

Hepatitis B & C Viral Markers Status in Icteric Children at a Tertiary Care Hospital

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Abstract

Background: Hepatitis B (HBV) and Hepatitis C virus (HCV) can cause important morbidity and mortality and are major causes of acute and chronic liver disease worldwide. **Objectives:** This study was an attempt to evaluate the seroprevalence rate of hepatitis B and C in jaundiced children who were admitted at Bangabandhu Sheikh Mujib Medical University. This would be helpful to take measure for the prevention of hepatitis B and hepatitis C infection in paediatric age group. **Methodology:** A total of 50 admitted jaundiced children of either sex selected randomly were studied during July 2004 to June 2005 in the Department of Paediatrics of Bangabandhu Sheikh Mujib Medical University. Venous blood was tested for HBsAg and anti-HBcAb (IgM) and anti-HCV viral markers by ELISA. **Results:** The HBsAg test was positive among 24.0 %, Anti-HBcAb (IgM) test positive in 14.0 %. HBsAg was positive in 66.66% of male children and 33.33% of female children. Sero positivity was more in the 10 years age group. **Conclusion:** This study shows high rate of HBsAg and Anti-HBcAb IgM seropositivity among icteric sick children so, further studies with appropriate design & sample size to be conducted.

Key words: HBsAg, anti-HBcAb (IgM), anti-HCV, icteric children.

Introduction

Viral hepatitis is a major public health problem in developing as well as developed countries¹. Hepatitis B virus (HBV) and C virus (HCV) are important cause of morbidity and mortality and are major causes of acute and chronic liver diseases worldwide². These often lead to cirrhosis or primary hepatocellular carcinoma.

The prevalence of HBV infection varies from country to country and within countries, having a close association with behavioural, environmental and host factors². It has been estimated that there are approximately 350 million HBV carriers in the world, of whom 80% are Asians³. In Europe and North America the incidence of known carriers is about 1 in 1000 people⁴. Five percent of world population and it is estimated that 10 to 30 million people become infected with the virus each year worldwide; many of them are children and teenagers⁴. Many cases of acute hepatitis B occur sporadically with no known source and studies have shown that prior unrecognized infection is common⁴. Over 90% of infants, 50% of children and 5% of adults with acute hepatitis B will develop chronic or long-

term infection³. The current prevalence of chronic hepatitis B based on seropositivity for HBsAg in Bangladesh ranges from 4.4% to 7.5%⁵. However, among high-risk populations, the seroprevalence of HBsAg is as high as 29%⁵. Other study shows about 7% to 10% population have hepatitis B infection and 3% to 5% pregnant mothers are carrying the hepatitis B virus in Bangladesh⁶. Carrier rate is very high, ranging from 9%-12% in Bangladesh, Korea, Myanmar, Thailand⁷. Up to 70% of cases of hepatocellular carcinoma are attributed to HBV infection⁸.

Hepatitis C is a particularly insidious disease. The annual incidence of HCV infection among general population in Bhutan, Indonesia, Myanmar, Sri-Lanka and Thailand are 1.3%, 2.5%, 3.9%, 1.4% and 0.74% respectively⁷. It is estimated that approximately 3% of the world's population is infected with HCV. Prevalence ranging from less than 1.5% in Europe, USA, Canada, over 2.5% Africa and south-East Asia; 2.5% to 5% in the Western Pacific to up to 12% in the Middle-East⁹. An acute HCV infection is mostly asymptomatic; however, evolves towards chronicity in approximately 85% of cases. Long-term morbidity is

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characterized by cirrhosis, primary liver cancer and several extrahepatic manifestations, including cryoglobulin associated symptoms and a sub-type of non-Hodgkin B-cell lymphoma⁹. It is estimated that 2.6 to 3.9 million people which is around 2% to 3% of population of Bangladesh have Hepatitis C infection⁶. In most of the patients there may be no symptoms⁶. HBV and HCV are transmissible through blood transfusion, sexual contacts, very close contacts, over-crowding, and using common syringes and even without any known parenteral risk factors and the infection might end up with fatal conditions like liver cirrhosis and HCC^{6,7,8}.

This study was an attempt to evaluate the seropositivity of HBV and HCV markers among icteric children admitted at Bangabandhu Sheikh Mujib Medical University, Dhaka.

