DECREASE OF CEREBRAL OXYGEN SATURATION MEASURED BY ABSOLUTE OXIMETRY IN PATIENTS UNDERGOING SPINE SURGERY IN PRONE POSITION

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Introduction: Prone position in patients undergoing spine surgery causes important cardiovascular and pulmonary disturbances. The aim of the present study was to determine incidence and magnitude of the decrease in cerebral oxygen saturation ($SctO_2$) in patients undergoing spine surgery in prone position.

Methods: Fifty consecutive patients undergoing spine surgery were enrolled. The FORESIGHT™ (CASMED, USA) absolute cerebral oximeter was used to measure left, right and average absolute $SctO_2$ and data were automatically recorded every 2 seconds from the awake state to extubation. Standard clinical parameters, bispectral index were continuously recorded. Blood gas analysis was performed every 30 min throughout surgery. Data are shown as mean (SD), and were analyzed using Spearman's correlation test, $p<0.05$.

Results: Patients [aged 59yrs (17), M/F 28/22, ASA I/II/III 15/18/17] showed an absolute baseline $SctO_2$ of 76% (6) during the awake state; 68% of the patients showed a $SctO_2$ value below 65% during prone position, while 26% of them showed a decrease below 60% (Table 1). Exposure time to $SctO_2 < 65\%$ was 34% (33) of prone position total time. Exposure time to $SctO_2 < 60\%$ was 18% (24) of prone position total time (Figure 1). During prone position, a significant number of patients had a decrease of $SctO_2$ of more than 15%. (Figure 2). The decrease in $SctO_2$ was correlated to patient's age, duration of prone position and the relative decrease of hemoglobin and hematocrit. No other correlations with standard clinical parameters were found. The $SctO_2$ decrease disappeared within 10 min in all patients after establishment of supine position.

Conclusions: Prone position during spine surgery is associated with a decrease of $SctO_2$ in a significant % of patients. These desaturations are related to the prone position itself and to blood loss.

Table 1: Exposure under SctO2 thresholds of 65% and 65%.

$SctO_2$ (%)	N (%)	Exposure time (min)	Exposure time (% of prone position)	Duration of prone position (min)
$SctO_2 < 65\%$	34 (68%)	80 ± 95	34 ± 33	233 ± 88
$SctO_2 < 60\%$	13 (26%)	43 ± 58	18 ± 24	238 ± 82

Figure 1: % of time of SctO2 below 65% and 60%

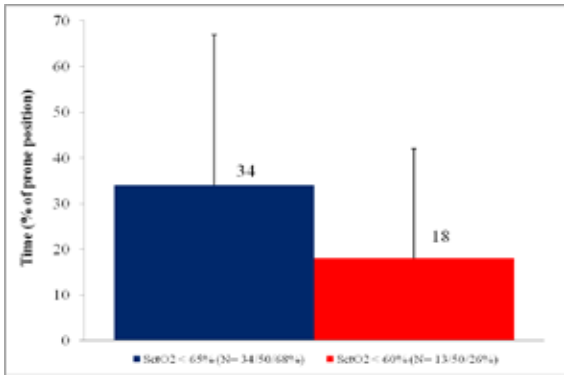

Figure 2: % of pt with SctO2 decrease

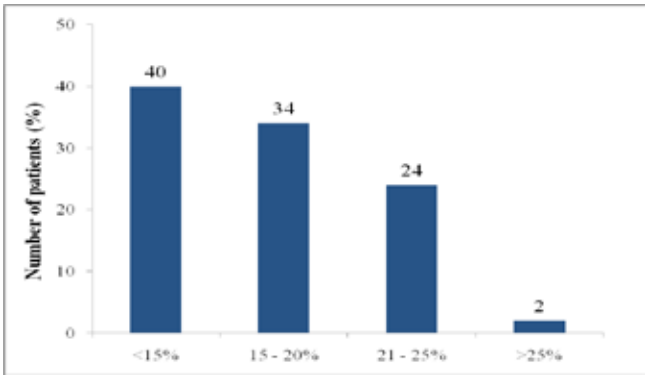

Table 2: Correlation between minimum absolute value of SctO2 and clinical parameters.

Correlation test (Spearman)	***R²***	***P-value***
Minimum absolute value of $SctO_2$		
Age	-0.326	0.021*
Duration of surgery	-0.363	0.010*
Duration of prone position	-0.373	0.008*
Relative hemoglobin decrease	-0.429	0.003*
Relative hematocrit decrease	-0.365	0.012*
Relative peripheral saturation decrease	-0.031	0.833
Relative PCO_2 decrease	-0.168	0.254
Relative PO_2 decrease	0.108	0.466
Relative MAP decrease	-0.246	0.092