

Summary

- hepatitis B is one of the most common infectious diseases in the world and is a serious public health problem;
- hepatitis B is a virus that can cause inflammation of the liver;
- it is found in blood and body fluids, including breast milk, saliva, vaginal secretions and semen;
- chronic (long-term) infection develops in the majority of people infected with hepatitis B early in life;
- the majority of people infected with hepatitis B as adults will recover completely;
- adult vaccination against hepatitis B involves three doses given over six months; and
- there are several types of medication available to treat chronic hepatitis B.

About the virus

Hepatitis B is the most common liver infection in the world and is caused by the hepatitis B virus. The hepatitis B virus enters the body and travels to the liver via the bloodstream. In the liver, the virus attaches to healthy liver cells and multiplies. This replication of the virus then triggers a response from the body's immune system. People are often unaware they have been infected with the hepatitis B at this stage.

The liver is the main site of hepatitis B viral multiplication. Hepatitis B infection can lead to cirrhosis (scarring of the liver), liver cancer or liver failure if it is not diagnosed and managed.

Worldwide, there are an estimated 350 million people with chronic (lifelong) hepatitis B infection, with the majority living in the Asia-Pacific region.¹ In Australia, it is estimated between 90,000 and 160,000 people are chronically infected with hepatitis B. Between 1991 and 2005, there have been over 90,000 people diagnosed with chronic hepatitis B in Australia.²

The majority of people with chronic hepatitis B in Australia were born overseas, predominantly in the Asia-Pacific region. Refugees and migrants from the Mediterranean, Eastern Europe, Africa and Latin America also have high rates of hepatitis B infection. Other groups at higher risk of hepatitis B infection include Indigenous Australians, people participating in high risk sexual activity and people who inject drugs.³

Hepatitis B infection is considered to be 'acute' during the first 6 months after infection. If hepatitis B virus tests (HBsAg+) are positive after 6 months, then a person is considered to have 'chronic' (long term) hepatitis B infection which can last a lifetime.

Symptoms of hepatitis B

The symptoms of hepatitis B depend on whether a person has acute or chronic hepatitis B infection.

Symptoms of acute hepatitis B

Symptoms resulting from acute hepatitis B infection among adults are common, with jaundice occurring approximately 12 weeks after initial infection. The symptoms of acute hepatitis B include:

- loss of appetite;
- nausea and vomiting;
- tiredness;

¹ World Health Organisation (2005)

² National Notifiable Diseases Surveillance System (NNDS). Available from: URL: <http://www9.health.gov.au/cda/Source/CDAindex.cfm>. Retrieved October 19, 2006.

³ O'Sullivan, B.G., Gidding, H.F., Law, M., Kaldor, J.M., Gilbert, G.L. & Dore, G.J. (2004). Estimates of chronic hepatitis B virus infection in Australia, 2000. *Australian and New Zealand Journal of Public Health*. 28(3), pp.212-6.

- abdominal pain;
- muscle and joint pain; and
- jaundice (yellowish eyes and skin, dark urine and pale-coloured faeces/poo/shit).

Many people with acute hepatitis B have no symptoms and never realise they had the infection. A very small percentage of people with acute hepatitis B become very sick in a short period of time. This happens if there is massive damage to the liver and it stops working. This is called 'fulminant hepatitis'.⁴

Symptoms of chronic hepatitis B

Most people with chronic hepatitis B do not have any symptoms of infection which means they may feel healthy and not be aware they are infected. However, other people may experience symptoms which are similar to those experienced with other forms of viral hepatitis. These can include:

- tiredness, depression and irritability;
- pain in the liver (upper, right side of abdomen);
- nausea and vomiting;
- loss of appetite; and
- joint aches and pains.

People with chronic hepatitis B have a significantly increased risk of developing liver cancer.

Hepatitis B disease course

The disease course of hepatitis B is very complex. The main predictor of disease course is age of infection:

- infants infected with hepatitis B rarely experience symptoms of acute infection, but 90% will develop chronic or lifelong infection;
- children infected with hepatitis B rarely experience symptoms of acute infection, but 30% will develop chronic or lifelong infection; and
- adults or adolescents infected with hepatitis B commonly experience symptoms of acute infection, however less than 5% develop chronic or lifelong infection.⁵

The people who do not develop chronic hepatitis B infection have cleared the virus and cannot be reinfected with hepatitis B.

Transmission of hepatitis B

Hepatitis B is found in blood and body fluids including saliva, semen, vaginal secretions and breast milk. The most common ways hepatitis B is spread include:

- mother to baby usually at or around the time of delivery;
- sexual contact;
- sharing of injecting equipment;
- needlestick injuries in the health care setting;
- reuse of unsterilised or inadequately sterilised needles;
- child-to-child transmission through household contact such as biting; and
- sharing personal items such as razors, toothbrushes or nail clippers.

