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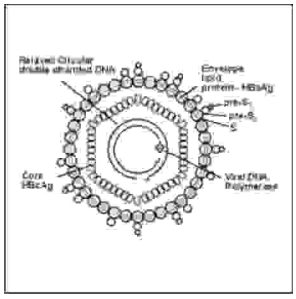
HEPATITIS B MARKERS;
ITS TRANSMISSION IN NEWBORNS FROM MOTHERS



DR. AMEER AHMAD, MBBS, FCPS
Assistant Professor, Children Ward-2
Bahawal Victoria Hospital Bahawalpur.

DR. GHULAM QASIM KHAN KHICHI
MBBS, DCH, MCPS, FCPS,
Professor of Pediatrics, Children Ward-2
Bahawal Victoria Hospital Bahawalpur.

DR. ABDUL REHMAN, MBBS
Children Ward- 2, BV Hospital
Quaid-e-Azam Medical College,
Bahawalpur.

ABSTRACT... ameermlk@yahoo.com **Objective:** To determine the transmission of Hepatitis B virus from infected mother to their newborns. **Design**: Cross-sectional descriptive study. **Setting:** Pediatrics Ward-2 and Gynecology & Obstetric Department Bahawal Victoria Hospital/Quaid-e-Azam Medical College Bahawalpur. **Period:** From August 2004 to December 2005 **Material and Methods:** A total of 300 pregnant ladies admitted in the gynecological and obstetric department for delivery were screened for HBsAG, HBeAG, HBcAB, HBsAB, and HBeAB. The newborns of the mothers with HBsAG and HBeAG were tested for the same antigens at the time of birth and the ones who were positives for the antigens were labeled as having "vertical infection" through placenta. Results were tabulated; incidence of hepatitis was calculated. **RESULTS**: HBsAG was positive in 37(12.3%) out of the 300 enrolled mothers. Out of the 37 babies born to 37 hepatitis B positive mothers, 4(21%) newborns were positive for HBsAG.In the mothers of these infected newborns, HBeAG was present in 3 while one mother did not have HBeAG. **CONCLUSION**: Universal prenatal screening for hepatitis B in all the pregnant women and protection of their off springs should be provided both by active and passive prophylaxis immediately after birth depending upon their serological status.

Key words: Pregnant mothers, Hepatitis B, Transmission, Vertically, newborns.

INTRODUCTION

A variety of congenital infections are responsible for a large proportion of mortality and morbidity in infancy and childhood. Hepatitis B virus (HBV) is recognized as one of the important viruses not only transmitted vertically through placenta but horizontally as well and plays an important role in the maintenance of endemicity. Fifty to seventy percent of the infants born to HBsAG positive mothers are at risk of acquiring this infection. The risk increases to 90% if the mother is also positive for HBeAG[1]. Since a large number of these transmitted cases progress to chronicity, infected infants can initiate

new cycle of both horizontal and vertical infection.

Over 90% of otherwise healthy adults and children who acquire hepatitis B virus(HBV) recover from infection but infants who are infected under the age of one year stand a 90% chance of developing a chronic infection and those under 05 years a 40-50%chance. Infection acquired during the perinatal period has the highest risk of chronicity[2,3,4].

The global prevalence of HBsAG- positive carriers increased from 280 million in 1995 to 350 million in 2002 and it is thought that >02 billion have been infected from this virus. In a developed country like United States 300,000 new cases are noted annually where no doubt infants account for fewer than 5% of acute HBV infections but represent 30% of newly diagnosed chronic infections.

In Pakistan 10% of general population and 8%of the pregnant females are reported to be the carriers of HbsAG [5,6]. This high prevalence of the virus with a crude birth rate of 36[7], transmission of HBV will add a large number of carriers in the community.

Keeping in view the above facts, we planned to detect the HBV markers in the pregnant ladies admitted in the last trimester for delivery and their rate transmission to newborns.

