

The utility of intraoperative neuromonitoring for lumbar decompression and fusion surgery: an analysis in New York State with SPARCS database

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INTRODUCTION: Intraoperative neuromonitoring (IONM) has been used by spinal surgeons for several decades. Several studies have demonstrated the utility of intraoperative neuromonitoring (IONM), including somatosensory evoked potentials (SSEPs), motor-evoked potentials (MEPs), and electromyography (EMG), in decreasing the risk of neurologic injury in lumbar spinal procedures. However, the utility of IONM for preventing neurologic deficit in all elective lumbar spine procedures has recently been called into question. This study sought to elucidate trends in the utilization of IONM during elective lumbar surgery procedures in New York State using the Statewide Planning and Research Cooperative System (SPARCS) and to investigate the association between the use of IONM and surgical outcomes, including intraoperative neurological injuries.

METHODS:

The SPARCS database was accessed to perform a retrospective cohort study comparing neuromonitoring versus non-neuromonitoring groups with lumbar decompression and fusion procedures between 2017 and 2018 using the International Classification of Disease-9 Procedural Coding System (ICD-9 PCS) codes. Patient demographics and comorbidities were recorded. Additionally, pertinent in-hospital events, and urban versus rural medical center (as defined by the US Office of Management and Budget) were recorded from 2007 to 2018. Propensity score matching (PSM) based on common cofounders was used to match patients who received neuromonitoring or non-neuromonitoring in a 1:1 ratio and outcomes were compared between these two groups. Multivariable logistic regression analyses were also conducted to assess independent factors for neurological deficits.

RESULTS:

A total of 34,592 (12,419 monitored (35.9%) and 22,173 (64.1%) unmonitored) patient's data were extracted. A total of 210 patients (0.6%) were extracted as neurological deficits patients. A diagnosis of spondylolisthesis, spondylosis, lumbar canal stenosis, scoliosis, adult deformity, or degenerative disc disease were highly monitored. The utilization of IONM since 2007 showed an increase in a linear fashion from approximately 1% of cases in 2007 to 35% in 2018. Unadjusted comparisons demonstrated that the IONM group was significantly associated with fewer neurological injuries. However, after PSM of 8,416 patients, the incidence of neurological deficits, other complications, and LOS were not significantly different between IONM and non-IONM patients. Multivariate analysis indicated that IONM was not an independent factor for neurological injuries.

DISCUSSION AND CONCLUSION:

The utility of IONM for elective lumbar surgeries continues to gain popularity statewide. PSM results indicated that IONM use was not significantly associated with a reduction in neurological injuries and LOS compared to non-IONM surgical cases. Our results do not support the routine use of IONM for all elective lumbar decompression and fusion. However, the effect of IONM on nerve injury prevention is still inconclusive since the overall reported incidence of neurological complications was very low.