The Surgical Care Improvement Project: Strategies for Perioperative Leaders

Practical help for improving the care of surgical patients

Sponsored by Kimberly-Clark Health Care

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A special supplement on the Surgical Care Improvement Project (SCIP) from OR Manager, Inc

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National effort aims to make surgery safer

An introduction to the Surgical Care Improvement Project (SCIP).

What is SCIP?
SCIP is a national quality partnership committed to improving patient safety by driving down postoperative complications. The goal is to reduce 4 types of surgical complications by 25% by 2010:
- surgical site infections
- perioperative heart attack
- deep vein thrombosis
- postoperative ventilator-associated pneumonia.

Who's leading SCIP?
Spearheading the project are the Agency for Healthcare Research and Quality, American College of Surgeons (ACS), American Hospital Association, American Society of Anesthesiologists, Association of periOperative Registered Nurses, Centers for Disease Control and Prevention, Centers for Medicare and Medicaid Services, Institute for Healthcare Improvement (IHI), Joint Commission, and Veterans Health Administration.

IHI has made the SCIP measures part of its new 5 Million Lives Campaign, which aims to prevent 5 million incidents of health care harm by December 2008.

What's at stake?
- Of more than 45 million inpatient operations performed in the US each year, up to 40% have complications such as those SCIP aims to reduce.
- Widely applying the SCIP measures could prevent 13,000 deaths and 270,000 surgical complications each year in Medicare patients alone, experts say.
- Postoperative complications accounted for up to 22% of preventable deaths among patients, depending on the complications, according to a 2003 report in the Journal of the American Medical Association.
- The same study looked at 18 types of medical injuries during hospitalization, finding these events accounted for 2.4 million additional hospital days and $9.3 billion in additional charges each year.

How will hospitals benefit?
“Everyone wants to improve care, but there are fiscal realities. We are trying to make a strong business case for SCIP,” said David Hunt, MD, FACS, medical officer for the Centers for Medicare and Medicaid Services (CMS) Quality Improvement Program. “We are saying, ‘If you do this, you will be stronger financially as an institution.’”

The cost of treating complications is high. A postoperative respiratory complication can run to $52,000, for example. With Medicare patients, the hospital absorbs most of the extra cost.

What is SCIP measuring?
For the 4 complications, SCIP will use 22 measures (sidebar). The complications were identified by the SCIP steering committee based on the literature and outcomes data. To develop the measures, SCIP leaders looked for processes where there was evidence to show they could prevent the complications.

SCIP measures

Surgical site infection
- Prophylactic antibiotic received within 1 hour prior to surgical incision
- Prophylactic antibiotic selection for surgical patients
- Prophylactic antibiotics discontinued within 24 hours after surgery end time (48 hours for cardiac patients)
- Cardiac surgery patients with controlled 6 am postoperative serum glucose
- Postoperative wound infection diagnosed during index hospitalization (Outcome)
- Surgery patients with appropriate hair removal
- Colorectal surgery patients with immediate postoperative normothermia

Cardiac
- Noncardiac vascular surgery patients with evidence of coronary artery disease who received beta-blockers during the preoperative period
- Surgery patients on a beta-blocker prior to arrival that received a beta-blocker during the perioperative period
- Intra- or postoperative acute myocardial infarction diagnosed during index hospitalization and within 30 days of surgery (Outcome)

Venous thromboembolism (VTE)
- Surgery patients with recommended VTE prophylaxis ordered
- Surgery patients who received appropriate VTE prophylaxis within 24 hours prior to surgery to 24 hours after surgery
- Intra- or postoperative pulmonary embolism diagnosed during index hospitalization and within 30 days of surgery (Outcome)
- Intra- or postoperative deep vein thrombosis diagnosed during index hospitalization and within 30 days of surgery (Outcome)

Respiratory
- Number of days ventilated surgery patients had documentation of the head of the bed being elevated from recovery end date (day 0) through postoperative day 7
- Patients diagnosed with postoperative ventilator-associated pneumonia during index hospitalization (Outcome)
- Number of days ventilated surgery patients had documentation of stress ulcer disease prophylaxis from recovery end date (day 0) through postoperative day 7
- Surgery patients whose medical record contained an order for a ventilator weaning program (protocol or clinical pathway)

What can perioperative leaders be involved?
Clinicians are increasingly adopting evidence-based practice, which is what the SCIP measures are based on. Managers can get involved by serving on QI task forces and educating their staffs about the SCIP measures and how they improve care.

Practical tools and resources are available on the SCIP website at www.medqic.org/scip.
SCIP leadership

SCIP: The perioperative leader’s key role

History may look back on these early years in the new millennium as the time of greatest change in health care, not because of technological breakthroughs but because of cultural breakthroughs. We are witnessing an unparalleled series of events resulting in the increasing unification of the most influential leaders and groups in health care demanding and driving improved patient care outcomes.

Starting with the Institute of Medicine’s (IOM) call to action in To Err is Human: Building a Safer Health System, the Surgical Infection Prevention Project (SIPP), the Institute for Healthcare Improvement’s (IHI) 100,000 Lives Campaign, and now the Surgical Care Improvement Project (SCIP), the culture of health care has changed forever. No longer can we accept health care-associated infections (HAIs) as inevitable consequences of medical treatment or even settle for “good enough” outcome rates that stay within the arbitrary boundaries of control charts. The old reality of the US health care system was that many hospitals operated independently, incorporating the Atlanta-based Centers for Disease Control and Prevention’s (CDC) HAI prevention recommendations inconsistently into practice. Fortunately for all, this has changed. Thanks to programs like SCIP, “good enough” is no longer acceptable.

Zero tolerance

As espoused by the Association for Professionals in Infection Control and Epidemiology (APIC), health care providers must have “zero tolerance” for HAIs. Kathy Arias, MS, MT, CIC, APIC’s immediate past president, explains that “zero tolerance (for HAIs) is not a number; it’s a culture.” The more common belief, which considers most HAIs to be inevitable, is called an “anchoring heuristic” by David Nash, MD, editor of a supplement on hospital-acquired infections in the American Journal of Medical Quality. He states that an anchoring heuristic “leads people to stick with their initial impressions, once they are solidly formed, and ignore competing facts.”

In assessing the outstanding results of SIPP and the 100,000 Lives Campaign, the fact that HAIs can be prevented and lives saved when evidence-based patient care practices are consistently practiced by all caregivers must now be accepted.

Relentless foe

Every time perioperative nurse leaders begin a shift, they do battle with infection—a relentless foe. Infections kill tens of thousands of patients each year in health care facilities across the country. According to the CDC, 2 million Americans develop infections in hospitals annually. Of those patients, 90,000 die each year, an average of 250 per day. Estimates by the CDC put the cost of US HAIs at $5 billion yearly, although new data from the Pennsylvania Health Care Cost Containment Council (PHC4) indicate the actual cost in lives and dollars may be much greater. PHC4 2004 data estimate that in Pennsylvania acute care facilities, 12,000 HAIs were associated with more than 1,500 additional deaths, 205,000 additional hospital days, and nearly $2 billion in additional hospital charges. With resistance to antibiotics spreading, the rate and severity of HAIs have the potential to cause even more devastation to patients and reimbursement balance sheets.

Perioperative nursing—leading the charge

At the intersection of increasing time and budget constraints; the need for consistent, quality patient care; and the risk factors that contribute to postsurgical infection stands the perioperative nurse leader. Guiding subordinates, monitoring patients, and coordinating staff, the perioperative nurse leader has multiple responsibilities. At the same time, perioperative care managers are uniquely positioned to play a crucial role in the effort to reduce infections. But no matter how skilled perioperative nurse leaders may be, they can’t do this alone. Fortunately, in the new health care environment, they are part of a larger national team committed to improving care for patients throughout the health care continuum.

With the help of perioperative nurse managers and other health care leaders, hospitals, nursing homes, and other medical facilities can adopt patient care improvement initiatives that raise the fiscal bottom line while lowering the rate of infection.

What perioperative nurse leaders need is similar to what every well-run medical or health care organization needs—a unified team effort among physicians, hospital administrators, and nurses to create a culture of change that values ongoing, systematic, systemwide efforts in improving patient care. Without systemwide support in a hospital trying to cope with overworked staff, heavy demand for services, and tight budget constraints, efforts to reduce infection rates would have little chance of success.

The perioperative nurse leader cannot do it alone. This is where the value of national programs like SCIP becomes evident. SCIP helps generate the momentum necessary to change work silos into multidisciplinary teams of people working under the common goal of providing safer patient care.

Currently, 16 states have passed laws requiring public or governmental disclosure of health care-associated infection rates and other adverse events of care. An additional 16 states are considering similar legislation. Consumers Union is pushing to make infection rate disclosure laws a legislative priority in all states across the country. With this growing movement toward hospital disclosure of infection rates, physicians and administrators must work with perioperative nurse managers to reduce adverse outcomes to maximize reimbursement as well as to compete effectively for clients and increase the demand for their services.

Commitment to quality care

Quality care initiatives like SCIP are working to improve treatment by lowering the incidence of infections and other

Continued on page 6
SCIP targets surgical complications

SCIP aims to reduce 4 types of adverse outcomes from surgery:

Surgical site infections (SSIs)
Amounting to 40% of all infections in surgical patients, SSIs are a complication familiar to perioperative care providers. SCIP advocates prophylactic antibiotic administration within an hour of surgery and managing serum glucose for cardiac patients, among other preventive measures.

Adverse cardiac events
In noncardiac surgery patients, the rate of cardiac complications is 2% to 5%, increasing to as much as 34% following vascular procedures. When myocardial infarction is a complication, patient mortality rates can range from 40% to 70%.

SCIP points to studies showing that beta-blocker therapy can halve the number of fatal cardiac complications.

