

8th Annual AOSPine North America Fellows Forum Abstract Submission

TITLE:

Intraoperative neuromonitoring: Lessons learned from 32 case events in 2095 spine cases.

AUTHORS: (include disclosures)

Matthew Eager, MD – no disclosures
Adam Shimer, MD – no disclosures
Faisal Jahangiri, MD – no disclosures
Francis Shen, MD - no disclosures
Vincent Arlet, MD – AO Spine speaking/teaching, Synthes research grant,
Medtronic research grant

INTRODUCTION: (Background, purpose, question asked)

Intraoperative neuromonitoring is becoming the standard of care for many more spinal surgeries, especially with deformity correction and instrumentation. We reviewed our institution's neuromonitored spine cases over the past four years to see the immediate intraoperative and postoperative clinical findings when an intraoperative neuromonitoring event was noted. The main question addressed in this review is how has multimodality intraoperative neuromonitoring affected our ability to avoid potential neurologic injury during spine surgery.

METHODS: (Methods used to seek the answer)

We retrospectively reviewed 2095 neuromonitored spine cases at one institution performed over a period of 4 years. Data from the single neuromonitoring provider (Impulse Monitoring, Inc.) at our institution was collected and any cases with possible intraoperative events were isolated. The intraoperative and immediate postoperative clinical documentation of these 32 cases were reviewed.

RESULTS: (Summarize the findings)

There were 17 cases where changes noted on EMG, SSEP, and/or MEPs affected the course of the surgery, and prevented possible postoperative neurological deficits. Of these 17, five were related to hypotension, seven due to deformity correction, one screw had a low triggered EMG threshold and it was repositioned, and four cases had changes related to patient positioning and external pressure (i.e.

brachial plexus stretch). None of these 17 cases had postoperative motor or sensory deficits.

Four cases consisted of intradural cord biopsies or tumor resections which had various positive neuromonitoring findings that essentially serve as controls. These cases confirm that the expected changes were seen on neuromonitoring. Four cases had false-positive neuromonitoring findings due to one technical issue requiring needle repositioning, one low threshold with triggered EMG without a pedicle breach, one case had decreased MEP responses with stable SSEPs, and one case had decreased SSEPs after positioning the patient prone. None of these five cases had any postoperative deficits. Four cases showed improved SSEPs after decompression; three cervical corpectomies, and one thoracic discectomy.

Three cases of lumbar instrumentation with spontaneous EMGs each had a medial screw breach without intraoperative findings. They all had a postoperative motor deficit (foot drop). None of these three cases had triggered EMGs performed with the index procedure.

CONCLUSIONS: (Define the overall significance of the findings)

Overall, this review reinforces the importance of multimodality neuromonitoring for spinal surgery. The incidence of possible events in our series was 1.5%. In a majority of those cases, possible postoperative neurologic deficits were avoided by intraoperative intervention. Clearly, in the three cases with lumbar pedicle screw malposition, triggered EMGs would have likely shown low thresholds. This would allow for screw reposition, and thus avoid a postoperative foot drop and revision surgery. The incidence of false-positive findings was very low in this review, and unfortunately the true incidence of false-negative findings is not able to be elucidated with this database.

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