocyte antigen (HLA).
- Alcohol intake: Even moderate amounts of alcohol increase HCV replication, enhance the progression of chronic HCV, and accelerate liver injury.
- Daily use of marijuana (kind of smoking drug): may cause a more rapid progression.

HCV Symptoms Types:

Acute Symptoms: Symptoms include malaise, nausea, and Right upper quadrant pain. In patients who experience such symptoms, the illness typically lasts for 2-12 weeks. Along with clinical resolution of symptoms. Sudden **hepatic failure** due to acute HCV infection may happen in patients with underlying chronic hepatitis B virus infection

Chronic Hepatitis: The risk of chronic HCV infection is high.

Patients with chronic infection are asymptomatic or have only mild nonspecific symptoms since cirrhosis is not present. The most frequent complaint is fatigue. **Less common manifestations** are nausea, weakness, myalgia, arthralgia, and weight loss

Viral coinfection:

HCV progression is more rapid in HIV-infected patients. Acute hepatitis B in a patient with chronic hepatitis C may be more severe. Liver damage is usually worse and progression faster in patients with dual HBV/HCV infections