

Methicillin-Resistant Staphylococcus Aureus

Adam Hersh, MD, PhD and Erica Pan, MD, MPH

Introduction

Community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) has caused an epidemic of skin and soft-tissue infections (SSTIs) among children in the United States. Recent nationally representative studies demonstrate that CA-MRSA has impacted the epidemiology of SSTIs by both changing the bacteriology and incidence. CA-MRSA has replaced methicillin-sensitive *Staphylococcus aureus* (MSSA) as the leading cause of SSTIs, accounting for the majority of infections in most communities.¹ Further, the rate of ambulatory visits among children with SSTIs has tripled in recent years.²

Bacteriology/Epidemiology

CA-MRSA is traditionally distinguished from hospital-acquired MRSA in several ways. It predominantly affects patients in community rather than hospital settings, is typically susceptible to multiple antibiotic classes and SSTIs are the most common clinical manifestation. However, as the prevalence of CA-MRSA increases, it is also becoming an important cause of nosocomial infections. USA300 is the predominant CA-MRSA strain in the United States.¹ Outbreaks and clusters have occurred which indicate certain risk factors including skin-to-skin contact, compromised skin surfaces, crowded living conditions and poor hygiene. However, most infections occur among healthy children with no identifiable risk factors.

Clinical Manifestations

The most common clinical manifestation of CA-MRSA is SSTI.³ More specifically, there is a strong propensity for the forma-

tion of purulent abscesses. Other common cutaneous manifestations include furuncles/carbuncles and pustules; many patients initially present with what they describe as a “spider bite.” Other important non-SSTI manifestations include osteomyelitis, septic arthritis, necrotizing pneumonia (including severe pneumonia or ARDS with influenza co-infection) and sepsis.

Management

The primary treatment for simple abscesses (regardless of etiology) is incision and drainage (I&D) and purulent material should be sent for culture. If the abscess is not initially amenable to drainage, warm

ommended to include empiric coverage for CA-MRSA (see table). When cellulitis is also a significant component (with or without abscess), antibiotic therapy should also include coverage for Group A *Streptococcus*. Once culture results are available, if MSSA is recovered, a beta-lactam antibiotic such as cephalexin or dicloxacillin is preferable.

Recurrent Infection And Role Of Decolonization

Evidence supports colonization as a risk factor for development of SSTIs.⁶ Colonization may be especially important among patients who experience recurrent

Most infections occur among healthy children with no identifiable risk factors.

baths or soaks are helpful to promote maturation. When an adequate I&D procedure cannot be performed in the office setting, referral to an appropriate setting (e.g. emergency department, surgeon, wound clinic) should occur promptly. The initiation of antibiotics should not delay I&D.

Although antibiotics are routinely prescribed for SSTIs, for patients with adequately drained purulent abscesses and no systemic symptoms, antibiotics may not add significant additional benefit, especially if follow-up can be ensured. This has been demonstrated among adults in a randomized-controlled trial⁴ and is suggested by multiple observational studies.^{1,3,5} A multi-center study including pediatric patients is underway. When antibiotics are prescribed for purulent abscesses, it is rec-

infections. Attempts to eradicate intranasal colonization with mupirocin can be considered among patients and family members who experience recurrent infections. Other interventions include the use of bleach baths to reduce skin colonization. It is reasonable to counsel families that these interventions may decrease the frequency of recurrences, however, the benefit remains uncertain.

Preventive Measures

Infection with CA-MRSA can be transmitted by direct skin contact between individuals or through contact with an infected surface. Important preventive measures include hand washing, showering or bathing, laundering clothes and towels, not sharing personal items such as

Drug	Dose	Advantages	Disadvantages
Clindamycin	30mg/kg/day divided TID	Includes GAS activity	Potential for resistance Taste <i>C. Difficile</i> risk
TMP/SMZ	Trimethoprim 8-12mg/kg/day Sulfamethoxazole 40-60mg/kg/day Divided bid	BID dosing Low resistance	Unreliable for GAS
Doxycycline	2-4mg/kg/day divided bid	BID dosing Low resistance	Only for >8 yrs old Unreliable for GAS

**In addition to activity against CA-MRSA, all of the above have activity against MSSA.*

towels, razors or athletic equipment and covering wounds/sores. There is no need to exclude patients with CA-MRSA from school or other settings as long as wounds are adequately covered.

State Reporting

As of 2/13/08, “severe” *S. aureus* infection in a “previously healthy person” is immediately reportable from healthcare providers to local health departments in California. “Severe” is defined as a case resulting in ICU admission or death. “Previously healthy” is defined as a person who has not been hospitalized or had surgery, dialysis, or residency in a long-term care facility in the past year, and did not have an indwelling catheter or percutaneous medical device at the time of culture.

