The Ultimate Fight Against SSI

Amanda Hankel

The use of antimicrobial dressings is being investigated to prevent post-op infection.

According to Patty Burns, a clinical nurse specialist, wound ostomy continence nurse and Vice President of Clinical Affairs at Smith & Nephew, the cause of surgical site infection (SSI) is pretty straightforward: it all boils down to bacteria.

"At some point," Burns says, "either during the surgery or after the surgery, bacteria is introduced into the surgical site. If allowed to proliferate, it will lead to an infection."

Burns explains that SSIs are classified depending on if they happen superficially or deep in the organ. Often, they're thought of in two buckets:
Exogenous, meaning the bacteria introduced from the environment after surgery is the source of infection.

Endogenous, when the bacteria in or on the patient is the source of infection.
The most frequent source of SSI, Burns says, is superficial, with the source of bacteria coming from the skin or the environment.

Furthermore, some patient populations are considered at higher risk for SSI. Issues like diabetes, renal disease, smoking, any type of autoimmune disease and obesity all put patients at higher risk of infection. Meanwhile, factors such as longer length of surgery can also contribute to a higher risk of infection.

Infection-fighting technology
To minimize such risks, infection-fighting wound closure and healing technologies have been enhanced. These technologies touch on every stage of the process, beginning with wound closure.

Traditionally, wound closure has been done using sutures or staples. In the past, these wound closure solutions have not provided infection prevention

characteristics. In recent years, research has shown solutions such as antimicrobial sutures help reduce SSI post-operatively.

Meanwhile, surgical adhesives are another form of wound closure technology that has incorporated antimicrobial properties to help fight infection. Often made of cyanoacrylate, skin adhesives have the ability to serve a dual purpose of closing the wound while providing microbial protection.

“It serves as a physical barrier to bacteria and it immobilizes bacteria on the skin,” says Wendy Booker, Director of Marketing at Adhezion Biomedical. “So any bacteria that is potentially residual, even after skin prep, would be prevented from migrating toward the wound.”

Utilizing an adhesive does change the procedure of wound closure, Booker says, as the surgeon needs to approximate the edges of the wound and glue it rather than sewing it. Furthermore, it cannot be used in mucus membranes or wounds that are already infected.

Still, for the right patients and procedures, a topical skin adhesive can provide protection intra- and post-operatively to reduce the risk for SSI.

Once the wound is closed, the use of antimicrobial dressings is being investigated as an intervention for preventing post-operative wound infections.

Burns says the agent most frequently seen in these dressings is silver.

“The reason that silver was chosen as the antimicrobial agent is it’s a well-established antimicrobial agent,” Burns says. “It was used historically in managing burn patients and it’s very broad spectrum. Today, while silver was historically available in a cream format, new technology has allowed silver to be available in a dressing format that allows for sustained release of that antimicrobial agent. So, you can put a barrier dressing on, and depending on the type of dressing, it could last from three days up to seven days.”

Historically, surgeons close the incision and then secure a plain gauze pad down with tape over the wound.

“This protected the wound from physical forces, but did not provide a functional barrier to bacteria from the environment,” Burns says. “Nor did it provide any kind of barrier from bacteria that might be on the skin from migrating to the incision.”
The next innovation to improve upon infection prevention technology was polyurethane film dressings, Burns says. These were an enhancement over traditional tape as they provided a physical, waterproof barrier that protected the wound, but they didn’t provide any antimicrobial activity.

Today, dressings are available that provide a barrier to physically protect the wound, create a waterproof environment and provide broad-spectrum antimicrobial coverage.

“This helps maximize protection of the surgical site in order to protect it from either bacteria from the surrounding skin or from the environment,” Burns says.

In fact, research has shown the effectiveness of using an antimicrobial dressing to reduce infection and complication rates in surgical wounds. In a 2007 study, researchers compared the use of an absorbent silver-eluting dressing system with a conventional dressing in the treatment of wounds following lower extremity revascularization, and found a 64 percent reduction in overall wound complications with use of the silver-eluting dressing1.

Aside from closure and dressing solutions, other innovations have been developed to contribute to preventing infection throughout the entire wound healing process.

As David Zansitis, Senior Market and Business Development Manager for Vashe Wound Therapy, a hypochlorous acid solution, explains, “A patient’s overall care plan should encompass several modes of therapy to ensure effective wound healing and infection prevention.”

Therapies such as wound irrigating cleansing solutions cleanse wounds for foreign matter and keep wounds clean and moist to enhance healing.

According to Zansitis, the ability to keep the wound moist and clean is an “integral part of an overall plan of care” and helps other antimicrobial wound healing technologies, such as dressings, work even better to prevent infection.

Considerations now, in the future

Currently, there no regulations in place requiring surgical facilities to make antimicrobial wound closure and healing technologies a part of their standard regimen. However, when deciding whether to use an antimicrobial technology for the wound closure and healing phase of a patient's care, think about the risks of infection, and consider the consequences if the patient acquires an infection post-operatively, such as:

1. Increased pain.
2. Increased recuperation period.
3. Increased length of stay at the hospital.
4. Increased rate of re-admission.
5. A failed procedure.

For hospitals and physicians, there are also economic and regulatory consequences, such as the initial economic cost associated with SSI and related complications. Furthermore, incidence of SSI is a quality indicator and monitored by various quality reporting agencies.

“It’s an indicator of the quality of care provided,” Burns says, “and there is a heightened awareness around the incidence of surgical site infections.”

In fact, with Centers of Medicare & Medicaid Services (CMS) tracking the incidence

and cost of SSI, quality organizations and payers are starting to write the monitoring of surgical site infections into their contracts.

“If you look at the total population of surgical patients, so there are 30 million+ patients a year, and the incidence of SSI in the whole population is two to three percent,” Burns says. “That appears to be a relatively low incidence. However, for patients who have complicated procedures, or are at risk for impaired healing, the incidence is much higher.”

Therefore, when deciding on which wound closure technologies to use in your facility, the experts offer some sound advice.

For wound closure choices, Booker recommends looking for properties including strength, flexibility and ease of use. For barrier dressings, Burns recommends looking for a solution that is:

1. **Broad spectrum.** The antimicrobial properties should fight against many strains of bacteria.
2. **Fast acting and long lasting.** You want a barrier dressing that will work quickly, but also provide antimicrobial activity over a long period of time.
3. **A high dosage.** A higher dose allows for broader coverage on more strains, particularly more strains of MRSA, Burns explains. It also provides a bactericidal dose compared to a bacteria static dose, which has therapeutic benefits.

Finally, Zansitis advises to look to provide the most proactive therapy to patients possible with a wide array of technologies that can work synergistically together. The solution should not inhibit the growth of new tissue, cause stinging or burning, or harm the patient in any way.

The key to a proper wound healing solution, he says, is to find a mix of technologies that efficiently and cost effectively work together. This is the answer to helping improve the wound healing process for patients and ultimately win the fight against SSI.

1Childress et al. Impact of an Absorbent Silver-Eluting Dressing System on Lower Extremity Revascularization Wound Complications. Ann Vasc Surg 2007; 21;1-5.

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