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Modern Diagnosis, Treatment Methods and Complications of Hepatitis B And C

Abstract

Hepatitis B and C viruses remain a serious social and medical problem in the world. Each year, 1.1 million people lose their lives due to these viruses and about 3 million people are registered as carriers. Hepatitis B virus can cause liver cancer and hepatitis C can cause cirrhosis of the liver. The only treatment for cirrhosis is a liver transplant and the cost of this operation varies between 100-150 dollars. In Azerbaijan, 465 cases of hepatitis B and 339 cases of hepatitis C were registered in 2009. Hepatitis B virus is transmitted through blood, mother-to-child and sexual contact. The disease is divided into acute, chronic and carrier stages and can be asymptomatic for a long time. The most effective way to protect against the virus is vaccination and awareness-raising measures.

Keywords: *Hepatitis B, Hepatitis C, Liver cirrhosis, Liver cancer, Viral infection, Vaccination, Public health*

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Hepatit B və C-nin müasir diaqnostikası, müalicə üsulları və ağırlaşmaları

Xülasə

Hepatit B və C virusları dünyada ciddi sosial və tibbi problem olaraq qalır. Hər il bu viruslar səbəbindən 1,1 milyon insan həyatını itirir, 3 milyona yaxın insan isə daşıyıcı kimi qeydiyyata alınıb. Hepatit B virusu qaraciyər xərçənginə, hepatit C isə qaraciyər sirrozuna səbəb ola bilər. Sirrozun yeganə müalicəsi qaraciyər köçürülməsidir və bu əməliyyatın dəyəri 100-150 dollar arasında dəyişir. Azərbaycanda 2009-cu ildə 465 hepatit B, 339 hepatit C hadisəsi qeydə alınıb. Hepatit B virusu qan, ana-bala və cinsi əlaqə yolu ilə ötürülür. Xəstəlik kəskin, xroniki və daşıyıcı mərhələlərə bölünür və uzun müddət simptomsuz keçə bilər. Virusdan qorunmanın ən effektiv yolu vaksinasiya və maarifləndirmə tədbirləridir.

Açar sözlər: *Hepatit B, Hepatit C, Qaraciyər sirrozu, Qaraciyər xərçəngi, Virus yoluxması, Vaksinasiya, İctimai sağlamlıq*

Introduction

Currently, hepatitis B and C viruses remain a social problem around the world. According to the latest statistics, 1.1 million people die in the world every year due to hepatitis B and C virus. About 3 million people are registered cases of hepatitis B and C virus. According to the latest data from the World Health Organization in 2017,60% of cases of liver cirrhosis and 68% of cases of liver cancer have been reported in the coming years due to complications of hepatitis. Complications of hepatitis B leads to liver cancer, and of hepatitis C leads to cirrhosis of the liver. The only treatment for cirrhosis of the liver is liver transplantation, which costs 100 $-150 $ worldwide (İsayev, 2009).

According to the statistics of the Ministry of Health of the Republic of Azerbaijan in 2009, 465 cases of HBV (hepatitis B) and 339 cases of HBC(Hepatitis C) were registered in Azerbaijan. If hepatitis viruses are detected in any of the health facilities, according to the instructions of the Ministry of Health, the ministry should be notified immediately.

The main importance of scientific research is that people need to know about these viruses. In order to prevent the hepatitis B virus, first of all, everyone should be vaccinated against the Hepatitis B virus. For the formation of a society with healthy youth, young people need to know how to protect themselves from dangerous viruses (Kurf, Gundesh, Geyik, 2013).

Research

The liver is a vital organ located in the abdominal cavity beneath the diaphragm, responsible for numerous physiological functions. It is the largest gland in the body. The liver performs the following functions:

1. Its primary function involves bile synthesis. The bile released into the duodenum plays a role in digestion.
2. The liver also excretes urea.
3. It participates in blood formation.
4. It contributes to carbohydrate metabolism.
5. It is involved in the functions of the endocrine glands.
6. It regulates the blood coagulation system and participates in the metabolism of heparin.
7. It serves a protective function in the body by neutralizing toxins.
8. It takes part in the synthesis of vitamin A.
9. It synthesizes proteins, fats, and carbohydrates.

