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Incidence and Resolution of Neuromonitoring Alerts During Extradural Cervical, Thoracic and Lumbar Spine Surgery

RESEARCH ABSTRACT

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Introduction

Intraoperative neuromonitoring (IONM) is used to assess and monitor the risk of neurologic injury during extradural spine surgery. However, minimal data exist about the incidence and resolution of neuromonitoring alerts during surgery in different spinal regions.

Methods

A retrospective review of a multi-institutional database of 67,163 consecutive extradural spine procedures monitored from May 2013 through August 2015 was performed. The incidence of IONM alerts and rate of unresolved change were compared for cervical (C), thoracic (T), lumbar (L), CT, TL, and CTL procedures. Test-specific alerts were defined according to accepted published criteria. Multiple comparisons of means using logistic regression and post-hoc Tukey contrasts were used to compare the rates of unresolved neurophysiologic change.

Results

IONM changes occurred in 8,285 (12.3%) of all procedures. Thoracic procedures experienced the lowest incidence of alerts (10.6%), but had the highest rate of unresolved change (34.4%). Lumbar procedures had an 11.3% incidence of alerts and the lowest rate of unresolved change (11.6%). Rates of unresolved change were higher for all surgical groups relative to the Lumbar group ($p < 0.001$) and were also higher for the Thoracic, Cervicothoracic and Thoracolumbar groups relative to the Cervical group ($p = 0.028$, $p < 0.001$, and $p = 0.0026$).

Conclusion

While thoracic extradural spine procedures appear to have a lower incidence of neuromonitoring alerts than other regions, the risk of neurologic injury may be greater based on their higher rate of unresolved IONM changes. Clinical indications for extension of cervical and lumbar surgery to the thoracic region may require recognition of possibly elevated risk of neurologic injury.

