MODE OF DELIVERY AND LEVEL OF PASSIVE IMMUNITY AGAINST HERPES SIMPLEX VIRUS

M. BUJKO - V. ŠULOVIĆ - G. SBUTEGA-MILOŠEVIĆ - V. ŽIVANOVIĆ
Institute of Microbiology and Immunology, Clinic of Gynecology and Obstetrics
School of Medicine - University of Belgrade (Yugoslavia)

Summary: The level of passive neonate protection against HSV depends on the transplacentally acquired neutralized HSV antibodies' titer. In this study we investigated the anti HSV antibodies' transplacental passage in a group of women who delivered vaginally and pregnant women who had cesarean section, with the aim of examining the influence of the mode of delivery on the level of passive immuninty to HSV. Serologic examination was performed in a group of 102 women who delivered vaginally and 80 pregnant women who had cesarean section, using the test of microneutralization. The titer of anti HSV type 1 and anti HSV type 2 antibodies in the mothers' and cord blood was determined and compared. The cord serum neutralizing HSV type 1 antibodies' titer, was twice higher as compared to those in mothers blood in 60.7% of paired sera in the group of women who delivered vaginally. The cord serum anti HSV type 1 titers were twice as high as compared to those in mothers' blood only in 15.5% of paired sera in group of pregnant women who had cesarean section. In the cases when cesarean section was performed, our results showed the lack of anti HSV type 2 antibodies in 15% of cord sera, even though the mothers' sera were anti HSV type 2 positive.

The results of this study point to the possibility that antibody transfer through the placenta is an active and selective process that depends also on the mode of delivery: there are lower levels of HSV neutralizing antibodies in the cord sera of infants whose mothers had cesarean section compared to those who delivered vaginally.

Key words: Herpes simplex virus (HSV); passive immunity; cesearean section; vaginal delivery; neutralizing anti HSV antibodies.

INTRODUCTION

In the normal adult, primary infection with Herpes simplex virus (HSV) type 1 or 2 is frequently more severe then recurrent infection, but fulminant disease is rare. In contrast, serious disseminated infection may occur in the newborn or the immunologically compromised host and is associated with a high mortality. The risk of neonatal infection increases in women with primary genital herpes because of the fact that neutralizing HSV antibodies were absent in the neonate delivered by the mother who had no antibodies. Humoral antibodies apparently prevent general dissemination of the virus ([4]). The interval required for the production of neutralizing HSV antibodies following primary herpes is often 7 to 14 days. The infant of the mother who develops primary genital herpes late in gestation may be delivered prior to the transmission of protective HSV antibodies. The level of passive neonate protection against HSV depends on the titer of the transplacentally acquired neutralized HSV antibodies.

In this study, we investigated the transplacental passage of anti HSV antibodies in a group of women who delivered vaginally and in pregnant women who had cesarean sections. We aimed to examine the influence of the mode of delivery on the level of passive immunity against HSV.

MATERIAL AND METHODS

Using the test of microneutralization serologic examination was performed in a group of 102 women who delivered vaginally and 80 pregnant women who had cesarean sections ([5]). Maternal blood was obtained during labor and blood was taken from the umbilical cord immediately after delivery. Sera were stored at −20 °C

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until assay. The titer of anti-HSV type 1 and anti-HSV type 2 antibodies in the blood of mothers and cord, was determined and compared.

RESULTS

Table 1. – *Comparison of titer of anti-HSV type 1 antibodies in maternal (Tm) and cord (Tc) paired sera.*

The ratio of Tc to Tm	Vaginal delivery No. of paired sera	Cesarean section No. of paired sera
Tc - Tm	34 (33.34%)	25 (55.56%)
Tc - 2 Tm	62 (60.67%)	7 (15.56%)
Tc - 4 Tm	3 (2.94%)	3 (6.67%)
Tc - 8 Tm	1 (0.98%)	–
Tc - Tm/2	1 (0.98%)	6 (13.33%)
Tc - Tm/8	–	2 (4.44%)
Total	102 (100%)	45 (100%)

The cord serum titer of the neutralizing HSV type 1 antibodies was twice as great as that found in maternal blood in 60.7% of paired sera in the group of women who delivered vaginally.

The cord serum titers of the anti HSV type 1 were twice as high as those found in maternal blood only in 15.5% of paired sera in the group of pregnant women who had cesarean sections.

Table 2. – *Comparison of the titer of anti-HSV type 2 antibodies in maternal (Tm) and cord (Tc) paired sera.*

The ratio of Tc to Tm	Cesarean section No. of paired sera
Tc - Tm	56 (70%)
Tc - 2 Tm	4 (5%)
Tc - 4 Tm	1 (1.25%)
Tc - Tm/2	5 (6.25%)
Tc - Tm/4	1 (1.25%)
Tc - Tm/8	1 (1.25%)
Tc - negative Tm - positive	12 (15%)
Total	80 (100%)

In the cases where cesarean section was performed, our results showed the lack of anti HSV type 2 antibodies in 15% of cord sera, even though the maternal sera were anti-HSV type 2 positive.

DISCUSSION

Transplacental transmission of antibodies of the IgG class from mother to fetus forms the basis of passive immunity and a basic mechanism of protection for newborn against infection. Starting from the 3rd to the 6th month of gestation, a gradual increase in fetal IgG will at term reach or exceed the maternal level. However, differences in the efficiency of IgG transfer through the placenta were demonstrated, and comparison between maternal and fetal IgG subclasses revealed differences in their concentration, as measured in premature low birth weight and full-term babies ([2]). Serological studies comparing viral-specific antibodies in maternal and cord blood have demonstrated a variety of trends. In some viruses, maternal antibody concentrations were lower or equal to cord blood, whereas in others, the levels of antibodies in cord were higher than in maternal blood indicating an active transfer through the placenta ([1, 3, 6]).

We found that in the cord serum neutralizing anti-HSV type 1 titers were twice as high as those in maternal blood in 60.7% and 15.5% in the group who delivered vaginally and had cesarean section, respectively. The percentage was even lower (5%) in the case of anti-HSV type 2 passage. Our results showed that in 0.98% of women who delivered vaginally, there were two and four-fold decreases of anti HSV antibodies in cord blood, while in the group with cesarean section we found that 13.3% and 4.4% of examined cord sera, the titer of anti-HSV antibodies was two and four times less, respectively. In cases where cesa-

rean section was performed, our results showed the lack of anti-HSV type 2 antibodies in 15% of cord sera, even though the maternal sera were anti-HSV positive.

CONCLUSION

The results of this study indicate the possibility that antibody transfer through the placenta is an active and selective process that also depends on the mode of delivery. There are lower levels of HSV neutralizing antibodies in cord sera of infants whose mothers had cesarean section compared to those who delivered vaginally. Our data showed significant differences between titers of mother and cord blood antibody compared to HSV type 1 and HSV type 2.

Our investigation results supports rerent data: the level of passive transferred IgG in cord blood also depends on the mode of delivery.

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