PREVALENCE OF HEPATITIS-B SURFACE ANTIGEN AMONG PREGNANT WOMEN WITH MATERNAL AND PERINATAL OUTCOME

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Abstract

Objectives: To find prevalence of hepatitis B surface antigen among obstetrics and gynecology patients coming to a tertiary care centre and to assess maternal and perinatal outcome. Methods: Study was conducted in 150 patients divided into three groups with Group I consisting of 50 non-pregnant female patients from gynecology ward , Group II consisting of 50 pregnant patients without hepatitis and Group III consisting of 50 pregnant patients with hepatitis. Each patient’s blood was tested for HBsAg by ELISA technique and those found to be positive were retested and if found positive again were declared HBsAg positive. Results: Overall prevalence of HBsAg among pregnant and non-pregnant women was found to be 4%. The carrier rate of HBsAg among pregnant women was higher i.e. 5% as compared to non-pregnant i.e. 2%. 3 patients had history of blood transfusion and 66.6% of them were HBsAg positive. 3 patients had history of jaundice in the past. 2 out of these i.e. 66.66% were HBsAg positive. These findings suggest that blood and blood products are the commonest methods of spread and history of previous jaundice as one of the major risk factors to be looked for during routine screening of patients for hepatitis B. All the 5 HBsAg positive pregnant patients delivered live babies at term vaginally without any major complication. The cord blood of 60% babies was positive for HBsAg delivered from HBsAg positive mothers and these values were statistically highly significant. Conclusion: Similar such studies in larger population groups are requested to further strengthen our observations so that a definite opinion regarding prevention of hepatitis B antigenemia in pregnancy can be formulated. Apart from HBV surface antigen study, other markers like ‘e’ antigen study is desired which would enable the health authorities to assess the need for routine immunization against HBV.

Keywords: Hepatitis B, Hepatitis B surface antigen, prevalence of HBsAg, perinatal transmission of hepatitis B virus / HBsAg.
Introduction

Hepatitis B is a global public health problem and a major cause of liver disease, including chronic hepatitis, cirrhosis and liver cancer. The hepatitis B surface antigen (HBsAg) is a marker of ongoing HBV infection and is found not only in the 42mm intact virion or Dane particle, but also in incomplete viral surface capsule particles devoid of DNA[1].

The prevalence of HBsAg varies widely in different parts of the world and its subpopulations depending on a variety of inter-related historical, behavioural, environmental and other risk factors. Out of different types of viral hepatitis, hepatitis B may be transmitted to the fetus and is the main concern of the obstetrician. Viral hepatitis during pregnancy is associated with a high risk of maternal complications, has a high rate of vertical transmission causing fetal and neonatal hepatitis and has been reported as a leading cause of maternal mortality[7-10].

Pregnant women are affected by acute hepatitis B virus (HBV) infection or have chronic infections. The acute infection is manifested by flu-like symptoms in approximately 25% of the patients and is asymptomatic in the rest.

The diagnosis of acute hepatitis B is confirmed by detection of the surface antigen and IgM antibody to the core antigen. Identification of HBeAg is indicative of an exceptionally high viral inoculum and active viral replication.

Transplacental transfer of this virus is apparently not the mode of transmission. Perinatal transmission occurs primarily as a result of the infants exposure to infected blood and genital secretions and ingestion of amniotic fluid and breast milk which are known to contain detectable HBsAg. Babies born to HBsAg positive mothers are at risk of severe acute neonatal hepatitis. Chances of transmission are more if mother develops illness in third trimester or immediate postpartum period.[3] Obstetricians must screen all of their patients for hepatitis B at some point during pregnancy. Selective screening on the basis of acknowledged risk factors will fail to identify 30-50% of seropositive women.

The aim of this prospective study was to study the prevalence of HBsAg among different groups of women in Jammu, India. It also aims at reducing the incidence of perinatal transmission of HBV by prenatal screening of all pregnant women for HBsAg and providing hepatitis B immunoprophylaxis to all new born infants of hepatitis B surface antigen positive mothers.

Material and Methods

This case control study was carried out in the Department of Obstetrics and Gynaecology, Government Medical College, Jammu, India. Cases were selected from patients attending gynaecology OPD or admitted in the Department of Obstetrics and Gynaecology, GMC Jammu. Prior informed consent was taken from all participants and the study was cleared by ethics committee of the hospital. The following three groups of patients were studied.
Group I: 50 non-pregnant patients from gynaecology unit of the hospital.

