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Introduction:

Most recently introduced cerebral oximeter relying on Near Infrared Spectroscopy (NIRS) (Fore Sight technology) uses 4 wavelengths to determine absolute cerebral oxygen saturation (SctO₂) at the microvascular level. Very few data are currently available on normal SctO₂-values (using this technology) in healthy volunteers. In the present study, we wanted to assess normal SctO₂-values in healthy (awake) volunteers in supine positioning. The validation of this monitoring technology as to normal values in healthy (awake) volunteers seems extremely important as to any further clinical implication of this NIRS technology.

Methods:

With IRB approval and written informed consent, 102 adult (18-30 years) ASA I volunteers were monitored by bilateral frontal SctO₂-monitoring (right and left SctO₂/2sec).

Additional monitoring included pulse rate (/min), pulse oximetry (SpO₂/min) and noninvasive blood pressure monitoring (/3min).

In all volunteers, SctO₂-monitoring was started in supine position and monitored for a 15 minute period.

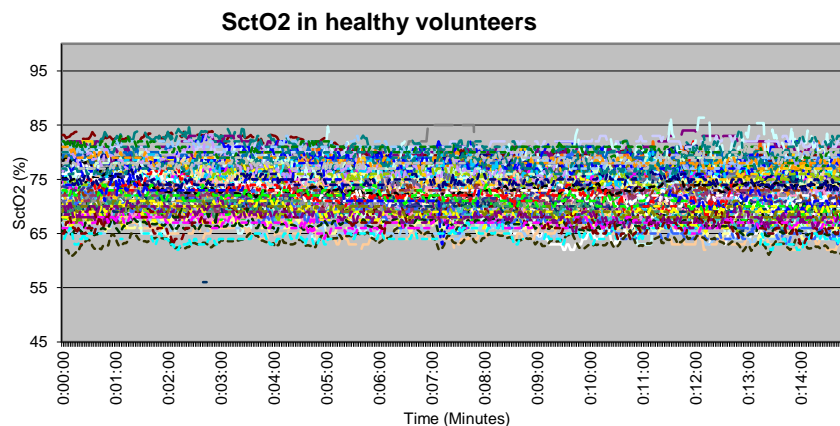


Figure 1: Bilateral SctO₂ measurements in healthy volunteers in supine position over a 15 minute period.

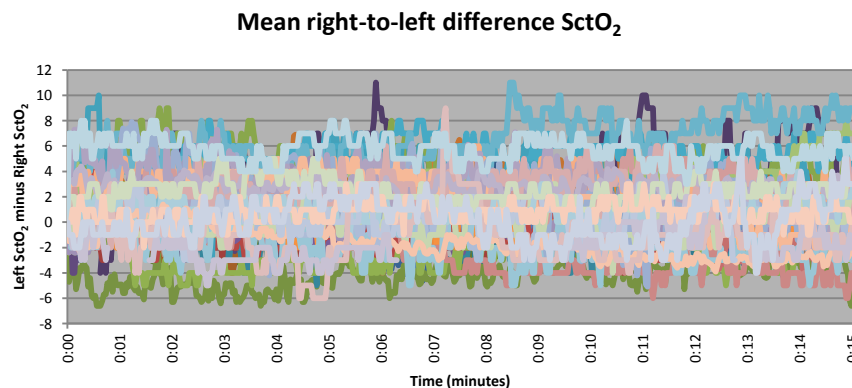


Figure 2: Bilateral SctO₂ measurements in healthy volunteers in supine position over a 15 minute period. Mean right to left right difference.

Results:

In all 102 volunteers, we were able to obtain reliable signal monitoring (and bilateral SctO₂-values).

In supine position mean SctO₂ for all 102 volunteers was 74.25%, with SD 4.603% and range between 62% and 85%. In every individual volunteer, mean SctO₂ change over 15min period was 3.08% (range between 1% and 8%). (Figure 1)

Mean right to left differences in SctO₂ for all 102 volunteers at the start (first minute) was 3.49%, with a range between 0% and 9%. In every individual volunteer, mean right to left difference in SctO₂ over 15 minutes period was 2.87%, with range 2% to 10%. (Figure 2)

Discussion:

Using the Fore Sight technology, normal absolute cerebral oxygen saturation values in healthy volunteers are between 62% and 85%. Right to left differences are insignificant and changes in SctO₂ over a 15 minute period in every individual patient are insignificant. These validation data, obtained in healthy volunteers, could guide a better interpretation of significant changes in SctO₂ occurring in intra-operative (anesthesia) conditions.