Keywords used: reduce MRSA risk

Problem: Total knee and hip arthroplasty are the most utilized orthopedic procedures. Patients undergoing these surgeries risk acquiring methicillin-resistant S. aureus (MRSA) infections. These infections are difficult to treat and can lead to prolonged therapy, multiple surgeries and patient morbidity.

Solution: Physicians must be aware of advancements that could improve patient outcomes. This article informs doctors about four practices to reduce MRSA risk.

Four Techniques to Reduce MRSA Risk for Orthopedic Surgeries

Golf is Charles' passion. Yet recent joint pain has kept him in his recliner more than he would want. He dreaded knee surgery but was hopeful that a new knee would allow him to get back on the golf course. Many of his friends felt instant relief after their joint replacement. However, Charles' experience was different. He was surprised when the knee pain persisted and heat at the surgical site developed.

Prosthetic joint infection (PJI) is a devastating complication of orthopedic surgeries, mandating extensive treatment. These infections contribute to significant morbidity and decreased quality of life. Keep reading to discover four evidence-based practices to reduce MRSA risks.

Key Takeaways

- S. aureus was first discovered in 1881. Since that time, it has become resistant to many antibiotics.
- MRSA often causes painful infections, extended hospital stays, significant personal loss, and a financial burden for individuals and healthcare organizations.
- Physicians must identify at-risk patients and help them address modifiable risk factors before surgery.
- Prevention is the best, easiest and most cost-effective intervention to reduce complications related to MRSA infections.
- Recent research provides hope for the future. Combination therapy and natural products show promise in maximizing the antibacterial impact on MRSA.

The history of MRSA

In 1881, a Scottish surgeon found that Staphylococcus caused wound infections. Penicillin, discovered by Sir Alexander Fleming in 1928, helped treat these infections. This antibiotic saved many lives during World War II. However, within two years, the pathogen became resistant to penicillin.

In the 1950s, scientists developed methicillin to treat S. aureus. A decade later, the pathogen also showed resistance to methicillin. In 1961, methicillin-resistant S. aureus (MRSA) was discovered, and the MRSA epidemic began. The World Health Organization (WHO) categorizes MRSA as a "priority pathogen" because of its resilient clones and life-threatening capabilities.

MRSA and total joint arthroplasty

According to the Centers for Disease Control and Prevention (CDC), surgical site infections (SSIs) account for 20% of all healthcare-associated infections (HAIs). HAIs increase hospital stays, mortality rates, medical expenses and readmission rates. The pathogens responsible for 63% of PJIs are the following:

- methicillin-sensitive Staphylococcus aureus (MSSA)
- methicillin-resistant Staphylococcus aureus (MRSA)
- coagulase-negative staphylococci

Staphylococcus aureus (S. aureus) is the most common cause of SSIs, and the nares are the most common source of colonization. These pathogens are minuscule but cause extensive damage. The National Institute of Health (NIH) estimates that SSIs produce the following:

- 1. A financial burden of \$3.3 billion annually
- 2. Hospital stays extended 9.7 days
- 3. Additional expenses of \$20,000 per readmission

The NIH reports that **85% of SSIs stem from endogenous colonization of the patient.** What measures can medical professionals implement to reduce MRSA risk during orthopedic surgery?

#1: Identify patients at risk for MRSA

Identifying those at risk and implementing strategies to reduce the threat of MRSA is imperative. The immune-compromised, elderly and individuals with comorbidities are most susceptible to these infections. High-risk patients include those with:

- Uncontrolled diabetes
- A history of smoking
- Kidney disease
- Obesity

Lifestyle modification conversations can be uncomfortable, but these comorbidities stack the odds against the patient. Addressing modifiable risk factors improves short- and long-term results of joint replacements.

#2: Enforce preoperative decolonization protocol

For those colonized with S. aureus, decolonization before surgical procedures must be performed. Physicians typically prescribe mupirocin for the nasal passage and chlorhexidine body wash. Some hospitals implement nasal decolonization in pre-op, ensuring proper decolonization of the nares for all patients.

Patients were receptive to this preventive protocol because they understood its importance. With decolonization enforcement, NIH estimates a **cost savings of \$45.08 million over five years.**

#3: Implement postoperative protection

Postoperative monitoring is challenging, especially with outpatient procedures. Most people assume they know how to wash their hands. However, many do not adequately disinfect. Others avoid handwashing altogether. People unknowingly contaminate their hands. Something as simple as scratching the nose and then touching the wound can cause infection. That's why **patient education is vital for at-home success.**

Many orthopedists use dressings that can be left on until the follow-up appointment. That way, healthcare providers perform the initial dressing change. This practice promotes postoperative protection and reduces MRSA risk.

#4 Consider alternative treatments

Could alternative treatments play a role in reducing the risk of MRSA for orthopedic surgeries? According to the NIH, combining synthetic and natural drugs could improve outcomes. Using plant extracts with conventional antibiotics shows promising results in the fight against MRSA.

In a study by Jency Blesson et al., integrating gentamicin and *C. esculenta* extract **produced maximum antibacterial effect against MRSA.** The plant extract binds to MRSA's cell wall, increasing permeability. The antibiotic was able to penetrate the pathogen better and lyse the bacteria. The natural products showing exceptional antibacterial impact against MRSA are the following:

- Garlic
- Ginger
- Thai longan honey
- Manuka honey
- Juncus and Luzula species
- Curcumin
- Greek oregano
- Baru plant
- Lichen

• Apple cider vinegar

Vancomycin is currently the primary treatment for MRSA infections. However, considering alternative treatments and combination therapies could decrease the adverse impact of this unpredictable pathogen.

Advancing safety and reducing MRSA risk for orthopedics

Over the past century, S. aureus has become a formidable infection, causing devastation worldwide. By implementing preventive measures and considering alternative interventions, we can promote the safety of patients like Charles.

Your patients want to enjoy life and actively participate. However, joint pain often gets in the way. <Facility Name> provides excellent orthopedic care while advancing safety ratings. Are you looking to partner with a facility passionate about patient safety? Look no further. Contact us at <Facility number> or click the "Refer" button to get started.

Resources

"Recent Developments in Methicillin-Resistant *Staphylococcus aureus* (MRSA) Treatment: A Review." NIH: National Library of Medicine, 2022, Recent Developments in Methicillin-Resistant *Staphylococcus aureus* (MRSA) Treatment: A Review - PMC.

"Risk of methicillin-resistant staphylococcus aureus prosthetic joint infection in elective total hip and knee arthroplasty following eradication therapy." NIH: National Library of Medicine, 2021, Risk of methicillin-resistant staphylococcus aureus prosthetic joint infection in elective total hip and knee arthroplasty following eradication therapy - PMC.

"Pre-surgical Nasal Decolonization of *Staphylococcus aureus:* A Health Technology Assessment." NIH: National Library of Medicine, 2022, Pre-surgical Nasal Decolonization of *Staphylococcus aureus:* A Health Technology Assessment - PMC.

"The Current State of Screening and Decolonization for the Prevention of *Staphylococcus aureus* Surgical Site Infection After Total Hip and Knee Arthroplasty." NIH: National Library of Medicine, 2015, The Current State of Screening and Decolonization for the Prevention of *Staphylococcus aureus* Surgical Site Infection After Total Hip and Knee Arthroplasty - PMC.

"Hygiene Fast Facts." Centers for Disease Control and Prevention (CDC), 2022, Hygiene Fast Facts | CDC.