

Validation of a noninvasive neonatal optical cerebral oximeter in veno-venous ECMO patients with a cephalad catheter

K Rais-Bahrami^{1,2}, O Rivera^{2,3} and BL Short^{1,2}

¹Department of Neonatology, Children's National Medical Center, Washington, DC, USA; ²The George Washington University School of Medicine, Washington, DC, USA and ³Department of Biomedical Engineering, Children's National Medical Center, Washington, DC, USA

Introduction: Cerebral Oximetry is an optical technique that allows for noninvasive and continuous monitoring of brain oxygenation by determining tissue oxygen saturation (SctO₂). In conjunction with pulse oximetry, cerebral oximetry offers a promising method to estimate cerebral venous oxygen saturation (SvO₂).

Objective: The aim of this study was to validate the cerebral oximetry measurements with the cerebral oxygen saturation measured from blood drawn in neonates on veno-venous ECMO with existing cephalad catheter with a prototype neonatal cerebral oximeter developed by CAS Medical Systems (Branford, CT, USA).

Study Design: After obtaining informed consent, neonates undergoing VV-ECMO with cephalad catheterization were monitored by the CAS cerebral oximeter. Cephalad blood samples were periodically obtained to validate the monitor's accuracy.

Results: Seventeen neonates were studied with 1718h of cerebral oximetry data collected. Compared to the reference values, the bias±precision for cerebral oximetry SctO₂ was 0.4±5.1% and derived SvO₂ was 0.6±7.3%.

Conclusion: We recommend the use of this noninvasive method as an alternative to blood draws for cerebral venous saturation measurements in neonates requiring extracorporeal life support.

Journal of Perinatology advance online publication, 10 August 2006; doi: 10.1038/sj.jp.7211573