Group II: 50 pregnant females without hepatitis.

Group III: 50 pregnant females with hepatitis

A detailed history was taken regarding present and past history with special reference to presence or absence of liver disease, either recent or past history of blood transfusions, contact with and history of jaundice, infections, previous surgical procedures, multiple sexual contacts etc. A thorough clinical examination was done in each case followed by various blood tests, ultrasound etc. to rule out other causes of hepatitis. Socio economic status of the patients was taken into consideration with patients divided into four groups on the basis of income — Class IV with income < Rs.2000 (1$=Rs.50), Class III with income Rs.2000-5000, Class II with income between 5000-10000, Class I with income more than Rs. 10000. From blood specimens, serum was separated and a part of it was used for enzyme immunoessay for HBsAg and rest was used for liver biochemical tests. Cord blood of babies was collected at the time of delivery and tested for HBsAg to find out the rate of transplacental transmission. For statistical analysis Chi-square test/Yates correction was applied and a level of 5% was taken as significant.

Results

This Cohort study was conducted in a tertiary care centre in India. The study was done on 150 patients divided into three groups of 50 cases each. Group I consisted of 50 non-pregnant females from gynaecology unit of the hospital, Group II consisted of 50 pregnant female without hepatitis and remaining 50 pregnant females with hepatitis formed Group III. All cases were screened for HBsAg by ELISA technique and the following observations were made using a chi-square test for statistical analysis. 5% level was taken as significant. Prevalence of HBsAg among all groups of patients studied is shown in table 1. It was 2% in non-pregnant patients (Group I) as compared to 6% in pregnant patients without hepatitis (Group II) and 4% in pregnant patients with hepatitis (Group III). Overall prevalence in all the groups was of the magnitude of 4%. Chi square/yates correction was applied and it was found that variations in Group I, II and III were statistically non-significant implying that HBsAg positivity among different groups was independent and had no relationship with pregnancy with or without hepatitis and non-pregnant population. It was observed that HBsAg positivity had no relationship with hepatitis parturients as compared to normal parturients. It was observed that 2.27% cases were positive for HBsAg whose socioeconomic class was IV as compared to 6.66% whose socioeconomic class was III and not a single case was found to be positive in class I and II. This observation was statistically non-significant (X²=3.02). Similarly relationship of age, parity and rural/urban with HBsAg seropositivity showed differences which were non-significant.
**HEPATITIS-B SURFACE ANTIGEN AMONG PREGNANT WOMEN**

Table I: Prevalence of HBsAg among all groups of patients studied

<table>
<thead>
<tr>
<th>Status of the Case</th>
<th>Total No. of Patients</th>
<th>No. of HBsAg Positive Patients</th>
<th>% of HBsAg Positive Patients</th>
<th>Statistical Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>50</td>
<td>1</td>
<td>2</td>
<td>$X^2 = 1.04$ (NS)</td>
</tr>
<tr>
<td>Group II</td>
<td>50</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Group III</td>
<td>50</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>150</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Previous history of blood transfusion and its relation to HBsAg positivity showed that 3 patients had history of having a blood transfusion in the past and 147 had no such history. Out of the 3 patients with positive history of blood transfusion, 2 (66.66%) were HBsAg positive. In contrast only 4 patients (2.72%) Out of 147 with no history of blood transfusion, were positive for HBsAg as is shown in table II.

Yates correction was applied and was found to be statistically highly significant. This clearly indicates that previous history of blood transfusion was an important parameter to be looked for during routine screening of women for HBsAg positivity.

Past history of jaundice and its relationship with HBsAg positivity is shown in table III. It was observed that out of 150 cases, 3 had prior history of jaundice in the past. While 147 had no history of jaundice in the past. Among the 3 patients with prior history of jaundice 2 (66.6%) were positive for HBsAg. In a sharp contrast, out of 147 patients with no history of jaundice in the past, only 4 (2.70%) were positive for HBsAg. This finding is statistically highly significant.

It was observed that out of 100 pregnant patients, 87 had spontaneous onset of labour and in 13 patients labour was induced. All HBsAg positive patients had spontaneous onset of labour. These findings were statistically non-significant. Relationship between mode of delivery and HBsAg positivity was observed and it is found that out of 100 patients, 82 had normal vaginal deliveries, 16 had LSCS and 2 had instrumental deliveries. All the 5 HBsAg positive pregnant patients had normal vaginal delivery. However this observation was not statistically significant. It was observed that out of 100 pregnant patients, 92 delivered live babies, 7 had intra uterine deaths and 1 delivered a still born baby. All the 5 HBsAg positive mothers delivered live babies. This finding was statistically non-significant [$z =0.46$ (NS)].