Deep vein thrombosis (DVT)
In the absence of prophylaxis before major orthopedic procedures, pulmonary embolus (PE) leads to nearly 30% of major postsurgical problems, while DVT accounts for over 50% of complications. Though the effectiveness of prophylaxis is well understood, SCIP indicates prophylaxis is often used ineffectively.

Postoperative ventilator-associated pneumonia (VAP)
Though the risk is greatly reduced by preventive measures or intervention, 9% to 40% of postoperatively ventilated patients develop VAP, with a mortality rate of 30% to 46%.

SCIP estimates that reducing postoperative pneumonias can save from $22,000 to $28,000 per patient using simple techniques like elevating the patient’s head 30 degrees or more if not contraindicated.

SCIP generates momentum for change.

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Consumers Union. Hospital infection reporting laws spread across the country: Growing concern over patient infections prompting states to take action. May 9, 2006. www.consumerunion.org/pub/2006/05/003427.

Need help getting started?
A change package available on the SCIP website includes:
- background on each SCIP initiative
- expectations for hospitals
- change strategies for each SCIP process measure
- recommended actions for senior leadership
- recommendations on antibiotics by surgery type
- recommendations for VTE prophylaxis.

Download the SCIP Change Package at www.medqic.org/scip. Look under Infections, then Other Resources.
SCIP: Creating a culture of teamwork

Surgical Care Improvement Project (SCIP) interventions may sound straightforward—make sure surgical patients receive prophylactic antibiotics on time, the right patients receive preventive treatment for blood clots, and so on.

But bringing about changes so they are practiced consistently is far from easy. It takes a broad-based, unified effort. Perioperative leaders at Durham Regional Hospital in Durham, NC, part of the Duke University Health System, have built a cohesive, 17-member SCIP Team and kept the momentum up. The team was recognized with the system’s 2006 Blue Ribbon Teamwork Award.

As in many organizations, the effort has had ups and downs. Some clinicians were skeptical because they’d seen similar projects come and go. But persistent effort and physician support help keep SCIP projects on track.

A breakthrough

There was much discussion about the SCIP Team’s efforts to make the order sheet for preoperative antibiotics mandatory. For physicians, a group that historically has been autonomous in their practice, there was a fine line between putting systems in place that ensure quality outcomes and dictating the practice of medicine.

After much debate, a breakthrough came when the team’s physician champion, Thomas Marsicano, MD, a cardiothoracic surgeon, cast the deciding vote to make the order sheet mandatory.

“That was huge,” says Yvonne Acker, RN, BSN, quality improvement nurse. The antibiotic order form must now be completed for every patient even if antibiotics are not ordered. If no antibiotic is indicated, the physician checks the appropriate box and signs it.

“The form is considered one of our key documents, just like the history and physical,” says the SCIP Team’s leader, Lisa Lambros, RN, BSN, CNOR, director of perioperative services.

The form is included on the preop checklist so nurses can verify that the antibiotic issue is addressed for every patient. The chart manager checks for the order sheet as she assembles the patient charts preoperatively.

A 5-month phase-in period allowed time to lay the groundwork. During that period, team members attended surgical section meetings to get input and discuss implementation. They also made sure the form was stocked wherever surgical patients come from—physicians’ offices, ambulatory care unit, inpatient units, and so on.

Compliance now is at or near 100%, says Lambros.

Building on success

The SCIP Team is building on that success as it moves on to other initiatives. There are plans to make a venous thromboembolism (VTE) prophylaxis order form mandatory as well.

“We hope we can carry the momentum from the antibiotic project over to the VTE project,” Lambros says. The team is working on a beta-blocker protocol as well.

Other team members have picked up the ball. Ruth Long, a certified registered nurse anesthetist, took interest in developing a normothermia policy for colorectal surgical patients. The infection control nurse led the effort to develop a policy for preoperative hair removal. Melanie Mabrey, RN, a nurse practitioner, has guided introduction of a glucose control protocol for cardiac surgery patients.

“The anesthesiologists are thrilled to have her on the team,” Lambros comments. They were more willing to be involved once they saw everyone was willing to take responsibility for the glucose and antibiotic protocols, and the success or failure of these efforts wouldn’t fall solely on them.

“I think we gained their buy-in because they realized this was going to be a team effort,” she says.

Seeing that the surgeons were willing to make the antibiotic order sheet mandatory also helped convince the anesthesiologists the project isn’t a flash in the pan.

What works?

Factors in the SCIP Team’s success:

- A multidisciplinary team. “Our team covers the whole spectrum—nurses, surgeons, anesthesia providers, pharmacy, infection control, diabetes education, and others. They are all engaged in the process, and that has made a big difference,” says Yvonne Acker, RN, BSN.

- Communication. Ongoing communication was crucial. Physicians needed to feel they had input into the process and weren’t just being told what they needed to do. Keeping lines of communication open allowed trust to develop, which led to success, Lisa Lambros, RN, BSN, CNOR, notes.

- A physician champion. Support from a cardiovascular surgeon gave the team a major boost.

- Top-level support. The hospital’s chief medical officer serves as the team’s administrative leader, providing backing from the executive level.

- A realistic meeting time. Anesthesia providers got more involved once the team agreed to meet at 7 am to fit their schedule.

- Mandatory order sheet. Making the antibiotic order sheet mandatory ensures patients aren’t overlooked.

- Action-oriented meetings. Team meetings aim to make the best use of everyone’s time. Action items are recorded in the minutes, along with the responsible party. Lambros and Acker meet after the meeting to plan what needs to take place before the next meeting. Lambros starts each meeting by asking, “What did we say we were going to do last time, and have we done it?”

- Flexibility. “Know your goals and have a plan, but keep an open mind on how you will get there,” Lambros advises. “What works in some organizations will not necessarily work in others.”
The right antibiotic at the right time

Despite evidence that proper use of antimicrobials prevents postoperative infections, it’s a challenge to set up a system to ensure antibiotics are used properly. Christiana Care Health System in Newark, Del, formed an interdisciplinary committee to develop an antimicrobial prophylaxis protocol in January 2004. The goal was a protocol that made it easy for surgeons to order the appropriate antibiotics based on national standards.

At first, a generic order based on the recommended antibiotics seemed like the answer. The surgeons could just check a box that said: “Institute surgical prophylaxis.”

A nurse and pharmacist would then use a checklist to identify the planned procedure and which antibiotics should be given according to the protocol.

But this approach didn’t improve compliance. Many surgeons were opposed because they thought someone else was ordering their antibiotics for them.

Leaders went back to the drawing board and came up with an approach using standard orders, which has been more successful.

The project started with formation of an interdisciplinary team to develop the antimicrobial prophylaxis protocol.

Choosing the appropriate drug

“We did not have an official protocol in writing on prophylactic antibiotics before this group started meeting,” Mary Cay Curran, MSN, RN, CAPA, perioperative clinical practice coordinator, told OR Manager.

The committee developed the protocol as part of the hospital’s Care Management Guidelines, which are care paths followed by physicians and nursing staff.

In writing the protocol, the committee used the surgical procedures suggested by the National Surgical Infection Prevention Project, as described by Bratzler and colleagues.

Christiana later expanded the protocol to include all patients undergoing surgery. “We realized that if we were going to have the same standard of care for all patients, we had to expand the protocol,” says Curran.

A generic order didn’t improve compliance.

The infection control department and pharmacy developed recommendations for the appropriate antibiotics and sent them to the surgical specialty sections. They also asked the surgeons what they were routinely using and what their professional organizations recommended.

Because the protocol is a care path, it doesn’t supersede individual surgeon’s decisions.

“If for some reason, the surgeon disagrees with the drug selection for a patient, the surgeon can prescribe the drug he or she thinks is best,” says Judith Townsley, RN, MSN, CFAN, perioperative director of clinical operations.

For the most part, the surgeons went along with the recommendations, but some specialties made changes because of recommendations from their professional societies.

Beta-lactin allergies

The biggest issue was use of vancomycin and clindamycin for beta-lactin allergies. Many of the surgeons used clindamycin as the drug of choice. But the infection control department recommended vancomycin instead because of the number of patients with methicillin-resistant Staphylococcus aureus (MRSA).

“The surgeons thought they were doing a good thing by not overusing vancomycin, but infection control pointed out that because the organization had a number of patients with MRSA, it is best overall to use vancomycin,” says Curran.

Garnering surgeon support

Based on feedback about the generic order approach, the committee chose instead to use a 1-page sheet of standing orders, which lists the drug of choice and drugs to substitute if the patient is allergic to the drug of choice for each specialty. There is a space to write an alternative drug if the surgeon chooses.

There has been more support for the new protocol since the standing-order form was developed. About 90% of the surgeons now order prophylactic antibiotics according to the protocol guidelines, says Townsley.

She sent thank you letters to the physicians who comply with the protocol and order set.

“It is important to recognize those physicians who are dedicated to delivering excellent care to patients receiving services at Christiana Care Health System,” she says.

Outliers are surgeons who have been using the same antibiotic for years, say they have not had any infections, and do not want to change.

Start & Chart

For timing and duration of administration, the committee followed the Centers for Medicare and Medicaid Services (CMS) recommendations that antibiotics be:

• given 0 to 60 minutes before surgery
• discontinued within 24 hours after surgery

The committee came up with the phrase “Start & Chart,” to help ensure the antibiotic is started before the patient leaves the holding area. A bright orange laminated sign on the wall of the holding area reminds anesthesia providers to start the antibiotic and chart the time.
Monitoring the protocol

The protocol is monitored in 2 ways.
- Christiana’s OR is required by the state’s Medicare quality improvement organization (QIO) to report on the 3 performance measures of appropriate antibiotic, appropriate timing, and discontinuation of antibiotic within 24 hours.
  One person audits all charts after patients are discharged and fills out forms for the QIO, which gives the organization a score. The score is available to the public on the Department of Health and Human Services website.
- Curran also does her own proactive audit for the OR’s process improvement statistics.
  “If I identify an issue, we can make a change quickly and not wait for the QIO audit,” she says. For example, in February 2005, cefotetan, the drug of choice for gynecologic and colorectal surgery, was no longer available. The committee recommended that these specialties change to an alternative, cefoxitin. But the organization’s supplier ran out, so the pharmacy made an automatic substitution to cefazolin and metronidazole. Because Curran was doing her own audit, she was able to communicate the substitutions and administration timing to surgeons and anesthesia providers quickly.

