

**Analysis of Immunological Function of Infants with Congenital Heart Disease after Cardiopulmonary Bypass Surgery: Evaluation the Optimum Timing of Vaccination**

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**Background:** The optimal timing of vaccination of infants with congenital heart disease (CHD) after cardiopulmonary bypass (CPB) surgery is not clear. They have to be received a number of vaccines earlier, such as *Haemophilus influenzae* Type b vaccine, pneumococcus vaccine, influenza vaccine. The purpose of this study is to examine immunological function of infants with CHD after CPB surgery for evaluating the optimal timing of vaccination.

**Methods:** The 14 infants with CHD after CPB surgery were examined. The age ranged from 2 months to 24 months ( $9.3 \pm 6.7$  months). We analyzed immunological function of infants with CHD 1 month to 3 months after CPB surgery ( $2.1 \pm 0.7$  months). The IgG, IgM, IgA, IgD, B cell surface immunoglobulin (Sm-Ig), CD3, CD4, CD8, CD4/8, CD20, CD56 were measured using flow cytometry. Lymphocyte transformation test was also performed. We investigated measles and rubella (MR) virus antibody value in infants at before and after CPB surgery who were already received MR vaccine before CPB surgery.

**Results:** All of both humoral and cell mediated immunological function in infants with CHD were normal value at 1 month to 3 months after CPB surgery (IgG  $587.7 \pm 299.5$  mg/dl, IgA  $34.5 \pm 28.0$  mg/dl, IgM  $68.8 \pm 40.5$  mg/dl, IgD  $0.6 \pm 0$  mg/dl, Sm-IgG  $1 \pm 0\%$ , Sm-IgA  $1 \pm 0\%$ , Sm-IgM  $15.6 \pm 7.3\%$ , Sm-IgD  $14.9 \pm 7.2\%$ , Sm $\kappa$   $8.5 \pm 4.2\%$ , Sm $\lambda$   $6.8 \pm 3.3\%$ , CD3  $59.2 \pm 14.7\%$ , CD4  $39.3 \pm 11.5\%$ , CD8  $24.7 \pm 7.3\%$ , CD4/CD8  $1.8 \pm 1.0$ , CD20  $19.2 \pm 7.7\%$ , CD56  $17.1 \pm 7.9\%$ , PHA  $43424 \pm 14092$  cpm). The MR virus antibody in 2 infants were normal value even at after CPB surgery.

**Conclusions:** Both humoral and cell mediated immunological function of infants at 1 month to 3 months after CPB surgery were normal value. These results suggested that optimal timing of vaccination in infants with CHD was 1 month to 3 months after CPB surgery.