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## Summary 1

### Validation of the FORE-SIGHT® Tissue Oximeter for Measurement of Somatic Oxygenation in Children

October 18, 2011; 3:00 PM - 4:30 PM; Room Hyatt Regency 10CD

Presented at ASA 2011 (LBT07) by Barry Kussman, M.B.,B.Ch., Peter Laussen, M.B.,B.S., Paul Benni, Ph.D., Doff McElhinney, M.D. and Francis McGowan, M.D. from Children's Hospital Boston and Harvard Medical School in Boston, Massachusetts, United States.



This report marks the first time a somatic validation study has been reported in pediatric patients using NIRS. Sixty-five patients (0.2-16 years; 3.9-49.5 kg) undergoing cardiac catheterization at Children's Hospital of Boston were enrolled in a study to validate FORE-SIGHT's medium sensor to measure somatic tissue oxygen saturation. The sensor was placed on the flank in the paravertebral region just above the 12th rib. Blood samples were collected from central venous and arterial catheters to provide a reference for StO<sub>2</sub> using the formula:

$$\text{REF StO}_2 = (0.3 * \text{SaO}_2) + (0.7 * \text{ScvO}_2)$$

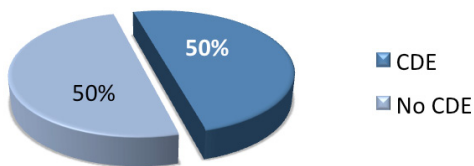
The reference StO<sub>2</sub> was compared with FORE-SIGHT StO<sub>2</sub> through Deming regression showing the precision (one standard deviation) to be 5.17% with a -0.45% bias. The results were then stratified by patient's weight to see if the lower-weight subjects had more of a contribution to the NIRS signal from kidney tissue rather than skeletal muscle which would be evident with a higher bias. The analysis did not show a significant bias, attributing most of the NIRS value to skeletal muscle when the sensor is placed on the flank in children greater than 4 kg.

## Summary 2

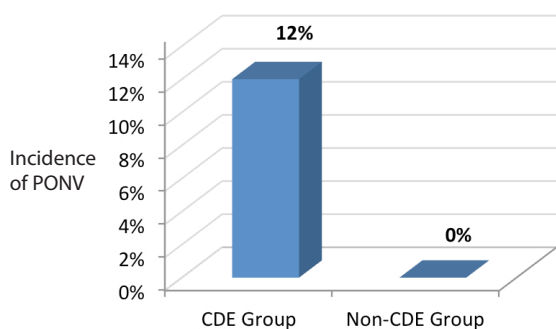
### The Incidence of Cerebral Desaturation Events in the Intensive Care Unit (ICU) Following Cardiac Surgery

October 18, 2011; 1:00 PM - 4:00 PM; Room Hall B2 Area K

Presented at ASA 2011 (A1454) by Steven B. Greenberg, M.D., Andrea Garcia, B.A., Renee Fasanella, R.N., Glenn Murphy, M.D., Joseph Szokol, M.D. and Jeffery Vender, M.D. from the NorthShore University HealthSystem, in Evanston, Illinois, United States.

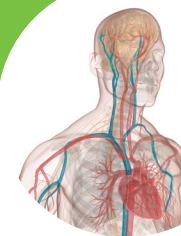


This study used FORE-SIGHT post-operatively to monitor patients during their first six hours in the ICU following elective cardiac surgery. The goal was to identify cerebral desaturation events (CDEs) defined as an absolute decrease in SctO<sub>2</sub> below 60% for greater than 15 seconds.



Fifty high-risk (ASA IV) patients were enrolled at NorthShore University Health System. These novel findings show a high incidence of CDEs (25/50) in this postoperative period, with some events exceeding one hour. Postoperative nausea/vomiting (PONV) was present in 3 of the 25 patients with a CDE, while no patients without a CDE experienced PONV.





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### Summary 3

## NIRS Values Following Phlebotomy Support the Safety of Foregoing Volume Replacement

October 15, 2011; 8:00 AM - 11:00 AM; Room Hall B2 Area G

Presented at ASA 2011 (A209) by Peter D. Winch, M.D., Aymen N. Naguib, M.D., Julie Rice, B.S.N., Joseph D. Tobias, M.D. from Nationwide Children's Hospital Anesthesiology, in Columbus, Ohio, United States.



Since there are many risks associated with administering allogenic blood products, techniques have been developed to limit the need for these products. One such technique, isovolemic hemodilution, used at Nationwide Children's Hospital, uses phlebotomy prior to surgical incision, with volume replacement guided by end-organ perfusion, measured by NIRS, blood pressure changes, and EKG tracings.

This technique requires blood removal after anesthetic induction, with a target volume based on the patient's weight and initial hemoglobin value. A drop of more than 20% in either NIRS, as measured by FORE-SIGHT, or blood pressure triggers crystalloid administration, cessation of phlebotomy or both.

Twenty-one patients (2 months-50 years) who were undergoing cardiac surgery were enrolled in this study with an average blood removal of 9.5 ml/kg per patient and average crystalloid replacement of 7.1 ml/kg. This blood loss caused a decline in MAP from 69.6 to 59.4 mmHg and a decline in NIRS from 76.7 to 69.6%. Fifteen minutes after phlebotomy, the MAP and NIRS remained consistent at 59 mmHg and 69.8%. Interestingly, in patients older than 1 year with an arterial carbon dioxide value greater than 45 mmHg, the average NIRS decline was less at 5.2% points.

Isovolemic hemodilution is a safe and effective way to limit unnecessary transfusions and crystalloid administration. The need for replacement blood volume during this technique may be greatly reduced when guided by new monitors such as NIRS, serving as a proxy for cerebral perfusion. Volume replacement can be individualized to the patient and only used with evidence of declining end-organ perfusion. More investigation is needed on the effect of arterial carbon dioxide concentration in further minimizing declines in NIRS.