Changes had no impact on system: Why?

Cefotetan was no longer available, and cefoxitin was on back order. There was confusion about substitution of cefazolin and metronidazole (Flagyl).
- Concurrent orders used to identify barriers and correct them quickly.

We assumed a generic order would make it easy to do the right thing. Not so!
- Listen to users. The process did not suit their needs. It was considered too confusing. Non-OR nurses and pharmacists were not sure how to categorize OR procedures.
- Not all surgeons agreed with the Care Management Guidelines recommended antibiotics and did not use them.
- Don’t be afraid to make changes to simplify and improve the process.

Process Improvement

We revised the process to include an order set. This allowed the Care Management Guidelines to cover all surgical procedures and surgeons to control the ordering.

#1 Multidisciplinary team initiated care management guideline
- Generic surgeon order: “Institute surgical antimicrobial prophylaxis”
- Evidence-based practice
- Pharmacy prepares all antibiotics
- Education for all caregivers.

#2 Cefotetan was no longer available, and cefoxitin was on back order. There was confusion about substitution of cefazolin and metronidazole (Flagyl).
- Concurrent orders used to identify barriers and correct them quickly.

#3 We assumed a generic order would make it easy to do the right thing. Not so!
- Listen to users. The process did not suit their needs. It was considered too confusing. Non-OR nurses and pharmacists were not sure how to categorize OR procedures.
- Not all surgeons agreed with the Care Management Guidelines recommended antibiotics and did not use them.
- Don’t be afraid to make changes to simplify and improve the process.

#4 Cardiac and orthopedics re-evaluated practice for postop antibiotics.
- Nursing timed antibiotic schedule based on OR dose, not routine med administration times.

References

This article originally appeared in the April 2006 OR Manager.
Aiming for tighter glucose control

Physicians and nurses used to be taught not to worry about a glucose level of 200 mg/dL. “Now we know what we were taught is probably wrong. We need blood sugars at much less than that—less than 150 mg/dL and probably less than 120 mg/dL,” says Yale University researcher Ronnie A. Rosenthal, MD, MS.

Patients with glucose levels above 200 mg/dL have a high risk of postoperative infection, as reported in landmark studies by Furnary and Van den Berghe.

Moreover, 20% of patients—1 in 5—coming in for surgery have diabetes but don’t know it.

The Surgical Care Improvement Project (SCIP) chose glucose control as 1 of 7 infection control measures, setting 200 mg/dL or below as the postoperative target level for 6 am blood glucose in cardiac surgery patients (sidebar, p 11).

**A positive step**

St Joseph Hospital in Lexington, Ky, seized the opportunity to help other hospitals achieve better glucose control when it joined SCIP’s pilot project in 2003.

Karen McKnight, RD, LD, director of St Joseph’s Diabetes Treatment Center, notes that the SCIP target of 200 mg/dL is much higher than what St Joseph strives for but believes many hospitals aren’t ready for tight control.

“The target of 200 mg/dL is a positive step,” she says.

St Joseph’s goal matches recommendations of the American College of Endocrinology (sidebar, p 11).

St Joseph worked on improving glucose control for 6 years before joining the SCIP pilot. McKnight, also chair of the Inpatient Management Specialty Practice Group of the American Association of Diabetes Educators, led a team that developed a basic inpatient surgery protocol requiring anesthesiologists to check blood glucose levels at least every 2 hours intraoperatively, whether the patient has a diabetes diagnosis or not. Before, each anesthesiologist had protocols that varied with each patient based on the anesthesia assessment.

“It seems almost radical to some of the physicians that we want to control blood sugar so tightly. They learned in their training to focus on hypoglycemia prevention before we had this great body of evidence about the dangers of even mild perioperative hyperglycemia,” says McKnight. “Our task is to share the newer evidence and change our practices to be evidence based.”

All patients known to have diabetes have a fingerstick immediately before surgery, and almost all surgical patients have a basic metabolic panel or other testing that provides a glucose level preoperatively. The anesthesiologist adjusts insulin doses to regulate blood glucose based on those results plus results obtained every 2 hours during surgery.

Even before SCIP, St Joseph emphasized glycemic management for cardiac surgery patients and implemented an insulin drip protocol in the critical care unit. This protocol brings blood glucose levels into the desired range of 80 mg/dL to 110 mg/dL within 6 to 9 hours postoperatively with less than 0.5% severe hypoglycemia.

Diabetes educators monitor hospital-wide blood glucose results. When patients have 2 or more results over 180 mg/dL or less than 70 mg/dL in 1 day, the educator reviews the care plan and makes recommendations or calls the physician for a change in therapy. The educators also provide instructions to nurses and physicians.

St Joseph has been able to justify the cost of the extra staffing because of the reduced length of stay for diabetic patients—from 6.6 days to 5.5 days. McKnight uses the hospital’s nondiabetic length of stay as a benchmark because national measures are not yet defined. The targeted gap between diabetes and nondiabetes length of stay is one-half day or less. St Joseph has achieved a gap of 0.38 days.

**Fear of hypoglycemia is the biggest barrier.**

**Landmark studies on glucose control**

**Risk of hyperglycemia**

In a prospective study of 2,467 diabetic patients who had open heart surgical procedures between 1987 and 1997, researchers from the Providence Health System, Portland, Ore, were the first to show that hyperglycemia was the significant risk factor for death, infection, and length of stay in diabetic patients. They were also the first to show that eliminating hyperglycemia with perioperative continuous IV insulin infusion prevents these complications.


**Benefits of insulin therapy**

A prospective controlled study by researchers from Belgium randomized 1,548 adults (diabetic and nondiabetic) admitted to a surgical intensive care unit to receive:

- intensive insulin therapy (maintaining blood glucose between 80 mg/dL and 110 mg/dL) or
- conventional treatment (insulin only if blood glucose level exceeded 215 mg/dL and maintaining glucose between 180 mg/dL and 200 mg/dL).

Findings showed intensive insulin therapy:

- cut mortality almost in half—from 8.0% to 4.6%
- reduced bloodstream infections by 46%, acute renal failure by 41%, and blood transfusions by 50%.


**Fear of hypoglycemia**

Physicians’ fear of hypoglycemia is the biggest barrier to improved blood sugar control. Rose Garcia, RN, BSN, cardiovascular ICU nurse at St Luke’s Health System, Kansas City, Mo, advises starting slow, with 200 mg/dL as the tar-
Perioperative protocols
Before developing its glucose control protocols, St Luke’s gathered a task force, including the cardiac surgery pharmacist, medical director, a cardiac surgeon, a dietician, the infection control specialist, the quality and practice chairman, an endocrinologist, and the clinical nurse manager.

The task force recommended basing the glucose control protocols on the Portland Protocol developed by Anthony Furnary, MD, lead author of one of the landmark studies. The protocol is a finely tuned set of orders for IV insulin infusion for use in the ICU and patient care units (www.providence.org/Oregon/Programs_and_Services/Heart/portlandprotocol/default.htm).

St Luke’s protocol requires an insulin drip to be started in the preoperative holding area for:
- diabetics with a blood glucose of 150 mg/dL or more
- nondiabetics with a blood glucose of more than 200 mg/dL.

The anesthesiologist checks blood glucose for patients on an insulin drip every 30 minutes during surgery.

Before the new protocol was implemented, physicians did not treat patients with insulin unless their blood glucose was more than 250 mg/dL.

Cardiac surgery protocol
For cardiac patients, glucose levels are checked hourly as well as before, during, and after cardiopulmonary bypass. Cardiac patients are especially prone to hyperglycemia, Garcia notes, because of:
- the stress of the surgery
- mechanical ventilation
- vasopressor therapy
- corticosteroid therapy for chronic obstructive pulmonary disease (COPD)
- decreased physical activity
- glucose in the cardioplegia fluid.

When the new protocol was implemented, anesthesiologists discovered glucose spikes of up to 500 mg/dL when the cardioplegia solution was injected into the heart.

They asked the surgeons to take the glucose out of the cardioplegia solution. All surgeons did but one, who didn’t believe it had any effect. He was convinced when he was shown that his patients were the only ones with spikes in glucose levels. He finally agreed to take the glucose out.

The cardiovascular program’s quality chairperson monitors infection rate data as well as blood sugars on postoperative days.

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Preventing infection

SCIP targets glucose control

SCIP process measure
- Cardiac surgery patients with controlled 6 am postoperative serum glucose

Potassium shifts
Another fear is hypokalemia.

“You need an incredibly large buy-in from the anesthesiologists because treatment with insulin causes hypokalemia, which puts patients at a significant risk for developing arrhythmias that are difficult to treat,” advises Dr Rosenthal, associate professor of surgery at Yale University School of Medicine and chief of surgery at VA Connecticut Healthcare System, West Haven, Conn.

“You have to get the anesthesiologists over the hurdle of potassium shifts,” she says. “You have to get them to understand that giving insulin is not only safe but beneficial. This is why it is wise to start off with protocols that allow higher blood sugars and lower amounts of insulin.”

You had better have the data to prove the benefits.

Glucose control recommendations

American College of Endocrinology

Recommendations for upper limits for glycemic targets:
- maximum of 110 mg/dL for critical care patients
- maximum of 110 mg/dL before meals and never more than 180 mg/dL for noncritical care patients.


