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Diagnosis, Current Treatment Approaches, and Management of Hepatitis B Virus

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ABSTRACT :

Hepatitis B is a viral infection that can cause liver damage and proceed to cirrhosis. A review was undertaken to better understand the epidemiology of hepatitis virus infection and make recommendations for diagnosis, management, and treatment. When a person has HbsAg positive, it becomes contagious. It is vital to understand that not all people with chronic HBV require medication. Hepatitis B can be prevented using safe and effective immunizations, whereas hepatitis C can be treated with efficient medications. People who have current symptoms of liver illness may benefit the most from treatment, which is assessed by a physical exam, blood tests, and perhaps imaging exams like as an ultrasound or Fibroscan. Regular monitoring may help prevent the condition from deteriorating. However, hundreds of study papers show that there is no permanent cure.

Keywords: Hepatitis B, Vaccine, Fibroscan, No permanent cure.

Introduction:

Hepatitis B is a chronic viral infection. According to estimates from the World Health Organization (WHO), 254 million people worldwideroughly 3.3% of the total population—have chronic hepatitis B. It can be spread through contact with contaminated bodily fluids, including semen, blood, saliva, vaginal secretions, and unclean sexual contact. A woman may also transmit it to her offspring. Furthermore, WHO projects that 1.2 million individuals first became infected with hepatitis B in 2022, and 1.1 million people died from the infection. Cirrhosis, which can result in hepatocellular carcinoma (HBC), is a consequence of these disorders getting worse. A positive HBsAg test indicates that a person does not require medication. Hepatitis B can be acute or chronic in certain people. Antibodies or our body's immune system can eliminate an. Our body's immune system or antibodies can eradicate an acute illness. Changing our lifestyle might sometimes make a chronic infection worse. Symptoms such as dark urine, jaundice, exhaustion, nausea, ascites, stomach pain, and appetite loss typically appear six months after infection. should use some antiviral medications to lessen the disease's severity and progression. Numerous phases of the HBV life cycle are impacted by interferon therapy, including virion uncoating, DNA transcription, RNA translation, viral particle assembly, and virus entrance into the cell. Even though IFN therapy is usually safe, choosing the wrong patients can have negative effects that range from hepatitis to liver failure. IFN treatment is not appropriate for patients with significant leukopenia and/or thrombocytopenia, portal hypertension, autoimmune illnesses, major depression, severe cardiac diseases, or symptoms of decompensation in cirrhosis. Pegylated interferon is the primary treatment for HBV infections; the recommended dosage and treatment period are 180 µg of pegylated interferon alfa-2a given subcutaneously once weekly for 48 weeks. It can be used for compensated cirrhosis without portal hypertension and mild-to-moderate hepatitis. Approximately 20–30% of HBeAg-positive CHB patients respond to treatment after a year. In patients who test positive for HBeAg, hepatitis B e antigen loss usually occurs over the first six months. Twenty-three percent of individuals have both HBV DNA <2000 IU/mL and HBeAg loss.

Clinical features:

Definition :

The most prevalent severe liver illness brought on by the hepatitis B virus is hepatitis. It lingers in the serum for a long time, attacking and harming the liver. An increased blood level of alanine aminotransferase (ALT) indicates hepatitis B virus-induced liver inflammation.

Signs and symptoms:

Symptoms typically appear six months after infection. exhaustion, fever, jaundice, appetite loss, stomach discomfort, ascites, black urine, and advanced cirrhosis. Untreated cirrhosis develops into hepatocellular carcinoma.

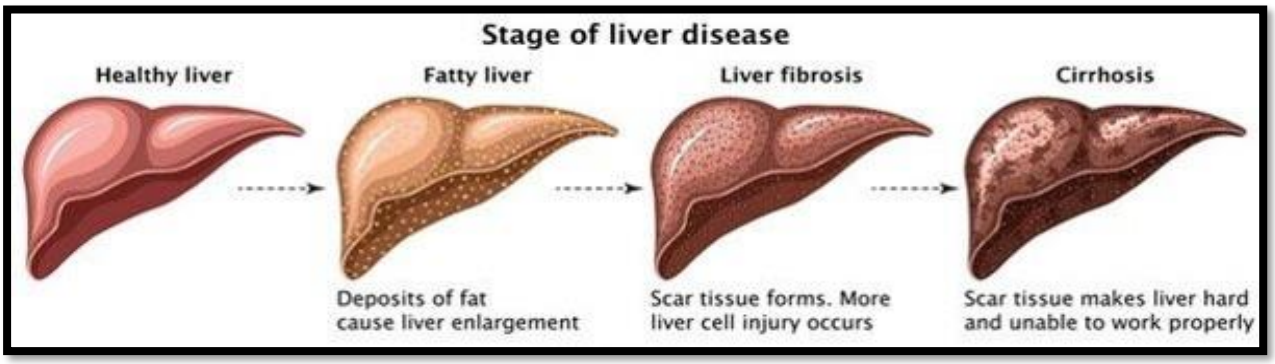
Diagnosis:

1. **Serological test**

Understanding the latest diagnostic tests is essential for correctly screening, diagnosing, and treating people infected with HBV. A positive HBsAg test for more than six months is a sign of CHB virus infection. By using the ELISA method as a diagnostic test for any other disease, we methodically evaluated the efficacy of two serum biomarkers. Following this, a qualitative real-time polymerase chain reaction (PCR) test will be used to determine the viral load.

