

ROLE OF HEPATITIS 'B' SURFACE ANTIGEN (HBsAg)
DURING PREGNANCY WITH OR WITHOUT JAUNDICE
IN VERTICAL TRANSMISSION IN THE NEW BORN

By

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SUMMARY

Incidence of HBsAg in pregnant women was found to be 25%, that of asymptomatic carriers 9.8%, transplacental transmission to babies, born to jaundiced mothers 100% and asymptomatic carrier mothers 20%. Multigravidas represent the higher risk group. Asymptomatic carriers were more in middle social class 15.78%, with previous H/O jaundice—28.57% and who had undergone surgical procedures and injections etc. 10.71%. Transplacental transmission is usually associated with presence of 'e' antigen in mother. We suggest, a search for this should also be made in pregnant women who have HBsAg positive jaundice at the time of delivery and their babies should be given combined prophylaxis in the form of hepatitis 'B' immunoglobulin and hepatitis 'B' vaccine. Cord blood positive HBsAg babies may become asymptomatic carriers (20%) so all infants born to HBsAg positive mothers should also receive HBIG (hepatitis B immunoglobulin) and they should be followed up for detection of HBsAg.

Introduction

Hepatitis 'B' surface antigen (HBsAg) is the surface coating of hepatitis B virion. Its detection in the serum provides a useful specific marker for viraemic phase of serum hepatitis, which so far had depended on the epidemiological and clinical features. This antigen can be transmitted by parenteral route or others like feco-oral, oral-oral, sexual, insect-vectors and vertical transmission from mother to foetus transplacentally (Schweitzer *et al* 1975), ingestion of

vaginal contents and amniotic fluid at the time of delivery (Wang *et al* 1978) and breast feeding (Linneman and Goldberg 1974).

Prevention of vertical transmission of HBsAg may have a significant role in prevention of disease. Use of immunoglobulins and hepatitis B vaccine, elective caesarean section, routine gastric-aspiration of new born and avoidance of breast feeding in high risk cases are a few such methods (Wang *et al* 1978). The following study was designed to:

1. Assess the incidence of HBsAg in pregnant women with jaundice.
2. Assess the incidence of HBsAg

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in pregnant women without jaundice (asymptomatic--carriers).

3. Assess the incidence of trans-placental transmission in HBsAg.

Material and Methods

This study was conducted in U.I.S.E. Maternity Hospital, L.L.R. and Associated Hospitals and Pathology Department, G.S.V.M. Medical College, Kanpur. One hundred and eighteen pregnant patients in third trimester of pregnancy with or without jaundice were selected for this study, specially, those with history of jaundice, blood transfusion, surgical procedures (D & C, episiotomy, tattooing etc.) or multiple injections in the past. Patients who expired before delivery were excluded from the study. A thorough examination was conducted and 5 ml blood (maternal and cord blood) was collected under aseptic precautions with disposable syringe and needle in sterilised vials. Cord blood collected within 6 hours of delivery and serum was separated and stored at 4°C soon after the blood collection. Serum bilirubin and SGPT were done and patients were labelled as jaundiced when serum bilirubin was more than 1 mg/dl

and SGPT more than 30 IU/litre. The technique used was reversed passive haemagglutination technique (WHO 1981) and Cellognost HBsAg derived by Hoechst Pharmaceuticals was used for for this.

Observations

Patients were divided in 2 groups:

1. Group 'A'—Patients having jaundice at the time of delivery—16 cases.
2. Group 'B'—Patients not jaundiced—102 cases.

Presence of HBsAg in these patients indicated that they were asymptomatic carriers.

The distribution of cases according to presence of HBsAg in both the groups is shown in Table I. Among 118 mothers screened for HBsAg, 16 had jaundice at the time of delivery. Their mean age was 24.87 ± 3.72 , of these 4 mothers were having HBsAg demonstrable in their sera. The remaining mothers who were not having jaundice at the time of delivery were of mean age 24.17 ± 5.05 and HBsAg could be demonstrated in sera of 10 such mothers. The difference in proportion of positive cases in both those groups was tested by applying the

TABLE I
Showing Incidence of HBsAg in Mothers and in Cord Blood

S. No.	Groups	Total cases		HBsAg Positive in mothers		HBsAg present in cord blood of HBsAg positive mothers	
		No.	%	No.	%	No.	%
1. (A)	Cases with jaundice at the time of delivery	16	13.55	4	25.00	4	100.00
2. (B)	Cases without jaundice at the time of delivery (asymptomatic carriers)	102	86.45	10	9.80	2	20.00

normal approximation test and the difference was not significant ($p < 0.05$).

