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A Systematic Review on Hepatitis B

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Abstract

Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus (HBV). It is a major global health problem. It can cause chronic infection and puts people at high risk of death from cirrhosis and liver cancer. A safe and effective vaccine that offers 98% to 100% protection against hepatitis B is available. Preventing hepatitis B infection averts the development of complications including chronic disease and liver cancer. The burden of hepatitis B infection is highest in the WHO Western Pacific Region and the WHO African Region, where 116 million and 81 million people, respectively, are chronically infected. Sixty million people are infected in the WHO Eastern Mediterranean Region, 18 million in the WHO South-East Asia Region, 14 million in the WHO European Region and 5 million in the WHO Region of the Americas.

Keywords: Transmission, Risk factors, Clinical manifestations, Diagnosis, Reactivation, Screening, Nursing management, Medical management

Introduction

Hepatitis B is the most common serious liver infection in the world. It is caused by the hepatitis B virus that attacks and injures the liver. Two billion people (or 1 in 3) have been infected and about 300 million people are living with a chronic hepatitis B infection. Each year up to 1 million people die from hepatitis B despite the fact that it is preventable and treatable.

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Hepatitis B is transmitted through direct contact with infected blood or certain bodily fluids. The virus is most commonly transmitted from an infected pregnant person to their baby during childbirth, due to the blood exchange that happens between mother and baby. It is also transmitted through unsterile medical or dental equipment, unprotected sex, or unsterile needles, or by sharing personal items such as razors, toothbrushes, nail clippers, body jewelry.

Hepatitis B is a “silent epidemic” because most people do not have symptoms when they are newly infected or chronically infected. Thus, they can unknowingly spread the virus to others and continue the silent spread of hepatitis B. For people who are chronically infected but don’t have any symptoms, their liver is still being silently damaged which can develop into serious liver disease such as cirrhosis or liver cancer.

The good news is that hepatitis B is preventable and treatable. There is a simple blood test to diagnose a hepatitis B infection. Testing is the only way to know for sure if you are infected. There is a safe vaccine to prevent hepatitis B. There are effective drug therapies that can manage a chronic hepatitis B infection, and a cure is within sight.

Transmission

HBV is transmitted through activities that involve percutaneous (i.e., puncture through the skin) or mucosal contact with infectious blood or body fluids (e.g., semen and saliva), including

- Sex with a partner who has HBV infection;
- Injection drug use that involves sharing needles, syringes, or drug-preparation equipment;
- Birth to a person who has HBV infection;
- Contact with blood from or open sores on a person who has HBV infection;
- Exposures to needle sticks or sharp instruments; and
- Sharing certain items with a person who has HBV infection that can break the skin or mucous membranes (e.g., razors, toothbrushes, and glucose monitoring equipment), potentially resulting in exposure to blood.

HBV can survive outside the body and remains infectious for at least 7 days

Any blood spills (including dried blood, which can still be infectious) should be disinfected using a 1:10 dilution of one part household bleach to 9 parts water. Gloves should be worn when cleaning up any blood spills.

Risk factor for HBV infection

The following populations are at increased risk for becoming infected with HBV:

- Infants born to people with HBV infection
- Sex partners of people with HBV infection
- Men who have sex with men
- People who inject drugs
- Household contacts or sexual partners of known people with chronic HBV infection
- Health care and public safety workers at risk for occupational exposure to blood or blood-contaminated body fluids
- Patients on hemodialysis

Hepatitis B Virus

The hepatitis B virus is a small DNA virus contains an outer envelope and an inner core.

- The outer envelope of the virus is composed of a surface protein called the hepatitis B surface antigen or "HBsAg". The HBsAg can be detected by a simple blood test and a positive test result indicates a person is infected with the hepatitis B virus.

- The inner core of the virus is a protein shell referred to as the hepatitis B core antigen or "HBcAg," which contains the hepatitis B virus DNA and enzymes used in viral replication.

