“Zero in on zero” to reduce complications

By Mary Ann Porucznik

Orthopaedic surgeon leads way to improving care in joint replacement

Three years ago, Mark A. Snyder, MD, an orthopaedic surgeon in Cincinnati, Ohio, was recruited by an academic, private hospital center to help develop a program and achieve Joint Commission certification as a “Center of Excellence” in hip and knee replacement. In doing so, Dr. Snyder became passionate about really achieving excellence—far beyond what federal certification regulations required.

“What if,” he asked, “we could get to a zero rate of periprosthetic joint infections? What if we could eliminate the need for allogenic transfusions during joint replacement surgery? What if we could get in-hospital and 30-day postoperative deaths from venous thromboembolism (VTE) down to zero? Why couldn’t we achieve a 100 percent satisfaction rating from our joint replacement patients?”

Dr. Snyder made a list of 10 targets for improvement (Table 1). In each case, his goal was to eliminate the problem entirely.

“Think of the savings to the healthcare system if we could reduce the rate of periprosthetic joint infections to near zero,” he said. “Research has shown that treatment for periprosthetic joint infection after total knee arthroplasty (TKA) costs about $50,000. Treatment for methicillin-resistant Staphylococcus aureus infections costs more than $100,000. If we prevent just 10 infections, we can save $500,000 to $1,000,000.”

Using the evidence

To build the program, Dr. Snyder turned to evidence-based medicine. Contributing factors before, during, and after surgery were identified for each target. He then researched and analyzed the highest level of evidence available, using data from randomized clinical trials, controlled clinical trials, meta-analyses, clinical practice guidelines, and Cochrane reviews. From these, a list of best practice proposals was developed for each improvement target.

For example, the following contributing factors were identified to address the issue of reducing allogenic transfusions:

- Before surgery—uncorrected preoperative anemia
- During surgery—unfettered bleeding and no inhibition of fibrinolysis
- After surgery—mandated chemoprophylaxis for VTE

Simple protocols, drawn from the best evidence available, were then developed. To identify anemia cases, a complete blood count is ordered more than 4 weeks prior to surgery. If the patient’s hemoglobin is less than 13 gm/L, epoetin alfa injections and iron supplements are prescribed; if the hemoglobin is less than 10 gm/L, the patient is referred to hematology. Autologous donations are avoided.

During surgery, regional anesthesia or, for patients who require general anesthesia, hypotensive anesthesia is used. Unless the patient has active intracranial bleeding or thrombosis, a known seizure disorder, a history of VTE, or an allergy to the drug, a dose of tranexamic acid (15 mg/kg) is administered 15 minutes before the incision is made. In most TKA cases, this helps minimize tourniquet time and avoid the use of drains. Further perioperative blood loss may be mitigated with the use of bipolar cautery.

In low-risk TKA patients, strong VTE chemoprophylaxis is avoided. Instead, a 40 mg daily dose of enoxaparin, or twice-daily enteric-coated aspirin 325 mg, or low dose warfarin is administered along with sequential compression
devices. TKA patients without drains have their knees flexed at 70 degrees over pillows for 6 hours on the day of surgery. Intravenous fluids are used first to correct hypotension, before resorting to allogenic transfusion.

“Simply treating preoperative anemia in patients cut our transfusion rate in half. The addition of tranexamic acid cut the rate in half again,” said Dr. Snyder.

**The Eisenhower strategy**

In implementing his program, Dr. Snyder used what he called “the Eisenhower strategy.”

“You have to get buy-in from all these different groups—the hospital administration, the nursing and housekeeping staffs, surgeons from various practices who have privileges at the hospital. The way to do that is to do what President Ike did—collegially help everyone move in the same direction to achieve a solution,” he said. “Doctors want to do the right thing for their patients, and new idea adoption is easier when they own it themselves.”

Now the hospital credentialing agreement requires surgeons performing TKAs and total hip arthroplasty to participate in its joint registry. Results are audited on a regular basis and reviewed with the surgeon. Surgeons who want to use the hospital’s designation as a “Center of Excellence” in their marketing efforts must agree to follow the established guidelines and protocols and participate in the registry efforts.

Although physicians can and should decide what is the best course of action for their own patients, any disagreements with the protocols must be in writing. As new evidence-based literature and updated national practice guidelines are released, they will be included in the “Zero in on zero” initiative.

“It took less than a year to get to the point where we could begin acting on these issues,” recalled Dr. Snyder. “We built trust and collegiality before implementing the strategies, and we are supporting the American Joint Replacement Registry with level 1 data. Our in-hospital registry also includes the ‘Zero in on zero’ quality and safety data points.

“We are committed to achieving near zero rates in these 10 major areas. We want each surgeon to have quick and easy access to the registry and plan to work with them to choose the electronic equipment that best meets their needs.”

Mary Ann Porucznik is managing editor of AAOS Now. She can be reached at porucznik@aaos.org

**References:**