Hepatitis B is NOT spread by contaminated food or water, and cannot be spread through casual or social contact such as kissing, sneezing or coughing, hugging or eating food prepared by a person with hepatitis B.

⁴Lin, K.W. & Kirchner, T.J. (2004). Hepatitis B. *American Family Physician*. 69(1), pp.75-82.

⁵Dore, G., Wallace, J., Locarnin, S., Desmond, P., Gane, E. & Crawford, D. (2006). Hepatitis B in Australia—Responding to a diverse epidemic.

Disclosure of hepatitis B status

There is no legal obligation for people with hepatitis B to tell their employer. There is no specific employment law for people with hepatitis B, but some protection is provided under the Federal Disability Discrimination Act (1992) and individual state and territory Anti-Discrimination or Equal Opportunity Acts.⁶

It is important that immediate family members and sexual contacts of people with chronic hepatitis B are vaccinated against hepatitis B to prevent transmission.

Testing

Many people with hepatitis B have no signs of illness and do not realise they have the virus in their body. Hepatitis B is diagnosed through various blood tests, which look for markers of the hepatitis B virus in the blood.

To understand the tests, it is important to understand two basic medical terms:

- antigen—a foreign substance in the body, such as the hepatitis B virus; and
- antibody—a protein that the immune system makes in responses to a foreign substance. Antibodies can be produced in response to a vaccine or a natural infection.

Test	Abbreviation	What it shows
Hepatitis B surface antigen	HBsAg	Shows that the person is infected with hepatitis B. It can be detected during acute and chronic infection.
Hepatitis B surface antibody	HBsAb or Anti-HBs	Shows that the person has developed immunity to hepatitis B. It can be detected in people who have recovered from hepatitis B or been vaccinated against hepatitis B.
Hepatitis B e antigen	HBeAg	Shows that hepatitis B virus is multiplying.
Hepatitis B e antibody	HBeAb or Anti-HBe	Shows that the person's immune system has responded against hepatitis B and the virus is not actively replicating.
Hepatitis B core antibody	HBcAb or Anti-HBc	Shows that a person has been infected with hepatitis B but does not provide any protection against infection.
Hepatitis B virus DNA	HBV DNA	Measures the amount of hepatitis B virus in the bloodstream and indicates how actively the virus is multiplying.

⁶Gilead (2005). Hepatitis B: a guide for patients.

Other tests are used to check how the liver is working and whether it has been damaged by the virus.

For example:

- **Liver Function Tests (LFTs):** are a group of blood tests that show how well your liver is working. One important test is the Alanine Aminotransferase (ALT). The ALT is released from liver cells into the bloodstream when the liver is injured. An ALT level above normal may indicate liver damage. ALT levels are included in the regular monitoring of all chronic hepatitis B patients; this test can also be useful in deciding whether a patient would benefit from treatment, or for evaluating how well a current treatment is working;
- **liver Biopsy:** involves the removal of a small piece of tissue from the liver using a fine needle. The tissue is examined under a microscope to look for inflammation or liver damage; and
- **alpha-fetoprotein:** is a blood test which can sometimes detect liver cancer.

Treatment of hepatitis B

People who have immunity and normal LFTs do not need treatment. People who are chronically infected but do not have any liver damage also do not need treatment but need close monitoring with regular (6 monthly) liver function tests. However, if a person has liver damage they should consider having treatment for hepatitis B. The decision on when to start treatment is complex and should be made in consultation with a gastroenterologist with an interest in hepatitis B.

The Australian Government through the Pharmaceutical Benefits Scheme (PBS) funds several different medications to treat chronic hepatitis B. They are:

- **Pegylated Interferon (Pegasys®)**—is given by injection once a week, usually for 6 months to a year. The drug has many potential side effects, such as flu symptoms and depression, but can control the virus in a third of patients without need for long term medication.
- **Lamivudine (Zeffix®)**—is a tablet taken once a day for at least a year or longer. There are almost no side effects, however a significant concern is the possible development of hepatitis B virus mutations and antiviral drug resistance after long term use.
- **Adefovir (Hepsera®)**—is a tablet taken once a day for a year or longer. In Australia, Adefovir is only funded for people who have developed a hepatitis B virus mutation after taking Lamivudine. There are almost no side effects except for the possibility of developing virus mutations and antiviral drug resistance.
- **Entecavir (Baraclude®)**—is a tablet taken once a day for up to a year, with almost no side effects except for the possibility of developing virus mutations and antiviral drug resistance. Entecavir is the most potent oral antiviral drug available for treatment of chronic hepatitis B. It was approved for use in Australia in December 2006 and has replaced lamivudine as first line tablet therapy.

Hepatitis B treatment is suitable for people who are classified as being in a particular stage of hepatitis B infection, which is characterised by:

- increased virus activity and liver inflammation demonstrated by elevated liver enzymes (ALT);
- inflammation and activity in the liver as seen in the results of a liver biopsy; and
- high levels of hepatitis B virus (HBV DNA) in the blood.

