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Review Article

Hepatitis B

Magnitude of Hepatitis-B in India: Role of Hepatitis B Vaccination

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Hepatitis B Infection is most prevalent chronic infection in India. It is associated with Hepatocellular carcinoma in chronic carrier. It is also responsible for chronic hepatitis and hepatic failure in large number of population. It is almost more than a decade Hepatitis B vaccination was included in National Immunization Programme (NIP). Still hepatitis B continues to be a major health Issue. In this review article we have discussed about role of vaccination in Hepatitis B infection in Indian scenario.

Keywords: Hepatitis B, Vaccination, Chronic carrier, Prevalence of Hepatitis B

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Introduction

Viral hepatitis continues to be a major public health problem in India. It is caused by different hepatotropic viruses like Hepatitis A, B, C, D and E. Nearly 290,000 cases of viral hepatitis were reported in India in 2013. Since 1955, several epidemics of hepatitis have been reported [1-5]. Although feco-orally transmitted hepatitis A (HAV) and hepatitis E (HEV), are highly endemic in India, hepatitis E has been responsible for most of the epidemic [1-5]. But recently outbreaks of hepatitis A have been also reported from the country. Different studies shows that HEV is responsible for acute liver failure in 30-70% cases [6, 7]. In pediatric population, hepatitis A is the predominant etiological agent for the cases of viral hepatitis.

Hepatitis viruses B (HBV), D (HDV) and C (HCV), which predominantly transmit through the parenteral route, pose a serious "silent epidemic" challenge to India. Infected persons are unaware of their chronic carrier status, and continue to infect others for decades and ultimately increase burden on health care system with expenses of treating liver failures, chronic liver diseases, and cancers. Despite the availability of the various serological test (for Hepatitis A, B, C, D and E) commercially, in 30-40 per cent of the cases of viral hepatitis, cause remain unknown. Hepatits G virus, Sen Virus (sen V) and TT virus (TTV) could be cases of unclassified viral hepatitis [31].

In India, HBV is second most common cause of acute hepatitis after HEV. About 12.5-21 per cent of the cases of acute viral hepatitis are due to hepatitis B infection and 40 per cent of the cases of subacute hepatic failure as well. Estimated point prevalence of HBV is 3.7%. India is considered "intermediate level" of HBV endemicity. Every year, one million Indians are at risk for HBV and about 100,000 die from HBV infection. In our country, of the 25 million infants born every year, over one million run the lifetime risk of developing chronic HBV infection Though HBV is the major cause of chronic liver disease, cirrhosis and liver cancers in India, about 20% of them are also associated with HCV infection. Dual infection of HDV and HBV has more serious presentation of liver failures in acute infections and liver cancers in chronic infections. HBV and HCV co-infection and their coinfection with HIV is another area of concern.

Despite the presence of a substantial HBV disease burden, India has not yet embarked on a national programme for the control of this infection.

In India, the frequency of HBV infection has been studied in 4 distinct population groups: (i) general population, (ii) blood donor's pregnant women, (iii) subjects at high risk of acquiring HBV infection, and (iv) patients with various liver diseases.

Table 1: Prevalence of hepatitis B surface antigen (HBsAg) positivity among general population

Author (Year)	Place	Number	Prevalance
Hills et al. (1970) [8]	West Bengal	100	0.00
Sama et al. (1973) [9]	Delhi	952	0.10
Pal et al. (1973) [10]	Chandigarha	1461	1.60
Sama et al. (1973) [11]	Delhi	879	2.74
Shanmugham et al. (1973) [12]	Vellore	741	4.2
Dutt et al. (1972) [13]	Delhi	796	2.6
Singhni et al. (1990) [14]	Vellore	8569	0.7-3.8
Elavia et ai. (1991) [15]	Mumbai	10433	2.02
Irshad et al. (1994) [16]	Delhi	20435	2.60
Nijhawan et al. (1997) [17]	Jaipur	69330	2.1-3.1
Choudhury et al. (2005) [18]	West Bengal	7653	2.97

This table shows that prevalence of hepatitis B in different studies is 0.1-4.2% in general population. The HBsAg positivity rates among pregnant women is slightly higher than general population [19, 20, 21]. Further, all these studies were point prevalence studies and did not meet the defining criterion for HBsAg carrier—HBsAg positivity lasting for at least 6 months. Keeping in mind, false positive and false negative test result, calculated true HBsAg positivity rate might lie between 1-2% [22]. However, based on studies in blood donors and the general population, we still believe that the prevalence rate for HBsAg lies between 2% and 4%.

