HEPATITIS B

Hbv

An infection caused by the hepatitis B virus which inflames the liver and which could also impair sperm motility.

Diagnosis  Male & Female

About Hepatitis B

Hepatitis B (HB) is an infection caused by the hepatitis B virus which inflames the liver (Pic. 1). Hepatitis B is one of the most serious types of hepatitis. The virus can cause either acute (short-lived) or chronic (long term, >6 months) liver disease. The disease can affect babies, children and adults (Pic. 2).

More than half of those infected with hepatitis B show few or no symptoms. This can be a risk as they may transmit the virus to others without knowing it. The acute illness causes liver inflammation, vomiting, jaundice and rarely, death. Chronic hepatitis B may eventually cause liver cirrhosis (see below) and liver cancer—a fatal disease with very poor response to current chemotherapy.

The hepatitis B virus lives in blood or other body fluids. It is spread through blood-to-blood contact with an infected person which may include:

- sharing needles or syringes
- coming into contact with inadequately sterilised instruments (such as those used for tattooing and body piercing)
- sexual contact (hepatitis B is one of the most common sexually transmitted infections in the world)
- babies with infected mothers are also at very high risk of being infected with hepatitis B at birth

Blood tests can be taken to check for hepatitis B. Blood tests show if a person has had hepatitis B in the past and whether the infection is acute or chronic. Tests can also show if there is any damage to the liver.

There is a reliable and safe vaccine available to prevent the spread of hepatitis B. Routine immunization with hepatitis B vaccine is strongly recommended for the prevention of HBV infection in individuals at risk for STIs. HBV vaccination of adults has been found to be effective at conferring immunity to individuals who are exposed to HBV via sexual transmission. However, the first priority is directly preventing the spread of HBV by the most reliable and appropriate method, which is use of a condom for safe sexual contact.

As people with hepatitis B are carriers for the disease, they:

must not donate blood, semen or organs

should inform their doctor, dentist and other relevant health workers of their hepatitis B status

If anyone find out that he has hepatitis B, he should notify his recent sexual partners and close contacts to advise them to have a sexual health check and provide them with an opportunity to be tested. This is to see if they are infected and to prevent further spread of the infection. If anyone feel uncomfortable or embarrassed about telling his partner or partners, the doctor, nurse or health worker can contact them. Hepatitis B is known to decrease sperm motility in men. In women, tubal damage is referred to decrease the likelihood of getting pregnant.

Associated diseases
Due to shared modes of transmission, coinfection of HBV with other viruses, human immune virus (HIV), hepatitis C virus (HCV), and hepatitis D virus (HDV), is likely to occur. When it occurs, it usually triggers an accelerated progression of liver disease with adverse clinical outcomes.

**HIV**

The human immunodeficiency virus (HIV) causes HIV infection and over time acquired immunodeficiency syndrome (AIDS). Many HIV-positive people are unaware that they are infected with the virus. Moreover, the HIV/ HBV coinfected patients tend to exhibit rapid clinical deterioration and poor outcomes as compared to their HIV or HBV monoinfected counterparts. These includes high rate of HBeAg seropositivity, increased HBV-DNA, severe hepatotoxicity, occurrence of liver fibrosis, and increased risk of mortality.

**HCV**

HCV is known to cause both acute and chronic infections. Usually, 15–45% of acute cases clear the infection without any treatment. Chronic HCV infection is defined as the persistence of the virus in the body for six months or more and is usually determined by the presence of viral antigen and/or DNA in addition to positive serology of Hepatitis C core antibody (HCVAb). HCVAb develops during an acute phase and persists throughout the life; therefore, detection of viral antigen/DNA in serological positive individuals is crucial to confirm the presence of virus and hence a need for commencing medication. Serological tests are thereby employed for screening purposes.

The standard management of people with HBV/HCV infection includes the treatment of HCV with antiviral therapy followed by anti-HBV.