Consensus conference

The American Association of Clinical Endocrinologists, American College of Endocrinology, and American Diabetes Association met at a consensus conference in January 2006 to develop strategies for management of hospitalized adults with high blood glucose. Facts from the conference include:
- Blood glucose readings need to be reduced to less than 110 mg/dL.
- 1 of 3 people with diabetes are unaware of their condition.
- 30% to 40% of heart surgery patients have diabetes.
- Fear of hypoglycemia is a major barrier to improving glycemic control.


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**Preventing infection**

*Continued from page 11*

1 through 3, sending a report to physicians and nurses every 6 months.

**Discovering undiagnosed diabetics**

Through its testing, St Luke’s has found at least 20% of surgery patients are undiagnosed diabetics. When St Luke’s began its new protocol, the task force recommended having a hemoglobin A1c (HbA1c) drawn preoperatively on all surgical patients. This tells them not only if a diabetic’s glucose level is controlled but also if a patient is an undiagnosed diabetic. Results in the 7% to 8% range trigger an automatic endocrinology consult.

In a new report published in April 2006, Dr Rosenthal, Melissa Perkal, MD, and colleagues found a strong association between a patient’s preoperative HbA1c level and postoperative infections in diabetic noncardiac surgery patients. An HbA1c level <7% was significantly associated with decreased postoperative infectious complications.

“We now draw an HbA1c on all patients preoperatively,” says Dr Perkal, assistant clinical professor at Yale University and assistant chief of surgery at VA Connecticut. “If the preoperative clinic coordinator sees that an elective surgery patient has a high HbA1c of 9% or 10%, the patient is sent back to the primary care physician, and surgery is delayed until the patient’s blood glucose is corrected.”

Though anesthesiologists check every diabetic’s glucose frequently during surgery, this hasn’t been the case for non-diabetics, says Dr Perkal, though it is known that about 30% of hyperglycemics are not identified as diabetics.

All patients are routinely tested for glucose in the holding area after they have their IV placed so they don’t need an additional needle stick. If the HbA1c is at a certain level, the anesthesiologists give them insulin during the case and check their glucose levels.

**Who will follow up?**

A sticking point for anesthesiologists is who will follow up on the insulin they give during surgery.

“This is not just a situation for a few hours in the perioperative services—it has to be followed up or the patient could suffer,” says Dr Perkal.

In June 2005, she and her colleagues joined the Institute for Healthcare Improvement’s reducing surgical site infection initiative, which includes preoperative glucose control (www.ihi.org).

“We’re almost there, but our formal response to an elevated glucose is not protocol driven yet,” says Dr Rosenthal, noting that an anesthesia champion is needed to help achieve that.

—Judith M. Mathias RN, MA

**Quality reporting on SCIP**

Medicare is expanding the number of SCIP measures hospitals will need to report. Here’s an update on the reporting requirements from the Hospital Quality Alliance (HQA):

**Reporting required for full payment update**

- Prophylactic antibiotic within 1 hour prior to incision
- Prophylactic antibiotic discontinued within 24 hours (or 48 hours for specific surgeries)

**Reporting requested, not yet linked to payment**

- Right prophylactic antibiotic chosen

**Reporting requested to HQA; linked to payment in 2008**

- Venous thromboembolism prevention ordered
- Venous thromboembolism prevention provided within 24 hours pre/post surgery

**Reporting requested to HQA beginning 2008*; linked to payment in 2008**

- Cardiac patients with controlled perioperative serum glucose
- Appropriate hair removal
- Colorectal patients with postoperative normal body temperature maintained
- Weaning protocol used for ventilator patients

*Assuming endorsed soon by National Quality Forum.


**References**


This article originally appeared in the September 2006 OR Manager.

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For decades, there has been strong evidence that shaving the surgical site is unnecessary and even harmful, but changing practice has been difficult. Now some organizations have found ways to eliminate the preoperative shave.

Key concepts for changing practice are to:
• remove all razors from the operating room
• perform hair removal when necessary with clippers right before surgery
• establish a protocol for when and how to remove hair in affected areas.

Razor roundup
Mercy Health Center in Oklahoma City, Okla, chose hair removal to kick off its surgical site infection quality improvement (QI) process because “we wanted a big, visible success that would garner momentum for the process,” notes Ronda Pasley-Shaw, RN, CIC. Mercy, a 400-bed tertiary care center, performs about 1,000 procedures a month in the main OR.

For the project:
• The goal was to minimize preoperative hair removal and disturbance of skin integrity.
• The method was to perform indicated hair removal with clippers immediately prior to surgical skin preparation.

She and her team planned small steps that would make the change process safe for the staff.

“We wanted to make it easier for people to do the right thing,” she says.

Even before the first meeting, Pasley-Shaw had supply techs do an inventory and start a “razor roundup,” pulling back on the numbers of razors in stock.

To gain support, the team asked the staff to select the style of clippers they wanted. The staff also planned where the clippers would be kept in each room.

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To gain support, the team asked the staff to select the style of clippers they wanted. The staff also planned where the clippers would be kept in each room. “Clipper tenders” were assigned to keep the clippers where they belonged.

“One of the things you run into is the scarcity mentality,” explains Pasley-Shaw. “If you have 100 razors in every room and one set of clippers, it looks like you don’t have enough clippers to go around.” That encourages people to stash the clippers in their own special places. Then the next person can’t find them, fueling the perception of scarcity.

Once the clippers were stocked in the ORs, the next step was to make it less convenient for surgeons to get razors. Razors were gathered and moved onto supply carts in the halls. The staff were given a script of what to say when a surgeon asked for a razor: “I will be happy to get that for you. It is out on the supply cart. In the meantime, I have these clippers.”

Next, razors were moved a step further to the supply room. The staff kept using the script, now telling surgeons they would be glad to get a razor but would need to get it from the supply room.

“Nobody says ‘no’ at any time—it isn’t confrontational. It is letting people make safe changes,” Pasley-Shaw comments.

“The shot heard ‘round the OR”
To drive the change forward, the team recruited 2 respected surgeons. On a prearranged day, they asked the 2 surgeons to refuse to start their cases until clippers were used for their patients.

“It was the shot heard ‘round the OR,” Pasley-Shaw notes.

When these 2 surgeons calmly and quietly refused to take their patients back to the OR until clippers were used, the word traveled quickly. That helped quiet the voices of those who said clipper use would never work. From then on, when someone groused about the clippers, a staff member could say, “Oh, but Dr So and So wants to use them.”

One benefit of the project was to reduce the amount of hair removal overall.

Over the first year, the percentage of cases with no hair removal rose from 66% to 77%—a result that has been sustained through December 2006 (graph).

Changing practice, one surgeon at a time
An easy-to-read summary of the

Continued on page 15
During the month of July, the change concept we will be testing is avoiding shaving of the surgical site. Below is a summary of evidence/research that supports this process:

**CDC GUIDELINE FOR PREVENTION OF SURGICAL SITE INFECTION, 1999**

Published in April 1999, this two-part guideline presents the Centers for Disease Control and Prevention’s recommendations for the prevention of surgical site infections (SSI). The development of this document included 497 references, the work of five authors, and an infection control practice advisory committee from the CDC. Part I, Surgical Site Infection: An Overview, describes the epidemiology, definitions, microbiology, pathogenesis, and surveillance of surgical site infections. Part II, Recommendations for Prevention of Surgical Site Infection, represents the consensus of the Healthcare Infection Control Practices Advisory Committee regarding strategies for the prevention of SSIs.

**Preoperative hair removal recommendations**

(Category IA: Strongly recommended for implementation and supported by well-designed experimental, clinical, or epidemiological studies) are as follows:

- Do not remove hair preoperatively unless the hair at or around the incision will interfere with the operation.
- If hair is removed, remove immediately before the operation, preferably with electric clippers.

**INFLUENCE OF HAIR REMOVAL METHODS ON WOUND INFECTIONS**

Published by J. Wesley Alexander, in the Archives of Surgery, Vol 118, March 1983. The influence of preoperative shaving versus clipping on wound infection rate was studied. Patients were prospectively randomized to be either shaved or clipped the night before or the morning of operation. The AM clipper method was associated with significantly fewer infections than were the other methods, both at discharge and at 30-day follow-up. The greatest benefit was in the group with clean wounds. For each 1,000 patients treated, a savings of approximately $270,000 could be realized if the AM clipper method replaced shaving for preoperative hair removal. Preoperative shaving is deleterious, and the practice should be abandoned.

**WOUND INFECTIONS AFTER PREOPERATIVE DEPILATORY VERSUS RAZOR PREPARATION**

Published by R. Seropian, B. Reynolds, in the American Journal of Surgery, 1971:121; 251-4. The influence of the method of hair removal, razor versus depilatory, on the risk of postoperative wound infection was studied in 406 cases. The infection rate was 5.6% after razor preparation, 0.6% after depilatory, and 0.6% after no preparation. These findings suggest that although depilatory preparation does not contribute to the risk of wound infection, the razor preparation has a definite adverse effect. Support is provided for the concept that bacterial liberation and growth after razor preparation injury are responsible for this adverse effect.
Continued from page 13

research on hair removal posted by the scrub sinks helped Gwinnett Hospital System, Lawrenceville, Ga, to change its hair removal practices (illustration).

A multidisciplinary team of nurses from the OR, prep, and postanesthesia care plus an anesthesiologist planned how to implement the no-razor practice. Circulating nurses talked up the plan, and the director of inpatient surgical services discussed it at staff meetings, says Gwen Hudson, RN, BSN, the surgical systems project operations manager.

The project began with hysterectomies, performed by 2 surgeons, and colon procedures, performed by 1 surgeon.

The team proposed that the clinical champion, surgeon Dave Schmidt, MD, use the clippers for 1 day on his patients. He liked the clippers and was interested in the statistics on infection risks with razors. He shared the information with his partners, and they also began using clippers.

