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October 18, 2009
2:00 PM - 4:00 PM
Room Area P

The Incidence of Cerebral Oxygen Desaturation Events during Surgery in the Beach Chair Position

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Introduction: The beach chair position (60-90° above the horizontal plane) is used for shoulder arthroscopy procedures in order to provide optimal operating conditions for the surgeon. A potential risk of surgery in this position is cerebral ischemia secondary to hypoperfusion. Several recent case reports have described severe postoperative neurologic damage (coma, visual loss) in patients emerging from anesthesia after sitting shoulder surgery (1-3). These authors hypothesized that brain hypoperfusion and ischemia due to inadequately maintained systemic/cerebral pressures contributed to the catastrophic injuries. Recent developments in near-infrared spectroscopy (NIRS) technology now permit rapid assessment of cerebral oxygenation. The aim of this clinical investigation was to assess and compare regional cerebral oxygen saturation (rSO₂) values in patients undergoing arthroscopic shoulder surgery in the beach chair and lateral decubitus positions. The incidence of critical rSO₂ desaturation events (defined as a ≥ 20% decrease in rSO₂ values from baseline measures or a rSO₂ value ≤ 55 for ≥ 15 seconds (4)) was recorded.

Methods: 110 consecutive patients presenting for elective shoulder surgery in the beach chair position (n=55) or lateral decubitus position (n=55) were enrolled in this observational clinical trial. Anesthetic management was standardized (propofol, rocuronium, sevoflurane titrated to BIS values of 40-60). Standard intraoperative monitoring was used, including a manual blood pressure cuff applied to the upper arm and NIRS monitoring sensors (CAS Medical Systems, Inc, Branford, CT) applied to standard forehead positions before induction of anesthesia. Baseline values were recorded after a one-minute stabilization period breathing 50% oxygen and then continuously recorded throughout the intraoperative period. Clinicians providing anesthetic care were notified by a research assistant if any values below the critical thresholds were observed and cerebral desaturation events were treated according to a standard protocol in the following order: (1) raise mean arterial pressure, 2) increase end-tidal carbon dioxide concentrations, 3) raise inspired oxygen concentration.

Results: Complete data sets were collected on 99 patients (49 in the beach chair group and 50 in the lateral decubitus group). Patient demographics were similar between the two groups. In the beach chair group, 37 of 49 patients (75.5%) had at least one episode of a ≥ 20% decrease in rSO₂ values from baseline values (P < 0.05). In addition, 4 of 49 subjects (8.2%) had rSO₂ values ≤ 55 recorded. In contrast, no episodes of critical rSO₂ desaturation events (0%) were observed in the lateral decubitus group during the entire intraoperative measurement period.

Conclusion: Significant reductions in cerebral rSO₂ were observed in the majority of patients undergoing orthopedic procedures in the beach chair position. These events were not observed when the same procedures were performed in the lateral decubitus position.

References: 1. J Clin Anesth 2005; 17: 463-9

2. Anesth Analg 2003; 96: 899-902

3. APSF Newsletter 2007; 22: 25-27

4. Seminars in Cardiothorac Vasc Anesth 2004; 8: 147-166.

From Proceedings of the 2009 Annual Meeting of the American Society Anesthesiologists.