**HDV**

HDV is a unique RNA virus that requires a helper function provided by hepatitis B virus (HBV) for replication. Thus, HDV can replicate only in people who are also infected with HBV. Infection with HDV may result in either acute or chronic hepatitis(4). The clinical course of hepatitis D is variable but usually more severe than that of other forms of viral hepatitis. Patients with acute hepatitis D may present with fulminant hepatitis, a rare sequela of the acute hepatitis caused by other hepatitis viruses. Chronic hepatitis D is a serious and rapidly progressive liver disease.

People with chronic hepatitis B need to be monitored regularly as there is a risk of developing liver cirrhosis, and hepatocellular carcinoma.

**Complications**

Chronic HBV infection is the cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC).

**Chronic hepatitis**

Acute hepatitis B infections become less likely to progress to chronic forms as the age of the patient increases, with rates of progression approaching 90% in vertically transmitted cases of infants compared to 1% risk in young adults. Overall, the 5-year survival rate for chronic hepatitis B ranges from 97% in mild cases to 55% in severe cases with cirrhosis.

Most patients who acquire hepatitis D at the same time as hepatitis B (co-infection) recover without developing a chronic infection; however, in people with hepatitis B who later acquire hepatitis D (superinfection), chronic infection is much more common at 80-90%, and liver disease progression is accelerated.

Chronic hepatitis C progresses towards cirrhosis, with estimates of cirrhosis prevalence of 16% at 20 years after infection. While the major causes of mortality in hepatitis C is end stage liver disease, hepatocellular carcinoma is an important additional long term complication and cause of death in chronic hepatitis.

**Cirrhosis**

Cirrhosis (Pic. 3) is a condition in which the liver does not function properly due to long-term damage. This damage is characterized by the replacement of normal liver tissue by scar tissue. Hepatitis B virus (HBV) is
among the leading causes of liver cirrhosis worldwide. Cirrhosis is often associated with hormonal imbalances that can interfere with sperm production. Pregnancy is rare in women with cirrhosis due to reduced fertility, but when it occurs, requires specialized management.

Hepatocellular carcinoma

Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer (Pic. 4) in adults, and is the most common cause of death in people with cirrhosis. Hepatitis B virus (HBV) is one of the most well recognised human carcinogens. Many cancer treatments can affect a fertility. Most likely, it is important to talk about whether or not cancer treatment may increase the risk of, or cause, infertility.

Risk factors

The following at risk groups for hepatitis B:

- household or other close (household-like) contacts of people with acute or chronic hepatitis B
- sexual contacts of people with acute hepatitis B
- migrants from hepatitis B endemic countries - includes most East and Southeast Asia (except Japan)
  - Pacific Island groups, parts of central Asia and the Middle East, the Amazon Basin and sub Saharan Africa
- Aboriginal and Torres Strait Islander people
- persons who inject drugs
- people with hepatitis C or chronic liver disease
- HIV positive adults and other immunocompromised adults
- sex industry workers

The vaccine is also recommended (but not funded) for other people at high risk of exposure to the disease:

- adult haemodialysis patients and patients with severely impaired renal function in whom dialysis is anticipated
- solid organ and haematopoietic stem cell transplant recipients
- recipients of certain blood products
- persons with developmental disabilities
- in-mates and staff of long-term correctional facilities
- persons at occupational risk directly involved in patient care and/or the handling of human blood or tissue such as health care workers, police, members of the armed forces, emergency services staff, staff of correctional facilities assigned to duties that may involve exposure to blood/body fluids
- travellers to hepatitis B endemic areas
- others at risk including funeral workers, embalmers, staff in residential and non-residential care of persons with developmental disabilities, tattooists, body piercers

Impact on fertility

Female fertility

HBV infection in either partner probably increases the risk of pelvic infection in female partner through impaired immune response to sexually transmitted infections, with consequent tubal damage and thus tubal or uterine infertility. Tubal factor infertility occurs when the fallopian tube(s) prevent sperm from reaching the ovary to fertilize an egg. Moreover, oocytes can be carriers of HBV and brought HBV DNA into embryos in case of fertilization with normal sperm.