Table II: Previous history of blood transfusion and its relationship to HBsAg positivity

<table>
<thead>
<tr>
<th>History of Blood Transfusion</th>
<th>No. of Patients</th>
<th>HBsAg Positive Patients</th>
<th>Statistical Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>% of HBsAg positive</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3</td>
<td>2</td>
<td>66.6</td>
</tr>
<tr>
<td>Absent</td>
<td>147</td>
<td>4</td>
<td>2.72</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>150</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at 5% level
Table III: Past history of jaundice and its relationship with HBsAg positivity

<table>
<thead>
<tr>
<th>Past History of Jaundice</th>
<th>No. of Patients</th>
<th>HBsAg Positive Patients</th>
<th>Statistical inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>3</td>
<td>2</td>
<td>%age</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66.66</td>
<td></td>
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</tr>
</tbody>
</table>

* Significant at 5% level

Relationship of maternal HBsAg positivity and cord blood antigenemia was studied and it was found that among the 5 babies born to HBsAg positive mothers, 3 (60%) had detectable HBsAg in the cord blood at the time of delivery. Thus there is a significant chance that the HBsAg seropositivity observed in mothers may be transmitted to the fetus, which in the present series is of the magnitude of 60% and statistically highly significant (Yates Correction = 16.87*).

Table IV sums up the maternal and perinatal outcome among 5 HBsAg positive pregnant mothers. 80% of HBsAg positive patients were multigravidas. All the positive patients had spontaneous onset of labour at term. All the positive patients had normal vaginal delivery and had no third stage complication. All babies born to HBsAg positive mothers were delivered live with A/S of 10/10 at birth. 60% of babies born out of positive mothers had cord blood positive for HBsAg at birth whereas 40% remained still positive at 4 weeks.

Discussion

India is the second largest pool of HBV carrier in the world (next to China). The number of carriers tends to grow with time because of both horizontal and vertical transmission. It is established beyond doubt that HBV infection is a public health problem in our country and its importance for morbidity and mortality has not been realized because it is a silent killer.

The incidence of seropositivity for HBsAg in pregnant and non-pregnant women at random, including all symptomatic hepatitis cases and asymptomatic carriers, varies from 0.10-20%. [2,3,4] It is more common in developing countries including India.

In the present study overall prevalence among all three groups was 4% (pregnant and non-pregnant). The prevalence rate among pregnant women was 5%. The prevalence of HBsAg varies widely in different parts of the world and its subpopulation depending on a variety of inter-related historical, behavioural, environmental and other risk factors. Incidence of hepatitis has been on increase over last few decades especially in developing world. Studies by Itoua-Ngapora et al. [2] found the prevalence to be 6.5% among pregnant women in Brazzaville and Madzime et al.[3] reported 25% prevalence in Zimbabwe whereas Graham et al. [4] reported 0.13% carrier rate in pregnant patients in Texas and Ivic I et al.[5] reported 0.75% carrier rate among pregnant patients in Croatia.

Based on these factors, there are high HBsAg prevalence areas (7-20%), low prevalence zones (0-2%) and intermediate prevalence areas (2-7%). India is grouped under the intermediate zone of HBV prevalence. However some studies in India revealed a higher
prevalence rate among pregnant women [6]; 10.85% [11]; 9.5%. The difference in prevalence also depends upon the specific period of the study conducted i.e. whether it is conducted during epidemic or non-epidemic period of HBV. Higher prevalence rate is noted if the study includes more number of mothers suffering from acute hepatitis rather than asymptomatic mothers. Other various possible explanations for this difference include increased exposure of mothers to HBV through injections & transfusions, difference in the sensitivity of the method used for the detection of viral markers and unknown immunological mechanisms.

Hepatitis B is generally responsible for approximately 30% of all cases of acute hepatitis in adults, of most of the countries in the world, including India [12]. In the present study, 3 out of 150 women (pregnant and non-pregnant) had history of jaundice in the past and 2 of these 3 patients were HBsAg positive (66.66%). In comparison only 4 patients were positive for HBsAg among 147 patients who had no history of jaundice in the past (2.72%). These findings were significant thereby implying that previous history of jaundice was an important factor to be looked for during HBsAg screening.

