The silent epidemic: CA-MRSA and HA-MRSA

By Dr. Richard P. Evans MD

Recommendations for prevention, identification, and treatment

Orthopaedists continue to face the increasing problem of antimicrobial resistance in their practices and require the latest tools for preventing and treating infections. Hospitals and physicians must employ every known infection prevention measure.

The statistics for methicillin-resistant *Staphylococcus aureus* (MRSA) speak for themselves. From 1999 through 2005, infections outside the lungs or blood tripled. The most frequent primary diagnosis associated with other *S aureus*–related infections was cellulitis and abscess, followed by postoperative infection, infections from an implanted device (Fig. 1), or graft and osteomyelitis.

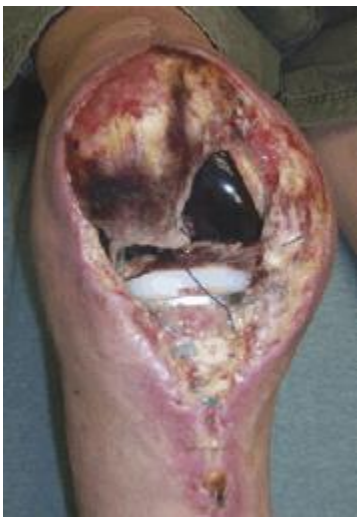

Fig. 1 Chronic MRSA periprosthetic total knee sepsis. Courtesy of Richard P. Evans, MD

The three most common procedures associated with MRSA infections are surgical treatment of skin/subcutaneous infection, the débridement of wound infection, and bone excision. Next to death, surgical site infection (SSI) remains the most unwanted postoperative complication, and yet it accounts for approximately one third of all hospital-acquired infections. More than 29 percent of SSIs are MRSA-positive. The most common method of contracting MRSA is direct skin-to-skin contact.

Definition

MRSA infections that are acquired by persons who have not been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as community-acquired MRSA (CA-MRSA) infections, according to the Centers for Disease Control and Prevention (CDC). Community outbreaks have been reported in sports teams, child care attendees, prison inmates, and diverse populations where habitation is relatively concentrated.

The CDC defines hospital-acquired MRSA (HA-MRSA) in persons who have had frequent or recent contact with hospitals or healthcare facilities (such as nursing homes or dialysis centers) within the previous year, have recently undergone an invasive medical procedure, or are immunocompromised.

Although HA-MRSA and CA-MRSA have distinct clinical differences, both are transmitted in the same fashion—most frequently through direct skin-to-skin contact or contact with shared items or surfaces (such as

towels or bandages) that have come into contact with someone else's colonized or infected skin. Currently, MRSA originates more frequently outside of the hospital, implying it is brought into the hospital upon admission as either the CA-MRSA or HA-MRSA genotype.

MRSA may be more easily transmitted when the following five Cs are present:

- Crowding
- Frequent skin-to-skin Contact
- Compromised skin (cuts or abrasions)
- Contaminated items and surfaces
- Lack of Cleanliness.

Locations where the five Cs are common include schools, dormitories, locker rooms, military barracks, households, correctional facilities, and daycare centers.

Prevalence of MRSA

The number of hospital admissions for MRSA has exploded in the past decade. By 2005, admissions were triple the number in 2000 and 10-fold higher than in 1995. In 2005 in the United States alone, 368,600 hospital admissions for MRSA—including 94,000 invasive infections—resulted in 18,650 deaths. The number of MRSA fatalities in 2005 surpassed the number of fatalities from hurricane Katrina and AIDS combined and is substantially higher than fatalities at the peak of the U. S. polio epidemic.

Currently, 85 percent of MRSA infections are healthcare associated; MRSA accounts for 60 percent of all staphylococcal infections. At least 58 percent of MRSA infections originate in the community but are healthcare associated. The death rate, length of stay, and cost of treating patients with MRSA are more than double other hospital admissions.

Clinical expression and successful treatment depends more on the genotype of the organism than its place of origin. CA-MRSA is clinically and biologically distinct from HA-MRSA. The epidemiology and incidence of each strain of MRSA is changing and has become a worldwide problem. Understanding differences of these two strains is required to effectively prevent, treat, and manage orthopaedic patients. Follow-up of discharged patients to measure MRSA cultures and sensitivities is more important than ever.

Efficacy of screening

Routine screening for MRSA upon hospital admission is controversial. Although the CDC does not recommend preadmission screening, a few states have called for universal patient screening, and some hospital systems have adopted it. Hospitals face an added financial risk in October when the Medicare and Medicaid health insurance programs will halt reimbursements for treating hospital-acquired infections and other "preventable" conditions.

Although some studies indicate that screening can help reduce the incidence of MRSA in hospital admissions, other studies do not support this conclusion. Data supporting preoperative decolonization in orthopaedic patients is also limited. Further studies will provide a better concept of how and which patients need to be screened and decolonized. Technological advances in screening, as well as prevention through vaccination, are being developed.

Impact on reimbursement

Reimbursement for treating nonsurgical hospital-acquired infections is being eliminated based on the presumption that the use of evidence-based guidelines can reduce these infections. Recently, legislative elimination of payment for treating hospital-acquired surgical site infections has also been proposed.

As MRSA spreads into hospitals from the community, current insurance company and proposed governmental policies that penalize the healthcare system may be inappropriate. It may be simplistic to ascribe responsibility of any MRSA infection to the environment or the providers where it occurred (either community or hospital). MRSA has evolved unpredictable resistance and epidemiology patterns in response to decades of successful antibiotic treatments that have been prescribed in all environments and have saved millions of lives.

MRSA is not a new clinical disease, but the incidence continues to grow at an alarming rate. The data clearly suggest that *S aureus* and MRSA should become a national priority for disease control. The more resistant vancomycin-intermediate-sensitive *S aureus* and vancomycin-resistant *S aureus* potentially loom as even greater problems. Only vigilant prevention and implementation of the most current treatment protocols will provide an increased margin of safety.

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