MATERIALS AND METHODS

This is an observational cross-sectional study carried out at pediatrics-2 ward and gynecology & obstetric department Bahawal Victoria Hospital attached with Quaid-E-Azam Medical College Bahawalpur from August 2004 to December 2005. All the pregnant females numbering 348 being admitted for delivery in both the department of Gynecology and obstetrics were registered.

Only 300 females who opted to take part in the study were enrolled while 48 who refused to participate were excluded. Volunteers answered a brief demographic questionnaire and venous blood was taken from all of them to test the sera for hepatitis B surface antigen(HBsAG), hepatitis B e antigen(HBeAG), hepatitis B core antibody(anti HBcAB) hepatitis B surface antibody(anti-HBsAB) and hepatitis B e antibody (anti-HBeAB). Immunochromatography test(ICT)was used for screening. Samples were retested by ELISA. On the basis of these markers, the mothers were divided into free of hepatitis or positive for hepatitis.

Newborns delivered with hepatitis B positive mothers were 37 (using HBsAG, HBeAG and anti-HBcAB alone or in combination, as an indicator of positivity).

Blood samples were taken from all the newborns for HBsAG and HBeAG.All the newborns received 1st dose of hepatitis B vaccine and 0.5 ml of HBIG intramuscularly at a separate site. Those who tested positive for these antigens were taken as infected and those who tested negative for these were taken as un-infected. The data was collected and tabulated.

RESULTS

In this cross-sectional study, serological test results for HBV markers in the pregnant mothers are recorded in table-1. A total of 40.35% of study population was positive for at least one serum marker of HBV infection.

Out of exposed population, 32.45% were positive for one or more antigens or antiHBC who were taken infective. HBsAG prevalence was 12.3% which is taken as a marker of carrier state, acute infection or chronic infection are considered potentially infectious, and the relative degree of their infectivity was assessed by HBeAG where 15/37(40.54%) are positive for both the antigens.

Out of the 37 babies born to the hepatitis B positive mothers, 4(21%) were positive for HbsAG. In the mothers of these HBsAG positive babies, HBeAG was present in 3 while one mother did not have HBeAG. In the newborns of study group, male: female ratio was 45:55.

Table-I. Prevalence of HBV markers & their interpretation

	HBsAg	HBeAg	Anti HBc	Anti HBs	Anti HBe	Total	Inference
No of Pts	37	18	61	63	54	114	-
%Age	12.3	6	20.3	21	18	40.2	-
	+	+	-	-	-		Incubation period
	+	+	+	-	-		AC H or P. Carrier
	+	+	+	-	-		Persistent hepatitis
	+	-	+	-	+		Carrier
	-	-	+	+	+		Convalescence
	-	-	+	+	-		Recovery
	-	-	+	-	-		*Infection
	-	-	+	-	-		Recovery**
	-	-	-	+	-		Immunization**

*Infection with HBV without detectable HbsAG
** Recovery with loss of detectable Anti-HBs
** Immunization without infection, or repeated exposure to AG without infection or recovery from infection with loss of detectable anti-HBC.

DISCUSSION

Hepatitis B, is a viral liver infection, caused by a DNA virus (Hepatitis B Virus or HBV). It is one of the most hazardous types of hepatitis in terms of danger to health and life because of its serious complications, persistence of infection and transmission by apparently healthy carriers. Hepatitis B is spread by contact with blood and blood products or body fluids. Transmission from mother to infant during birth is one of the most efficient modes of HBV transmission. If the mother is positive for both HBsAg and HBeAg, about 80%-90% of infants will become infected. Although infection is rarely symptomatic in the acute phase, approximately 90% of these infected infants will become chronic HBV carriers. It has been estimated that 25% of these chronic carriers may die of cirrhosis or primary hepatocellular carcinoma[8]. In addition, such persons are infectious, and female carriers may subsequently perpetuate the cycle of perinatal transmission. If the HBsAg-positive carrier mother is HBeAg-negative or if anti-HBe is present, transmission occurs in less than 25% and 12% of cases, respectively. Such transmission rarely leads to chronic HBV carriage; however, severe acute disease, including fatal fulminant hepatitis in the neonate, has been reported[9,10]. The exact mechanism of transmission to newborns is not clear. It is unusual for infants to be infected while still in the womb. Umbilical cord blood is usually negative for hepatitis B markers; however, occasionally intrauterine infection does occur. Possible avenues of infection mentioned include birth trauma and infected mother's milk. Transmission may occur if there was an in apparent sore in the inner lining of the mouth, or during teething.