Methodology

This cross-sectional study was conducted in the Department of Paediatrics and Department of Microbiology of Bangabandhu Sheikh Mujib Medical University, Dhaka, from July 2004 to June 2005. A total number of 50 children admitted with jaundice of one (1) to fifteen (15) years age of either sex were selected randomly by selecting every fifth children. The parents were explained the purpose of the study. Both the written & verbal consent was taken from the parents without any coercion. When parents did not give consent for any particular case next case was selected. The exclusion criteria were very sick children, vaccinated against hepatitis B, children suffering from malignancy, parents didn't give consent for the study. History and clinical findings were recorded in pre-tested semi structured questionnaire. Three ml of venous blood was taken aseptically in plain dry sterilized test tube and serum was separated by centrifugation at a rate of 4000 rpm for five minutes. The supernatant clear serum was collected in a dry screw-cap vial, labelled for individual subject and was stored at -20°C till it could be tested. All samples were tested for HBs Ag, anti-HBcAb-IgM and anti HCV by ELISA technique using kits from DiaSorin S.N.I, Italy. Positive results were interpreted according to the manufacturer's recommendations.

Results

Table 1 shows the 24% positive for HBs Ag and 14% positive for Anti-HBc Ab (IgM). Table 2 shows the differences of sero-positivity in both the sexes.

Table 1: Seropositivity of the viral markers in jaundice children (n=50)

Variable	Children with Jaundice (n=50)	
	Number	Percentage
HBsAg +ve	12	24
Anti-HBc (IgM) +ve	7	14
Anti-HCV +ve	0	0.0

Positivity was higher in male children. HBsAg was positive in 66.7% of male and 33.3% of female children. The relationship of age with viral marker's seropositivity is shown in table 3. The viral markers HBsAg and Anti-HBc Antibody IgM were positive more in the age group 10 years and above with percentages of 58.3% and 57.1% respectively.

Table 2: Distribution of seropositivity of the viral markers in both the sexes

Sex	HBsAg +ve	Anti HBcAb (IgM)+ve	Anti HCV +ve
Male	8 (66.7%)	5 (71.4%)	0
Female	4(33.3%)	2(28.5%)	0
Total	12(100%)	7(100%)	0

There was no history of blood and blood products transfusion among the positive cases for HBsAg, Anti-HBcAb IgM. Only in 2 cases there was history of blood and blood product transfusion but they were negative.

Discussion

Routine screening for hepatitis B requires assay of at least two serological markers. HBsAg is the first detectable serologic marker of infection to appear and is found in almost all infected person. Antibody to core antigen Anti-HBc Ab-IgM is valuable single serologic marker for HBV infection because it is present as early as HBsAg and continues to be present later in the course of the disease when HBsAg has disappeared.

Table 3: Shows the association of age with viral markers seropositivity in children

Age groups (yrs)	HBsAg +ve	Anti-HBcAb (IgM)+ve	Anti-HCV +ve
<5	2(16.6)	1(14.3%)	0
5-9	3(25.0)	2(28.6%)	0
>10	7(58.3)	4(57.1%)	0
Total (n=50)	10(100%)	7(100%)	00

The fifty children who were admitted having apparent sign of yellow sclera, HBsAg were positive in 24% case and Anti-HBcAb IgM was positive in 14% cases respectively. Abe et al¹⁰ studied on children with liver disease in the age group 1 to 14 years, to find out prevalence of both HBV and HCV respectively. It was found that 65.6% was positive for HBV and 15.9% was positive for HCV. This high rate of positivity was probably for widespread endemicity in Russia of both the viruses. Study done by Mehnaz et al¹¹ in Pakistan among children with liver disorders was tested for HBsAg and 37.5% was detected positive, which is similar with this study. A study by Islam et al¹² in wide-spread age ranges, found that children suffering with viral hepatitis, 15.4% positive for HBsAg. Malathi et al¹³ in India was done a study for detection of a etiological factors of acute viral hepatitis

of the children admitted in hospital and found hepatitis B 22% which is consistent with the present study. In the present study HBsAg was positive in 24% cases. It can be explained on the basis that this study was done in a tertiary hospital, where serious cases were referred from all over the country. In the present study the male percentage is higher. Male and female ratio was 2:1. In Bangladesh a study which covered a wide age range was found that prevalence of HBsAg was higher in male than female¹⁴. This correlates with the study done by Malik et al¹⁵ and another study was done Mehnaz et al¹¹ in Pakistan, in which both the studies were hospital bases and selected age range was one to fifteen years and one month to fourteen years respectively, where they found acute viral hepatitis is higher in male than female. Gerety et al¹⁶ was done on children and showed that males are more likely to become HBsAg carrier than females and it appeared to reflect a greater risk of exposure to this sex group.