6.6% cases were HBsAg positive among class III women followed by 2.27% among class IV (socioeconomic class). Not a single case was found to be positive in class I and II, these cases were statistically non-significant. Further it was observed that though the positive cases belonged to class III and class IV, most of them were from urban areas. This could be attributed to exposure of urban population to common sources of infection of HBsAg i.e. blood transfusion, multiple sexual contacts, parental drug abuse etc. as compared to rural population. Inferior socioeconomic conditions usually associated with bad sanitation and overcrowding may be the primary factor responsible [1,13].

DD Banker in his study revealed Hepatitis B virus or its infective antigens namely HBsAg and HBeAg are present in blood and transfusion of blood or blood products would be the most common method of spread 14. In the present study, out of 150 patients, 3 had a previous history of blood transfusion and 2 out of these 3 were positive for HBsAg (66.66%). This value was statistically very significant implying that previous history of blood transfusion was one of the main factors for HBsAg antigenemia among patients.

Hepatitis B virus is generally responsible for approximately 30% of all acute hepatitis in adults in most of the countries including India[12]. In the present study out of 50 pregnant patients presenting with hepatitis, 2 were seropositive for HBsAg (4%). In comparison, 3 patients were seropositive out of 50 pregnant patients presenting without hepatitis (6%) and 1 patient out of 50 was positive among non-pregnant patients (2%). These findings were statistically insignificant. In our study one fact was evident that HBsAg antigenemia had no relationship with presence or absence of hepatitis among pregnant patients. These findings were not synchronous with other studies conducted in India. SK Sachdeva et al [15] isolated HBsAg more frequently in pregnancy with hepatitis (36.7%) as compared to pregnancy without hepatic dysfunction (12%). Similar observations were also made by Talib et al. [16] who found 40.3% HBsAg positivity among patients suffering from infective hepatitis in general population. This disparity
between our findings and the published record could be due to different geographical conditions, different methods used for detecting HBsAg and small sample for survey. Pertinently [15] studied only 30 cases of pregnancy with hepatitis compared to our study of 50 cases.

In our study there was a tendency of increasing seropositivity with advancing age and parity. Out of 5 HBsAg positive cases among pregnant women, 3 were between ages of 25 and 30 years (5.76%). One was below 25 years (2.63%) and one was above 30 years of age (10%). J. Shanmugam et al. [17] also found an increased rate of HBsAg carrier state among 21-30 years of age group. It may be due to more frequent contact with diseased and carrier population by this age group. Our study revealed 2.08% seropositivity among primigravidae compared to 7.69% seropositivity for HBsAg among multigravidae. This higher incidence in multigravidae, though insignificant, could perhaps be attributed to increased exposure of multigravidae to HBV through injection, transfusions and surgical exposures during previous deliveries or abortions. The mode of labour and gestational age were not affected by HBsAg seropositivity in our study. All the 5 HBsAg positive cases among 100 pregnant women had spontaneous onset of labour at term and vaginal delivery and none had to be induced. This was statistically insignificant. Similar findings were observed by Madzime et al. [18]. The physiological and endocrinological factors responsible for onset of labour were not affected by HBsAg antigenemia. Though there was higher incidence of preterm deliveries among patients with hepatitis but none of these were HBsAg positive.

In our study all the 5 HBsAg positive pregnant cases delivered live babies. There was one still birth and 7 IUDs among HBsAg seronegative pregnant women. As observed by Madzime et al. [18] also, these findings suggest that HBsAg antigenemia had no effect on perinatal outcome.

In this study, cord sera was positive for HBsAg in 3 out of 5 (60%) HBsAg positive mothers and this was statistically highly significant. Similar observations were also made by Stevens et al. [19], Derso et al. [20] and who noted a transplacental transmission rate of 50%, 50% and 40% respectively although SC Biswas et al noted a much lower rate of transplacental transmission [21]. On the other hand, observations by Susan et al. [22] noted a much higher incidence of transplacental transmission [22].

However the precise mechanism of this maternofetal transmission of HBV is uncertain. Interuterine infections do not occur very commonly but few infections which occur in utero are probably due to leakage of maternal blood into the fetal circulation associated with a tear in the placenta [23].
Conclusion: Hepatitis B virus infection is a grave public health problem in developing countries especially in neglected and inaccessible areas of such nations. All pregnant women should be routinely screened during early prenatal visit. Screening of blood products for HbsAg should be enforced strictly. Apart from HBV surface antigen study, other markers like ‘e’ antigen study is desired which would enable the health authorities to assess the need for routine immunization against HBV.

References

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