

Intraoperative Neuromonitoring During Posterior Spinal Fusion

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Introduction

Somatosensory evoked potentials (SSEP) and motor evoked potentials (MEP) are frequently used to monitor neurological function during spinal deformity surgery. The sensitivity and specificity of Intraoperative Neuromonitoring (IONM) in patients undergoing Posterior Spinal Fusion Surgery (PSFS) is unknown. Hence, we review our experience.

Methods

A retrospective review of all patients undergoing PSFS with IONM from October 2008 to December 2012 was performed. Factors including gender, operative time and spinal levels of posterior fusion were analyzed as risk factors for intraoperative alerts.

Results

A total of 784 consecutive patients who underwent PSFS with IONM with no baseline neurological deficits were analyzed. Patient demographics were: 45% male (n=356), 55% female (n=428) and mean age of 56 years. The mean procedure time was 7 hours. 3.3% (n=26) of patients experienced intraoperative alerts. In this cohort, the average number of levels involved per procedure was approximately 7.1, ranging from 1-16 levels. Of all the spinal levels, the cervico-thoracic region had the highest incidence intraoperative alerts (6 of 97 cervico-thoracic cases p=0.06). Among these patients, age (p= 0.32), gender (p= 0.66) and procedure time (p=0.63) were not predictive factors. 4 out of 26 (15%) patients had neurological deficits despite surgeon intervention following neuromonitoring alerts.

Distribution of monitored cases and intraoperative positive changes with regards to region of the spinal column.

	Monitored (% of total)	Positive Change (% of cases)	p value
Cervical	153 (19.5)	7 (4.6)	0.246
Cervicothoracic	97 (12.4)	6 (6.2)	0.067
Thoracic	79 (10.1)	2 (2.5)	0.777
Thoracolumbar	115 (14.7)	2 (0.9)	0.151
Thoracolumbar sacral	165 (21.0)	7 (3.7)	0.634
Lumbar	112 (14.3)	1 (0.9)	0.158
Lumbosacral	63 (8.0)	1 (1.6)	0.488

Conclusions

SSEP and MEP changes occurred in 3.3% of patients undergoing PSFS, with highest incidence at the cervico-thoracic level. 23/26 patients with intraoperative neuromonitoring changes had improvements in IONM signals following interventions during surgery. Neuromonitoring in PSFS enhances surgical safety and in our study prevented post-operative neurological sequelae.