

#### A Conservative Policy of Intraoperative Neuromonitoring for Spinal Surgery: Costs and Outcomes Shane Hawksworth MD; Nicholas Andrade BA, MPH; Colin Son MD; Viktor Bartanusz; David F. Jimenez MD, FACS

Department of Neurosurgery, University of Texas Health Science Center San Antonio, San Antonio, Texas 78229

UT HEALTH SCIENCE CENTER SAN ANTONIO

#### Introduction

The practice of intraoperative neuromonitoring (IONM) for spinal surgery has become widespread, despite the expense and the limited evidence to support its routine use. In July of 2012, we adopted a departmental policy to only use IONM in cases of deformity correction or intradural lesions.

### Methods

We retrospectively reviewed the clinical records and billing invoices for all spinal surgeries at a single institution in the 18 months before and after policy adoption (January 2011 to December 2013) to determine IONM usage, clinical outcomes (specifically immediate postoperative neurologic deficits), and any related litigation.

Table 1. Age and Diagnosis		
	JAN 2011 - JUN 2012	JUL 2012 - DEC 2013
Age (years)	47	46
Diagnosis		
Spondylosis	228	221
Trauma	131	111
Tumor	28	21
Infection	25	20
Pain	8	15
Revision	8	14
Congenital	6	12
Total	434	414

	JAN 2011 - JUN 2012	JUL 2012 - DEC 2013
Levels of surgery	2.5	2.4
Procedure		
Decompression	181	176
Anterior fusion	53	52
Posterior fusion	145	127
360 fusion	4	5
Stimulation	8	15
Intradural tumor	7	13
Extradural tumor	20	13
Kyphoplasty	4	0
Deformity	6	7
Hardware removal	2	0
Other	4	6
Total	434	414

### Results

The use of IONM significantly decreased from 38% (163/434) to 7% (28/414) of cases, with an associated decrease in IONM costs from \$162,875 to \$33,150, after protocol implementation. One case of a new postoperative neurologic deficit was observed in each time period. Of note, neither injury was indicated by the IONM. Since the application of this practice there has been no related litigation and all faculty express continued satisfaction with the policy.

# Conclusions

A departmental policy for spinal surgery IONM allows consistent application of this technology, with reduced costs, high surgeon satisfaction, and no apparent adverse clinical or medical legal effect. In the absence of level I evidence to support routine IONM, we believe a conservative approach is justified.

## Learning Objectives

After viewing this presentation the audience will be able to:

- 1. Summarize the available evidence supporting the use of intraoperative
- neuromonitoring in spinal surgery.

2. Recognize the costs associated with IONM.

3. Understand the benefits of adopting a conservative policy regarding spinal IONM.

#### References

 Fehlings MG, Brodke DS, Norvell DC, et al. The evidence for intraoperative neurophysiological monitoring in spine surgery does it make a difference? Spine (35) 9S: S37-S46, 2010.
Feng B, Qiu G, Shen J, et al. Impact of multimodal intraoperative monitoring during surgery for spine deformity and potential risk factors for neurological monitoring changes. J Spinal Disord Tech (25) 4:E108-14, 2012.

3. Forster M, Marquardt G, Seifert V, et al. Spinal cord tumor surgery – importance of continuous intraoperative neurophysiological monitoring after tumor resection. Spine (37)16:E1001-8, 2012.

4. Park P, Wang AC, Sangala JR, et al. Impact of multimodal intraoperative monitoring during correction of symptomatic cervical or cervicothoracic kyphosis. J Neurosurg Spine 14:99-105, 2011.

5. Traynelis VC, Abode-Iyamah KO, Leick KM, et al. Cervical decompression and reconstruction without intraoperative neurophysiological monitoring. J Neurosurg Spine 16:107-113, 2012.

6. Wiedemayer H, Fauser B, Sandalcioglu IE, et al. The impact of neurophysiological intraoperative monitoring on surgical decisions: a critical analysis of 423 cases. J Neurosurg 96:255-262, 2002.