The term “hepatitis” carries various meanings in ancient Greek and Latin. In Greek, “hepar” means liver, while “itis” signifies inflammation. This disease involves the damage and inflammation of liver cells. The World Health Organization has determined that over 250 million people globally are carriers of the hepatitis C virus, and approximately 300 million carry the hepatitis B virus. Several types of hepatitis have been identified: Hepatitis A, B, C, D, E, and G.

Hepatitis B

The causative agent of hepatitis B is a DNA virus from the Hepadnaviridae family. Hepatitis B is an acute and chronic infectious disease caused by a DNA virus that leads to the destruction of liver tissue. It often progresses without symptoms for a long time. Over 400 million people worldwide are carriers of hepatitis B. The virus is enveloped by a protein coat, known as the surface antigen (HBsAg), which is utilized in hepatitis B diagnosis. The virus contains a nucleus surrounded by a nucleocapsid, and inside the nucleus, there is DNA polymerase. There are three primary modes of hepatitis B transmission (Oghuz, Ureten, Erjul, Chiftchi, 2017):

1. Blood transmission — contact with the blood of an infected individual.

2. Maternal-fetal transmission — from an infected mother to the newborn during birth.

3. Sexual transmission — through the mucous membranes of sexual organs, spreading between partners.

Hepatitis B can also be transmitted through non-sterile needles, unsterilized medical instruments during gynecological and dental treatments (such as tooth extraction and implants), blood transfusions, manicures, pedicures, shaving, tattoos, and other similar procedures. The hepatitis B

virus can survive in the environment at room temperature for up to seven days, meaning that items contaminated with the virus can remain infectious for up to seven days (Azizov, 2012).

The incubation period of hepatitis B, or the latency period, lasts from 30 to 60 days. The disease is categorized into acute, chronic, and inactive carrier phases:

• **Acute phase**: lasts up to six months. If diagnosed in this phase, the disease often resolves with recovery.

• **Chronic phase**: persists beyond six months.

• **Inactive phase**: the virus is detected in the patient's blood, but it does not cause symptoms, and the individual is considered a carrier. Such carriers typically do not develop severe liver diseases over their lifetimes (Abdulrahmanov, Esmembetov, Nikulina, 2019).

Clinical Course of Hepatitis B

The clinical course of the disease is divided into three stages:

1. Incubation period
2. Pre-icteric phase
3. Icteric phase

Incubation Period:

This latent period typically spans 30 to 180 days. During this phase, the patient shows no symptoms and appears indistinguishable from a healthy person; however, they may still be contagious. Often, a patient only discovers they are a carrier or infected with hepatitis B through routine blood tests. If the HBeAg viral antigen is detected, the virus is active and rapidly replicating within the body. In contrast, if anti-HBe antibodies are present, the patient is not infectious and is merely a carrier of the hepatitis B virus (Abdulrahmanov, Esmembetov, Nikulina, 2019).

Pre-icteric Phase:

During this phase, patients may experience symptoms such as high fever, nausea, vomiting, diarrhea, itching (especially under the right ribcage), muscle pain, low mood, general weakness, and pain in the right subcostal region. The patient may present with a coated tongue, and due to the liver's enlargement, they may experience nausea and vomiting after eating. Additional signs include hypotension and bradycardia. This stage may last from several days to several months, and jaundice may not always develop. In cases where the body's immune response is strong, the disease has a positive outcome in 90-95% of cases. However, if the immune response is insufficient to combat the disease, the prognosis is poor. For infants and young children, the illness becomes chronic in 90-95% of cases (Abdulrahmanov, Esmembetov, Nikulina, 2019).

Symptoms of Chronic Hepatitis B:

In chronic hepatitis B, the disease often remains asymptomatic, affecting 5-10% of patients. Many carriers are unaware of their status until routine blood tests reveal their infection. These patients do not display symptoms until 30 years later when liver tissue has become significantly damaged, often presenting as acute hepatitis symptoms. Over time, chronic hepatitis B may lead to liver tissue damage, cirrhosis, liver cancer, and liver failure. In some cases, the disease manifests as chronic fatigue, depression, and general weakness without a specific cause. Each year, over 600,000 people worldwide die from hepatitis B-related complications (Uchaykin, Cherednichenko, Smirnov, 2014).

Complications of Hepatitis B:

In the acute phase, complications may include liver failure and hemorrhagic syndrome (liver bleeding). In the chronic phase, cirrhosis may develop, where healthy liver tissue is replaced by connective tissue, and hepatocellular carcinoma (liver cancer) may arise (Uchaykin, Cherednichenko, Smirnov, 2014).