In group 'A' the incidence of positive HBsAg was higher in the age group 21-25 years (33.33%) compared to that in age group 26-30 years (25%) where as in group 'B' incidence of HBsAg positive cases was highest in 31-35 years age group (25%) followed by 26-30 years (13.33%) group and 21-25 years group (5.88%). 5.08% Primi were jaundiced compared to 8.47% multigravida.

Distribution of HBsAg positive cases with jaundice and cases not having jaundice at the time of delivery along with cord blood is shown in Table II. HBsAg could be demonstrated in the serum of 4 mothers with jaundice and 10 mothers without jaundice (asymptomatic carrier) at the time of delivery. Cord blood of all HBsAg positive cases with jaundice (100%) was positive for HBsAg but cord blood of only 20% was positive for HBsAg in asymptomatic carriers. The overall incidence of transplacental transfer comes out to be 42.85%. The difference in proportion of positive cases in both the groups was tested by applying normal approximation test and the difference was found to be highly significant ($p < 0.01$).

Discussion

In our study HBsAg could be demonstrated in the serum of 25% pregnant women in group 'A', which is in agreement with the incidence in general population 23.6% (Joshi, 1977 and Dutta *et al*, 1977). However in group 'B' it could be demonstrated in 9.8% of mothers (representing asymptomatic carriers). This is quite a high incidence compared to that observed by Mollica *et al* 1979 (2.8%) but is comparable to that (10%) observed by Hsieh, *et al* 1979. The latter had used a less sensitive method of counter electrophoresis (CEP) than used by us (RPHA). However our patients also had some other factors like H/O injections and surgical procedures which also favours transmission of HBsAg. Incidence of asymptomatic carriers is higher in tropical countries (Blumberg *et al* 1970) and asymptomatic carrier state during pregnancy is more common (45%) among Asians (Deriso *et al* 1975). This could be a possible explanation of the higher incidence observed by us.

Incidence of asymptomatic carriers is higher than in the general population probably because of pregnant state representing the higher risk population

TABLE II

Showing Distribution of HBsAg Positive Cases Who did not have Jaundice at the Time of Delivery (Asymptomatic Carriers)

S. No.	Groups	Total cases		HBsAg positive cases	
		No.	%	No.	%
1.	Past H/O jaundice	14	13.73	4	28.57
2.	H/O blood transfusion	4	3.92	—	—
3.	H/O surgical procedures multiple injections Tattooing etc.	56	54.90	6	10.71
4.	H/O jaundice in husband or close contacts	4	3.92	—	—
5.	Without any relevant history	24	23.53	—	—

(H/O D & C, episiotomy, infections and blood transfusion during antenatal period favouring transmission). Asymptomatic carrier state had some possible relationship with increasing age—this finding could not be compared because of lack of literature on this particular aspect. Kelkar *et al* (1973) have found a prevalence of Australia antigen in 41-45 years age group (21.6%).

A higher incidence (11.76%) of HBsAg positive cases in multics could possibly be because of parenteral transmission to which they are more exposed. More asymptomatic carriers belonged to middle class, because of their using more medical facilities than lower class.

HBsAg was seen in 28.57% patients who had jaundice in the past compared to 10.71% patients who had H/O parenteral exposure. Since these cases represent asymptomatic carrier state, it shows that past history of jaundice and parenteral exposure co-relate strongly with chronic carrier state. This can be explained by the fact that the elimination of virus ultimately depends on immune response of host so that these cases might represent those who have inadequate immune response. In jaundiced HBsAg positive cases, 100% babies were HBsAg positive showing transplacental passage. Some authors support this route of transmission (Schweitzer *et al* 1975) others consider it to be a result of contamination (by usage of clamps, scissors etc.) occurring at delivery. Our findings could not be a chance finding as babies born to HBsAg negative mothers were always negative for HBsAg. Because of a short duration of study, we could not follow up the babies and therefore it is difficult to say whether these babies remained

antigenaemic or were able to clear their antigenaemia. Stevens *et al* (1975) have reported 76% of cord blood positive infants become subsequently antigenaemic. Incidence of asymptomatic carriers transmitting HBsAg to babies was 20% in our study compared to 20.38% (Stevens *et al* 1975) and 56.1% (Schweitzer *et al* 1975). In the light of these observations it can be said that babies born to asymptomatic carrier mothers have quite a high probability of becoming asymptomatic carriers.

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