

## **Propofol Sensitivity Alone can Cause Alert Level Loss of Transcranial Motor Evoked Potential during Corrective Surgery for Adolescent Idiopathic Scoliosis**

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**INTRODUCTION:** Transcranial motor evoked potential (TcMEP) is used intraoperatively to monitor the integrity of the motor pathways from the brain to musculature during Adolescent Idiopathic Scoliosis (AIS) correction. While a necessity to alert surgeons to potential interruptions during correction, use of TcMEP is not without challenges. This study aims to investigate the safety and efficacy of a TcMEP protocol incorporating the maintenance of intraoperative mean arterial pressure (MAP) >65 and hematocrit (HCT) >25; obtaining a baseline TcMEP prior to incision, and progressive dosing of propofol.

**METHODS:** From 2009-2022, consecutive AIS patients undergoing deformity corrections using a TcMEP protocol were studied. Inclusion criteria: age (11-49 years), and  $\geq 5$  spinal fusion levels. Exclusion criteria: previous surgery, fusion to the pelvis, neurogenic scoliosis, and other deformity related diagnoses.

**RESULTS:** A total of 510 patients met inclusion criteria with mean age 15.4 ( $\pm 3.5$ ) years. Some 86% were female. Mean spinal levels treated and OR time were 9.6( $\pm 3.3$ ) and 346.2( $\pm 89.4$ ) min, respectively. There were 21 TcMEP alerts (4.1%). Of these, 3 were hypotension related, 9 occurred during deformity correction, 7 were Propofol dose related, and 2 indeterminate. None were related to screw placement. In 4 manipulation related alerts, any rod-based deformity correction triggered an alert, leading to placement of in situ contoured rods. These patients were staged, and successful correction achieved 3 weeks later. In all 7 of the Propofol dose related alerts, there were no concurrent confounding factors. Initiation, but not completion, of a wake-up test resolved the alert. Propofol was restarted at a lower dose. No postoperative neurologic deficits were encountered. None of our patients reported intraoperative awareness.

**DISCUSSION AND CONCLUSION:** For reliable TcMEP monitoring during AIS surgery, our protocol incorporated hemodynamic support, no incision until TcMEPs achieved, and progressive Propofol titration. Successful monitoring was achieved in all 510 patients. There were no postop neurologic deficits or episodes of intraoperative awareness. Of the 21 TcMEP alerts, in 7 cases, Propofol dose reduction leads to restoration of baseline potentials. Propofol was determined to be the sole cause of TcMEP loss, and initiation of the Wake-Up test but not completion, with lightening of the propofol dose, resolved the issue.