

MRSA: From the hospital and into the community

By Annie Hayashi

A more virulent form of these bacteria challenges the orthopaedic community

The death of Ricky Lannetti, a senior at Lycoming College and a wide receiver on the football team, in 2003 due to community-acquired methicillin resistant *Staphylococcus aureus* (CA-MRSA) marked a turning point in awareness about the disease.

“In the 1980s, we started hearing about ‘community-acquired MRSA,’” said Kathleen Weber, MD, MS, at the annual meeting of the American Orthopaedic Society of Sports Medicine.

“Young, healthy individuals without any co-morbid conditions or associations with a hospital-based facilities or nursing homes were developing this new form of MRSA.”



One of multiple MRSA cultured pustules surrounded by erythema in a Division I track and field athlete. Courtesy of Kathleen Weber, MD, MS

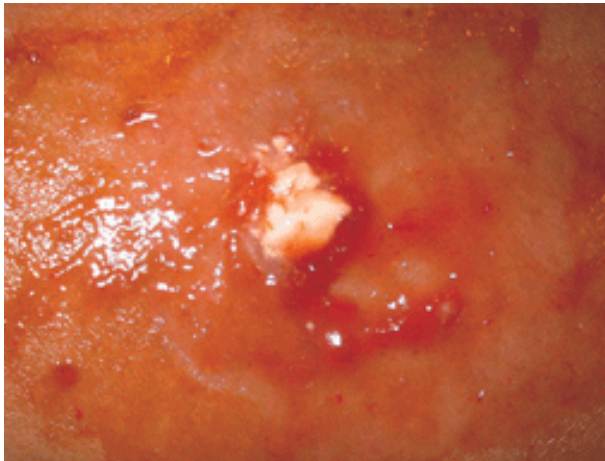
What is CA-MRSA?

CA-MRSA was first isolated in the state of Minnesota after necrotizing pneumonia was reported in a group of children. During the 1980s, cases were reported in Illinois, North Dakota, and Texas. Today, CA-MRSA is a worldwide problem, with increasing numbers of both hospital acquired-MRSA (HA-MRSA) and CA-MRSA being reported.

CA-MRSA usually starts as a mild, superficial infection of the skin—innocent-looking at the outset. In their initial stages, some forms of CA-MRSA can be successfully treated with antibiotics or incision and drainage.

But as it progresses, CA-MRSA can lead to life-threatening illness, including osteomyelitis, necrotizing pneumonia, or fasciitis and sepsis. The increased risk of CA-MRSA infection has been associated with the growing use of antibiotics to treat viruses, as well as with certain skin diseases, and crowded living conditions. Individuals living in certain geographic areas as well as certain indigenous populations appear to be a higher risk of developing CA-MRSA.

“We’re also seeing an increased incidence of CA-MRSA in the following populations: athletes who participate in competitive sports, prison inmates, children in day care centers, military personnel, homeless people, men who have sex with men, intravenous drug users, and individuals who come into physical contact with draining lesions,” Dr. Weber explained.



Incision and drainage of a MRSA cultured abscess. Courtesy of Kathleen Weber, MD, MS

How do the two types differ?

Although both CA-MRSA and HA-MRSA are resistant to methicillin and other β -lactam antibiotics, differences exist between the two strains. CA-MRSA, for example, has a unique, particular gene sequence—*mecA* gene—that is especially resistant to β -lactam antibiotics.

According to Dr. Weber, CA-MRSA strains typically carry the *mecA* gene on a mobile genetic unit called the “staphylococcal chromosomal cassette,” which encodes for a methicillin-resistant penicillin-binding protein. This genetic unit enhances CA-MRSA to microbial resistance.

“These community-acquired strains seem to transmit resistance between organisms, which may account for the rapidly increasing number of CA-MRSA infections that we are seeing,” she said.

CA-MRSA also contains “a cytotoxin that likely enhances tissue necrosis, which is not typical of HA-MRSA,” Dr. Weber noted. “This cytotoxin can actually drill holes into the leukocytes and destroy them. It can cause the necrotizing fasciitis, the pustules, and the different types of skin infections that we see.

“In any given community, more than 50 percent of skin infections are now CA-MRSA-related,” she continued. “In some communities, almost 80 percent of the skin infections seen in the emergency department are due to CA-MRSA.”

Treating CA-MRSA

According to Dr. Weber, many antibiotics—including cephalosporins and fluoroquinolones—are

losing their effectiveness against MRSA. “Minacycline and docacycline may be good choices but it’s very important to know the resistance patterns in your community to various antibiotics,” she said.

“The key to treating MRSA is early identification and treatment,” stated Dr. Weber. “Whenever a patient has a skin or a soft tissue infection, MRSA should be at the top of the differential diagnosis list. If the infection does not respond to the selected antibiotic, consider a diagnosis of MRSA.

“Culture anything that has pustules or is draining. This will help guide the choice of antibiotic and help monitor the prevalence of MRSA,” she emphasized.

Team physicians and others who treat athletes should take preventive measures in the locker room and off the field to reduce the risk of MRSA. (See “Preventing MRSA in the Locker Room” below.)

“Good communication is extremely important. Everyone has to be on the same page—not only the team physician but also the coaching staff and the athletes,” she said.

Surgical considerations

“With the increase in cases of MRSA, orthopaedic surgeons must be concerned about the risk of surgical infections,” said Dr. Weber.

“Individuals who are colonized with *S. aureus*—25 percent to 30 percent of the population and 1 percent with MRSA—are at increased risk of infection during surgical procedures. Much of the current research is focused on decolonization to decrease the risk of infection.

“We are looking for the perfect decolonization agent—one that can decolonize and prevent recolonization. Unfortunately, we don’t yet have that type of agent,” she continued.

“Treatment of surgical patients is controversial because we don’t have the perfect formula. If preoperative decolonization treatment is being considered, I would definitely advise working with and getting help from the infectious disease department to choose the proper protocol,” Dr. Weber concluded.

Kathleen Weber, MD, MS, serves as a team physician for the Chicago Bulls and the Chicago White Sox. Dr. Weber practices non-operative orthopaedics at Midwest Orthopaedics and is director of primary care sports medicine and women’s sports medicine at Rush University Medical Center. She is a nationally recognized authority on MRSA.

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Preventing MRSA in the Locker Room

To help reduce the spread of community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA), orthopaedic surgeons should take the following steps:

- Educate coaches, staff, athletes and parents about how they can prevent MRSA.
- Encourage hand washing. Make sure that hand gels are always available.
- Encourage the use of soap dispensers rather than bar soap. Fill the dispensers with anti-MRSA soaps, such as chlorhexidine or Hibiclins.

- Do not allow the sharing of personal items. Towels, water bottles and other personal items should not be shared. Each player should have his/her own towel and water bottle.
- Require athletes to shower with soap immediately after workouts. Stress this step with high school athletes who prefer a quick shower and "towel off."
- Ensure that whirlpools, hot tubs, showers, and exercise equipment are regularly disinfected.
- Encourage use of a hot dryer, rather than air-drying clothes. Some teams avoid using dryers so uniforms don't shrink. Hot dryers, however, will kill bacteria.
- Practice proper wound care. If a patient participates in a contact sport, the wound must be "properly covered." The National Collegiate Athletic Association (NCAA) defines "properly covered" as covering the skin infection by a securely attached bandage or dressing that will contain all drainage and will remain intact throughout the sports activity. If the wound cannot be properly covered, then the athlete cannot participate in games or practices.
- Use antibiotics appropriately. If a patient's MRSA infection is not resolving with antibiotics, make sure that patient has taken the entire prescribed amount of antibiotics.

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