After just 2 months, all of the surgeons were using clippers on all procedures in all 4 of Gwinnett’s surgical facilities. The Gwinnett system performs about 25,000 cases a year. Gwinnett partnered with 3M, which provides the clipper-heads, about 25,000 cases a year. Gwinnett partnered with 3M, which provides the clipper-heads, smoothly. Garrett attributes success to surgeon support that made the difference,” she says.

Memorial Hospital in Colorado Springs, Colo, has seen clipper use jump from 25% to 96% since March 2003, says Jill Garrett, RN, perioperative division care manager.

A major driver of the change was the hospital’s participation in Colorado’s surgical infection prevention collaborative. Earlier efforts had been unsuccessful, but this time the change went smoothly. Garrett attributes success to support from the administration, the surgeons, and the perioperative nursing staff.

The key, she says, was enlisting staff support and providing education. Both staff and surgeons were interested in the research that supported clipping.

The perioperative division obtained a grant from AstraZeneca that allowed them to provide a series of 1-hour in-service programs with continuing education units plus breakfast and lunch for day and evening personnel, which reached over 90 employees. Garrett reviewed information about mandatory use of clippers and asked for the staff’s input about the problems of razors. Most of the comments she heard were, “Clippers are never available,” and “The surgeons don’t want to wait for the staff to find clippers.”

Clippers are never available,” and “The surgeons don’t want to wait for the staff to find clippers.

Clipper heads weren’t being stocked appropriately, and clippers had a way of disappearing. The department negotiated with the vendor for new clippers for the 15 ORs where about 1,400 procedures are performed each month. Having clippers readily available solved delay problems voiced by the surgeons.

The staff accepted the clippers so well that they persuaded the surgeons to use them. “No shave zone” posters were displayed above the scrub sinks and in all the rooms. (The poster is on the OR Manager website at www.ormanager.com. Look under the OR Manager Toolbox.)

“Clippers are never available,” and “The surgeons don’t want to wait for the staff to find clippers.”

“It was really the staff buy-in and surgeon support that made the difference,” says Garrett.

The surgery team continues to reinforce appropriate hair removal. The hospital invited SCIP expert Dale Bratzler, MD, of the Oklahoma Foundation for Medical Quality to speak to the physicians and staff.

In the rare instance when a surgeon uses a razor, the surgeon is approached by the physician champion, a general surgeon, who discusses the issue with him. Surgeons also know razor use is now reportable as a quality measure, and any such case will not pass the hospital’s quality screen.

“That carries a lot of weight,” Garrett notes.

—Judith M. Mathias, RN, MA

Change strategies for appropriate hair removal

Strategies recommended by SCIP:

• Remove all razors from operating rooms and surrounding patient support areas, or eliminate razors from surgical prep kits.

• Institute a policy to avoid shaving surgical sites, or if hair removal is necessary, to perform hair removal only with clippers right before surgery.

• Gain support from the chief of surgery.

• Institute the placement of electric clippers throughout the holding area and operating rooms where hair removal is likely to occur.

• Educate surgeons and clinical staff on appropriate hair removal techniques, and educate purchasing personnel on appropriate supplies.

• Post “No shave zone” posters throughout the hospital.

• Standardize documentation of hair removal technique in preoperative and operative records to state, “No hair removal, clipper, depilatory,” eliminating the razor or shaving options.


Available at www.medqic.org/scip. Look under Infections, then Other Resources.

This article is updated from an article in the January 2004 OR Manager.
Preventing infection

Taking steps to keep OR patients warm

Even a small drop in patients’ core temperatures triples the risk of surgical site infections after colon surgery and increases the hospital stay by 20%. Since these landmark findings were reported in 1996, clinicians have taken steps to make sure patients stay warm before, during, and after surgery.

In 2005, the Surgical Care Improvement Project (SCIP) chose immediate postoperative normothermia for colorectal surgery patients as 1 of 7 infection control measures. These patients were targeted because many of the studies on normothermia focus on this population.

OR Manager interviewed Daniel Sessler, MD, senior author of the landmark study and a leading researcher on normothermia, about his research and advice for maintaining normothermia.

Warm patients before surgery

Dr Sessler advises active warming of every patient preoperatively, saying that is key for preventing intraoperative hypothermia.

“Patients need active warming for at least 30 minutes to be effective,” he adds. An hour or more of prewarming prevents core hypothermia for 2 to 3 hours of open abdominal surgery without any intraoperative warming, his research shows.

“It is remarkably effective, and patients love it because they feel warm and toasty preoperatively,” he says.

Warming patients in the preoperative holding area prevents “redistribution hypothermia,” the most important cause of hypothermia in most patients (sidebar).

About 80% of hypothermia in the first hour of surgery results from a redistribution of heat from the internal core to peripheral tissues. This large internal flow of heat is induced by anesthesia and occurs independently from the environment, heat loss from the skin, or a net decrease in body heat content (sidebar).

Preoperative warming does not change patients’ core temperatures because they are unanesthetized and thus able to regulate their core temperatures. But it does transfer body heat into the peripheral tissues, which reduces the core-to-periphery temperature gradient. If a patient is prewarmed sufficiently, there is essentially no temperature gradient between the core and the periphery, he says. Then when anesthesia is induced and causes vasodilation, heat cannot flow from the core to the periphery because of the Second Law of Thermodynamics, which holds that heat can only flow down a temperature gradient.

Warming every patient

Warming every patient is a reasonable strategy given the low cost, high efficacy, and safety of forced-air warming, Dr Sessler says. He would accept not warming patients having short operations, but says patients should be warmed when a procedure lasts for close to 1 hour. His personal cutoff time for not warming is about 30 minutes.

Paradoxically, “it is actually harder to keep patients normothermic in short operations than in long ones,” he says. The reason is that a short procedure is finished before the redistribution hypothermia can be treated by active warming.

Normothermia definitions

**Normothermia:** Core temperature range of 36°C to 38°C (96.8°F to 100.4°F)

**Hypothermia:** Core temperature less than 36°C (96.8°F)

**Core temperature:** Core temperature is the single best indicator of a patient’s thermal status. Roughly speaking, the core thermal compartment consists of the head and trunk and is nearly half the body mass. About 80% of thermal input to the regulatory system is derived from the core, and most complications associated with hypothermia are related to core temperature.

Sources: American Society of PeriAnesthesia Nurses Hypothermia Guideline. www.aspan.org/hypothermia.htm

How hypothermia develops

Hypothermia develops during general anesthesia in 3 phases:

1. An initial rapid reduction in core temperature occurs after anesthesia induction and results from an internal redistribution of body heat. Redistribution of body heat redistributes heat. Redistribution of body heat... which holds that heat can only flow down a temperature gradient.

2. Core temperature subsequently decreases at a rate determined by the difference between heat loss and production.

3. When surgical patients become sufficiently hypothermic, they trigger thermoregulatory vasodilation, which restricts the core-to-peripheral flow of heat. Constraint of metabolic heat, in turn, maintains a core temperature plateau—despite continued systemic heat loss—and eventually reestablishes the normal core-to-peripheral temperature gradient.

The patient’s postoperative return to normothermia occurs when the anesthetic agents decrease sufficiently to trigger the body’s normal thermoregulatory defenses.


Which warming method?

SCIP does not recommend how to measure patients’ temperatures or keep them warm. Each organization needs to determine what methods are most efficient and give the most reliable results.

Dr Sessler does not have a preference for a patient warming device. He says ORs tend to use forced-air warming covers because they are effective, safe, and inexpensive—noting that the blowers are often free, and the blankets cost about $8.

His research has found the newer circulating water devices, such as circulating water garments and energy transfer pads, warm about 50% better than forced air because they also warm the posterior skin. They are also more expensive.

Manufacturers of the circulating water devices say their products are cost-effective because they result in improved patient outcomes compared with traditional warming methods. They also say...
their devices can be placed on all body surfaces, not just on the anterior surface as with forced-air covers. They say this is important for patients having surgery that requires large areas of their anterior skin to be exposed.

As long as the patient’s temperature is approximately normal at the end of surgery, it doesn’t matter whether the method used is circulating water, forced air, an increase in the ambient room temperature, or prewarming patients in the holding area, says Dr. Sessler, who is chair of the Outcomes Research Department at the Cleveland Clinic and professor of anesthesiology and director of the Outcomes Research Institute at the University of Louisville in Kentucky.

About warming of IV fluids, he says, “There is no scientific basis for this approach in 90% of patients. Fluid warming costs as much as forced air but transfers a tiny amount of heat compared to forced air.”

**What’s best for measuring temperature?**

Measuring core body temperature is important because of the redistribution effect caused by anesthesia.

For intubated patients, the best route is the distal esophagus, Dr. Sessler says, noting that flexible esophageal probes “are inexpensive, easy to insert, and resistant to artifact.”

For nonintubated patients, he recommends oral, axillary, or forehead skin temperature measurement. Bladder temperature is a good alternative for patients who require catheters for other reasons, he says.

“The data show the forehead strips work remarkably well,” says Dr. Sessler. In a 1997 study that tested use of the liquid-crystal forehead temperature indicator strips in 3 different ways, the strips didn’t fail, though he says he thought they would.

He doesn’t recommend using aural canal ( tympanic membrane) or temporal artery infrared thermometers to monitor core temperature during surgery, having found these to be “insufficiently accurate to be used in the perioperative period.” Both appear to be “little better than random number generators,” he says.

In a 1998 study, Dr. Sessler and researchers from Japan studied the accuracy of 4 infrared aural canal thermometers during cardiac surgery and concluded none was sufficiently accurate and precise for perioperative care. In a 2002 study of temporal-artery thermometers...