Male fertility

It is found that HBV DNA sequences can integrate to spermatozoa; therefore, there is possible risk of vertical transmission of HBV to the offspring via the germ line. Hepatitis B virus found in semen is most likely sexually transmitted and could cause male infertility by damaging spermatozoa, affecting on sperm parameter especially forward motility.

Prevention

There is a reliable and safe vaccine available to prevent the spread of hepatitis B (see immunisation).
As hepatitis B is spread through blood-to-blood contact with an infected person, it is important to practice safe sex and take care not to exchange body fluids during sex. People with more than one sexual partner (or whose partner has more than one sexual partner) are at risk of getting an STI like hepatitis B. Always using condoms and a water-based lubricant when you have vaginal or anal sex is the best way to reduce your risk of hepatitis B. If anyone is giving a man oral sex (his penis in your mouth), then he will need to wear a condom. If anyone puts his mouth in contact with his/her partner’s anus or vulva while having sex, he/she should use a dental dam as protection.

**Symptoms**

Some people can develop hepatitis B disease and not be aware they are infected (Pic. 5). Most children and up to half of the adults with hepatitis B have no symptoms at the time they are first infected. They do not get sick and they do not develop the jaundice (yellowing of the skin and whites of the eyes; Pic. 6) associated with liver disease.

Others do get sick and some are very unwell and may need to be admitted to hospital. Early signs of infection include pain in the abdomen, nausea, vomiting, weakness and tiredness, loss of appetite, general aches and pains and fever. This may be followed by jaundice, dark urine and pale-coloured faeces (stools).

**Therapies**

**Self therapy**

Unfortunately, there is no cure for hepatitis B. People with acute hepatitis B are advised to rest, drink plenty of fluids, avoid fatty/oily foods and alcohol and to have regular check-up tests with their doctor to ensure the infection clears and the liver recovers.

**Conventional medicine**

If hepatitis B is chronic, treatment choices should be discussed with a specialist liver doctor. Indications for HBV treatment are strict. A patient is therefore entailed to undergo a bunch of serial investigations prior to the commencement of treatment (Pic. 7).

Patients with acute hepatitis B are treated by supportive care, with no specific treatment. Patient care is focused on maintaining comfort and adequate nutritional balance, including replacement of fluids lost from vomiting and diarrhea.

**Pharmacotherapy**

**Antiviral medication**

The goals of antiviral therapy for patients with chronic HBV are to slow the progression of chronic liver disease and decrease the development of complications, including cirrhosis and liver cancer. To date, seven antiviral agents (Lamivudine, Adefovir, Entecavir, Telbivudine, Tenofovir, Emtricitabine, and Standard and Pegylated Interferon) have been approved for the treatment of chronic hepatitis B.

**Surgical therapy**

**Liver transplant**

Transplantation of liver may be needed if condition becomes life-threatening because advanced liver damage.
Therefore, infertility treatment, when there is a possibility of infection with hepatitis of the couples or one of them, is causing concern. Since, transmission of the infection to the baby, laboratory technicians, medical staff, and contamination of gametes/embryos is possible.

The management of infertility associated with the hepatitis infection is a very important and controversial topic, by performing diagnostic tests before starting treatment of infertility can reduce or eliminate potential risks. Accordingly, proper initial detection of hepatitis in fertility clinics should be done and protocol and techniques for virus removal should be performed. Moreover, before embryo and gamete cryopreservation or donation of HBs, Ag (antigen), or HCV, status should be determined and suggested protocol of sperm washing technique. In addition, storage of sample in the nitrogen vapor instead of the liquid state and double-sealing technique for cryocontainers in order to avoid potential cross-infection should be performed.