2. **Assessing the severity of liver by**

- **Imaging test -** Three hypothetical methods for forecasting severe fibrosis that is exclusively brought on by an HBV infection. The fibrosis index based on the four components (FIB-4) and the aspartate aminotransferase-to-platelet ratio index (APRI) were among the blood indicators. The three imaging modalities were magnetic resonance elastography (MRE).
- **FibroScan, and acoustic radiation force impulse (ARFI).Fibroscan-**To gauge the degree of liver scarring, which may be brought on by an illness or condition such as cirrhosis.-To examine fatty liver or fibrosis.



Clinical stages of liver disease

Fibroscan shows some data about fibrosis.

Liver Stiffness approved ranges

Condition	KPa Suggested values for Fibrosis staging			
	F0 – F1	F2	F3	F4
NAFLD or NASH	2 - 8.5	8.5 – 9.5	9.5 – 13.5	>13.5
Alcohol Related Disease	2 - 9	9 – 12	12 – 18.5	> 18.5
Primary Biliary Cholangitis	2 - 8.5	8.5 – 10.5	10.5 – 16.5	> 16.5
Autoimmune Hepatitis	2 - 6	6 – 10.5	10.5 - 16	> 16
Hepatitis B	2 -7	7 – 9.5	9.5 – 12.5	> 12.5
Hepatitis C	2 -7	7 – 9.5	9.5 – 12.5	> 12.5
HIV / HCV coinfection	2 -7	7 – 11.5	11.5 - 14	> 14

Based on > 2300 peer-reviewed publications (2020) however these are NOT absolute and should be discussed with your physician

- **Ultrasound scan -**

It is used to assess the liver damage such as cirrhosis, fibrosis, or hepatocellular carcinoma,that is caused by hepatitis B.
Regular ultrasound scans recommended for individuals who has chronic hepatitis B to screen liver cancer.

Mode of transmission of Hepatitis B

Hepatitis is a type of Blood Born Infections (BBIs).
Route of transmission of HBV virus by

1. **Parenteral (Percutaneous) route:** Through Blood transfusions, Needle sharing, Tattooing or piercing, sharing personal care items i.e razors.
2. **Sexual route of transmission:**Sexual intercourse with infected person, multiple sex with sex partners, a men who sex with men.

3. **Vertical transmission:** Transmission of HBV from infected mother to child during childbirth or breastfeeding.

Note:CentresFor Disease Control and Prevention (CDC) states that Hepatitis B virus is not transmitted by kissing, hugging, using infected persons utensils, cough, sneezing.

Monitoring

Regular monitor of HBV may reduce the severity of the disease. 3 months to 6 months of periodic monitoring is required those who has HBV positive. The elevated level of Alanine Aminotransaminase (ALT) shows abnormality of liver or indicates liver damage. Alanine aminotransaminase (ALT) is enzyme produced by the liver, when the liver gets damaged, ALT is leaks out in the bloodstream and becomes elevated in the blood.
Treatment and Monitoring decisions are based on formal clinical guidelines developed by medical societies such as the American association for the study of liver diseases (AASLD), European Association for the study of the liver (EASL), Asian pacific association for the study of the liver (APASL), and the world health organization.

PREVENTION:

The major factor found that impede the current efforts to prevent and control the disease that are lack of awareness and knowledge about the disease. Regular master body checkup may reduce the risk of liver infection. Usually HBV is a asymptomatic condition in the initial stage.
About 65% and 75% of infected population are unaware that they are infected with HBV and HCV. Among infected population 1000 Infants acquire the infection from the mother (infected mother) Hepatitis B positive carrier.
Centre for Disease Control and Prevention (CDC) found that relatively poor awareness about HBV and HCV among the public, healthcare providers, social-service providers. Lack of knowledge and awareness about the prevalence of chronic viral HBV in the world population. CDC took preventable measures to control HBV and HCV and other health programs were conducted.

IMUNNIZATION:

Immunization is the longstanding availability of effective elimination, prevention of hepatitis B virus in healthy individuals and new HBV infection possible, particularly in children. To prevent the transmission of HBV from mother to new born, The Advisory committee on Immunization practices, recommends that infants born to mothers who are positivefor Hepatitis B surface antigen receive Hepatitis globulin and a first dose of the Hepatitis vaccine within 24 hours of childbirth.

MANAGEMENT AND TREATMENT:

Antiviral Therapy

The main aim of therapy of chronic Hepatitis B are to reduce the life threatening condition and improve the life survival and enhance the quality of life by preventing the disease progression and reduce the risk of liver damage such as cirrhosis and hepatocelluar carcinoma. Antiviral therapy is not recommended those who are has normal ALT levels and low level of HBV DNA viral load <2000 IU/ml.

Currently suggesting treatments for chronic HBV including entecavir and tenofovir disoproxil fumarate (TDF), with an emerging role for tenofovir alafenamide (TAF).
Patients with active immune, HBeAG positive, chronic hepatitis B, Hepatitis B surface antigen positive who have ALT levels > 2 times normal with HBV DNA >20000 IU/ml, should be considered for treatment.

Conclusion :

This review will cover current best practice for managing chronic HBV infection and emerging novel therapies for HBV infection and their prospect for cure. Some current treatment approaches for chronic HBV including entecavir and tenofovir disoproxil fumarate (TDF), with an emerging role for tenofovir alafenamide (TAF). Regular monitoring is necessary to detect disease progression and surveillance is recommended for individuals at increased risk for Hepatocellularcarcinoma (HCC). Therefore, these review shows better understanding and ideology about progression, diagnosis, management, treatment of hepatitis B virus.

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