

## Hepatitis: Crisis of People

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### ABSTRACT

Hepatitis is a viral infection which can lead to the inflammation of liver. The injury is occurred to the liver due to the inflammation of hepatic cells. The auto immune hepatitis occurred when the body makes antibodies against its own hepatocytes (or) liver cells. Hepatitis is an inflammation that can be shelf limited or can progress to fibrosis, liver cancer, and cirrhosis. The hepatitis word comes from the ancient Greek, it means, heap-liver cities: inflammation the first hepatitis discussed in 1963 when Dr Baruch Blumberg discovered an antigen that detected in blood samples. HAV severity is increased with the age; this is lead to outbreaks of HAV. HAV vaccination was developed in 1990s; it is thermo-stable and acid resistant. All viruses are classified according to their virion properties like morphology, physiochemical properties and physical properties, genome, lipids, proteins, carbohydrates, genome organization and replication. HBV is a global health problem that can lead to the liver cirrhosis and hepatocellular carcinoma. The majority of liver transplantations occurred due to the HCV infection. The pathophysiology is not completely understood, the virus is reached to the liver but exact mechanism not known, the HVE replicated in Gastro-intestinal tract it before enter to the liver. The study was mainly done because of the common people have lakh of knowledge on about hepatitis, they are suffered a lot due to this disease by doing this type of reviews reveals that how the common peoples are suffered, how to improve health information and communication to people in health care system. Health care team and system improve the information provided to people regarding the current issues of diseases, treatments and preventing measures based on this type of reviews.

**Keywords:** Liver, Hepatitis, Hepatocellular Carcinoma, Pathophysiology

### INTRODUCTION

“Hepatitis” means inflammation of the liver. The liver is a vital organ that processes nutrients, filters the blood, and fights infections. When the liver is inflamed or damaged, its function can be affected. Heavy alcohol use, toxins, some medications, and certain medical conditions can cause hepatitis. However, hepatitis is most often caused by a virus. In the United States, the most common types of viral hepatitis are Hepatitis A, Hepatitis B, and Hepatitis C (www.cdc.gov, Jules).

### BACKGROUND / HISTORY

Hepatitis, a general term referring to inflammation of the liver, may result from various causes, both infectious (ie, viral, bacterial, fungal, and parasitic organisms) and non-infectious (eg, alcohol, drugs, autoimmune diseases, and metabolic diseases); this article focuses on viral hepatitis, which accounts for more than 50% of cases of acute hepatitis in the

United States, primarily in the emergency department setting. (emedicine.medscape.com)

### TYPES OF HEPATITIS

The hepatitis was classified into various types depending upon the viruses, they are hepatitis A, hepatitis B, hepatitis C, hepatitis D& hepatitis E.

The hepatitis was isolated by Dur cell in 1973. HAV is one of the more common causes of acute hepatitis. (Goldberg et al,2016).

Approximately 90% of HAV in children below the age of 6 yrs are asymptomatic and above the age of 6yrs to adulthood will show symptoms appx 75% (Franco E *et al*,2012). Hepatitis B infection is caused by the hepatitis b virus will affects the liver the infection of time period is very short is called acute hepatitis, in some causes time period is prolonged is called chronic hepatitis B. HBV was first discovered in 1976 by the Dr Blumberg. HBV infection is the major

problem in present situation in worldwide, appx 30% of the world population shows the infection based on serological evidence current and past infection (Trépo C, 2014). HBV is a global health problem that can lead to the liver cirrhosis and hepatocellular carcinoma (Tang CM *et al*, 2014). HBV is generally divided into four phases depending upon natural history of HBV. They are tolerant, reactive phase, inactive carrier stage immune clearance phase (Chan Ran You, 2014). Hepatitis C is a major cause for chronic liver disease, it is further classified into acute and chronic hepatitis (Blanca san, 2016). In chronic HCV which can lead to the liver cirrhosis and hepatocellular carcinoma. The majority of liver transplantations occurred due to the HCV infection (Zhang, 2016). The acute HBV are asymptomatic which can lead to the liver failure rarely (Vinay sundaram, 2015). Hepatitis D Virus (HDV) is smallest virus which is infected to humans then leads to increasing the cause of fulminant hepatitis (Abbas Z, 2013). HDV is present in underneath of the outer HBS Ag layer & it is tightly associated with HDV RNA genome (Seyed Mohammad).

HBV is a satellite RNA virus dependent on HBV surface antigens which assemble to envelope and form new viral and propagate infection (Corolina alves, 2013).