Find more about related issues

Therapies

Egg donation
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: www.fertilitypedia.org/edu/therapies/egg-donation

ICSI
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: www.fertilitypedia.org/edu/therapies/icsi

Sperm donation
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.
Learn more at: www.fertilitypedia.org/edu/therapies/sperm-donation

Standard IVF
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: www.fertilitypedia.org/edu/therapies/standard-ivf

Gallery

<table>
<thead>
<tr>
<th>Pic</th>
<th>Pic</th>
</tr>
</thead>
<tbody>
<tr>
<td>The main predictor of disease course is age of infection.</td>
<td></td>
</tr>
<tr>
<td><strong>Age infected</strong></td>
<td><strong>Acute infection</strong></td>
</tr>
<tr>
<td>Infants</td>
<td>Symptoms rare</td>
</tr>
<tr>
<td>Children</td>
<td>Symptoms rare</td>
</tr>
<tr>
<td>Adolescents/adults</td>
<td>Symptoms common</td>
</tr>
</tbody>
</table>

- Pharynx
- Salivary glands
- Mouth
- Liver
- Esophagus
- Stomach
- Gallbladder
- Small intestine
- Pancreas
- Large intestine
- Anus
A person with massive ascites caused by portal hypertension due to cirrhosis.

Large liver tumor in 50-year-old man.

The findings on physical examination vary from minimal to remarkable, according to disease severity.

<table>
<thead>
<tr>
<th>Clinical staging</th>
<th>Signs, symptoms, and clinical findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute hepatic</td>
<td>General fatigue, loss of appetite, nausea, vomiting, abdominal pain, encephalopathy, jaundice, hepatomegaly, palmar erythema, spider nevi, and Osler-Nodeaux syndrome (gallbladder and splenic enlargement, skin rash, edema, edema, hepatomegaly, jaundice, ascites, transient encephalopathy).</td>
</tr>
<tr>
<td>Chronic hepatic</td>
<td>Similar to acute hepatic, hepatomegaly, palmar erythema, spider angiomata.</td>
</tr>
<tr>
<td>Progressive liver disease, hepatic failure</td>
<td>Ascites, jaundice, history of variceal bleeding, portal venous hypertension, ascites, abdominal collateral veins (based on the site of the portal vein), hepatic encephalopathy, encephalopathy, ascites in some patients; mental confusion, coma, variceal bleeding, encephalopathy, ascites, peripheral edema, and portal vein venous collaterals.</td>
</tr>
</tbody>
</table>

A yellowish or greenish pigmentation of the skin and whites of the eyes due to high bilirubin levels. It is commonly associated with itchiness. The feces may be pale and the urine dark.

ALT: Alanine Aminotransferase. UNL: upper normal limit. UNL is 30 U/L for men and 19 U/L for females.

Sources

- "Infection and Infertility" [https://www.intechopen.com/books/genital-infections-and-infertility/infection-and-infertility]” —by Wu et al. licensed under [CC BY 3.0]
- "HBs Ag and HCV Status Need to Be Specified Before Using Assisted Reproductive Technique" [http://hepatmon.com/en/articles/65297.html]" —by Maradani et al. licensed under [CC BY-NC 4.0]
- "Hepatitis B Virus Infection in Tanzania: Current Status and Challenges" [https://www.hindawi.com/journals/jtm/2018/4239646/]” —by Kilonzo et al. licensed under [CC BY 4.0]
"Hepatitis B virus and its sexually transmitted infection – an update" by Inoue and Tanaka licensed under CC BY 4.0

"Predictive Factors in the Incidence of Cirrhosis in Chronic Hepatitis B Virus Infections" by Alavian et al. licensed under CC BY-NC 4.0

"Factors associated with significant liver necroinflammation in chronic hepatitis B patients with cirrhosis" by Chen et al. licensed under CC BY 4.0

"Cirrhosis" —sourced from Wikipedia licensed under CC BY-SA 3.0

"Hepatocellular carcinoma" —sourced from Wikipedia licensed under CC BY-SA 3.0

"HIV" —sourced from Wikipedia licensed under CC BY-SA 3.0

"Hepatitis D Virus Infection; Iran, Middle East and Central Asia" —by Alavian and Alavian licensed under CC BY-NC 4.0

"Big Liver Tumor" by haitham alalfah licensed under CC BY-SA 3.0

"Hepatic failure" by Heilman licensed under CC BY-SA 3.0

"Jaundice eye" by Sellers licensed under CC BY 1.0

"Virškinimo sistema" —by VeronikaSidorevic111 licensed under CC BY-SA 3.0