USEFUL WEBSITES

<http://www.lapublichealth.org/acd/MRSA.htm>

<http://www.sfdcp.org/mrsa.cfm>

<http://www.cdph.ca.gov/HealthInfo/discond/Pages/MRSA.aspx>

http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_clinicians.html

http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_skin.html

REFERENCES:

1. Moran GJ, Krishnadasan A, Gorwitz RJ, et al. Methicillin-resistant *S. aureus* infections among patients in the emergency department. *N Engl J Med* 2006;355:666-74
2. Hersh AL, Chambers HF, Maselli JJ, Gonzales R. National trends in ambulatory visits and antibiotic prescribing for skin and soft-tissue infections. *Arch Intern Med*. In Press.
3. Fridkin SK, Hageman JC, Morrison M, et al. Methicillin-resistant *Staphylococcus aureus* disease in three communities. *N Engl J Med* 2005;352:1436-44
4. Rajendran PM, Young D, Maurer T, et al. Randomized, Double-Blind, Placebo-Controlled Trial of Cephalexin for Treatment of Uncomplicated Skin Abscesses in a Population at Risk for Community Methicillin-Resistant *Staphylococcus aureus* Infection. *Antimicrob Agents Chemother* 2007
5. Lee MC, Rios AM, Aten MF, et al. Management and outcome of children with skin and soft tissue abscesses caused by community-acquired methicillin-resistant *Staphylococcus aureus*. *Pediatr Infect Dis J* 2004;23:123-7
6. Ellis MW, Hospenthal DR, Dooley DP, Gray PJ and Murray CK. Natural history of community-acquired methicillin-resistant *Staphylococcus aureus* colonization and infection in soldiers. *Clin Infect Dis* 2004;39:971-9

Report on the Medical Leadership Council on Cultural Proficiency



Elliot Weinstein, MD

The Medical Leadership Council (MLC) is a collaborative group sponsored by the California Academy of Family Physicians and supported by a grant from the California Endowment. The council meets each year in Los Angeles and Sacramento. The members of the council include medical societies (e.g., Los Angeles County Medical Association, San Bernardino County Medical Society, California Medical Association, etc.), specialty societies (e.g., American Academy of Pediatrics, American Academy of Family Physicians, American College of Obstetrics and Gynecologists, etc.), hospital systems (e.g., Kaiser Permanente, Catholic Healthcare West, etc.) and many cultural, health advocate, ethnic and other interested parties. The MLC is dedicated to removing the cultural and language barriers to healthcare that exist in the medical field.

As a representative of the American Academy of Pediatrics, California District IX (AAP-CA), I present the issues to the group that may concern both our constituencies: our pediatric aged patients and our physician members. Additionally, the Executive Director of AAP-CA, Kris Calvin is a representative as well.

The most recent meeting was held at the Sheraton Grand Hotel in Sacramento on November 28, 2007. The event was well attended and a number of presentations were made to highlight the current status of the states' healthcare system. First, an update on various health reform proposals was presented. Included in this update was the California Pan Ethnic Health Network summary of the three proposals, Nunes/Perata (Assembly Bill 8), Schwarzenegger and Kuehl (Senate Bill 840). There were a number of similarities between the various plans, but the main differences were in how the financing would be implemented. Concerns were voiced about the individual mandate, affordability and financing provisions in Assembly Bill x1 1 (Nunez/Perata), a late proposal being brought up in the assembly.

Discussion continued about the need for diversity in the physician work force in the future. It was noted that the new medical school at UC Riverside is to be dedicated in part to fulfilling that need. The officers and other individuals (including myself) of AAP-CA Chapter 2 recently met with the organization committee of UCR medical school to discuss our involvement in the development of pediatrics in the program.

Another update at the meeting was presented by Lupe Alonzo-Diaz, which dealt with various means of reimbursement for language access services. The report mentioned how such activity has been accomplished in the few states that currently fund reimbursement. There are four models of how this is done, but none will work for a state the size and complexity of California. Therefore a hybrid model was discussed as a possibility.

Distributed at the meeting were examples of some useful new booklets available from the Medi-Cal Managed Care and Healthy Families Programs in the Oakland area. These contain contact numbers and services available for the members who need it in Spanish, Vietnamese, Chinese Mandarin, and Korean. Another excellent resource distributed at the meeting was the booklet, Addressing Language and Culture: A Practice Assessment for Health Care Professionals. This is available from the CAFPP Foundation, at www.familydocs.org.