

HBsAg in Cord Blood of Newborns of HBsAg-Positive Mothers

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ABSTRACT Vertical transmission of hepatitis B infection that may occur during pregnancy at delivery, in infancy, and early childhood has an important role in the development of chronic hepatitis B. Intrauterine infection is suspected to occur when hepatitis B viruses cross the placenta into fetal circulation due to failure of placental tissue function. In Cipto Mangunkusumo Hospital, Jakarta, 98 (6.4%) of 1536 pregnant mothers observed during 3 years (1987-1990) showed positive HBsAg. Six (8.3%) of 60 babies of born to HBsAg positive mothers showed positive HBsAg in their cord blood, but this disappeared after one month. All babies born to HBsAg positive mothers were vaccinated on months 0, 1, 2, and 12. HBsAg in cord blood might not play an important role in vertical transmission. [*Paediatr Indones* 1994; 34:125-128]

Introduction

Chronic hepatitis B is more likely to develop after early hepatitis B infection of the newborn.^{1,2} Patients with chronic

hepatitis B have 220 times higher risk for liver malignancy at a later age when compared with non-infected person. Hepatitis B transmission may take place vertically from mother to newborn, or horizontally from one to other person or members of the family. This vertical transmission causes less pronounced clinical manifestations when compared with horizontal transmission;^{4,6} however, since early infection is often caused by vertical transmission, this route is very important. The vertical transmission can

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occur during pregnancy (i.e., through transplacental or through materno-fetal transfusion), at delivery, or in infancy and early childhood. It is suspected that hepatitis B virus may cross the placental barrier and enter fetal circulation,⁷ giving rise to positive HBsAg in babies' cord blood. This study was conducted to see whether HBsAg in cord blood is an evidence of intrauterine infection, which eventually develops into hepatitis B infection in the newborn.

Methods

From 1987 to 1990, we examined sera of 1535 pregnant women attending the prenatal clinic of Cipto Mangunkusumo Hospital, Jakarta, for HBsAg, HBeAg, and anti-HBs. Neonates born to HBsAg positive mothers were tested for HBsAg, anti-HBs and anti-HBc at birth (using cord blood), and at the age of 1 month, 4 months, and 1 year, respectively. Assays for HBsAg, anti-HBs, anti-HBc, as well as for HBeAg were performed by using radioimmunoassay at the Department of Biochemistry, Medical School, University of Indonesia; the results were then confirmed in the Smith-Kline Biological Laboratory, Belgium. All babies born to HBsAg positive mothers were vaccinated against hepatitis B at birth, and then at the age of 0, 1, 2, and 12 months.

Results

Among 1535 pregnant women, 98 (6.4%) were HBsAg seropositive and 16 (1.4%) of them were also HBe positive. Five cord

blood specimens of babies born to these mothers were positive for HBsAg and anti-HBc, but at one month of age the HBsAg had disappeared from the babies' blood. Anti-HBs concentration of higher than 10 mIU were found in 3 babies at month 4. In only one baby was the anti-HBs concentration less than 10 mIU, and in 5 babies it was still negative. Four of the mothers of these babies also showed positive result for HBeAg and HBsAg.

Discussion

HBsAg detected in cord blood may be caused by hepatitis virus which is able to cross and attack the placenta,^{8,9} and consequently causes hepatitis B in the fetus.⁸ However, in all 5 babies blood specimens, HBsAg had disappeared as the babies were 1 month old. This is in accordance with the finding of Dorso¹⁰ who reported that 50% of cord blood specimens of babies from HBsAg positive mothers were positive for HBsAg, that disappeared after some time. According to Okada¹¹ HBsAg in babies' cord blood is not related to antigenemia in the babies, and that hepatitis infection thus has not occurred in the fetus. This was proven by the fact that no anti-HBc IgM was found, indicating that no acute infection has occurred in the newborn.¹²

The fact that infection has not taken place might be caused by the inability of the virus to cross the placenta¹² or by inhibition of viral replication in the fetus by mother's anti-HBcIg;¹³ consequently, there will be no attack on the liver. Since hepatitis B virus is covered by anti-HBc,

Table 1. Hepatitis B markers of HBsAg positive mothers and their babies

Patient No	Mother			Baby											
	HBsAg	HbeAg	Anti-HBc	Anti HBs at month				HBs Ag at month				Anti HBc at month			
				0	1	4	12	0	1	4	12	0	1	4	12
164	+	+	10.0	0.5	8.0	633.0	140.0	+	-	-	-	+	+	+	-
437	+	-	0.5	0.5	0.5	12.0	160.0	+	-	-	-	+	+	+	-
668	+	+	0.5	0.5	84.0	50.0	138.0	+	-	-	-	+	+	+	-
1054	+	+	0.5	0.5	-	-	-	+	-	-	-	+	-	-	-
1340	+	+	0.5	0.5	5.5	7.0	-	+	-	-	-	+	-	-	+
175	+	+	39.0	0.5	0.5	0.5	0.5	-	+	+	+	+	+	+	+

Note: 0.5 indicates an undetectable (< 1 mIU/ml) titer

there should be no contact between the antigen and the T/B cells and no anti-HBs is found in the fetus.¹³ Since no anti-HBc is present in the newborn's blood, administration of HBIg to reduce viral replication in newborn has not been considered very successful.¹⁴

It is without doubt that infection of the newborn may take place at birth. This was illustrated by baby no. 175, who was at birth negative for HBsAg but became HBsAg positive some time between one to 12 months in spite of vaccination. The infection of this baby might have occurred at birth, as the mother was positive for both HBsAg and HBeAg. Similar result was shown by Schweitzer,¹⁵ who found that hepatitis infection occurred in 13 of 27 babies born to mothers who had acute hepatitis B in the 3rd trimester of pregnancy, or 2 months after delivery.

In conclusion, our findings suggest that the presence of HBsAg in cord blood is not related to infection during pregnancy. In other words, hepatitis infection of the newborn occurs at delivery.

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