Performance improvement

National study probes ties between ‘best practices,’ surgical infection

What distinguishes hospitals with low levels of surgical infection? What characteristics and practices make a difference? In an effort to identify best practices nationally, the American College of Surgeons (ACS) has reported new research using its rigorous methodology for studying surgical outcomes.

Among the major findings, hospitals with a lower incidence of surgical site infection (SSI) had shorter procedure times even for routine operations. They also used fewer blood transfusions and had a lighter teaching load.

Examining accepted OR practices such as use of preoperative showers and double gloving, interestingly, the study found little difference in compliance for hospitals with low and high incidence of surgical infection, with about 40% adherence overall to the measures studied.

Hospitals with low and high SSI incidence were also similar in their compliance with 2 measures from the Surgical Care Improvement Project (SCIP): the percentage of patients receiving preoperative antibiotics within 60 minutes of the incision and the percentage with antibiotics discontinued within 24 hours of the operation.

The study was the first effort by ACS to identify best practices for preventing SSIs using its National Surgical Quality Improvement Program (NSQIP) methods. NSQIP is a standardized, audited, risk-adjusted program to quantify clinical outcomes of surgery for its participating hospitals. The study involved 117 hospitals and nearly 114,000 vascular and general surgery operations.

Through a statistical analysis, the researchers, led by Darrell A. Campbell, Jr, MD, FACS, professor of surgery at the University of Michigan, Ann Arbor, determined an observed-to-expected ratio of SSIs for each hospital. They then identified 13 hospitals with higher than expected SSIs (high outliers) and 20 with lower than expected SSIs (low outliers). They sent these hospitals a survey about their use of infection control practices and made site visits to 3 low outliers and 2 high outliers.

Overall findings

“One of the major things we found was the operative duration. That hasn’t been emphasized enough,” Dr Campbell told OR Manager in an interview. “We as surgeons need to look at our practice and make sure we aren’t dawdling.”

The high outliers had longer operations even for low-complexity cases like appendectomy and laparoscopic cholecystectomy. They also took longer for the non-operative parts of the case, from patient entry to incision and incision close to patient exit.

In addition, the high outliers had more patients who came to surgery anemic and needed transfusions. They also had a heavier teaching load, with a higher proportion of residents and medical students.

In contrast, overall the low outlier hospitals were smaller, efficient in delivery of care, and had low turnover among surgeons and OR staff.

One thing that could help operative duration, Dr Campbell suggests, is to provide feedback to surgeons and compare their times to national norms, which are available.

There is also the question of organization in the operating room. “Are we as organized as we could be, not only during the operation but before and after?” he asks.
The findings suggest that better teamwork might be a strategy for infection control as well as patient safety. He notes that some ORs are using team training or crew resource management, adopted from aviation, as a way of planning for cases. Some are conducting expanded time-outs before surgery and a debriefing afterward to be sure all equipment and supplies are in place and to anticipate issues that could arise.

**Use of “best practices”**

Dr Campbell admits he was surprised that the low and high outliers didn’t differ much in their adherence with the SCIP measures and infection control practices.

With regard to SCIP, about 84% of both groups were delivering antibiotics on time, and about 70% were discontinuing them at 24 hours. For the 12 infection control practices surveyed, both groups had compliance of about 40% overall, with considerable variation on individual measures. For example, 71% of low outliers and 50% of high outliers were minimizing preoperative hair removal. Only 14% of low outliers and 8% of high outliers were double gloving. In all, 57% of low outliers and 42% of high outliers were performing terminal room cleaning with floor flooding and wet vacuuming.

Low and high outliers did show a significant difference on one practice, minimizing traffic in the operating room: 50% of low outliers limited traffic, while only 8% of high outliers did.

Dr Campbell says he doesn’t want to diminish the importance of standard infection control measures, such as the AORN recommended practices.

“Nobody is going to argue that you shouldn’t keep the operating room clean, prep properly, wash your hands properly, and use sterile technique,” he says. “We have to do these basic things well. It’s just that wound infection rates haven’t changed much over the years, so I think we need to add new things to focus on.”

