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SPECIAL REPORT

A Perspective on Surgical Site Infection Prevention

Key Issues in Infection Prevention: An Overview



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Although most health care–associated infections (HAIs) are considered preventable events, they are a clear threat to patient safety. A surgical site infection (SSI) results in significant patient morbidity, even death, and contributes to increased use of health care resources. Therefore, infection prevention is important in today's environment and the evolution of health care reform in the United States. The effect of health care reform is being felt in all health care environments (eg, no reimbursement for HAIs), forcing health care professionals to rethink their practice, especially in relation to the incidence of HAIs and SSIs.

In the perioperative environment, clinicians are all too cognizant of the risks that patients face if an SSI occurs. In addition to potentially devastating patient outcomes, there are also financial implications of HAIs and SSIs. According to Zimlichman et al, “The total annual costs for the [five] major infections were \$9.8 billion (95% [confidence interval], \$8.3-\$11.5 billion), with surgical site infections contributing the most to overall costs (33.7% of the total).”^{1(p2039)} According to the Centers for Medicare & Medicaid Services, “For discharges occurring on or after October 1, 2008, hospitals will not receive additional payment for cases in which one of the selected conditions [eg, HAIs, SSIs] was not present on admission.”² This can have a serious adverse effect on the livelihood of a physician, surgeon, or other health care professional as well as on health care facilities in all sectors of the health care environment and

underscores the significance of the crusade to prevent infections.

The goal of this special report in the *AORN Journal* is to highlight some of the key issues and events that are affecting infection prevention in the perioperative setting. The issues have been grouped into four separate discussions:

- patient care interventions to help reduce the risk of SSIs;
- the role of the OR environment in preventing SSIs;
- the importance of timely, thorough, and complete reprocessing of endoscopic equipment; and
- a look at evolving considerations for preventing SSIs in 2015.

PATIENT CARE INTERVENTIONS

A primary goal of every member of the perioperative team is to prevent HAIs, particularly SSIs. Therefore, identifying evidence-based strategies for reducing the risk of SSIs is imperative. Some of these strategies include surgical attire and hand hygiene, antimicrobial sutures, preadmission showers and cleansing, and weight-based dosing. Additional strategies include mitigating the risks of methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-sensitive *S aureus* (MSSA) by using active surveillance, preoperative nasal screening, and selective decolonization protocols, as well as preoperative bathing or showering with chlorhexidine gluconate and the use of alcohol-containing antiseptic agents for skin prep. Other patient care interventions to decrease the risk of SSIs include using antiseptic solutions to irrigate

surgical tissues and implantable devices and performing perioperative hair removal when necessary by using clipping or depilatory methods that reduce skin injury.

Most of these strategies are within the realm of responsibility of one or more perioperative team members. For instance, the surgeon may be interested in using antimicrobial sutures, but it takes the OR manager or central sterile supply manager to ensure availability of the sutures and the RN circulator and scrub person to ensure the particular sutures are in the room or are immediately available during surgery. Similarly, although the surgeon orders the specifics for the preadmission showering or cleansing routine, ensuring compliance is the responsibility of the patient and the preadmission nurse. For many years, preoperative antibiotic dosing essentially was a set dose that depended mostly on patient allergies. The change to weight-based dosing is being guided by evidence-based practice and requires all involved clinicians to establish a new mindset, whether it is the surgeon or anesthesia professional who orders the antibiotic and determines the dose or the nurse who administers the antibiotic. Surveillance for MRSA and MSSA, as well as other multidrug-resistant organisms, is always important, and numerous team members are involved, including the physician making the diagnosis and the anesthesia professional and nurse administering appropriate medications. This is particularly important for high-risk surgical patient populations and emphasizes the significance of careful consideration when deciding to use antimicrobial irrigation solutions and ensuring proper and careful perioperative hair removal when necessitated by the site of the incision.