Hepatitis delta virus was first discovered by Mario Rizzuto in 1977 Turin Italy (Nouredine, 2014).

Hepatitis is a viral infection traditionally it has been considered as acute, water borne disease and it is similar to hepatitis A (Arvind, 2015). The one of the causes of the HEV is sporadic and epidemic viral hepatitis worldwide the infection mainly spreads through faecal oral route (Vasickova 2007). HEV is single-standard RNA and nonenveloped virus (Hoofnagle, 2012).

HBV similar features to retrovirus, it is small DNA virus with prototype virus of hepadanaviridae family. In infectious serum three types of viral particles are visualized with the help of electron microscope in that two viral particles are smaller spherical in structures with the diameter about 20nm and its filaments are variable width of 22nm (Jake Liang, 2009).

Hepatitis D Virus (HDV) is smallest virus which is infected to humans then leads to increasing the cause of fulminant hepatitis (Jennifer, 2001). The shape of HDV is spherical and about size is 36nm, with satellite virus, circular RNA of negative polarity of helper function to propagate (Dastgerdi, 2012). HDV is a small single standard RNA genome of 1679 nucleotides (Severin Gudima, 2002) (Praveen k Roy).

### VIROLOGIC CLASSIFICATION

All viruses are classified according to their virion properties like morphology, physiochemical properties and physical properties, genome, lipids, proteins, carbohydrates, genome organisation and replication. In addition to that viral particles may be envelope [host cell derived lipid enveloped] or non-enveloped.

There are five major types of hepatitis viruses they are given above

Viruses	Classification	Transmission or spread	Genome	Envelope
Hepatitis A	Picornaviridae	Faecal-oral	RNA	Non -envelope
Hepatitis B	Hepadnaviridae	Parenteral	DNA	Lipid envelope
Hepatitis C	Flavivirid	Parenteral	RNA	Lipid envelope
Hepatitis D	Unclassified	Parenteral	RNA	Lipid envelope
Hepatitis E	Caliciviral	Faecal oral	RNA	Non -envelope

### ETIOLOGY

- \*Poor sanitation
- \*Lack of safe water
- \*Use of recreational drugs
- \*Living in a household with infected person (C. Hang, 2012).

- \*Men and women who are have multiple sex partners
- \*Men who have sex with men
- \*Sexual transmitted disease
- \*Infected mother to infants
- \*Close physical contact with infected persons

- \*Men/women who have participated sex with the infected person
- \*Sexual contact with infected persons
- \*Blood transfusions
- \*Organ transplantations
- \*Have gotten tattoos with non-sterile tools
- \*Peoples infected with HIV ( Chou R,2012).

HDV is replicated by the help of HDV, it is single standard RNV with delta antigen.

HDV is also referred as incomplete virus ([www.doh.wa.gov](http://www.doh.wa.gov)). The causative organism of HEV is hepatitis E virus, is a non-enveloped sphere of about 27 to 34nm in diameter (James,2001).

### EPIDEMIOLOGY AND PREVALENCE

Hepatitis E annually 2 million cases are occurred in India based on estimated or statistical data 60% of sporadic hepatitis in India ([www.gideononline.com](http://www.gideononline.com)). The worldwide hepatitis A virus (HAV) clinical cases are occurred approx. 1.5 million but the rate of infection as much as increases 10 times greater than cases reported. The HAV is depends upon the socioeconomic status because has income is increases the quality of drinking water is increases when the income is decreased the quality of water is decreases.

HAV is depends on sanitation, age dependent factor, in developed countries HAV infection rate is very low due to the hygiene and sanitation conditions maintained in children. The children are more prone to this infection, in developing countries due to the lack of hygiene and sanitation conditions (Franco E et al, 2012; Arvind,2015). HBV infection symptoms in adults are majorly asymptomatic in fulminant liver failure in adults 30% will present with jaundice and hepatitis is 0.1-0.5% In acute hepatitis candidates, we can do serological test can detect hepatitis B surface antigen and hepatitis B antigen (James,2001).

