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CORR Insights®: Patient Factors Are Associated With Poor Short-term Outcomes After Posterior Fusion for Adolescent Idiopathic Scoliosis

James O. Sanders MD

Where Are We Now?

The authors of the current study focus their attention on one important aspect of improving value in orthopaedic surgery, namely the identification of modifiable factors that can be addressed to improve

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quality. Improving care requires us to study our actual results. With the exception of a few disorders where individual institutions have large volumes, the numbers of patients with specific diagnoses and treatments are often too small at individual sites for more than preliminary observations. Use of large administrative databases attempts to overcome this problem, but the quality of their data from hospital coding is usually suspect and only useful for broad regional or national trends. The American College of Surgeons National Surgical Quality Improvement Program® (ACS NSQIP®) is an important step in the right direction of obtaining high quality data for patient quality improvement because each site must have trained data abstractors. The data likely are generalizable since the patients were treated at a number of institutions. The design of ACS

NSQIP® sampling is unlikely to result in important selection or sampling errors. Since most patients with adolescent idiopathic scoliosis (AIS) are asymptomatic before surgery, serious adverse events are especially concerning. The rarity of important adverse events is reassuring that modern AIS surgery is generally safe. The association of length of stay with larger surgeries is not surprising from the larger physiological disruption. The finding of nervous system injury (0.4%) is similar to prior reports. The most striking finding is the association between obesity and adverse events, principally surgical site infections (SSIs) rather than neurological injuries.

Where Do We Need To Go?

The real difficulties in scoliosis surgery safety include the prevention of neurological injury, the prevention and treatment of SSIs, and the prevention of long-term adverse consequences of spinal fusion. Both neurological injury and SSI are rare in AIS except for SSI in the obese. Since AIS surgery is

J. O. Sanders MD (✉)
Department of Orthopaedic Surgery and Rehabilitation, University of Rochester,
601 Elmwood Ave, Rochester,
NY 14642, USA
e-mail:
james_sanders@urmc.rochester.edu

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entirely elective, mitigating risk factors including obesity should be part of the perioperative planning. These same problems of SSI and neurological injury are magnified in non-AIS patients. A powerful technique of improving quality is the Plan Do Study Act (PDSA) cycle [1, 2] developed by scholar W. Edwards Deming PhD, which has proven highly effective in many industries. In this process, a specific quality issue is studied (Plan), a strategy for improvement is implemented (Do), and results are assessed (Study). If the plan for improvement works, it is implemented as a change (Act). If the plan either does not work or only partially succeeds, another plan is created, and the cycle continued. While effective, this is difficult to do between institutions, particularly if the data is not well risk stratified. The ACS NSQIP® database is designed for improvement in patient care and can potentially be used to improve care in both AIS and non-AIS spinal deformity patients. The current ACS

NSQIP® format is not sufficiently detailed enough to properly risk stratify for non-AIS patients. This would be an important early step that could potentially advance patient care.

How Do We Get There?

The ACS NSQIP® is currently trialing a pediatric spinal deformity project, which expands the items being abstracted pertaining to pediatric spinal deformity from the data and also tracks the data for 90 days rather than 30 days following surgery. This effort hopefully will help us perform the initial step of developing proper risk stratification for pediatric spinal deformity patients. Proper risk stratification will require that we consider a large number of patient risk factors for various adverse outcomes, including neurological injury, SSIs, instrumentation failure, and failure of fusion. Each of these adverse events has different risk factors

and likely will have its own solutions. If we continue treating patients with instrumentation and fusion, as seems likely, our care improvements either will come through improved basic science, allowing us to prevent or effectively treat each of these adverse events, or, through the long and demanding process of aggregating data, identifying best practices, implementing them, studying how well they work, and continuing through the cycle of continuous quality improvement techniques to improve care. The ACS NSQIP® pediatric program is an important step in this direction.

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