THE OR ENVIRONMENT

A number of strategies have been identified to mitigate the risk of infection transmission from organisms in the OR environment, such as *S aureus*, MRSA, and MSSA. With ever-increasing emphasis on cost economy, perioperative clinicians work to decrease turnover time without sacrificing environmental hygiene and sterile processes. This can be

particularly challenging in integrative hybrid ORs because of the sheer size of the rooms and the volume of equipment present. Health care facility administrators work cooperatively with clinicians to obviate environmental sources of contamination, focusing on air handling systems; traffic control; proper surgical attire and aseptic technique, including hand hygiene; smoke evacuation; and use of ultraviolet technology in the terminal cleaning process. Other environmental strategies focus on the importance of infection prevention in the sterile processing department.

REPROCESSING ENDOSCOPIC EQUIPMENT

Typically, flexible endoscopes are cleaned and then reprocessed using high-level disinfection rather than steam sterilization. The heavy bioburden (eg, tissue, blood, body fluids) that contaminates flexible endoscopes during use and the intricacies of endoscope design require focused attention to decrease the risk of postprocessing contamination. Of particular concern is the risk of contamination with pathogens, such as *Escherichia coli*, *Klebsiella pneumoniae*, *Clostridium difficile*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Serratia* species, *S aureus*, MRSA, and MSSA. An endoscope contaminated with any of these pathogens puts patients at risk of cross-contamination if there is a failure somewhere in the necessary reprocessing steps that results in inadequate, delayed, or incomplete reprocessing. Inadequate or incomplete reprocessing can result when personnel feel rushed to speed up turnover times and, as a result, cut short certain reprocessing steps. Another issue is when a delay occurs in reprocessing, which allows bioburden to dry on the endoscope, thereby making it more difficult to remove. A final consideration with regard to endoscopic procedures is the need for transparency with patients, ensuring that patients are told of the potential risk of bacterial transmission during endoscopic procedures. Personnel and administrators should be aware of these challenges and take steps to ensure that all endoscopic instruments are reprocessed according to current

standards and that patients are well informed before they undergo an endoscopic procedure.

GOING FORWARD

In addition to patient care, OR environment, and endoscope reprocessing strategies, perioperative personnel can use other strategies to improve patient outcomes and reduce the risk of infections. Being aware of and addressing racial and ethnic disparities is one such strategy. According to numerous studies, HAIs have a disproportional effect on selected racial and ethnic populations in the United States.³⁻⁶ According to Bakullari et al,⁵ a common misperception is that bias is the reason for disparity in health care; however, factors that contribute to this disparity include language barriers, income level, education, and a tendency of minorities to use lower-quality health care facilities. Whatever the cause, clinicians need to be aware of racial and ethnic disparities as more non-English-speaking immigrant populations seek health care and need to work together with patients to improve patient outcomes.

A surgical care bundle is a set of interventions that, when implemented as a group, help to improve surgical patient outcomes. Some examples of interventions that may be included in a surgical care bundle are

- appropriate and timely antibiotic administration before surgery;
- timely discontinuation of antibiotics after surgery;
- management of blood sugar level after heart surgery;
- appropriate hair removal, if required, before surgery;
- administration of beta-blockers if the patient is currently on beta-blocker therapy; and
- appropriate ordering and implementation of treatment to prevent blood clots.

After evaluating evidence-based research and practices, multidisciplinary teams must work together in developing a surgical care bundle for their facility.

Finally, perioperative professionals need to better assess what is considered a clean versus a dirty

surface, how this might affect the process of terminal cleaning, and whether the application of adenosine triphosphate bioluminescence technology may assist in evaluating the effectiveness of the terminal cleaning process. This is important because as ORs increase in size and complexity, perioperative and environmental services personnel face challenges in ensuring the cleanliness and effectiveness of disinfecting processes.

The present discussion characterizes the challenges that perioperative professionals currently face in delivering a high quality of care to surgical patients. Looking forward to 2015, these challenges likely will continue, in part because of increased patient morbidity, high demand on institutional resources, and emerging surgical technologies, which often require a steep learning curve for effective use. The importance of infection prevention within perioperative services likely will increase in the 21st century. Meeting these challenges will require collegiality between all perioperative professionals; a continued focus on putting evidence-based research into practice; and an institutional commitment to invest in innovative, safe, and effective patient care practices. [AORN](#)

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