Life Cycle of the Hepatitis B Virus

The hepatitis B virus (HBV) has a complex life cycle. The virus enters the host liver cell and is transported into the nucleus of the liver cell. Once inside the nucleus, the viral DNA is transformed into a covalently closed circular DNA (cccDNA), which serves as a template for viral replication (creation of new hepatitis B virus). New HBV virus is packaged and leaves the liver cell, with the stable viral cccDNA remaining in the nucleus where it can integrate into the DNA of the host liver cell, as well as continue to create new hepatitis B virus. Although the life cycle is not completely understood, parts of this replicative process are error prone, which accounts for different genotypes or "genetic codes" of the hepatitis B virus.

Clinical manifestations of HBV infection

Not all people with acute HBV infection have symptoms. The presence of signs and symptoms varies by age. Most children <5 years of age and newly infected immunosuppressed adults are generally asymptomatic, whereas 30%–50% of people age ≥5 years have signs and symptoms.

General signs and symptoms of acute HBV infections can includes:

- fever
- fatigue
- loss of appetite
- nausea
- vomiting
- abdominal pain
- dark urine
- clay-colored stool
- joint pain
- jaundice

Most people with chronic HBV infection are asymptomatic and have no evidence of liver disease or injury. However, some people develop chronic hepatitis (elevation of AST/ALT), cirrhosis, or hepatocellular carcinoma (i.e., primary liver cancer).

The average incubation period for hepatitis B is 90 days (range: 60–150 days) after exposure to HBV.

The symptoms of acute hepatitis B occur, typically last for several weeks but can persist for up to 6 months.

Diagnosis

Your doctor will examine you and look for signs of liver damage, such as yellowing skin or belly pain. Tests that can help diagnose hepatitis B or its complications are:

- **Blood tests.** Blood tests can detect signs of the hepatitis B virus in your body and tell your doctor whether it's acute or chronic. A simple blood test can also determine if you're immune to the condition.
- **Liver ultrasound.** A special ultrasound called transient elastography can show the amount of liver damage.
- **Liver biopsy.** Your doctor might remove a small sample of your liver for testing (liver biopsy) to check for liver damage. During this test, your doctor inserts a thin needle through your skin and into your liver and removes a tissue sample for laboratory analysis.

- Three different serologic tests are needed (hepatitis B surface antigen [HBsAg], hepatitis B surface antibody [anti-HBs], and total hepatitis B core antibody [anti-HBc]) to determine whether a patient. HBsAg will be detected in an infected person's blood an average of 4 weeks (range: 1–9 weeks) after exposure to the virus. About half of patients will no longer be infectious by 7 weeks after onset of symptoms, and all patients who do not remain chronically infected will be HBsAg-negative by 15 weeks after onset of symptoms.

The seriousness of HBV infection

Acute infection ranges from asymptomatic or mild disease to fulminant hepatitis, although the latter occurs only rarely. Disease is more severe among adults age >60 years. Approximately 25% of people who become chronically infected during childhood and 15% of those who become chronically infected after childhood die prematurely from cirrhosis or liver cancer, and most remain asymptomatic until onset of cirrhosis or end-stage liver disease. The risk for chronic infection varies according to the age at infection and is greatest among young children. Approximately 90% of infants and 25%–50% of children aged 1–5 years will remain chronically infected with HBV. By contrast, approximately 95% of adults recover completely from HBV infection and do not become chronically infected.

HBV reactivation

HBV reactivation is the abrupt reappearance or rise in HBV DNA in a patient with previously inactive chronic or resolved hepatitis B. It is often accompanied by a flare in disease activity with elevation of liver enzymes with or without symptoms. HBV reactivation can be severe, resulting in death.

Patients who test positive for both anti-HBc and HBsAg are at substantially higher risk of reactivation than are those who are positive for both anti-HBc and anti-HBs. Others at risk include people

- Undergoing cancer chemotherapy;
- Taking immunosuppressive therapy, including
    - Rituximab and other drugs that target B lymphocytes (black box warning),
    - High-dose steroids, and
    - Anti-TNF agents;
- With HIV infection who have discontinued therapy with antiretroviral drugs that also have activity against HBV;
- Undergoing solid organ or bone marrow transplantation; and
- Being treated for HCV coinfection.