High risk populations: In patients with Thalassemia and Haemophilia, HBsAg and anti-HBs positivity rates are much higher than general population. Different studies shows that HBsAg positivity is between 6%–60% and anti-HBsAg is between29%– 70% [23- 25]. Among professional blood donors HBsAg has been reported between 15%–20% [26]. However, among healthcare workers, HBsAg positivity has been reported to be 1.7%–40% [27, 28]. Kamlesh Sarkar et al. in 2004 found in their study that 23.3% commercial sex workers were HBsAg positive [29]. Household contacts, particularly spouses and children of

Persons with chronic HBV infection, are known to be at an increased risk of acquiring HBV infection [30]. Therefore, such household contacts need to be screened for HBV infection and preventive steps taken if they are not already infected.

Prevention and control: Liver disease due to HBV infection is considered major public health problem, because it is the fourth or fifth most important cause of mortality in the most productive period of life, between 15-45 years of age. There is no safe and effective drugs which specifically acts against hepatitis viruses, protects from damage and stimulates liver functions and helps in hepatic regeneration. The use of available anti-viral drugs like lamivudine, adefovir dipivoxil, entecavie, telbivudine, tenofovir, Foscarnet, Ribaverin and others have not yielded adequate and satisfactory success. Only interferons and pegylatet interferon have shown some beneficial results. However, the prohibitive cost, prolonged treatment and side-effects have restricted their use.

Prevention of acute and chronic HBV infection and elimination of HBV transmission in all age groups is most effectively achieved through hepatitis B vaccination. WHO recommends routine infant vaccination along with catch-up immunization for adolescents and high risk populations? India introduced universal immunization against hepatitis B in 10 states in the year 2002, and in 2011, scaled up this operation countrywide. Recently a pentavalent vaccine, which also protects against HBV, has been introduced in some states. The HBV vaccine also protects from HDV infection..The national strategy to eliminate HBV transmission has four components:

01. Prevention of perinatal HBV infection through maternal screening and post-exposure prophylaxis of newborns of HBsAg-positive mothers;
02. Hepatitis B vaccination of all infants to prevent infection in childhood and at later ages;
03. Vaccination of all adolescents not previously vaccinated to prevent infection in this ag group and at later ages;
    Vaccination of adults and adolescents in groups at increased risk for infection.

Promoting safe blood supply, safe injections and safe sex are other recommended preventive measures. Universal hepatitis B vaccination Provide long term protection. A 3-dose course induces protective antibody concentrations in >95% of healthy infants, children, and adolescents and in >90% of healthy adults [32, 33]. The minimum spacing of doses is 4 weeks between doses 1 and 2, 8 weeks between doses 2 and 3, and 16 weeks between doses 1 and 3[34]. Vaccination coverage among adults at occupational risk for HBV infection has successfully reduced infection incidence by >90%.

He conventional vaccination schedule of 2 doses at 1 month interval followed by a third dose 6 months after the first (0-1-6) does not coincide with the EPI immunization program of Government of India. The studies shows that GMT (Geometric mean titer) after 3 dose of hepatitis B vaccination is variable for different schedule [35, 38, 39]. The GMT of Anti HBs obtained in infants using 2, 4 and 6 months and 0, 1 and 6 months schedules were however higher than EPI schedule.

Table 2: Geometric Mean Titers in Infants Vaccinated against Hepatitis B by Different Vaccination schedules

Schedule	Study	Geometric mean titers (mIu/ml)
6, 10 and 14 weeks	Gomber et al. [35]	224
2, 4 and 6 months	Giamanco et al [38]	949
0, 1 and 6 months	Safary et al.[39]	4023

The significance of post vaccination titers in providing long term protection is unclear but some of the expert suggests that infants who achieved higher Anti HBs titers were likely to be protected better in later years than infants with low titers [36, 37].

Conclusion

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