An Overview of Hepatitis B and C in Pakistan

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Abstract

Hepatitis is leading cause of morbidity and mortality in the world, and especially in Pakistan due to high prevalence. Around 7.4% of Pakistani population is suffering from chronic hepatitis B and C, which is highest in Southeast Asia region. Unnecessary high use of injections, use of contaminated razors, intravenous drug users (IDUs) and acupuncture needles are some of the leading factors of infection in Pakistan. HBV is a DNA type virus with a genome size of 3.2kb while HCV is positive single stranded RNA type virus with a genome size of 9.6kb and most prevalent type of hepatitis C in Pakistan is 3a. Majority of patients (>80%) remain asymptomatic with no clinical signs of disease. Chronic hepatitis results in liver fibrosis, cirrhosis, hepatocellular carcinoma and other complications which are very hard to treat. Hepatitis B vaccine is available in the market which gives lifelong protection while due to high mutation rate of HCV, there is no vaccine for HCV yet. As treatment of hepatitis is very expansive so government should have focus on preventive measures to avoid the further spread of infection and this can be achieved by proper educational and awareness campaigns about the disease.

Key words: Chronic Infection, Hepatitis, Prevalence, Pakistan, Vaccine.

Introduction

Hepatitis is a disease that causes inflammation of the liver. This may be caused by many factors including viruses, bacteria, drugs or any toxic materials. Viruses are known to be the major cause of hepatitis and the hepatitis caused by the viruses is termed as viral hepatitis. The viruses responsible for hepatic inflammation include hepatitis A, B, C, D and E. Viral hepatitis has posed a serious health concern globally due to high prevalence of hepatitis around the world [1]. Viral hepatitis has been classified in two types, infectious hepatitis and serum hepatitis. Hepatitis A and E have faeco-oral route for transmission. Both these viruses spread by drinking contaminated water and cause abdominal pain, anorexia, vomiting, fever and jaundice. These are both self-limiting and the virus is cleared by the body’s immune system [2]. Hepatitis D is an incomplete RNA virus and cannot cause infection without the help of hepatitis B because it requires hepatitis B surface antigen for transmission of its genome. Therefore, this can cause infection only...
in hepatitis B positive patients [3]. Hepatitis B and C account for more serious disease and in Pakistan, these account for major burden of hepatitis. Both hepatitis B and C spread through blood, serum, vaginal and other body fluids. These viruses can also be transmitted perinatally i.e. from mother to children. It does not spread through breast milk, food or casual contact with the infected person or sharing food drinks or utensils with infected person. Hepatitis B and C can cause hepatocellular carcinoma and other liver complications. Highest morbidity rates are due to hepatitis A, E and D, while hepatitis B and C account for highest mortality of all the viral hepatitis types.

Prevalence
According to WHO, it is estimated that 360 million people have chronic hepatitis B infection worldwide and about 600,000 individuals die each year from complications of HBV, while 3-4 million new cases of HCV appear each year. 130-150 million people are with chronic Hepatitis C infection. According to WHO reports the seriously infected patients among these are under high risk of getting liver cancer or liver cirrhosis. Each year more than 350,000 individuals die of HCV related diseases worldwide (WHO). Pakistan is one of the countries having highest rates of chronic infection of hepatitis B and C. According to a survey conducted by Pakistan Medical Research Council (PMRC), it is estimated that in Pakistan about 12 million individuals are affected by hepatitis B and C. This comprises of 7.4% of the population and out of this 2.4% are infected with hepatitis B and 4.9% are infected with Hepatitis C [4]. Therefore, high endemic disease of Hepatitis B and C virus is present in Pakistan.

Major Factors of Infection
According to WHO, mostly the developing countries and those with low socio-economic ratio have high rate of HBV and HCV prevalence. Pakistan is one of the countries having highest prevalence of chronic infection. According to a survey conducted by regional office of world health organization for South-East Asia, it was reported that countries with highest chronic infection of HBV and HCV are Egypt (22%), Pakistan (4.8%) and China (3.2%). In these countries, the cause of viral spread may be with the use of items contaminated by the infected patients. These items may include needles, razors, acupuncture needles, hemodialysis, needle stick injury and tattooing equipment’s etc. The barber’s razor is also considered as a major vehicle for carrying infection from one individual to another. Because in most underdeveloped and developing countries uneducated, people associated with this profession are not aware of the risk of reusing their razor on multiple customers. In Pakistan, some barbers shave their clients with an old fashioned razor with a fixed blade which results in the spread of disease from an infected individual to a healthy person [5]. In addition, poor waste disposal and lack of appropriate medical and surgical waste infrastructure can be another reason for the spread of virus. The use of unscreened blood from blood donors can also add to the factors for viral transmission. In Pakistan, about 4% of the blood donors are reported to have HCV antibodies.