Screening for HBV

CDC recommends that the following people be screened for HBV infection

- People born in countries with prevalence of HBV infection ≥2%
- People born in the United States not vaccinated as infants whose parents were born in regions with high rates of HBV infection (HBsAg prevalence of ≥8%)
- Men who have sex with men
- People who inject drugs
- People with HIV
- Household and sexual contacts of people with HBV infection
- People requiring immunosuppressive therapy

- People with end-stage renal disease (including patients on hemodialysis)
- Blood and tissue donors
- People with elevated alanine aminotransferase levels (≥19 IU/L for women and ≥30 IU/L for men)
- Pregnant people (hepatitis B surface antigen [HBsAg] only is recommended)
- Infants born to people with HBV infection (HBsAg and antibody to hepatitis B surface antigen [anti-HBs] only are recommended)

Hepatitis B Vaccination

The Advisory Committee on Immunization Practices (ACIP) recommends that the following people should receive hepatitis B vaccination:

- All infants
- Unvaccinated children aged <19 years
- Adults aged 19 through 59 years
- Adults aged 60 years and older with risk factors for hepatitis B

The following groups may receive hepatitis B vaccination:

- Adults aged 60 years and older without known risk factors for hepatitis B

Risk factors for hepatitis B

- People at risk for infection by sexual exposure
  - Sex partners of people who test positive for hepatitis B surface antigen (HBsAg)
  - Sexually active people who are not in a long-term, mutually monogamous relationship (e.g., people with more than one sex partner during the previous 6 months)
  - People seeking evaluation or treatment for a sexually transmitted infection
  - Men who have sex with men
- People at risk for infection by percutaneous or mucosal exposure to blood
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  - People with current or recent injection use
  - Household contacts of people who test positive for HBsAg
  - Residents and staff of facilities for people with developmental disabilities
  - Health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
  - People on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis, and people who are predialysis
  - People with diabetes at the discretion of the treating clinician
- Others
  - International travelers to countries with high or intermediate levels of endemic hepatitis B virus (HBV) infection (HBsAg prevalence of ≥2%)
  - People with hepatitis C virus infection
  - People with chronic liver disease (including, but not limited to, people with cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and an alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
  - People with HIV infection
  - People who are incarcerated

In certain health care, evaluation, or treatment settings, a high proportion of clients have known risk factors for HBV infection. ACIP recommends universal vaccination of adults who receive care in those settings, which include:

- Sexually transmitted disease treatment facilities,
- HIV testing and treatment facilities,
- Facilities providing drug-abuse treatment and prevention services,

- Health-care settings targeting services to people who inject drugs,
- Correctional facilities,
- Health care settings targeting services to men who have sex with men,
- Chronic hemodialysis facilities and end-stage renal disease programs, and
- Institutions and nonresidential day care facilities for people with developmental disabilities.

Medical management

Treatment to prevent hepatitis B infection after exposure

If you know you've been exposed to the hepatitis B virus and aren't sure if you've been vaccinated, call your doctor immediately. An injection of immunoglobulin (an antibody) given within 12 hours of exposure to the virus may help protect you from getting sick with hepatitis B. Because this treatment only provides short-term protection, you also should get the hepatitis B vaccine at the same time, if you never received it.

Treatment for acute hepatitis B infection

If your doctor determines your hepatitis B infection is acute — meaning it is short-lived and will go away on its own — you may not need treatment. Instead, your doctor might recommend rest, proper nutrition and plenty of fluids while your body fights the infection. In severe cases, antiviral drugs or a hospital stay is needed to prevent complications.

