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Big Clinical Data in the OR

How neuromonitoring is improving outcomes following spine surgery

"You cannot demonstrably improve what you cannot measure," wrote Clifford Ko, MD, MSHS, director of the American College of Surgeons Division of Research and Optimal Patient Care, "and to measure, you need good data – data that are fair, accurate, and robust."¹

Dr. Ko was making the case for using data to elevate patient care quality, and indeed, big data is being harnessed in healthcare now to predict epidemics, cure disease, improve quality of life, and avoid preventable deaths.² But the challenge for surgeons, he acknowledged, lies in gathering clinical data—information gleaned from patient charts and actual surgical procedures—to bring about meaningful change. Measurement of clinical data is what identifies deficits and informs new techniques and protocols.

The average health system can't accomplish the task on its own. Much of their clinical data may be buried across many sources governed by different departments, hospitals, vendor partners, or even states.³ However, surgical providers that work with health systems throughout the country are filling a critical gap in data collection and analysis.

To see it at work, consider how clinical data in the OR are managing patient risk and improving neurology outcomes following spinal surgery.

CASE STUDY: IONM FOR SPINE SURGERY

During spine surgery, such as treatment for degenerative disc disease, spondylolisthesis or spinal stenosis, Intraoperative Neurophysiological Monitoring is used to identify neurologic changes that may occur while the surgical team performs the procedure. The ultimate goal of IONM is to reduce the incidence of postoperative neurologic injury. Through the use of monitoring modalities such as SSEPs, tceMEPs, SpEMG and tREM, expert IONM technicians watch for neurophysiological change during surgery, providing real-time feedback to the surgical team and alerting them to evolving injury. This affords the surgical team the opportunity to intervene and potentially prevent postoperative neurologic deficit.

Success of IONM, then, depends not only on what the neuromonitoring team tracks and discovers during surgery, but also on the ability of the surgical team to intervene and resolve issues. Using data from SCOPE, the SpecialtyCare Operative Procedural Registry™, hospitals have been able to confirm efficacy on both sides of the equation.

The largest multi-institutional database of its kind, SCOPE™ assimilates the data from hundreds of thousands of surgical procedures across a wide range of clinical settings. Members of SpecialtyCare's

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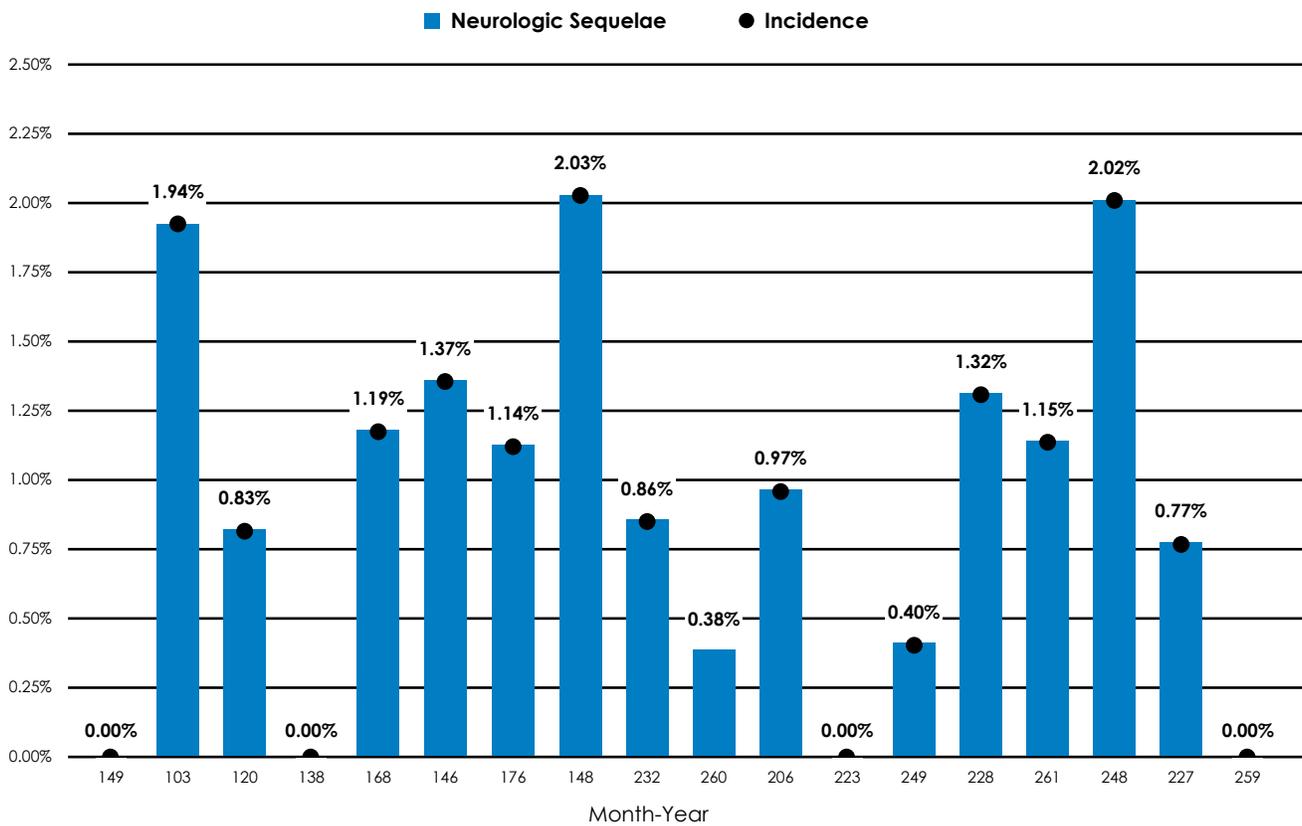
medical office analyze the data and use it to develop evidence-based best practices that are shared with OR teams throughout their national network.