Misuse and overuse of therapeutic injections and the use of invasive medical instruments without proper sterilization is also considered as a major factor for the viral infection. According to WHO, the estimated proportion of needle and syringe reuse is 30-75% in south-east Asia, which is highest in the world. Pakistan has highest rate of intramuscular injections per person in a year and about 95% of these injections are therapeutic in nature [6]. In developing countries, people prefer to take injections even if the drug of the same therapeutic effect is available because they consider injections have greater therapeutic efficiency. Sometimes physicians also encourage injection seeking for extra fee. About 94% of the syringes used for these injections are re-used most of the time and sterility is not maintained because of financial limitations [4, 7] which resulted in rapid spread of infection in the region and especially in Pakistan. Sometimes healthcare providers also lack risk awareness associated with the use of unnecessary injections. In a study conducted in peri-urban area of Karachi, it was found that none of the 18 practitioners interviewed, knew about the HCV transmission through injections [7]. These unsafe injections
may cause annually 21 million cases of HBV and 2-5 million cases of HCV globally [8]. These injections appear to be the most significant cause of virus spread in Pakistani population.

The government of Pakistan is making several efforts to stop infection in Pakistan e.g. use of auto-disposable syringes, blood screening before donation, vaccination of newborns and high risk groups, standard patients safety measures, education and awareness campaigns and free treatment of needy patients but still new cases are emerging at very fast rate [9].

Genomics of Hepatitis B and C
Hepatitis B belongs to the family Hepadnaviridae. It consists of a partial double stranded DNA genome which is 3.2kb in size [10]. Hepatitis B surface antigen (HBsAg), hepatitis B core antigen (HBcAg), hepatitis B e antigen (HBeAg) and nucleocapsid core protein are the viral proteins of great clinical importance. These proteins are tested for the diagnosis of Hepatitis B. If serum contains HBsAg, this signifies viral infection, while antibodies against HBsAg appear after recovery from the infection [11]. Hepatitis C belongs to the family flaviviridae. The virus is single positive stranded RNA virus and has 9.6kb genome. Most prevalent type of hepatitis C in Pakistan is 3a [12]. Although HCV replicates mostly in liver but is also reported to exist in some extra hepatic sites, including peripheral blood lymphocytes, epithelial cells of gut and central nervous system [13]. The genome of HCV codes three structural and six non-structural proteins [14]. Hepatitis C is reported to be 5-20 times more infectious as compared to Human Immunodeficiency Virus (HIV) [15].

Disease and complications
Initially after infection from the virus, the disease is termed as acute hepatitis, while the disease is said to be chronic if the virus is not cleared even after six months. The chronic infection may lead to the development of fibrous tissue in liver termed as liver fibrosis. In addition, liver cirrhosis can also happen. Hepatitis C virus is a slow progressing virus and develops cirrhosis after 10 to 40 years of initial infection. About 80% of the people remain asymptomatic during acute infection, so it is called silent infection, while some patients suffer from fatigue, abdominal pain, vomiting, decreased appetite, fever, dark urine, grey colored feces and possibly jaundice. In 75-80% of the acutely infected individuals, the virus is cleared due to the activation of the cell mediated and humoral immune response of the body. The cell mediated immune cells kill the virus infected hepatocytes, which later on regenerate. The antibodies produced during the humoral immune response are important for clearance of virus from body and to prevent re-infection [3]. It is still unknown that why in some individuals who become chronically infected, immune response is unable to clear the infection from their body [10]. The development of liver cirrhosis may cause a person to vomit blood or have black tarry stool. This is due to the slowing down of blood flow to the liver and increased pressure in the veins of stomach carrying blood to liver. This causes development of varicose veins in the stomach which on breaking down cause blood vomit (International Hepatitis Foundation). WHO has estimated that 20% of the chronically infected individuals develop liver cirrhosis. Of these 25% may develop liver failure and 1-5% die of the disease. Identification of acute or chronic infection is only possible with clinical tests.

Vaccines and Treatment
There are two types of vaccines available for HBV. These are monovalent hepatitis B vaccine and recombinant hepatitis B vaccine. The HBV vaccine provides immunity for 15 years or even lifelong immunity can be conferred by the vaccine whereas, yet no vaccine is available for HCV. Hepatitis B vaccine does not provide immunity against hepatitis C [16]. The HCV has RNA dependent RNA replication and the enzyme for this replication does not have proof reading ability and this leads to an error prone replication. This causes generation of a great diversity in the types of HCV globally which makes vaccine development against this virus even more difficult [13]. No treatment is required for acute hepatitis because this is self-limiting and is cleared by the body’s own immune system. In the case of HBV infection, taking injection of hepatitis B
immunoglobulin within 14 days of contracting the virus may be helpful for clearance of acute infection. To treat chronic infection, two medications are available i.e. Interferon and Lamivudine. For the treatment of HCV, three types of interferon and a combination of interferon and Ribavirin are available. Many new drugs with better treatment efficiency are coming in the market and will also have fewer side effects. The medications available for both HBV and HCV have some adverse side effects on the health of the individuals [17].

Conclusion
The prevalence of both Hepatitis B and C is very high in Pakistan and is highest in the region, which has created a medical emergency situation in the country. With each passing day, hundreds of patients are dying due to complications of Hepatitis B and C. The treatment of viral hepatitis is very expensive and posing a great financial burden on the economy of the country. Therefore, it is more economical to take preventive measures to avoid the disease. Awareness at massive level is very important to stop the further spread of infection. In addition, avoiding improper handling of items infected with blood or any other body fluids of an infected person is very important. Beside this, sterilization of medical equipment’s, proper waste disposal and blood screening before blood transfusion should be practiced to decrease disease burden in the future.

References