### CLINICAL MANIFESTATIONS

various types of hepatitis and their incubation period and clinical presentations were given in below table

Type	Clinical presentation
<b>HAV</b> [2-4weeks]	symptoms include mild to severe it includes dark coloured urine and jaundice, loss of appetite, abdominal pain, diarrhoea, fever malaise.
<b>HBV</b>	Hepatocellular carcinoma, Liver cirrhosis, Fatigability, Anorexia, Nausea Myalgia, Vomiting Patient with fulminant and sub fulminant hepatitis shows following Mental confusion, coma, ascites, hepatic encephalopathy. Characteristic complications and

In globally 350,000 deaths are occurred per annually due to the HCV infection, one of the most common cause of liver cirrhosis is HCV infection. Based on estimated statistical data one third of those with HCV infection will go developed the liver cirrhosis (Shaina,2016). In global wide estimated prevalence HCV infection is about 13000000 HCV positive persons in worldwide (Jake Liang,2009). Hepatitis delta virus (HDV) routes of transmission is similar to that hepatitis B five no of 5% of HBV antigen carrying to effect of HDV around 15-20 million people around worldwide (Sultanik,2016). Based on statistical data appx 15 million people are infected with HDV are HBV ([www.who.int](http://www.who.int)). HDV is more common in children; in under developed countries mostly children are effected with HDV (<https://emedicine.medscape.com>).

### PATHOLOGY & PATHOPHYSIOLOGY

Hepatitis A virus (HAV) is a single standard linear RNA with positive sense belongs to the picornaviridae family in humans the viral/virus replication depends upon hepatocytes uptake and synthesis. it is accumulated in the liver cells.

HBV has eight genotypes and four genes its consists of following

- \*Surface antigen for the viral envelope
- \*Pre-core antigens and nucleocapsid core antigen
- \*X-gene
- \*P-gene for DNA POLYMERASE

When the HBV produce the antigen in the blood, then immune system to produce antibodies against antigen to disappear (Hesham M. Elgouhari, 2008).

Hepatitis E is an evolving disease (Sandra Rodriguez, 2012). The pathophysiology is not completely understood, the virus is reached to the liver but exact mechanism not known, the HVE replicated in Gastrointestinal tract it before enter to the liver (Sébastien lhomme,2016).

	symptoms from decompensated liver disease are related to portal HTN and synthetic dysfunction. in these including physical and mental changes like Hepatic encephalopathy, Ascites, Variceal bleeding, Ankle oedema and Paraesthesia's
<b>HCV</b>	Palma erythema Well-wishing of the eyes Liver cirrhosis Mucosa associated lymphoid tissue tumours (MALT) ((Trépo,2014;Vinod k Dhawan). The patients who are suffered with chronic HDV will developed the acute liver disease
<b>HDV</b> [3-7 weeks]	Pre-icteric phase -Nausea &anorexia ,Lethargy, fatigue Icteric phase- Fatigue &nausea persist risks for fulminant hepatitis it is characterised by encephalopathy &deep jaundice. Hepatocarcinomatous. Symptoms-Fatigue ,Dark urine, Joint pain and Abdominal pain (Phusa,2005).
<b>HEV</b>	asymptomatic in acute and sub-acute liver failure, but in symptomatic causes Jaundice, Fever, Joint pain ,muscle and abdominal pain (Kamar,2016).

### DIAGNOSIS;

Hepatitis A virus (HAV) is diagnosed by the detection of HAV-IGM antibodies in the blood and other additional tests include "reverse transcriptase-polymerase chain reaction [PT-PCR] to detect hepatitis A virus RNA (Pallavi,2017). Patient with acute hepatitis showing/following Low grade fever, jaundice, spider nevi with chronic disease including hepatomegaly, splenomegaly, vasculitis.

The laboratory studies include

- \*Aspirate aminotransferase levels
  - \*Alkaline phosphatase level
  - \*Aluminium levels
  - \*Serologic tests
  - \*Total and direct and indirect bilirubin levels in serum (Nikolaos, Medscape.com).
- HCV infection was diagnosed by the following
- \*HCV antibody enzyme immune assay recombinant immunoblots assay
  - \*Quantitative HCV RNA polymerase chain reaction (Thad Wilkins, 2010).
  - \*To detect HDV antigens present in the blood
  - \*To check the liver damage present or absent
  - \*Other tests include liver function tests (www.altiusdirectory.com). Diagnosis is done by two types direct and in direct. In indirect method to detect virus or virus particles or nucleic acid in blood and stool samples by the method of immune electron microscopy RT-Pyrin direct method to detect anti-HEV.LAMP(loop mediated isothermal implication) (Ahmed,2015). Advances in hepatitis E-1

virology pathogenesis and diagnosis (Rakesh Aggarwal ,2011).

### SCREENING

The persons who are having HCV 15-20%experinCESS the spatulous recovery and remaining 75-80% of people are progressed to chronic HCV. There are two types of screening in which one is selective and another one is universal screenings (Shobha,2014).