Until recently, little was known about the relationship between the resolution of intraoperative neurologic changes and the patient's neurologic outcome following surgery. Reviewing SCOPE™ data from nearly 70,000 consecutive extradural spine procedures, SpecialtyCare researchers were able to determine that neurologic outcomes following successful resolution of neuromonitoring changes were comparable to those in which there were no neuromonitoring changes detected during surgery. The findings, which earned a prestigious "Best Paper" honor at the North American Spine Society 2016 Annual Meeting, proved the significant value of IONM information provided to the surgical team during procedures.

When detected, how often are neurologic changes during surgery successfully resolved? A SCOPE™ data analysis of nearly 18,000 cases with IONM alerts demonstrated that surgeons and anesthesiologists across the country are able to successfully resolve those neurologic changes almost 80 percent of the time.

Interestingly, both alert and resolution rates varied across spine regions. Alert and resolution rates were both lowest in thoracic spine surgery; alert rates were highest in cervical spine procedures, and resolution rates were highest in lumbar spine procedures. Knowledge of variations in alert and resolution rates can enable surgical teams to set region-specific protocols to optimize success rates. Client hospitals can actually compare their rates across numerous key performance indicators in the database to identify

Graph 1: Procedural Volume and Outcome over 18 Months after SpecialtyCare becomes Sole Provider



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places where their surgical and anesthesia teams can improve processes and outcomes.

At one large academic medical center, for example, the implementation of data-driven quality improvement initiatives resulted in an improvement in alert reliability and a reduction in overall adverse events. Over an 18-month period after SpecialtyCare became the sole IONM provider, the hospital achieved a 75 percent reduction in the technological confounds that could potentially interfere with alert reliability, as well as a 30 percent improvement in the rate of resolution of neurologic changes. Overall, the hospital realized a 6 percent decrease in postoperative neurologic injury. (Graph 1)

Across the country, the SpecialtyCare network has seen 31 percent decrease in neurologic injuries since Q2 of 2015, which equates to 306 fewer injured patients each year. In addition to the personal quality-of-life benefit to each patient, fewer injuries has a financial impact as well. The lifetime costs accrued by a patient who suffered a spinal cord injury during spine surgery can be as much as \$5.4 million.

Additional industry data confirms the efficacy of IONM for long-term clinical outcomes. Researchers John P. Ney, MD, MPH, and Daniel P. Kessler, PhD, JD, reviewed a large administrative healthcare database to compare outcomes of patients who underwent single-level cervical spine surgery with and without IONM.⁴ They determined that patients who received IONM experienced a lower readmission rate, fewer nervous system complications at one year post-surgery, and lower prescribed opioid use in the year following surgery.

In the example of IONM for spinal surgery, the power of big clinical data is being harnessed to optimize surgical success and postoperative neurologic outcomes. By measuring good data—fair, accurate and robust, as defined by Dr. Ko—we can, indeed, see a demonstrable improvement in patient care.

Learn More: SpecialtyCare currently supports 2,300 surgeons nationwide with IONM services. Click here to receive more information about our surgical partnerships.

¹ Ko, Clifford, MD, MSHS. "The Critical Importance of Good Data to Improving Quality." *American College of Surgeons*. July/August 2012, 12-14. Accessed May 2, 2018. <https://www.cfhi-fcass.ca/sf-docs/default-source/on-call/2015-4-29-good-data.pdf?sfvrsn=2>.
² Marr, Bernard. "How Big Data Is Changing Healthcare." *Forbes*. April 22, 2015. Accessed May 02, 2018. <https://www.forbes.com/sites/bernardmarr/2015/04/21/how-big-data-is-changing-healthcare/#3b731b072873>.
³ Marr, Bernard. "How Big Data Is Changing Healthcare." *Forbes*. April 22, 2015. Accessed May 02, 2018. <https://www.forbes.com/sites/bernardmarr/2015/04/21/how-big-data-is-changing-healthcare/#3b731b072873>.
⁴ "Use of IONM During Cervical Spine Surgery Associated with Reduced Opioid Use, Readmissions." *SpecialtyCare*. August 29, 2017. Accessed May 02, 2018. <http://www.specialtycare.net/ionm-associated-with-reduced-opioid-use-readmissions/studies/2017/unwarranted-variations-in-care>.

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