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**Preoperative warming is key.**

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**Preoperative warming**

Patients were divided into 2 groups:

- Control patients: covered only with a wool blanket during a 1-hour preinduction period
- Treatment patients: received forced-air warming for 1 hour before induction

**Results**

- Control patients: following induction of anesthesia, core temperature decreased at a rate of 1.1 +/- 0.1°C/hour. After 1 hour of anesthesia, only 1 of 8 patients had core temperatures of at least 36.5°C.
- Treatment patients: following induction, core temperature decreased at a rate of only 0.6 +/- 0.1°C/hour. After 1 hour of anesthesia, 6 of 8 prewarmed patients had core temperatures of at least 36.5°C.


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**Colorectal surgery patients**

The study involved 200 patients divided into 2 groups:

- Control patients: routine intraoperative thermal care (mean temperature 34.7°C)
- Treatment patients: active warming (mean temperature on arrival to PACU 36.6°C).

**Results**

- Control patients: 19% surgical site infection (SSI) (18/96)
- Treatment patients: 6% SSI (6/104), P=0.009


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**Clean surgery**

In the study, 421 patients having clean surgery (breast, varicose vein, or hernia procedures) were divided into 3 groups:

- Unwarmed group (standard)
- 2 warmed groups (local and systemic): warming applied for at least 30 minutes before surgery.

**Results**

- Unwarmed group: 14% SSI (19/139)
- Warmed groups: 5% SSI (13/277), P=0.001.


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**Turning up the thermostat**

There are patients who will not be normothermic despite the best of efforts, he adds. Procedures such as a colectomy in lithotomy position entail so much skin exposure that there is not enough surface area to warm. In these cases, some clinicians turn up the temperature in the operating room. This can help, says Dr.

Continued on page 18
Sessler, though raising the OR temperature enough to help “makes everyone in the operating room miserable.”

A more sophisticated approach, he says, would be to keep the ambient temperature comfortable for people working in the operating room and keep the patient warm with an active warming device.

Postop warming nice but not necessary

If patients are normothermic at the end of surgery, they won’t necessarily need or want warming postoperatively.

“Patients won’t get colder in recovery because they are not anesthetized, and they are thermoregulating very well on their own,” Dr Sessler says.

“There is nothing wrong with leaving active warming devices on patients in the PACU if they feel more comfortable, and they like it.”

SCIP calls for patients to be normothermic immediately postoperatively, he points out. This means patients have to be normothermic during surgery—not be allowed to become hypothermic and rewarmed at the end of surgery.

“It is okay to keep the warming blanket on patients postoperatively, but warming in recovery is no excuse for inadequate intraoperative thermal management. Intraoperatively is when hypothermia occurs, and most complications develop,” he says. 

—Judith M. Mathias, RN, MA

References


This article originally appeared in the December 2006 OR Manager.
Two hospitals recognized by the Institute for Healthcare Improvement (IHI) describe their protocols.

Small hospital diligent on warming

Perioperative staff at 45-bed Porter Hospital Inc in Middlebury, Vt, has paid close attention to patient warming. Porter was recognized by IHI for a 0 infection rate in more than 350 surgical procedures performed during IHI’s 100,000 Lives Campaign. The campaign’s goal is to prevent unnecessary hospital deaths by encouraging evidence-based practice.

The current record at Porter Hospital is 1 infection in more than 400 procedures.

Porter’s normothermia protocol includes monitoring patients’ temperatures in the preoperative holding area, the OR, and the postanesthesia care unit (PACU).

Forced-air warming blankets are placed on all patients in the OR and remain on into the PACU. The blankets are removed either when patients say they are too warm or are discharged from the PACU. All patients also receive warmed IV solutions.

Ann Beauregard, RN, BS, Porter’s performance improvement manager, reviews all patient charts monthly to monitor that the normothermia protocol is being followed. The team checks for readmissions within 30 days of surgery. They also send questionnaires to surgeons asking them to report any postoperative infections they see in their offices.

The nursing staff and physicians “eagerly anticipate the monthly data reports” and usually ask for the numbers before she has them ready, Beauregard says.

“They want to keep that infection rate at 0,” she says. “Once the staff see the value in what they are doing, they will take it on and go with it.”

Porter has 3 ORs and is opening a new 3-room OR suite this fall.

Staff, physicians back protocol

All surgical patients at OSF St Joseph Medical Center, Bloomington, Ill, receive forced-air warming blankets in the OR, even for short procedures such as dilatation and curettage. The blankets are left on in the PACU if the patients want them for comfort, says Jan Weaver, RN, CNOR, clinical manager of surgical services. Each of the 5 ORs has a blower for the blankets, and the PACU has 2.

Patients also receive warmed irrigation fluids for laparoscopic cases and warmed IV fluids for longer cases. The ambient OR room temperature has been raised. Bladder catheter thermometers are used to monitor patient temperatures for long cases, and liquid-crystal forehead temperature indicator strips are used for short cases.

One sticking point with the staff was raising the ambient room temperature to 64°F from about 55°F. Many staff said 64°F was too warm, “so we looked at ways to cool the staff, such as cooling vests,” says Weaver.

The normothermia protocol was developed by Patricia Conte, RN, MSN, CNOR, director of surgical services, as part of the hospital’s participation in the Surgical Infection Prevention (SIP) project sponsored by the Centers for Disease Control and Prevention in 2002 and 2003. Because SIP was a corporate initiative, the administration supported development and funding of the normothermia protocol, Conte says.

St Joseph has been so successful at lowering its infection rate that it is nationally recognized by IHI as a mentor for other facilities in the fight to prevent surgical site infections (graph).

“Putting forced-air warming blankets on all surgical patients adds a small cost to each case, but the cost of having a patient with an infection is so much higher, and the administration recognized this,” she says.

Buy-in was almost immediate

At first, anesthesia personnel were opposed to using warming blankets for short cases, Weaver says, but after she informed them that the nursing protocol was to place warming blankets on all patients, buy-in was almost immediate.

Surgeons don’t object to warming all patients as long as they are getting good results. “We have not had any issues with patients being hypothermic since we instituted this protocol,” she adds. “Change is always hard, which is why you should always start off with education. You have to educate the staff on how warming the patient lowers the infection risk.”

Now that the staff have seen the statistics on patient warming and watched the infection rate drop, they are behind the protocol 100%, she says.

—Judith M. Mathias, RN, MA

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Source: OSF St Joseph Medical Center, Bloomington, Ill
Setting up a beta-blocker protocol

What if there was a way to reduce the risk of cardiac complications of noncardiac surgery by as much as 90% in your OR? What if this risk could be reduced in a cost-effective manner without new equipment or more personnel?

Research evidence shows that a substantial proportion of cardiac events may be prevented with use of beta-blockers given perioperatively—providing a relative reduction in risk between 30% and 90%. Beta-blockers decrease the heart rate, reducing the demands surgery places on the heart.

Cardiac events, such as myocardial infarction (MI), angina, and congestive heart failure, occur in 5% of patients undergoing noncardiac surgery on average and in as many as 30% of patients at highest risk.

A 2002 report from an American College of Cardiology/American Heart Association task force notes that current studies “suggest that appropriately administered beta-blockers reduce perioperative ischemia and may reduce the risk of MI and death in high-risk patients.”

‘Hard stuff’

Though evidence of the efficacy of perioperative beta-blockade has been reasonably strong for almost 8 years, it has not been widely incorporated into practice, says Andrew D. Auerbach, MD, of the University of California, San Francisco, the lead author in many publications on perioperative beta-blocker use.

“This is hard stuff—more complicated than antibiotics for SSI [surgical site infection] prevention in terms of clinical complexity,” Dr Auerbach told OR Manager. Also, prophylactic perioperative beta-blockade is a relatively new concept. Some physicians are concerned that the evidence base is not sufficient to make a strong commitment to a beta-blocker protocol at this time.

Nevertheless, more OR managers are being asked by physicians to develop a protocol for perioperative beta-blockers.

Dr Auerbach suggests questions to address when setting up a protocol:
• Which patients should be targeted?
• Who identifies the patients?
• Who orders the agent?
• Who determines which agent to use?
• When should the agent be started, and when should it be stopped?

‘Start it up’

Key to starting a protocol is a physician champion, says Patricia Conte, RN, BSN, CNOR. Conte, who is director of surgical services at OSF St Joseph Medical Center, Bloomington, Ill, began setting up a perioperative beta-blocker protocol about 4 years ago for the 5-room inpatient OR.

The anesthesiologists were the most interested and involved, though the other physicians were supportive, notes Conte.

“Our chief of anesthesia was passionate that this could save lives, and the anesthesiologists really wanted to get the ball rolling on a protocol,” she says.

Anesthesia section committee members drafted a plan for a protocol and sent it to the departments of medicine, surgery, cardiology, and the medical executives to get input and buy-in.

The cardiologists were especially positive, but they didn’t want to administer the protocol because they are not involved with patients coming in for noncardiac surgery, says Conte.

A protocol and algorithm were drafted to be administered by nursing and anesthesiologists, with the preadmission testing (PAT) nurse identifying patients to receive beta-blockers up front. (See flow sheet, p 21.)

Identifying patients

The PAT nurse identifies patients as candidates for perioperative beta-blockade using the criteria (sidebar, p 22). The nurse gives the information to an anesthesiologist for approval of implementation of the protocol. The primary anesthesiologist on the morning of surgery has final say in the use of beta-blockers in the preop holding area.

If the patient is identified as a candidate several days prior to surgery, the screening tool and order form are faxed to the primary care physician for beta-blockers to be initiated orally preoperatively. Rarely, a contraindication is identified from the primary care physician; for example, a patient may fail to mention a history of chronic obstructive pulmonary disease or heart failure. The primary care physician may then deny use of beta-blockers.

The OR scheduler is notified when the protocol has been initiated, and that is noted on the printed OR schedule. When the patient is admitted, a sticker is placed on the chart to alert all staff that the patient is on the protocol.