**Cleanliness stands out**

In the site visits, the researchers said they could easily identify low and high outlier hospitals, even though they were not told their status ahead of time. During the visits, they conducted structured interviews and toured the ORs.

Dr Campbell, who went on all 5 visits, says the cleanliness and level of organization stood out.

“In some of these hospitals, you could eat off the floor—they were really clean,” he says. They were also well organized: “When you looked at the turnover time between cases, some of them had SWAT teams who went in and within 10 minutes, everything would be cleaned, and they would be ready for the next patient.”

On the other hand, the poor-performing hospitals “were not a tight ship,” he notes. “It took a long time to clean the rooms. Sometimes they didn’t do terminal cleaning at the end of the day.”

He could also sense a difference in cultures: “You can tell when someone cares, and when someone doesn’t care as much.”

Also evident was the stability of surgeons and staff. “In some hospitals you would hear, ‘Oh, I know what Dr Jones is going to do. I’ve worked with him for 17 years.’ That speaks to the organization,” he says. “Some of the poorly performing hospitals had a lot of travelers. They come in for a contracted period and then leave. That doesn’t help in terms of organization.”

It also speaks to teamwork. “The more you can get good people, keep them, and form them into teams, the better,” he says. “I don’t think you can have a team for every type of operation. I don’t think you need a team for hernia surgery, but [I think you do] for cardiac surgery or liver transplant.”

**More SCIP measures needed?**

The search continues for other practices that make a difference in preventing SSIs. “There are lots of other areas we need to look into,” Dr Campbell says.

An example is the relationship between intraoperative hypotension and infection. Preliminary NSQIP information using electronic data from anesthesia systems suggests there is a relationship.

Glycemic control is another area needing further study. The researchers are
exploring a new concept, the “diabetic gap.” They have observed that among the approximately 12% of surgical patients nationally who develop complications, a disproportionate share are diabetic. In the current study, the “diabetic gap” between diabetic patients and nondiabetic patients who developed complications was greater at the high outliers than the low outliers, suggesting glycemic control during surgery may be important.

Though physicians “can’t control whether someone has smoked for years or is overweight, we can control their blood sugar during surgery,” says Dr Campbell, quoting surgical infection expert, E. Patchen Dellinger, MD.

At his own institution, physicians are giving weight-adjusted doses of antibiotic because many patients are large, and are redosing at 3 hours into surgery.

“If you have a longer case, I think it’s important to keep plasma levels high throughout the case. I would lobby that those could be SCIP measures in the future,” he says.

Another area he thinks OR leaders should consider is culturing of infected surgical wounds, with feedback to surgeons and nurses on the results.

“You get information from cultures,” he notes. “If they are primarily skin contaminants, you might want to focus more on your technique. If they are more enteric, then you have other kinds of issues. Letting doctors and nurses know what is being done in monitoring for wound infections is important.”

More refined research methods are taking OR leaders and clinicians closer to understanding the factors influencing surgical infection so they can improve their practices. ✶

—Pat Patterson

Reference

Summary of results of site visits at hospitals with low infection rates

- No surgical trainees
- Little turnover of surgeons
- Little turnover of nurses
- No traveling nurses in the operating room
- Perioperative efficiency
- Positive safety culture
- Strong backup support for quality improvement efforts
- Environment that fostered ease of communication
- Few breaks during surgery.


More about ACS NSQIP

The American College of Surgeons National Surgical Quality Improve-ment Program is described as “the first nationally validated, outcomes-based program to measure and improve the quality of surgical care.”

Highlights:
- The program collects data on 133 variables, including preoperative risk factors,
intraoperative variables, and 30-day postoperative morbidity and mortality for patients having major surgery in inpatient and outpatient settings.

• Trained nurse reviewers collect, validate, and submit the data through a secure online system.
• The software checks and prompts for data completeness, uniformity, and validity.
• Participating hospitals receive reports that allow them to monitor their outcomes and compare with their peers on a blinded basis.
• The program supports participants with site visits, conference calls, and an annual meeting.

Source: www.acsnsqip.org.