

Original Research Article

Prevalence of hepatitis B surface antigen (HBsAg) in asymptomatic pregnant women and in the cord blood of their newborns

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ABSTRACT

Background: In a developing country like India there is very high incidence and prevalence of hepatitis B. The disease is easy to prevent than to treat. Pregnant females are exposed more to risk factors than the general population which makes them a more apt candidate for HBsAg screening. This shall help both the mother (in terms of treatment) and newborn (in terms of prophylaxis and if not successful then, treatment).

Methods: This study was conducted on 111 patients who were divided into two groups of asymptomatic cases and symptomatic cases i.e. those patients who were jaundiced. ELISA was used for detection of HBsAg in the maternal and the cord blood of their newborn.

Results: Maximum incidence of sero-positivity was seen in age group between 20-25yrs and second pregnancy was associated with maximum HBsAg positivity. Asymptomatic cases showed only 10.41% sero-positivity whereas it was 60% in clinically jaundiced cases ($p < 0.05$). Also rate of vertical transmission was 66.6% in the diseased group. Obstetric complications like premature labour, early rupture of membrane were also observed in the study.

Conclusions: This study helped us to know the prevalence and the various other association of HBsAg positivity both in clinically asymptomatic cases and symptomatic cases. Thus we conclude that HBsAg screening should be mandatory for all pregnant females and in areas where resources are scarce at least high risk cases should be screened. This shall help to break the chain of mother to child transmission (MTCT) of this dreaded disease.

Keywords: HBsAg, Sero-positivity, Pregnancy, MTCT

INTRODUCTION

The term viral hepatitis has been defined as a systemic viral infection in which there is hepatocellular necrosis and inflammation. There is characteristic clinical, biochemical, immunological and morphological features. There are six major types- HAV, HBV, HCV, HDV, HEV, HGV.

Hepatitis B is a global problem with 325 million living with this disease. This virus has alone caused death of

1.34 million population in 2015, a number which is comparable to deaths caused HIV and TB. While mortality from HIV and TB has been declining, deaths from hepatitis are on rise.¹ Pregnant females are more vulnerable to this disease as apart from sharing all the risk factors they are exposed to instrumentation and operative procedures at the time of delivery, more exposed to blood transfusion and susceptible to infection due to altered immunological response of pregnancy. Although the virus is not known to be teratogenic, it is associated with increased risk of fetal growth retardation and prematurity.² Besides transplacental transmission in-

utero, squeezing of the virus across the placenta, ingestion of the vaginal secretion, blood and amniotic fluid at the time of delivery have also been suggested.³ This study, along with screening the mothers will be helpful in immunoprophylaxis of the newborns exposed to infection and it may contribute as an important step for eliminating the endemic source of infection.

Aim of the study

To study the prevalence of hepatitis B surface antigen (HBsAg) in asymptomatic pregnant women and in the cord blood of their newborn.

METHODS

It was a case control study carried out at Patliputra Medical College and Hospital (PMCH), Dhanbad, Jharkhand over a period of one year (December-2016 to December-2017). A total of 111 pregnant women during third trimester of pregnancy attending labour room of PMCH were selected. 96 of them were asymptomatic at the time of admission and these formed the asymptomatic cases (Group I). 15 remaining presented with clinical jaundice and these were included as diseased control (Group II). Blood samples of all patients were collected and the cord blood of their newborn was collected at the time of delivery for HbsAg screening. Screening was performed by Enzyme Linked Immunosorbent Assay (ELISA) which is 100% sensitive and 99.9% specific. The data were analysed using SPSS software and $p < 0.05$ was considered significant.

RESULTS

Out of 111 patients 63 (56.7%) were between 20-25 yrs age, 33 (30%) belonged to 26-30 age group and rest 15

were in the age group of 31-35 yrs. Age incidence in relation to HBsAg positivity showed that maximum cases i.e. 15 (13.5%) belonged to 20-25 yrs age group of which 6 belonged to group I and 9 belonged to group II. Table 1 shows the gravidity incidence in relation to HBsAg positivity which revealed maximum incidence in second gravida i.e. 4 (26%), followed by primigravida i.e. 3 (10%). Incidence lowered as parity increased as only 5.8% were sero-positive for HbsAg in third and more gravida ($p < 0.05$). Maternal HBsAg positivity in asymptomatic cases was only 10.41% (10 out of 96 cases) whereas it was 60% (9 out of 15 disease control) in group II ($p < 0.05$). HBsAg positivity in cord blood of asymptomatic cases was 4.16 % (4 out of 96) but it was as high as 40% (6 out of 15) in the control group ($p < 0.001$). The incidence of vertical transmission has been shown in Table 2 with highest rate (66.6%) in HBsAg+ve patients of control group ($p < 0.001$). Very strong co-relation between was seen between duration of gestation and modes of confinement with $p < 0.001$ as expressed in Table 3. Obstetric complications like premature labour was observed in 40% of sero-positive mothers and 6.9% of sero-negative mothers of group I whereas in control group premature labour was seen in 78% of sero-positive mothers and 50% of sero-negative mothers. Early rupture of membrane was observed in 30% of sero-positive cases of group I but not in other group. Other complications like PPH and toxemia were not observed in any of the groups ($p > 0.5$). Fetal outcome in HBsAg +ve mothers in group I was such that 40% of the babies were delivered at term and were mature. 30% were premature and 30% were IUGR. No still birth was found in study group. In control group HBsAg +ve mothers 78% gave birth to premature babies and 22% were still births ($p < 0.01$).