Diagnosis of Hepatitis B:

In the initial stage of acute hepatitis, diagnostic markers in the blood include HBsAg, HBeAg, HBV-DNA, and IgM anti-HBc. Liver function tests may show variations in bilirubin levels, ALT, and AST titers, which help distinguish between acute and chronic phases. Additional diagnostics include general blood and urine tests, abdominal ultrasound (US), biochemical blood tests, and PCR analysis.

Treatment of Hepatitis B Virus

The treatment of hepatitis B should be managed by a hepatologist or infectious disease specialist, typically in a hospital setting. Initially, patients are prescribed a diet that excludes fatty, salty, spicy, and highly seasoned foods, as well as alcohol and carbonated beverages. A "Diet Table No. 5" is recommended for these patients. Treatment also includes infusion therapy, where solutions like glucose, Ringer's solution, and hemodilution agents are administered intravenously. Diuretics, enzymes, and glucocorticosteroids are used in the treatment regimen, alongside antiviral therapy. In the acute phase of the disease, recovery is often achieved (Moiseyeva, Martynova, Mukhina, 2019).

Prevention of Hepatitis B

Vaccination remains the most effective method for preventing hepatitis B. There are two main types of hepatitis B vaccines: plasma-derived and recombinant vaccines. Currently, newborns and young children are routinely vaccinated, with vaccines providing long-lasting immunity. The vaccine consists of 3 doses and is administered at intervals:

1. The first dose is given within 12 hours after birth,in the delivery room.
2. The second dose is administered one month after the first.
3. The third dose is given six months later.

After completing all three doses, a person typically acquires lifelong immunity to hepatitis B. In addition to vaccination, other preventive measures include avoiding unprotected sexual encounters and adhering to safety protocols during blood transfusions, such as sourcing blood from rigorously tested blood banks. In beauty salons, clients are advised to use personal tools for procedures like manicures and pedicures to reduce the risk of infection (Moiseyeva, Martynova, Mukhina, 2019).

Hepatitis B in Children

Hepatitis B infections are also observed in children. The earlier the infection occurs in life, the more likely the disease will develop into a chronic form. For instance, 90% of infected infants, 50% of children between the ages of 1 and 5, and 10% of adolescents over the age of 15 develop chronic hepatitis B. Newborns often contract the virus from infected mothers during birth. Consequently, the World Health Organization (WHO) recommends administering the first dose of the hepatitis B vaccine to all newborns within 12–14 hours after birth. In cases where the mother is infected with or is a carrier of hepatitis B, the newborn should receive both the first dose of the hepatitis B vaccine and hepatitis B immunoglobulin within 12 hours of birth. Even if neither parent is a carrier, it is recommended that all newborns receive their first dose of the hepatitis B vaccine at birth and the remaining two doses at later pediatric check-ups under the supervision of a physician. The hepatitis B vaccine is recommended for people of all ages to protect against hepatitis B and the related hepatitis D virus (Nikolayeva, Mkhaylov, Blokhina, 2004).

Hepatitis B and Pregnancy

As noted, one route of hepatitis B transmission is from mother to child, which can occur during the antenatal, intranatal, or postnatal periods. In most cases, women are infected with this virus before pregnancy.

If a pregnant woman tests positive for HBsAg, the risk of fetal infection is 10–20%. If both HBsAg and HBeAg are present, this risk increases significantly, reaching up to 90%. Transmission of hepatitis B to the newborn may occur during vaginal delivery or cesarean section. Consequently, as part of standard prenatal care, pregnant women are screened for hepatitis B during their first visit, as well as at 12 weeks and again between 34–36 weeks. Women with chronic hepatitis B, in the absence of cirrhosis or liver failure, may continue their pregnancy. Pregnant carriers of hepatitis B are at increased risk for:

1. Miscarriage,
2. Preterm delivery,
3. Premature rupture of amniotic membranes,
4. Weak labor,
5. Hemorrhage during labor and pregnancy,
6. Birth asphyxia in the newborn,
7. Intrauterine fetal death, and

8. Intrauterine growth restriction.

During the second trimester, an acute hepatitis B exacerbation can lead to complications such as encephalopathy and coma. In the third trimester, worsening jaundice and increased toxicity may occur, potentially resulting in perinatal death (Nikolayeva, Mkhaylov, Blokhina, 2004).