In this study, a higher percentage of HBV was detected in the age group 10 years and above. A study was done in India and was found that HBV positivity was high in age group 6-8 years¹³. Toukan¹⁷ emphasized that exposure to HBV, on the other hand, increases steadily with age, positivity was more prevalent in children. This strongly indicates child to child transmission of HBV infection during recreational activities in that society where social distinctions among play-mates do not exist. This transmission is horizontal. In this study blood and blood-products transfusion, did not play any role in causing seropositivity of hepatitis B viral markers. This is a positive sign; due to people awareness and quality of screening procedures with blood and blood products transfusion. There is also a dramatic improvement in using disposable items. Anti-HCV is detected during the course of acute hepatitis between 4 to 24 weeks and it disappears of over years. While in the chronic hepatitis C, anti-HCV persists indefinitely. In this study, no case was detected positive for HCV. HCV prevalence is 3% in most parts of the world¹⁸.

Conclusion

In the conclusion the study permits to conclude that high rate of HBsAg and Anti-HBc Ab IgM seropositivity is present among icteric children. So, further studies with appropriate design & sample size to be conducted.

References

1. Kliegman RM, Behrman RE, Jenson HB, Stanton BF. Nelson Textbook of Paediatrics. Saunders. Philadelphia. 18th ed. vol 2, p.1682-87
2. Alter M J, Mast EE, Margolis H S. Strategies to prevent and control hepatitis B and C virus infections: a global perspective. Vaccine March. 1999;17:1730-3
3. Anna S F. 1998. Hepatitis B and C in Asians. University of Michigan. [Online]. Updated On: 21 January, 2005; Viewed on 12 May, 2005. Available at: <http://www.femsdoes.org/conference/9th/9hepatitisbandcinasians.html>
4. Millinship S. Hepatitis B, Health on the Net Foundation [Online]. Retrieved on 2005. Available at <http://www.hon.ch/Library/Theme/HepB/intro.html>.
5. Kowdley KV. Epidemiology of Chronic Hepatitis B: Current Perspectives- Special Report from APASL [online]. Viewed on 12 August, 2005. Available

- at <http://archievel.mail-list.com/hbv-research/msg07707.html>
6. Liver Foundation of Bangladesh. Hepatitis B and Some Information [Online]. Updated On: 21 January, 2005; Viewed on July 14, 2005. Available at: <http://www.liverfoundationbangladesh.com/news.html>
7. World health Organization. Health Situation in South-East Asia Region, 1994-1997 [Online]. Retrieved on 7/2/2005. Available at http://209.61.208.100/health_situa_94-97/ch5_2.4.htm
8. World health Organization. 1992. Global health situation and projections and estimates. World Health Organization, Geneva
9. Swiss Hepatitis C Cohort Study, Hepatitis C virus. [Online]. Viewed on 24 June, 2005. Available at: http://www.sevhep.unizh.ch/cohort_specificinfo_main.html
10. Abe K, Hayakawa E, Sminov AV, Rossina AL, Ding X, Huy TT, Sata T, Uchaikin VF. Molecular epidemiology of hepatitis B, C, D and E viruses among children in Russia. J Clin Virol. 2004;30(1):57-61
11. Mehnaz A, Billo AG, Zuberi SJ. Liver Disorders in Children, Department of Pediatrics, Civil Hospital and PMRC Research Centre, Jinnah Postgraduate Medical Centre, Karachi. JPMA. 1990;40:62-64
12. Islam MN, Islam KMN, Islam N. Hepatitis B virus infection in Dhaka, Bangladesh. Bangladesh Medical Research Council. Bull, 1984 ;10 :1-6
13. Malathi S, Mohanavalli B, Menon T, Srilatha P, Sankaranarayanan V S, Raju B B, Ramathilalagam B, Thyagarajan S P. Clinical and Viral Marker Pattern of Acute Sporadic Hepatitis in Children in Madras, South India. J Trop Paediatrics. 1998;44:275-278
14. Zaki M H, Ahsan C R, Nasir T A, Saha S K. 1999. Seroepidemiology of Hepatitis B Virus Infection in Bangladesh. [Online]. Retrieved on July 2, 2005. Available at <http://www.icddr.org/pub/publication.jsp?classificationID=31&pubID=724>
15. Malik I A, Anwar C M, Luqman M, Ahmed A, Sarfraz T, Qamar M A. The Pattern of Acute Viral Hepatitis in children- A Study based on seroepidemiology and Biochemical Profile. JPMA, 1987;37:314-317
16. Gerety RJ, Hoofnagle JH, Markenson JA, Barker LF. Exposure to hepatitis B virus and development of chronic HBsAg carrier state in children. The J Paediatrics 1974;84:664-5
17. Tauckan AU. Hepatitis B virus infection in Middle East: Aspects of epidemiology and liver diseases after infection. Gut 1996;38(2):2-4
18. Khan M. Hepatitis C will be a Major Health Issue in Bangladesh. Bangladesh Observer. Viewed on 3 December, 2004 <http://www.icddr.org/pub/publication.jsp?classificationID=31&pubID=724>