Negligible vertical transmission in our study supports the possibility of horizontal transmission. Zuberi et al have the same observation[11]. However keeping in mind the long incubation period of HBV infection the possibility of delayed sero-conversion cannot be ruled out, as only 2.5% infants born to HbsAg positive mothers are positive

for viral markers at birth and the remaining 40% develop antigenemia over a period of three to twelve months[12]. These children should, therefore, be followed up for a prolonged period of time and their blood routinely screened for HBV infection. We realize this limitation in our study and suggest long-term prospective study to rule out the possibility of delayed sero-conversion.

In our study, transmission of hepatitis B virus was more in newborns where mothers were having both HBsAG and HBeAG in their blood. There is need to chalk out the measures to reduce transmission of virus from mothers who are having both the antigens in their blood.

Even if perinatal infection does not occur, the infant may be at risk of subsequent infection from other family contacts. For these reasons, prophylaxis of infants from all HBsAg-positive mothers is recommended, regardless of the mother's HBeAg or anti-HBe status. A recent meta-analysis shows hepatitis B vaccine, hepatitis B immunoglobulin, and vaccine plus immunoglobulin prevent hepatitis B occurrence in newborn infants of mothers positive for hepatitis B surface antigen[13].

The primary goal of post exposure prophylaxis for exposed infants is prevention of HBV carrier state. In addition, there is a need to prevent the rare occurrence of severe clinical hepatitis in some of these infants. With appropriate immunoprophylaxis, breast-feeding ofinfants of chronic HBV carrier mothers poses no additional risk for the transmission of the hepatitis B virus[14.]. Administration of 0.5 ml HBIG to an infant of an HBsAg, HBeAg-positive mother soon after birth reduces the probability of chronic infection from about 90% to about 25% (efficacy about 75%). The concurrent use of HB vaccine and various combinations of HBIG increases the efficacy to close to 90%. Since approximately 5% of perinatal infection may occur in utero, it appears likely that no form of postnatal prophylaxis will be 100% effective in this circumstance.

Concurrent HBIG and vaccine administration does not appear to interfere with vaccine efficacy. HB vaccine has been shown to be equally immunogenic in neonates, whether given in 10-ug or 20-ug doses. The use of HB vaccine in combination with HBIG in the perinatal setting has the advantages of increasing efficacy, eliminating the need for the second and third doses of HBIG, and providing long-term immunity to those who are not infected during the perinatal period. A single dose of HBIG in preventing perinatal transmission from HBsAg carrier mothers who were also positive for hepatitis B "e" antigen (HBeAg) showed this combination to be highly effective in preventing the HBV carrier state in infants and significantly more effective than multiple doses of HBIG alone1.

Cost effectiveness studies indicate that hepatitis B vaccination for infants of mothers positive for hepatitis B surface antigen are cost effective in countries with low[15] intermediate, and high prevalence[16]. Two trials have discussed a new way to potentially prevent vertical transmission of hepatitis B. These trials randomized pregnant women positive for hepatitis B surface antigen to hepatitis B immunoglobulin versus no intervention before delivery[17,18]. In the group receiving immunoglobulin, fewer infants were positive for hepatitis B surface antigen at follow–up.

CONCLUSION

The high prevalence rate of HBV markers in the pregnant ladies at the time of delivery indicates that HBV is endemic and its transmission to newborns will add more carriers. Universal prenatal screening for hepatitis B in all the pregnant women and protection of their off springs should be provided both by active and passive prophylaxis immediately after birth depending upon their serological status and inclusion of hepatitis B vaccine for all newborns in the national immunization program is a logical solution to prevent this infection.

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