Access to treatment is dependent on a person meeting these criteria.

Treatment aims are to stop the hepatitis B virus from multiplying, or to reduce the rate of multiplication as much as possible. This decreases the risk of serious liver disease developing later in life and makes it possible for the liver to repair some of the damage and to work better.⁷ However, it is very rare that any of these medications will cure hepatitis B infection.

⁷ Keefe, E.C., Dieterich, D., Han, S-H. et al. (2004). A treatment algorithm for the management of chronic hepatitis B virus infection in the United States. *Clinical Gastroenterology and Hepatology*, 2, pp.87–106.

The main side effect of the antiviral tablets (Lamivudine, Adefovir and Entecavir) is sometimes the hepatitis B virus mutates (changes) during the course of treatment, which means the antiviral tablets are not as effective against the new form of the virus. This is called antiviral resistance.

During treatment, the patient's blood tests are monitored very carefully to look for signs of antiviral resistance. If there are signs of resistance such as elevated liver enzymes and high levels of hepatitis B virus in the blood, the antiviral tablets will be changed.

Lifestyle advice for people with chronic hepatitis B

There are a number of things people with chronic hepatitis B can do to stay healthy, including:

- limit or avoid alcohol;
- do not smoke;
- eat a healthy, well-balanced diet, and avoid 'fad' diets; and
- discuss the use of complementary and alternative medicines with a doctor, as some of them can affect your liver or interfere with the treatment.

Prevention

To avoid transmission of hepatitis B:

- consider being vaccinated (see below for more details);
- practice safe sex (use a condom);
- wash hands after touching blood or body fluids;
- wear disposable gloves if giving someone first aid, or cleaning up blood or body fluids;
- avoid sharing toothbrushes, razors, needles, syringes, personal hygiene items and grooming aids or any object that may come into contact with blood or body fluids;
- use new and sterile injecting equipment for each injection;
- cover all cuts and open sores with a bandaid or bandage;
- wipe up any blood spills and then clean the area with household bleach; and
- throw away personal items such as tissues, menstrual pads, tampons and bandages in a sealed plastic bag.

People who have been exposed to the hepatitis B virus and who have not been vaccinated should receive hepatitis B immunoglobulin (HBIG) within 72 hours of exposure, and a dose of hepatitis B vaccine as soon as possible or within 7 days of the exposure from their general practitioner or local emergency department.

Vaccine

Hepatitis B can be prevented with a safe and effective vaccine that has been available since 1982. In Australia, the hepatitis B vaccination program commenced in 1988, targeting groups at particularly high risk of infection. It is now recommended that all babies and adolescents be vaccinated against hepatitis B. The program continues and ensures that babies and adolescents have access to free hepatitis B vaccine.

The Australian Immunisation Handbook⁸ recommends that the following groups are vaccinated against hepatitis B:

- babies and young children;
- adolescents aged between 10 and 13 years;
- household contacts (other than sexual partners) of people with acute and chronic hepatitis B;
- sexual contacts of people with acute and chronic hepatitis B;

⁸National Health & Medical Research Council, (2003). The Australian Immunisation Handbook. 8th Edition

- people on haemodialysis, individuals with HIV and other adults with weakened immune systems;
- injecting drug users; *
- recipients of certain blood products; *
- individuals with chronic liver disease and/or hepatitis C; *
- residents and staff of facilities for persons with intellectual disability; *
- individuals adopting children from overseas;
- liver transplant recipients; *
- inmates and staff from long-term correctional facilities; *
- healthcare workers, dentists, embalmers, tattooists and body-piercers;
- others at risk including:
 - police, members of the armed services and emergency services staff;
 - long-term travellers to regions with high endemicity;
 - staff or child day-care centres; and
 - people playing contact sport.

* Individuals should consider the combined hepatitis A/hepatitis B vaccine.

Children born after the 1 May 2000 receive hepatitis B vaccine shortly after birth while they are in hospital and further doses at 2, 4 and 12 months of age.

Children in Year 7 or adolescents aged between 11 and 15 years receive a two-dose course of adult hepatitis B vaccine given 4 to 6 months apart.

In order to obtain maximum protection against hepatitis B, adults should receive three doses of the vaccine at zero, 1 and 6 months intervals.

A post-vaccination blood test, to assess if the vaccine course has been effective in producing protection against hepatitis B infection, is recommended four weeks after the third dose of the hepatitis B vaccine for people in the following categories: some would say all adults!

- people at significant occupational risk (e.g. healthcare workers whose work involves frequent exposure to blood and body fluids);
- people at risk of severe or complicated disease (e.g. people with pre-existing liver disease not related to hepatitis B and adults with weakened immune systems); and
- people in whom a poor response to the hepatitis B vaccination is expected.

Side effects of the hepatitis B vaccine are not common, however, a small number of people report pain at the injection site and/or a mild fever after the injections.