Abstract

Despite improvements in perinatal outcome in recent decades, multiple pregnancies are associated with increased risk of complications including preterm birth, fetal growth restriction (FGR) and twin-twin transfusion syndrome (TTTS). Fetal circulatory disturbances and immature cerebral vasculature increase the risk for serious perinatal injury and adverse neurodevelopmental outcome in multiple births. Cerebral oxygenation ($crSO_2$) monitoring using near-infrared spectroscopy (NIRS) is increasingly used in high-risk infants. However, limited data are available in twin preterm infants with respect to cerebral tissue perfusion.

The aim of this project was to measure $crSO_2$ using NIRS in preterm monochorionic and dichorionic twins during the first 72 hours of life and find out correlation between underlying fetal conditions and $crSO_2$ development. We divided the study population into 4 subgroups based on major fetal pathology: donor (1) and recipient (2) monochorionic twins (with TTTS), selective FGR infants (3) and twins without fetal compromise (4). We observed significant variation in $crSO_2$ among the subgroups using mixed model analysis. The recipient twins exhibited the lowest $crSO_2$ throughout the study period, whereas the FGR and donor twins presented with the highest values. Nevertheless, we found no statistically significant differences in neonatal mortality and morbidity among subgroups.

In conclusion, we were able to reveal significant correlation between $crSO_2$ values postnatally and underlying fetal pathology in monochorionic and dichorionic preterm twins. The presented $crSO_2$ patterns in these infants provide some insight into altered cerebral hemodynamics that stems from the fetal complications. The cerebral tissue oxygenation changes may contribute to adverse neurodevelopmental outcome in multiple births.