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Beach Chair Positioning Results in Significantly Lower Cerebral Oxygen Saturations

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Introduction: In beach chair position, shoulder endoscopic procedure can be performed without any distortion of the intra-articular anatomy and without traction to the the brachial plexus. However, the upright position is associated with significant hemodynamic changes that have the potential to compromise cerebral circulation. Moreover, optimal surgical visualisation often requires use of controlled arterial hypotension. Combining beach chair positioning with induced hypotension could ultimately threaten the maintenance of adequate cerebral perfusion. Fore-Sight absolute cerebral oximeter uses 4 wavelengths of near-infrared laser light to determine non-invasive absolute cerebral oxygen saturation (SctO₂). In this study, we monitored SctO₂ comparing beach chair positioning (BP) to conventional (lateral decubitus) positioning (LD).

Methods: With IRB approval, 180 patients were included (90 pts: BP/90 pts: SP). All procedures were performed under general anesthesia (propofol/remifentanyl and with pre-operative locoregional inter-scalene block). Before induction of anesthesia, bilateral SctO₂ monitoring was applied and monitoring was blinded during the whole procedure.

Results: Mean SctO₂ after induction of anesthesia (and before change in body position) was not different between both groups (BP: m77.12% SD 6.23% vs CP: m80.32% SD 7.16%). After BP positioning, SctO₂ was significantly lower compared to SP (after positioning BP: m60.74% SD 12.98% vs SP: m72.84 SD 6.74%). During procedure, arterial pressure management (mean systolic blood pressure BP: 86.2mmHg; SP: 85.4mmHg) was not different between both groups. However, the lowest SctO₂ observed in BP was significantly lower compared to SP (BP: m54.03% SD 6.28 % vs SP: m65.54% SD 5.56%). In BP, 55/90 pts revealed SctO₂ values below 55%, which did only occur in 5/90 pts in SP. There was no significant difference between both groups as to any hemodynamic or respiratory parameter (end-tidal CO₂, pulse oximetry...). No pt experienced any major postoperative neurologic deficit.

Conclusion: Cerebral oxygen saturation values were significantly lower (and below the threshold for cerebral ischemia) in patients managed in beach chair positioning (with induced arterial hypotension) compared to conventional positioning for endoscopic shoulder surgery.

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