Dr Auerbach recommends dividing criteria into minor and major clinical risk factors:
• Patients with no major criteria and 1 or less minor criteria would proceed to the OR with no beta-blockers.
• Patients with 1 or 2 major criteria or 2 minor criteria should be assessed for their functional status level before proceeding to the OR with beta-blockade.
• Patients with 3 or more major criteria should undergo additional risk stratification with noninvasive stress testing before proceeding to surgery with beta-blockade.

Implementing a protocol

The greatest challenge is how to implement guidelines that ensure all patients are treated appropriately, says Dr Auerbach.
Cardiac care

Perioperative beta-blocker protocol
Medical center staff flow

- Preadmission testing (PAT) identifies patient as candidate through use of inclusion/exclusion criteria.

- Once final approval is given, OR scheduler is notified so the notation can be made on the OR schedule.

- Nurse admitting the patient places orders and sticker on the chart.

- OR staff will transport patient to preop holding, allowing enough time to place patient on monitor and establish baseline.

- Anesthesia provider manages beta-blockade intraop and in the PACU.

- Preop holding staff double-checks that orders and sticker are on chart.

- Surgical nurse monitors vital signs and administers beta-blocker per protocol.

- PAT nurse notifies anesthesia for approval of implementation of the protocol. Screening tool and orders are faxed to the primary care physician.

- Postoperatively, surgical nurse notifies the primary care physician and/or surgeon that patient is to receive beta-blockers and documents that notation.

- Surgical nurse calls primary care physician and/or surgeon if problem or if beta-blocker is held per protocol.

Source: OSF St Joseph Medical Center, Bloomington, Ill.
Cardiac care

Continued from page 20

His recommendations:

• **Know your system:** Understand how patients get from home to surgeon, to anesthesiologist, to hospital, and back home.

• **Know your personnel:** Identify interested and motivated personnel from each health care group—physicians, nurses, pharmacists, and nurse practitioners.

• **Find a common pathway for all patients to take to get to the OR:** If the hospital has a single preoperative clinic, the strongest effort to begin the protocol should be made there.

• **Maintain continuity of beta-blockade in the hospital:** Have a single order set for all patients that is not altered and that follows the patients across the phases of care.

• **Maintain continuity of beta-blockade after discharge:** Develop a system that effectively treats patients short term or for a lifetime.

• **Have a protocol for dose titration:** Have a preprinted algorithm for dose titration.

  Kathleen Powell, RN, a PAT nurse at St Joseph, says the hospital has instituted fail-safe measures to ensure a patient’s beta-blocker protocol is implemented correctly. When she identifies a patient, she notifies the scheduling staff so they can place a beta-blocker protocol sticker on their patient information. She also writes a note on a surgical briefing form used by the OR nurses. This form, which follows the patient from the surgeon’s office into the operating room, includes any special information the OR nurses need to know, such as positioning and allergies.

  When the patient is admitted to the holding area, the nurse places another beta-blocker protocol sticker on the outside of the chart and places the perioperative beta-blockade standing order sheet in the chart.

• **Standing orders**

  St Joseph’s preoperative standing order begins with placing candidates for beta-blockade on a cardiac monitor in the holding area to establish a baseline reading.

  If the anesthesiologist believes a patient’s heart rate or blood pressure is too low, he or she can cancel the use of beta-blockers. Otherwise, the patient is given atenolol 5 mg slow IV push over 5 minutes. The dosages were determined by the anesthesia section committee.

  Postoperatively, patients take atenolol 50 mg by mouth daily for 7 days, unless the heart rate, blood pressure, or mean arterial pressure are too low, or if the patient is short of breath or wheezing or in second- or third-degree heart block. The beta-blocker also is not given if the patient is NPO or if a nasogastric tube is in place. In this case, 5 mg of atenolol can be administered by IV push, but the patient must be on continuous telemetry.

  If the atenolol is not given after surgery, the postoperative care unit nurse notifies the patient’s primary care physician.

  In the beginning, the protocol specified that patients were to take their beta-blocker by mouth before coming to the hospital, says Jan Weaver, RN, CNOR, operating room clinical manager. But this required the primary care physician to order the medication and tell the patient to take it. “The coordination of this was not happening,” notes Weaver.

  That is why the decision was made to administer the beta-blocker by IV push in the holding area. In addition, the anesthesiologist has another chance to check the patient and decide before surgery whether the drug should be given.

  —Judith M. Mathias, RN, MA

**Criteria for beta-blockade**

**Indications for use of beta-blockers (identified by the preadmission testing nurse through a phone interview)**

**Major indicators**

The protocol applies if either is identified:

- History of coronary artery disease (previous myocardial infarction, angina, previous positive stress test)
- Previous or current vascular surgery

**Minor indicators**

The protocol applies if 3 or more are identified:

- Age 65 or greater
- Hypertension
- History of stroke
- Abnormal EKG
- Diabetes

If less than 3 minor indicators and no major indicators are identified, the anesthesia provider will determine the need for a perioperative beta-blocker based on the Surgical Risk Index.

**Contraindications for beta-blockers (assessed by anesthesia)**

- Asthma
- Heart failure
- Heart rate < 55; 3rd-degree heart block
- History of bronchospasm
- Renal failure
- Heart failure
- Raynaud’s phenomenon
- Hypoglycemia

**References**


This article is updated from an article in the May 2005 OR Manager.
Preventing venous thromboembolism

A 28-year-old athlete with a cast on his leg dies on the operating table while physicians are trying to insert the lines for cardiopulmonary bypass. He had complained of pain under his cast—a pain that turned out to be a deep vein thrombosis (DVT) that became a fatal pulmonary embolus (PE).

A 99-year-old woman sails through hip fracture surgery, only to die of a PE 3 days postoperatively.

Two weeks after colon surgery, a 59-year-old man suddenly has trouble breathing. He is diagnosed with multiple pulmonary emboli.

These scenarios are all too familiar to anyone who has worked with surgery patients. Yet many patients aren’t getting the prevention they need for venous thromboembolism (VTE). The toll is high. Of patients who have major surgery without VTE prophylaxis, 25% develop DVT, and 7% develop PE—which is responsible for about 10% of hospital deaths.

PE is “the number one cause of preventable hospital death, and the number one strategy for improving patient safety in hospitals,” according to the American College of Chest Physicians (ACCP).

VTE is 1 of 4 surgical complications the Surgical Care Improvement Project (SCIP) aims to reduce. SCIP urges hospitals to adopt evidence-based practices outlined by the ACCP.

Why don’t more patients receive prevention?

Bleeding is one concern. But ACCP cites “abundant data” showing little or no clinically important bleeding with prophylactic doses of low-dose unfractionated heparin (LDUH), low-molecular-weight heparin (LMWH), or vitamin K antagonist (VKA). Prophylaxis also is cost-effective if given appropriately, ACCP notes.

Key recommendations

ACCP bases its recommendations on groups of patients, such as those having general surgery or orthopedic surgery, rather than on individual risk assessment. Risk assessment models haven’t been formally validated and are cumbersome without computer technology, ACCP notes. A simplified risk classification gives a rough estimate of VTE risk. (See chart, p 25.)

Develop a protocol and apply it consistently.

VTE prophylaxis isn’t black and white—risk factors are complex and interwoven. Perioperative leaders will want to review the ACCP recommendations and develop their own protocols. Some overall principles:

No aspirin

ACCP recommends against using aspirin alone as VTE prophylaxis for any patient group. Key points:

• Though aspirin has been shown to provide some protection, many of the studies have flaws.
• Some studies found no significant benefit from aspirin or found aspirin inferior to other prophylactic methods.
• Aspirin significantly increases the risk of major bleeding, especially when given with other antithrombic agents.

Compression devices for certain groups

Mechanical methods of VTE prevention, such as graduated compression stockings, intermittent pneumatic compression devices, or venous foot pumps, are an “acceptable option” in certain patient groups, ACCP notes, especially:

VTE’s toll

• 200,000 new cases are reported annually.
• In addition to the risk of sudden death:
  —30% of survivors develop recurrent VTE within 10 years
  —28% of survivors develop venous stasis syndrome within 20 years.
• VTE is more than 100 times more common for patients who have been hospitalized than for those in the community.
• Patient complications associated with thromboembolism cost an average of $18,310 and extend the hospital stay by 2.8 days.

Risk factors for VTE

• Increased age
• Surgery
• Trauma (major or lower extremity)
• Immobility, paralysis


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Malignancy
• Cancer therapy (hormonal, chemotherapy, or radiotherapy)
• Previous VTE
• Previous ischemic stroke with pare-sis
• Previous acute myocardial infarction
• Pregnancy and postpartum period
• Estrogen-containing oral contracep-tives or hormone replacement thera-py
• Selective estrogen receptor modula-tors
• Acute medical illness
• Heart or respiratory failure
• Inflammatory bowel disease
• Nephrotic syndrome
• Myeloproliferative disorders
• Paroxysmal nocturnal hemoglobin-uria
• Obesity
• Smoking
• Varicose veins
• Central venous catheterization
• Inherited or acquired thrombophilia

## VTE prophylaxis

**Continued from page 23**

- for patients at high risk of bleeding
- as an adjunct to anticoagulant-based prophylaxis.

But these mechanical devices haven’t been studied as much as anticoagulants, generally are less effective, and haven’t been shown to reduce PE risk or mortality.

Also, for these devices to be effective, they must be used correctly by:
- selecting the correct size
- applying them properly
- making sure they are removed only for a short time each day.

**What should nurses know?**

Nurses need to be aware of VTE risk factors and assess patients for risks (sidebar, p 23).

“More and more often, it is nurses who assess patients for VTE risk factors preoperatively,” says Marilyn Bartley, RN, MSN, CRNP, a trauma nurse practitioner at Christiana Care Health System, Newark, Del, who has written about VTE and developed risk assessment and prevention tools.