### TRANSMISSION

- \*HAV is transmitted by the focal oral route
- \*In families, the infected persons prepared the food for others in an unhygienic condition like improper washing/cleaning of the hands
- \*Homosexual transmission
- \*Water out breaks
- \*Sewage contamination
- \*The close physical contact with infected person.

It is mainly remitted through faecal oral route, By the contamination of water and water supplies (Kumar,2013), Hepatitis E virus is also spreads from HEV infected animals, By the blood transfusion but, it is occurred rarely (James,2010).

### RISK OF HEPATITIS

- \*Parenteral drug administrations
- \*People who have multiple sex partners more than two or multiple
- \*Infected persons to spread with close in the house holds (Elgouhari,2008).

## TREATMENT

HAV has there is no particular treatment but it involves supportive care.

To monitoring the fluid balance and prevent the complications like dehydration and exhaustion. The supportive care includes that replenishing nutrition.

**Drug therapy:** When the patient has low level or decreased level serum aminotransferase activity, bilirubin content would be treated with corticosteroids. if corticosteroids are failed in chronic HBV then we go HB immunoglobulin (HBIG)and interferon alpha

### Drugs chart

- Interferon alpha -2a 3MUTIW/IM SC -12
- Interferon alpha 1 9Ug TIW SC -6MONTHS
- In chronic HBV alpha 2b 10million UTIW -4 months.
- In acute HCV infection, if patient have symptoms of fatigue and elevated levels of ALT in that condition to give Alpha-interferon
- In chronic HCV infection, Ribavirin TID according to the patient weight (generally 1000mg is given if the weight less than 75 if more than 75 1200mg)
- INF-ALPHA 2b 3 million units for a week.
- Glucocorticoids are the infective treatment in HDV
- By the experimental trails INF alpha, High doses of INF alpha (9 million units three times a week) for 12 months 58% beneficiary

### Drugs

Lamivudine, adefovir, enterovirus if it is failure then go liver transplantations (Sultanik,2016). There is no particular treatment for HEV or anti-viral therapies' is treated with supportive therapy. To avoid the drugs which can cause liver toxicity. It should be adequate rest, nutrition and fluids ([www.cdc.gov](http://www.cdc.gov)).

## VACCINATION

Vaccination consists of two doses of vaccines in a period of 6-12months, within the first dose administration only 100% the people developed antibodies against the viruses and second dose acts as a booster dose.

## PREVENTION

The preventing measures includes

- \* Proper diet, hygienic condition,
- \* To maintain the areas are aseptic
- \* To avoid the close physical contact by the infected person
- \* Proper vaccination (seyed Mohammad,2008).
- \* Ribavirin(Charlotte,2015).
- \* To improve the individual education, it can reduce the infection rate
- \* To test the blood samples during blood transfusions
- \* During pregnancy condition the mother is effecting the infection to control the infection mother itself only then there is no chance to get the child, to prevent the neonatal infection by the administration of HBV immunoglobins, In between the period of 1981-1982 HBV vaccinations are available, the vaccinations should be given in the period of 0, 1, 2 & 6months in the form of 3 doses to achieve adequate immune response (Franco E et al,2012).

Currently there is no vaccination on HCV so we have to avoid spread and transfer of infection/diseases, to cover the cuts and scratches with an appropriate dressing ([www.hepatitisfoundation.org.nz](http://www.hepatitisfoundation.org.nz)).

To practice safe sex, avoiding drug sharing equipment([emedicine.medscape.com/article/177792-overview](http://emedicine.medscape.com/article/177792-overview)).

- \* To sterilize the blood tools and needles
- \* To take safety measure in blood transfusion
- \* To prevent the HBV transmission
- \* To cook meat and meat products properly and thoroughly
- \* Avoid raw meat and uncooked food
- \* Proper hand wash should be needed for preparing, serving, and eating food
- \* Drink boiled water ([www.who.int](http://www.who.int)).

## CONCLUSION

The viral hepatitis one of most complicated disease. The risk ratio is more in underdeveloped and developing countries because of poverty it leads to unhygienic conditions it is one of the drawback. By educating the common and effected people we can reduce the affected ratio and improve the public health. The suitable word in this disease is, "prevention is better than cure" because the

affected persons are recovered by longer periods by taking prolonged treatment. Advanced treatments are under clinical trials it takes much time to reach

the patient. The common and affected people are suffered a lot with these disease, preventing measure are best of eradication of hepatitis.

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