The Hospital for Special Surgery (HSS) in New York City has one of the highest volumes of total joint replacements in the world. It also has one of the lowest surgical site infection (SSI) rates.

The hospital, which performs about 8,000 joint replacements a year, was recently commended by the New York State Department of Health for its low infection rate for hip replacements—0.1%, significantly lower than the state average of 1.3%. Nationally, the average is 0.9% for patients with 1 risk factor and 1.87% for patients with 2 or 3 risk factors, according to the Centers for Disease Control and Prevention (CDC).

New York is the first state to use the CDC’s National Healthcare Safety Network (NHSN) system for reporting hospital-acquired infections. Hip replacement was included for the first time in the July 2009 report.

OR Manager talked with Thomas P. Sculco, MD, surgeon-in-chief, and Ron Perez, RN, JD, CNOR, assistant vice president for surgical services, about their infection control practices.

Dr Sculco acknowledges that HSS has an advantage because as an exclusively orthopedic facility, it doesn’t have the same types of bacterial flora as general hospitals.

Rapid surgery, regional anesthesia

Surgery is performed quickly, with the average surgical time for a joint replacement about 1 to 1½ hours. The duration of surgery is an independent risk factor for SSI, according to the CDC.

“All of our joint replacement operations are done with regional anesthesia,” Dr Sculco says. “We use hypotensive anesthetic techniques that reduce bleeding, which we have pioneered for the past 15 to 20 years. That allows the operation to proceed more rapidly.” In hypotensive anesthesia, the mean arterial pressure is reduced to 50 mmHg, which reduces blood loss. (A description is at www.hssanes.org/for-professionals/hypotensive-epidural-anesthesia.htm.)

Another advantage of a high-volume specialty center is that procedures can be performed systematically using specialized teams, which helps in
completing procedures expeditiously. “We try to keep consistent staffing with the surgeons,” Perez says.

**A special enclosure**

During surgery, patients are isolated from the environment and surgical team as much as possible to minimize exposure to contaminants. Operating rooms are equipped with laminar airflow. In addition, within each OR, surgery is performed within a Plexiglas enclosure with the patient’s head outside the enclosure (illustration). Instruments and implants are passed through an opening. The enclosure is used for all joint replacements.

“A lot of the bacteria that settle in incision sites are attached to dust particles, so we filter out the dust particles,” Dr Sculco explains.

Though the enclosures are costly to maintain, he says the hospital believes the investment is worthwhile because “an infection after a joint replacement is a catastrophe.”

The panel system can be dismantled quickly after surgery and stored in each OR.

As an additional safeguard, OR teams wear body exhaust suits (“space suits”), which help protect patients from bacterial shedding.

Regarding laminar airflow, in a recent review on SSI prevention, the American Academy of Orthopaedic Surgeons (AAOS) says: “Decades of use of laminar flow operating room ventilation in combination with other infection control measures have improved infection rates; however, no uniform opinion about laminar flow efficacy has developed.” The CDC considers laminar airflow for orthopedic implant operations to be an unresolved issue.

**Environmental cleaning**

ORs are cleaned after every case according to standards. Terminal cleaning of each OR is performed every night, which includes wiping down the entire room, panels, and all furniture and equipment. The process is monitored by the surgical services infection prevention nurse.

“She observes the unit assistants and the way they are cleaning to make sure they maintain the highest standard,” Perez says. Staff competencies are checked regularly.

The infection prevention RN, who is dedicated to surgical services, reports to the infection control department.

**Patient skin prep**

Prior to surgery, all patients attend a preoperative education class, where they learn about the procedure and what to expect during recovery. During the class, patients are given a bottle of chlorhexidine gluconate (CHG) solution and instructed on how to shower with it before surgery.

Povidone-iodine is used for the surgical skin prep; CHG is substituted if the patient is allergic to povidone-iodine. Perez and his team recently conducted an evidence-based review to compare CHG versus povidone-iodine for the skin prep and planned to make a final decision about which preparation to use. (In the meantime, in a new report of a randomized trial, skin preps with CHG-alcohol resulted in a significantly lower SSI rate than those with povidone-iodine. The report by Darouiche et al appeared in the January 7, 2010, *New England Journal of Medicine*. See related article.)
Remote infections treated

Patients are screened preoperatively for any infections remote from the surgical site, such as dental abscesses or urinary tract infections.

“We’re very aggressive,” says Dr Sculco. “If the patient has any evidence of an infection anywhere prior to surgery, we make sure that is dealt with.”

Every patient has a urine culture prior to surgery. If the culture is positive with an antibiotic-resistant organism, the surgery may be cancelled.

Postoperative urinary tract infection has been identified as a risk factor for periprosthetic joint infection in several studies but not all, AAOS says in its review. It is unclear whether there is an association between preoperative bladder infections and deep prosthetic infection.

Instrument processing

With its large orthopedic volume, the hospital doesn’t need to rely much on loaner instrument sets, which make up only about 5% of sets. Loaner sets can be a challenge because they must be delivered far enough in advance to allow for the appropriate reprocessing.

When loaner sets are used, Perez says they are brought into the central supply department for decontamination and then are wrapped, sterilized, and brought to the operating room like all of the other instrumentation.

The New York State report on hospital-acquired infections is at

References


