Benefit of Intraop Neuromonitoring May Not Outweigh Costs

Caroline Helwick | April 30, 2013

New Orleans, Louisiana — For low-risk elective cervical spine surgery for degenerative conditions, intraoperative neuromonitoring (IOM) adds significantly to the cost of the procedure without a corresponding benefit in safety or patient outcomes, researchers conclude in a new study.

"In an environment of increasingly scarce healthcare resources, efforts must be made to evaluate costly interventions and maximize patient quality of life," said lead author Saniva S. Godil, MD, from Vanderbilt University, Nashville, Tennessee. While IOP is widely used in spine surgery, the various modalities have not clearly been linked to better patient outcomes, only additional cost to patients, she said.

"IOM appears to be an area where cost can be saved without sacrificing surgical quality of patient safety," she concluded.

IOM use increased 531% among Medicare beneficiaries between 2001 and 2011. In 2011 alone, Medicare spending on IOM exceeded $23 million, she noted. Although IOM is critical for many procedures and patient populations, there are low-risk populations for whom it might safely be eliminated, the study suggests.

Researchers presented the findings here during the 81st American Association of Neurological Surgeons (AANS) Annual Scientific Meeting.

The Only Difference: Higher Cost

All patients undergoing cervical spine surgery for degenerative spondylosis were enrolled into a prospective registry. The study evaluated 180 patients having cervical surgery, including 102 with IOM and 78 without. Baseline characteristics were similar between the groups, although more men in the subset were not being monitored.

Data collected included demographic characteristics, treatment variables, and 90-day surgical morbidity. Patient-reported outcomes, return to work, and medical resource utilization were prospectively recorded at baseline and at 3 months. Current Procedural Terminology (CPT) codes 95920 (baseline electrophysiologic testing), 95295/95296 (somatosensory evoked potential monitoring), 95928/95929 (motor evoked potential monitoring), and 95937 (neuromuscular junction testing) were used to calculate the direct cost of IOM from a payer perspective.

The overall direct health costs included surgical diagnostic related group–based and CPT-based Medicare fees and medical resource utilization. Indirect costs included patient and caregiver work-day losses.

The economic endpoint was the cost of IOM per reduction in surgical morbidity (cost-benefit) and the difference in mean total cost per quality-adjusted life-year (QALY) gained with IOM via incremental cost-effectiveness ratio (ICER), ie, the cost utility.

Neuromonitoring identified changes in only 4 patients, of whom 3 had false-positive alarms; a modification in surgical strategy was necessary in only 1 case, Dr. Godil reported.

The complication rate was similar, at 12.8% for the IOM group and 14.1% for the non-IOM group (P = .79). New neurologic deficits were identified in 2 patients per group, for a rate of 2.0% and 2.6%, respectively.

There was no difference between the groups in 90-day morbidity or in patient-reported outcome–related improvements at 3 months.

While morbidity was not reduced with IOM, procedural costs were significantly increased by approximately $5000 per patient, Dr. Godil noted.

Table. Cost of Intraoperative Neuromonitoring per Patient

Cost	IOM Group (n = 102) ($)	No IOM Group (n = 78) ($)	*P* Value
Mean cost of IOM per Medicare patient	1208		
Mean cost of IOM per private pay patient	2053		
Direct cost	23,578	18,208	< .001
Indirect cost	1768	2228	.29
Total cost	25,212	20,637	.004

IOM added $1208 per Medicare patient and $2053 per private-payer payment. Considering the higher cost of IOM without significant additional improvements in outcomes, the ICER for IOM, vs no IOM, was $358,205 per QALY.

Dr. Godil emphasized that the findings pertain only to low-risk populations. "These data should not be extrapolated to complex cases, such as multiple reoperations, trauma, deformities, cord compression, and so forth," she said.

Cost-Effectiveness Applauded, Questioned

Senior investigator Matthew McGirt, MD, director of Clinical Spine Research at Vanderbilt, told *Medscape Medical News*, "We are in a time of escalating healthcare costs. There are things we do in practice that may not be value-added. We evaluated whether in the lowest risk patients these adjuncts for safety are needed, given their high cost.

"Our cost utility analysis suggested there may not be much value in this investment in this specific patient group," Dr. McGirt added. "The study challenges the notion that IOM is always valuable in low-risk elective surgery."

Joseph P. Cheng, MD, director of the Neurosurgery Spine Program at Vanderbilt Medical Center, also a coauthor, added that in patients lacking significant risk factors, "We probably don't need to spend the excess resources in monitoring them. The whole idea is to change practice to do what works, and not to do what doesn't work, and to do what's cost-effective."

He added that while physicians may have medicolegal concerns, the study aims to provide data that can support the more limited use of IOM. "Rather than focus on the anecdotal stories about paralyzed patients, we want to have data," he said.

But Richard Fessler, MD, professor of Neurological Surgery at Northwestern University Feinberg School of Medicine, Chicago, Illinois, disagreed. In a comment to *Medscape Medical News*, he called the study "very interesting," with predictable but perhaps irrelevant results.

"If you have one patient where the IOM tells you that you have a problem, and causes you to stop what you are doing and correct that problem and perhaps prevent having a patient who is paralyzed, I would argue that that is cost-effective," he said.

He added that he will not change practice on the basis of the study's findings.

Dr. Godil, Dr. McGirt, Dr. Cheng, and Dr. Fessler have disclosed no relevant financial relationships.

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