Some questions to ask: Is the patient elderly? Does the patient have a history of cancer? Has the patient traveled recently? Has the patient been immobile while awaiting surgery?

Nurses need to be involved in the assessment so they can remind the surgeon of the patient’s risk factors and be an advocate for ensuring prevention is prescribed, Bartley says. If the patient is at risk, prophylactic measures should be started as soon as possible.

**Important points:**
- **VTE risk factors are cumulative.**
- Ambulatory surgery patients are at risk and need to be assessed even though they don’t stay in the hospital.

**Periop nursing responsibilities**

In addition to assessment, perioperative nursing responsibilities for VTE prophylaxis include:

**Preoperative holding area**

Ensure anti-embolism (TED) stockings and pneumatic compression devices are placed on the patient and LMWH or LDUH is given if ordered preoperatively.

**Operating room**

Ensure pneumatic compression devices are positioned properly and turned on after moving the patient to the OR table.

### Postanesthesia care unit

Ensure patients receive LMWH or LDUH or Vitamin K antagonists, such as warfarin, if ordered, and make sure pneumatic compression devices are turned on and working properly.

After surgery, nurses must make sure patients wear the devices when they are in bed while encouraging patients to ambulate as much as possible.

### Role of antithrombic agents

The ACCP guidelines step up recommendations for giving antithrombic agents. Previously, these agents weren’t given unless patients were considered high risk. “Now pharmacologic agents are recommended even for moderate-risk patients, whether it is LMWH or LDUH,” Bartley says.

Close collaboration is needed among nurses, the surgeon, the anesthesia provider, and primary physician. Individual physician preference is a challenge for VTE prevention, which is why a standard protocol and general strategies for optimizing VTE prophylaxis are crucial.

### Systems needed

The key to routine prophylaxis is to “develop a systematic protocol and apply it consistently,” says C. Gregory Elliott, MD, FCCP, of the LDS Hospital, Salt Lake City, Utah. He led a study involving 70 medical centers that found many patients had substantial delays in VTE diagnosis.

Better education of the public and health professionals could raise awareness about prevention and early diagnosis of VTE, as it has for heart attack and stroke, he suggests. The public should be aware of common signs and symptoms, such as leg pain and swelling for DVT and unexplained shortness of breath for PE. Widespread use of protocols for CT pulmonary angiography could also reduce the diagnosis time for acute PE, he notes.

### Can technology help?

Technology, though still a ways off for many organizations, could help ensure patients are assessed and receive recommended VTE prophylaxis.

A computerized reminder system increased prophylaxis rates dramatically for patients having gynecologic and general surgery, Dr Elliott and David Mosen, PhD, MPH, and colleagues found. There was no change for orthopedic surgery patients because VTE prophylaxis is already widely accepted by orthopedic surgeons. Still, the computerized reminders didn’t lower the rate of postoperative symptomatic VTE.

The researchers also discovered a population of surgical patients who are resistant to ACCP-recommended measures—87% of the VTE complications occurred even though the recommended prevention was used—showing new strategies are needed to address prophylaxis-resistant VTE. Heparin-induced thrombocytopenia with thrombosis was clearly not the mechanism for lack of response for at least half of the cases because those patients had never received LDUH or LMWH, the authors noted. The majority of prophylaxis failures occurred in elderly patients with multiple VTE risk factors who had procedures with high risk for VTE.

Brigham & Women’s Hospital, Boston, developed a computerized alert linked to the patient database that used 8 common risk factors to determine each patient’s risk for VTE. Physicians were required to acknowledge the alert and could withhold or order prophylaxis. The results, reported in the *New England Journal of Medicine*, showed the alert was effective in patients with major VTE risk factors, reducing the rate of clinically diagnosed, objectively
**Levels of thromboembolism risk in surgical patients without prophylaxis**

<table>
<thead>
<tr>
<th>Level of risk</th>
<th>Successful prevention strategies</th>
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<tbody>
<tr>
<td><strong>Low risk</strong></td>
<td></td>
</tr>
<tr>
<td>• Minor surgery in patients &lt; 40 years of age with no additional risk factors</td>
<td>No specific prophylaxis; early and &quot;aggressive&quot; mobilization</td>
</tr>
<tr>
<td><strong>Moderate risk</strong></td>
<td></td>
</tr>
<tr>
<td>• Minor surgery in patients with additional risk factors</td>
<td>LDUH (q12h), LMWH (≤ 3,400 U daily), graduated compression stockings or intermittent pneumatic device</td>
</tr>
<tr>
<td>• Surgery in patients 40-60 years of age with no additional risk factors</td>
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<tr>
<td><strong>High risk</strong></td>
<td></td>
</tr>
<tr>
<td>• Surgery in patients &gt; 60 years of age or 40-69 years of age with additional risk factors (prior VTE, cancer, molecular hypercoagulability)</td>
<td>LDUH (q8h), LMWH (&gt; 3,400 U daily), or intermittent pneumatic device</td>
</tr>
<tr>
<td>• Surgery in patients with multiple risk factors (&gt; 40 years of age, cancer, prior VTE)</td>
<td></td>
</tr>
<tr>
<td>• Hip or knee arthroplasty, hip fracture surgery</td>
<td></td>
</tr>
<tr>
<td>• Major trauma; spinal cord injury</td>
<td></td>
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<tr>
<td><strong>Highest risk</strong></td>
<td></td>
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<tr>
<td>• Hip or knee arthroplasty, hip fracture surgery</td>
<td>LMWH (&gt;3,400 U daily), fondaparinux, oral VKA (INR 2-3), or intermittent pneumatic device/graduated compression stockings + LDUH/LMWH</td>
</tr>
</tbody>
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*Abbreviations: LDUH = low-dose unfractionated heparin. LMWH = low-molecular-weight heparin. VKA = Vitamin K antagonist*


confirmed DVT or PE at 90 days. But VTE prophylaxis did not significantly reduce the overall mortality rate.

The challenge, experts say, is to develop computer programs that streamline care without being too time-consuming for physicians. ✤

—Judith M. Mathias, RN, MA

**References**


*This article originally appeared in the May 2006 OR Manager.*
VTE prophylaxis

Seamless process to prevent DVT in surgical patients

A “seamless flow” process is helping to ensure all patients admitted to Barnes-Jewish Hospital in St Louis are assessed by their physicians for their risk for deep vein thrombosis (DVT). The assessment is linked to recommendations for prophylaxis, explains Mary Ann Coleman, RN, manager of quality and education for perioperative services. For example, it is recommended that physicians order a sequential compression device (SCD) for any patient with a risk factor of 1 point or more, such as patients over age 40, patients who have been immobile, and so forth.

A seamless flow in surgical services

These are the steps to keep the process seamless during the patient’s stay in surgical services:
- Anti-embolism (TED) stockings are placed on the patient in the preoperative holding area.
- SCD sleeves are placed on the patient in the OR and attached to a pump.
- Sleeves remain in place but are detached from the pump when the patient is transferred to the postanesthesia care unit (PACU). The pump stays in the OR.
- On the patient’s arrival in the PACU, a new SCD pump is attached to the sleeves and goes with the patient to the patient care unit.

This process allows for the SCD sleeves and pump to be ordered once. An SCD pump is standard equipment in all of the ORs. The patient’s SCD sleeves remain attached to the pump during the surgical procedure.

The PACU maintains a par level of SCD pumps to ensure a pump is always available for patients on arrival. This avoids extended stays in the PACU while another pump is ordered and allows the patient to continue prophylaxis from the PACU to the patient care unit.

A poster at the PACU exit door says: “PACU nurses: Don’t forget the SCD pump goes with the patient—seamless delivery of care.”

High-level support

“The commitment, buy-in, and support from senior management is the reason for the success we have seen with this program to prevent DVT,” says Coleman.

Senior management assembled a high-level team because they believed DVT prevention was an important patient safety measure, she says. The committee included representatives from medicine, nursing, physical therapy, pharmacy, inpatient care areas, and surgical services. The OR’s physician champion was invaluable in educating surgeons and residents about the program, she adds.

Because the surgeons are all faculty members at Washington University School of Medicine in St Louis, the physician champion was able to present the program to all surgeons at faculty meetings. He presented evidence to support the program, the expectations, and a physician DVT assessment form the surgeons and residents would have to complete for each patient.

The compliance rate for surgeon assessment of patients for DVT risk is at 96%, exceeding the target of 85%. Though the target has not been reached in all departments, “we are getting closer,” says Coleman.

Ordering of DVT prophylaxis and measuring risk are at 75% in non-ICU patients and 78% in ICU patients.

Data from the DVT program is now included in the hospital’s scorecard, which is reviewed monthly.

Coleman presented a poster abstract of the program at the Association of periOperative Registered Nurses Congress in March 2006 in Washington, DC.

—Judith M. Mathias, RN, MA

Hospital quality is improving

Hospitals had the greatest quality gains of any type of health care setting in the 2006 National Healthcare Quality Report. Overall, hospitals improved by 7.8% for quality measures tracked. Specifically:
- care for heart attack patients improved 15%
- care for pneumonia patients improved 11.7%
- steps taken to avoid postoperative complications improved 7.3%.

The improvements were attributed to quality initiatives by the Centers for Medicare and Medicaid Services and others. Hospitals also have an incentive to improve because of quality reporting by the Hospital Quality Alliance, a public-private collaboration.

Improvement on hospital quality measures

<table>
<thead>
<tr>
<th>QIO: Quality improvement organizations of CMS.</th>
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<tbody>
<tr>
<td>QIO heart attack care</td>
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<tr>
<td>QIO pneumonia care</td>
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<tr>
<td>QIO heart failure care</td>
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<tr>
<td>Patient safety: Central</td>
</tr>
<tr>
<td>Patient safety: General</td>
</tr>
<tr>
<td>Patient safety: General</td>
</tr>
<tr>
<td>All other core measures</td>
</tr>
</tbody>
</table>