Treatment for chronic hepatitis B infection

Most people diagnosed with chronic hepatitis B infection need treatment for the rest of their lives. Treatment helps reduce the risk of liver disease and prevents you from passing the infection to others. Treatment for chronic hepatitis B may include:

- **Antiviral medications.** Several antiviral medications — including entecavir (Baraclude), tenofovir (Viread), lamivudine (Epivir), adefovir (Hepsera) and telbivudine (Tyzeka) — can help fight the virus and slow its ability to damage your liver. These drugs are taken by mouth. Talk to your doctor about which medication might be right for you.
- **Interferon injections.** Interferon alfa-2b (Intron A) is a man-made version of a substance produced by the body to fight infection. It's used mainly for young people with hepatitis B who wish to avoid long-term treatment or women who might want to get pregnant within a few years, after completing a finite course of therapy. Interferon should not be used during pregnancy. Side effects may include nausea, vomiting, difficulty breathing and depression.
- **Liver transplant.** If your liver has been severely damaged, a liver transplant may be an option. During a liver transplant, the surgeon removes your damaged liver and replaces it with a healthy liver. Most transplanted livers come from deceased donors, though a small number come from living donors who donate a portion of their livers.

Other drugs to treat hepatitis B are being developed.

NURSING MANAGEMENT

Primary Nursing Diagnosis

- **Altered nutrition:** Less than body requirements related to decreased oral intake, nausea, vomiting, and anorexia

Nursing Intervention

1. Monitor hydration through intake and output.
2. Monitor prothrombin time and for signs of bleeding.
3. Encourage the patient to eat meals in a sitting position to reduce pressure on the liver.
4. Encourage pleasing meals in an environment with minimal noxious stimuli (odors, noise, and interruptions).
5. Teach self-administration of antiemetics as prescribed.
6. Encourage rest during symptomatic phase, according to level of fatigue.
7. Encourage diversional activities when recovery and convalescence are prolonged.
8. Encourage gradual resumption of activities and mild exercise during convalescent period.
9. Stress importance of proper public and home sanitation and proper preparation and dispensation of foods.
10. Encourage specific protection for close contacts.
11. Explain precautions about transmission and prevention of transmission to others to the patient and family.
12. Warn the patient to avoid trauma that may cause bruising.
13. Stress the need to follow precautions with blood and secretions until the patient is deemed free of HBsAg.
14. Emphasize that most hepatitis is self-limiting, but follow up is needed for liver function tests.

Documentation Guidelines

- Findings of physical exam and ongoing assessments: Nausea, vomiting, anorexia, diarrhea, color of stools and urine, daily weights, vital signs, jaundice, pruritus, edema, ascites, pain, level of consciousness
- Response to medical and nursing interventions:Medications,comfort measures,diet,hydration
- Pain:Location, duration,precipitating factors,response to interventions

Discharge and Home Healthcare Guidelines

- Provide instruction on the prevention of the spread of hepatitis to others. With hepatitis A, do the following for 1 to 2 weeks after the onset of jaundice. Use strict hand washing after bowel movements and before meals. Have separate toilet facilities if possible (if not,clean the seat with bleach after each use). Wash linens,towels,and undergarments separately from other items in hot,soapy water. Do not donate blood or work in food services until such work is cleared by a physician.
- With hepatitis B,C,or D,do the following,as directed by a physician,until antigen-antibody tests are negative. Maintain strict hand washing after urination and defecation. Do not share personal items (toothbrush, razor,washcloth). Use disposable eating utensils or wash utensils separately in hot, soapy water. Do not share food or eating utensils. Do not share needles, and dispose of them properly after a single use. Avoid intimate sexual contact; when sex can be resumed, use a condom and avoid intercourse during menstruation. Do not donate blood. Instruct the patient to inform household members and sexual partners of the fact that she or he has developed hepatitis and to encourage them to notify a primary healthcare provider immediately to assess the risk of the disease.
- To prevent complications, teach the patient to avoid alcohol for 6 months to 1 year, avoid illicit drugs and toxic chemicals, and take acetaminophen only when necessary and not beyond the recommended dosage. Note that in viral hepatitis, the patient has immunity only to the type of hepatitis he or she has had.

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