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SPECIAL POINTS OF INTEREST

MRSA infections are frequently confused with spider bites

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MRSA infections present unique treatment challenges, whether the patient acquires the infection in the hospital or the community setting.

Methicillin Resistant *Staphylococcus aureus* Infections

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a type of bacteria that is resistant to certain antibiotics. These antibiotics include methicillin and other more common antibiotics such as oxacillin, penicillin and amoxicillin. MRSA was first isolated in the United States in 1968. By the early 1990s, MRSA accounted for 20%-25% of *Staphylococcus aureus* isolates from hospitalized patients. In 1999, MRSA accounted for over 50% of *S. aureus* isolates from patients in ICUs in the National Nosocomial Infection Surveillance (NNIS) system; by 2003 that figure had increased to almost 60%.

Staph infections, including MRSA, occur most frequently among persons in hospitals and healthcare facilities (such as nursing homes and dialysis centers) who have weakened immune systems. However, the incidence of MRSA infection in the community has recently increased. About 14% of MRSA infections now occur in persons without obvious exposures to healthcare. About 85% of all invasive MRSA infections are associated with healthcare, and of those, about two-thirds occur outside of the hospital, while about one third occur during hospitalization.

It is very important to prevent, identify and treat all infections appropriately. MRSA infections present some unique challenges, including:

1. **Pathogenicity.** MRSA has many virulence factors that enable it to cause disease in normal hosts. For example, MRSA is a frequent cause of healthcare-associated bloodstream and catheter-related infections.
2. **Limited treatment options.** Many of the older antibiotics are no longer effective against MRSA. Vancomycin and newer antimicrobials such as linezolid (Zyvox[®]), daptomycin (Cubicin[®]), tigecycline (Tygacil[®]) and quinupristin-dalfopristin (Synercid[®]) are among the drugs that are currently used for treatment of severe healthcare-associated MRSA infections. Although some MRSA strains remain susceptible to trimethoprim-sulfamethoxazole, gentamicin, or rifampin, these drugs are not typically used as first-line agents.
3. **MRSA is transmissible.** An MRSA outbreak can occur when one strain is transmitted to other patients or to close contacts of the infected person(s) in the community. Often this occurs when a patient or health-care worker is colonized with MRSA (i.e., carries the organism but shows no clinical signs or symptoms of infection) and, through contact, the organism is spread to another person. Proper hand washing and other Standard Precautions are very important in preventing the spread of MRSA.

Community-Acquired MRSA (CA-MRSA)

Community-acquired MRSA (CA-MRSA) refers to an MRSA infection with onset in the community in an individual lacking established MRSA risk factors, such as recent hospitalization, surgery, residence in a long-term care facility, receipt of dialysis, or presence of invasive medical devices. Staph or MRSA infections in the community are usually manifested as skin and soft tissue infections (SSTIs), specifically furuncles (abscessed hair follicles or "boils"), carbuncles (coalesced masses of furuncles), and abscesses, and they occur in otherwise healthy people.

MRSA skin lesions are frequently confused with spider bites by both patients and



clinicians, even in areas of the country where spiders capable of causing necrotic skin lesions are not endemic. The spontaneous appearance of a raised red lesion might lead to this supposition among patients, while the tendency for lesions to develop necrotic areas might confuse clinicians. The role of MRSA in cellulitis without abscess or purulent drainage is less clear since cultures are rarely obtained. The severity of MRSA SSTIs varies from mild superficial infections to deeper soft-tissue abscesses that require hospital admission for surgical incision and drainage and treatment with parenteral antibiotics. Anecdotal reports suggest that recurrent MRSA skin infections and clustering of infections within a household are relatively common occurrences.

Less commonly, MRSA has been associated with severe and invasive staphylococcal infections in the community, including necrotizing pneumonia and empyema, sepsis syndrome, musculoskeletal infections including pyomyositis and osteomyelitis, necrotizing fasciitis, purpura fulminans, and disseminated infections with septic emboli. Invasive manifestations occur as complications of preceding SSTIs or viral respiratory tract infections (particularly influenza), as well as in otherwise healthy persons without recognized preceding infections or risk factors.

The incidence of CA-MRSA varies geographically in the United States. To date, reported CA-MRSA infections have disproportionately affected children and young adults and individuals from racial minority groups or low socio-economic status. Factors that can assist in the spread of infection include crowding, frequent skin-to-skin contact between individuals, participation in activities that result in compromised skin surfaces, sharing of personal items that may become contaminated with wound drainage, and challenges in maintaining personal cleanliness and hygiene. Limited access to health care and frequent antibiotic exposure may also facilitate spread of infection in some settings. While outbreaks have frequently been reported among members of defined groups, most patients did not have recognized CA-MRSA or HA-MRSA risk factors and were not linked to an outbreak.

Healthcare-associated MRSA

Methicillin-resistant *Staphylococcus aureus* (MRSA) has been a prevalent nosocomial pathogen in the United States for some time. In hospitals, the most important reservoirs of MRSA are infected or colonized patients. Although hospital staff can serve as reservoirs for MRSA and may harbor the organism for many months, personnel have been more commonly identified as a link for transmission between colonized or infected patients to other patients. The main mode of transmission of MRSA is by the hands (especially health care workers' hands) which may become contaminated by contact with:

- a) Colonized or infected patients,
- b) Colonized or infected body sites of the personnel themselves, or
- c) Devices, items, or environmental surfaces contaminated with body fluids containing MRSA.

Standard Precautions, as described in the CDC "Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007" should control the spread of MRSA in most instances. Additional measures for preventing the spread of MRSA are described in "Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006". These documents can be found on the CDC website listed in the first reference.

Treatment of MRSA Infections – Oral and Intravenous Drug Options

Oral antibiotics (trimethoprim-sulfamethoxazole, clindamycin, doxycycline, minocycline, linezolid) may be effective in treating mild to moderate MRSA infections. More serious infections may require the use of intravenous antibiotics. Depending on the organism's susceptibility profile, the site of the infection and the patient's other medical conditions, one of the following IV antibiotics may be appropriate: vancomycin, linezolid, daptomycin, tigecycline, or quinupristin-dalfopristin. These drugs can be infused at home in patients whose condition has stabilized, and when home infusion services are available and appropriate.

References:

1. CDC website on Information About MRSA for Healthcare Personnel, including CDC Fact Sheets and http://www.cdc.gov/ncidod/dhqp/ar_mrsa_healthcareFS.html and <http://www.cdc.gov/ncidod/dhqp/ar.html>, etc.
2. Summary of an experts' meeting convened by the Centers for Disease Control and Prevention. 2006. Available at http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html.
3. Healthcare Infection Control Practices Advisory Committee. Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006, available at <http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf>.