



Predictive Value of Intraoperative Neurophysiological Monitoring During Spine Surgery: A Prospective Analysis of 4489 Consecutive Patients

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Introduction

A single center study to define the sensitivity & specificity of intraoperative neurophysiological monitoring in detecting new neurological deficits.

Methods

A cohort of 4489 consecutive (2462 male and 2027 female) patients operated over 3 years was evaluated. Sub-group analysis performed for patients undergoing posterior cervical intervention (n=1373), posterior lumbar fusion surgery (n= 2420). Sensitivity and specificity were determined using Bayesian techniques. Impact of length of surgery & of variables including age, sex, BMI, DM, HTN, CAD, CVD & history of smoking, on the development of a new neurodeficit was defined.

Results

Of 4489 patients, 426 patients (9.4%) had significant intraoperative SSEP changes. New postoperative neurological deficits occurred in 121 (2.7%) patients. 25/426 patients (5.8%) with neuromonitoring changes developed a new neurodeficit. 96/4063 patients (2.3%) with no changes developed a new neurodeficit. In posterior cervical interventions 98/1373 (7.1%) developed SSEP changes and 13/98 (13.2%) patients developed a new neurodeficit, while 49 (3.8%) developed a new neurodeficit without any changes in IOM. In posterior lumbar fusion SSEPs, EMGs and Pedicle screw stimulation was utilized. 249/ 2420 (10.2%) patients developed IOM changes and 8/249 (3.2%) patients developed a new neurodeficit, while 37 (1.7%) developed a new neurodeficit without changes in IOM.

In the entire cohort SSEPs had sensitivity 20.7% and specificity of 90.8%. In the posterior cervical cohort SSEPs had sensitivity of 20.9 % and specificity 93.7 %. In the lumbar fusion cohort multi-modality monitoring including SSEPs, EMGs and Pedicle Screw stimulation had a sensitivity of 17.8% and specificity of 88.6%. Neither the length of surgery nor did any analyzed patient related variable have a statistically

Learning Objectives

By the conclusion of this session, participants should be able to 1) describe the sensitivity and specificity of SSEP monitoring in spine surgery.

2) Discuss the need for a cost-utility analysis to define the cost-effectiveness of the use of SSEP monitoring in spine surgery

References