Creating a Culture of Safety and Excellence in Pediatric Spine and Scoliosis Surgery

January 30, 2024 | 7 min read

In 2013, Michael G. Vitale, MD, MPH, Chief of Pediatric Spine Surgery at NewYork-Presbyterian Morgan Stanley Children's Hospital, spearheaded the creation of the Project for Safety in Spine Surgery in 2012. The initial goal was to establish best practices guidelines for averting surgical site infections (SSI) in scoliosis patients, a vexing problem affecting up to 8.5% of patients. A group of pediatric spine surgeons and infectious disease specialists reached consensus on 14 prevention strategies, while also highlighting areas where research was needed.

The guidelines were published in July/August 2013 issue of the *Journal of Pediatric Orthopedics*, along with a systematic review of the literature. These articles have brought new clarity to the process of making pediatric spine surgery safer and are oft cited.

A decade later, Dr. Vitale and his team have returned to the data to finetune and update the guidelines. A new systematic literature review, including studies published in the interim, was published in the *Journal of Pediatric Orthopedics* last summer.

A watershed moment for spine surgery safety

The pediatric SSI initiative was just the first of a larger long-term plan to apply a systematic quality improvement strategy across spine surgeries. Dr. Vitale and the Project for Safety in Spine Surgery has generated dozens of similar studies and holds an annual course on optimizing spine surgery.

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This initiative is transforming the culture around pediatric spine surgery quality and safety. Over the years, best practice guidelines have been developed in nondifferent areas of adult and pediatric spine surgery as part of NewYork-Presbyterian's annual Summit for Safety in Spine Surgery. According to Dr. Vitale, the learnings have changed practice for numerous centers, including NewYork-Presbyterian, during the subsequent decade. "At our institution, we've witnessed dramatic decreases in surgical site infection, with rates approaching zero," says Dr. Vitale. "That's out of about 400 procedures that we do a year, many of which have a very high statistical risk of infection."

Strategies that make a difference

Among the prevention strategies outlined in the original guidelines, the working group members agreed that pediatric spine patients should receive perioperative intravenous cefazolin and have intraoperative wound irrigation and that vancomycin powder should be used in the bone graft and/or the surgical site.

"One of the things that was really pivotal in 2013 was the recognition of the increase in the number of gram-negative infections in these kids," adds Dr. Vitale. "Kids that are high risk are often high risk because of colonization with gram-negative bacteria. The reality at that time was that very few places, including ours, were using gram-negative prophylaxis. That's probably been the biggest single change in the field."

Research and practice have brought new insights in the intervening years. "Since then, we've continued to look at other things that we could do, including things like formalizing the role of plastic surgery," Dr. Vitale says. "I have a great plastic surgeon close every high-risk case that I do, and we have some pretty good evidence showing that that's helpful in lowering SSI rates." Plastic surgeons typically use a plastic multi-layer closure and are fastidious about the use of drains, he explains.

In addition, in the most recent 10-year update to these guidelines, Dr. Vitale explained, "we decreased the importance of preoperative urine cultures, spoke about nutritional recommendations, and agreed that antibiotics should only be given for 24 hours postoperatively. We also made suggestions regarding therapeutic interventions—when and how to treat infection."

The group also defined "high-risk," which includes syndromic or neuromuscular etiology of scoliosis, BMI below 15 and above 30, a diabetes diagnosis, and nonambulatory status, among other patient characteristics. Similar best practices guidelines and updates are planned or are in the works for other areas of spine including a focus on best practices in robotic spine surgery to be timed with the spine safety summit to be held on May 31, 2024.

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A track record of excellence

Under Dr. Vitale's guidance, NewYork-Presbyterian has become a leader in implementing safety protocols, a process he sees as ongoing. "We're constantly changing the way we practice," he says. To promote continuing improvement, he and his team hold a pediatric spine surgery quality summit every year. Spine surgeons, infectious disease doctors, nurses, and a plastic surgeon all weigh in on their experiences and observations and work to decrease variability in practice.

"We learned things from that multidisciplinary group this year," Dr. Vitale says. "Our nurses pointed out that the three busy pediatric spine surgeons here have different approaches towards irrigation. Different usually means problematic. We look at variability as a problem because unexplained variability implies that at least some patients are getting care that's probably not optimal."

Variability is a concern for other spine surgeries as well. "It's one of the goals of our spine retreat every year," Dr. Vitale says. "We're constantly looking, for example, as to whether we should be prophylaxing against MRSA (methicillin-resistant staph aureus). Some places do that, but it has to do with the incidence of MRSA in the community. And ours has stayed low."

The drive to eliminate infection means that every case that develops is investigated. "Although rare, when a patient experiences a surgical site infection, it is a big deal here," says Dr. Vitale. "It leads to a whole root case analysis review and is formally presented in a large multidisciplinary group. We look to see if there's anything we could have done differently."

"Sunlight is the best disinfectant."

This familiar quote, attributed to Louis Brandeis, is Dr. Vitale's guiding philosophy. "It's the power of the Hawthorne effect—the reality that anytime you observe a process, you make it better," he says. "I run quality for the department of orthopedics, and if we have a problem in total joint replacement, it's the same treatment—sunlight. We'll create a working multidisciplinary group and talk about what's going on, derive some consensus, and decrease variability."

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The goal always is to grow the ranks of the "invisible patient." "This is the patient who *didn't* get the infection, who went to school and was a straight-A student, and went to his prom and to college," he says. "I see it as our obligation to practice in such a way that we minimize the number of complications."

Dr. Vitale believes that NewYork-Presbyterian's resources and physicians, many of whom have served in key leadership roles in the field, are key to the system's ability to move the needle on safety and quality here and elsewhere. "We have one of the largest pediatric ICUs in the country with incredible depth of pediatric subspecialty care," he says. "We can take care of sick patients that other places in the region cannot. Our goal is to deliver the very best outcomes to our patients, to continually make care better, and to promulgate those learnings at a national level."

Learn More

Project for Safety in Spine Surgery

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