Monitoring normal cerebral oxygen saturation: comparison between three oximeters.

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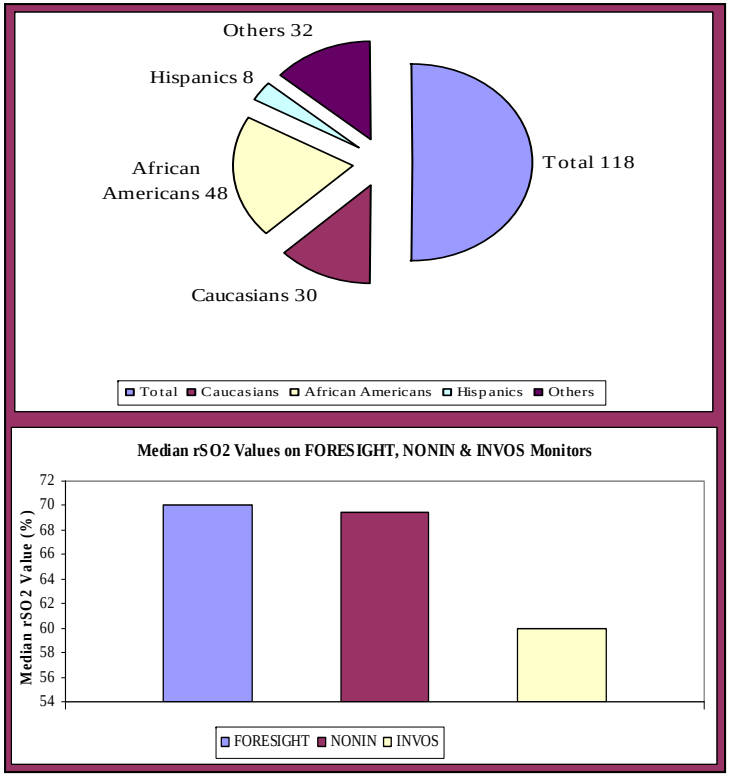
Introduction: The accurate monitoring of brain tissue oxygen saturation is important in clinical settings to asses circulatory and neurological abnormalities. In this study we compare the normal measurements and repeatability of the cerebral oxygen saturation from three near-infrared spectroscopy (NIRS) cerebral oximeters: CAS Medical FORE-SIGHT, Somanetics INVOS 5100B and NONIN Medical Regional 7600 in healthy subjects.

Methods: Following IRB approval, healthy adult subjects were enrolled in this study. In order to minimize the changes in cerebral oxygen saturation, all the subjects were asked to perform a consistent task of watching the same movie while the sensors were randomly placed on the left or right side of the forehead. All the subjects were monitored using one oximetry system at a time. Subjects were randomly assigned to have either.



brand of sensor start the sequence. Although the sensors are single use, the test sensor was removed and replaced in sequence with the other two sensors. Each set of three different sensors was repeated five times. Data were recorded as mean ± SD. Significance ($p<0.05$) was determined by Tukey-Kramer Multiple comparisons test & ANOVA.

Results: The study is ongoing and this report reflects 118 subjects (30 Caucasians/48 African Americans/ 8 Hispanics & 32 others) that have completed the study protocol. The average weight (lbs) and height (inches) was 156.6±34.2 and 66.5±3.7 respectively. The median values of cerebral oxygen saturation on FORE-SIGHT and Nonin monitors were similar (70±4.4 & 69.5±9.3; $p>0.05$) respectively whereas in INVOS Somanetics monitor, the value was 60±10 % which is lower than the value on other two cerebral oximeters ($p<0.001$).

Conclusion: The results demonstrate that the FORE-SIGHT and NONIN regional cerebral oximeters give different cerebral tissue oxygen saturation values in normal, awake patients than the INVOS cerebral oximeter monitor.

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