Diagnosis

When hepatitis B is detected in a pregnant woman, HBsAg is tested to determine if the infection has persisted for over six months. In cases of chronic hepatitis B, liver function tests are recommended, including ALT, AST, and bilirubin levels.

Treatment

There is no specific treatment for acute hepatitis B during pregnancy. Pregnant women who test positive for HBsAg should be managed by an obstetrician in coordination with a hepatologist or infectious disease specialist. Delivery should take place in a tertiary care center. If the patient's condition worsens, particularly with symptoms such as vomiting, jaundice, or liver decompensation, immediate hospitalization is necessary.

Prevention

The newborn should receive the hepatitis B vaccine and immunoglobulin within 12 hours after birth. Breastfeeding is not contraindicated for mothers who carry hepatitis B.

Hepatitis C

Hepatitis C is a viral infection that affects the liver, presenting as both an acute and chronic illness. According to the World Health Organization (WHO), hepatitis C occurs worldwide, with higher prevalence in Europe and the Eastern Mediterranean, where the infected population exceeds 12 million.

Transmission

Hepatitis C is primarily transmitted through blood. Common routes of infection include (Yushchuk, Klimova, 2012):

1. Use of improperly sterilized medical instruments in healthcare settings,
2. Lack of sterilization of tools in beauty salons,
3. Transfusion of untested blood and blood products,
4. Sharing needles in drug use,
5. Tattoos and piercings.

Hepatitis C can also be transmitted from mother to child and through sexual contact involving blood.

Clinical Presentation

The incubation period of hepatitis C, during which the virus remains asymptomatic, can last from two weeks to six months. Symptoms, when they do appear, may include loss of appetite, nausea, vomiting, pain in the right upper abdomen and general abdominal discomfort, jaundice (notably yellowing of the sclera and skin), itching, recurrent unexplained fevers, a sensation of heaviness in the lower extremities, dark and foamy urine, irritability, and general weakness (Yushchuk, Klimova, 2012).

Diagnosis

In many cases, individuals with hepatitis C are unaware of their infection due to its asymptomatic nature. The infection is often discovered incidentally during routine blood tests. Patients with chronic hepatitis C may live with the virus for years without symptoms until it progresses and causes significant liver damage. Diagnostic testing for HCV occurs in two stages:

1. A serological antibody test to detect the presence of hepatitis C virus antibodies.
2. If antibodies are detected (indicating a positive result), an additional test is conducted to check for hepatitis C virus RNA (ribonucleic acid) to determine whether the infection is acute or chronic. This RNA test is crucial, as in approximately 30% of cases, the infection may spontaneously resolve without treatment due to a strong immune response (Patyutko, 2005).

After a diagnosis of hepatitis C, additional laboratory and imaging tests, such as ultrasound (US), liver biochemical tests, liver biopsy, or non-invasive liver analyses, are recommended to assess the extent of liver damage. Early diagnosis is essential for timely treatment and improved outcomes.

Treatment

Treatment options for hepatitis C exist and aim to prevent prolonged liver tissue damage. Antiviral medications are commonly used. Individuals diagnosed with hepatitis C are advised to avoid alcohol and maintain a healthy weight. The World Health Organization (WHO) recommends antiviral therapy for patients with chronic hepatitis C infection. Oral direct-acting antivirals (DAAs) are often preferred due to their minimal side effects, and treatment typically lasts between 12–24 weeks, depending on the presence of liver cirrhosis (Patyutko, 2005).

Prevention

Currently, there is no vaccine for hepatitis C. Education is crucial for prevention, with individuals encouraged to avoid high-risk behaviors. Precautions include practicing safe sex and ensuring that tools used for manicures, pedicures, piercings, and tattoos are sterile.

Conclusion

Hepatitis B and C viruses are widespread infectious diseases that cause serious health problems worldwide. Thanks to modern diagnostic methods, early detection and treatment of these viruses have become possible. Effective treatment methods and vaccination programs play a crucial role in preventing the spread of the viruses. However, complications such as liver cirrhosis and liver cancer still carry a high risk of mortality. Therefore, public awareness and regular medical check-ups are essential. In the future, the development of more effective and accessible treatment methods will help reduce the complications caused by hepatitis.

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