Table 1: Gravidity incidence in study group.

Gravidity	No. of cases (%)	Sera positive for HBsAg	
		Total cases	%
Primigravida	30 (31.2)	3	10
2 nd gravida	15 (15.6)	4	26
3 rd -6 th gravid	51 (53.1)	3	5.8

Table 2: Cord blood sample tested for HBsAg.

Maternal sera	Total sample		Cord blood sample studied			
	Number	%	HBsAg +ve		HBsAg -ve	
Study group			Number	%	Number	%
HBsAg +ve	10	10.4	4	40	6	60
HBsAg -ve	86	89.58	0		86	100
Control group						
HBsAg +ve	9	60	6	66.6	3	33.3
HBsAg -ve	6	40	0		6	100

Table 3: Duration of gestation and mode of confinement.

Duration of gestation and mode of confinement	In study group (96)	In control group (15)
	Number (%)	Number (%)
Spontaneous vaginal delivery at term	50 (52)	6 (40)
Pre term delivery	4 (4.16)	4 (26.6)
C-section at term	42 (43.7)	1 (6.6)
Still birth	0 (0)	4 (26.6)

DISCUSSION

Hepatitis is one of the most common disease worldwide which is easier to prevent than treat. The quality of life in hepatitis patients is in general below average.⁴ There has been a decline in the incidence and prevalence in neonates in relation to this dreaded disease due to universal immunization programme. In our study the prevalence of sero-positivity was found to be 10.4% in group I and 60% in group II. This was in accordance with the study conducted by Franco et al.⁵ Higher incidence (13.5%) in younger age group was found in our study similar to studies conducted by Susan et al.⁶ This finding is supported by the fact that this age group is exposed to high risk behaviour and are in more frequent contact with diseased or carrier population. Also, as the age advances the immunological response of body and level of antigenemia becomes too low to be detected by conventional methods. Higher incidence of sero-positivity was seen in second gravida which might be due to more chances of exposure at the time of previous delivery. But the results were in contrast to a study conducted by Shoghli et al where maximum incidence was found in multigravida. This might be explained to more number of child birth thus more exposure to risk factors leading to sero conversion.⁷ As expected there was statistically very significant finding when HBsAg positivity was compared between the cord blood of asymptomatic cases to the cord blood of jaundiced group. This also explains the finding of 66.6% vertical transmission rate in the same group. The precise mechanism of vertical transmission still remains unsolved. Three mechanisms have been suggested- intrauterine transmission; transmission during delivery; and postpartum transmission. There are two ways of Intrauterine transmission: HBV can reach the fetus by crossing the placental barrier and as this process takes place HBV can infect and replicate in all types of placental cells including cytotrophoblast and syncytiotrophoblast before it reaches the fetus.⁸⁻¹⁰ Intra-uterine infection may also be due to materno-fetal leakage of blood antenatally or virus may get squeezed through placenta during intra-natal period. This condition can be associated with prolonged threatened preterm labor or threatened abortion due to increased uterine contractions.¹¹ Immunization either passive or active including at birth prophylaxis can prevent transmission during delivery or in the postpartum period, but it has no effect on the intrauterine route of transmission.³ There was quite a significant difference between the cord blood

sero-positivity in relation to mode of confinement. Higher rates were observed in cases of vaginal delivery that proposed elective caesarean section for such sero-positive mothers. This was in accordance with the meta-analysis done by Chang et al where 430 cases were studied and concluded that caesarean section may protect against HBV transmission.¹² As far as birth outcomes are concerned our study showed statistically significant difference between the study and the control group. There are studies which have showed severe adverse pregnancy outcome in HBsAg positive mothers and warrant a careful surveillance of maternal HBsAg status and viral activity especially in second trimester.¹³

CONCLUSION

This study shows us the broad aspects of differences between the asymptomatic and clinically symptomatic cases. On the basis of evaluation of present study it can be recommended that all pregnant women should be screened for HBsAg. If not all then at least high risk cases should be selected for screening. By doing so we can easily detect carrier mothers. Also, immune-prophylaxis of babies of sero-positive mothers may prove helpful in near future in breaking the maternal child link of spread of infection and in turn may prove helpful for eliminating endemic source of infection. It may also have preventive role in protection of medical and paramedical staffs as well as to those in contact.

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Ethical approval: The study was approved by the Institutional Ethics Committee of PMCH Dhanbad

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