

MRSA Update

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Staphylococcus aureus (*S. aureus*) is a gram positive bacterium that causes a variety of diseases. These include skin and soft tissue infections, endocarditis, blood stream infections, pneumonia, and deep-seated abscesses. *Staphylococcus aureus* also causes osteomyelitis, surgical wound infections, toxic shock syndrome, and food poisoning.^{1,2}

It has become the most frequent cause of these infections seen in emergency room departments across the United States.³ Methicillin-resistant *Staphylococcus aureus* (MRSA) has emerged over the past 50 years as an important pathogen, particularly in the health care setting, and the prevalence of this disease-causing bacteria is increasing.

Methicillin is a penicillinase-resistant semi-synthetic penicillin that was introduced in 1959. By 1961 methicillin-resistant strains were first described in England. While initially a hospital-based pathogen, MRSA has evolved through numerous major lineage changes to now include a community-based component.^{4,5} The first community-acquired outbreak of MRSA (CAMRSA) occurred in 1982; documented in an intravenous drug user in Detroit, Michigan.⁶ Since then, CAMRSA has reached epidemic proportions.^{7,8,9} MRSA/CAMRSA is important to recognize early, as it is a virulent pathogen that often produces rapidly progressive disease and is often resistant to other commonly used antibiotics.

Epidemiology of CAMRSA infections has indicated that certain predisposing factors do exist. These include dialysis, immunosuppression, foley catheter or nasogastric tube placement, intravenous drug use, chronic disease, diabetes, and parental nutrition, all of which predispose to more severe cases of MRSA. The predisposing factors for less severe cases of CAMRSA include environmental exposure at day care centers, prisons, or long term care facilities; recent hospitalization; internal medical device usage; prolonged antibiotic therapy; and participation on sports teams.^{10, 11, 12, 13, 14} Clinical manifestations of CAMRSA include, abscess formation, cellulitis, impetigo, folliculitis, ulcer, and paronychia. CAMRSA may be mistaken for a spider bite, which behooves the clinician to be very careful in making the distinction.¹⁵

The most practical approach for making a diagnosis is to perform a culture on a suspected lesion with susceptibility testing of the isolate. A local anabiogram (ie, a record of the susceptibility testing of local isolates) may help guide testing, until culture and susceptibility testing results become available. When severe infections such as sepsis, arthritis, or pneumonia are suspected to be due to CAMRSA, then fluids from abscesses, respiratory secretions, or bone or joint spaces may need to be evaluated, in conjunction with blood cultures.¹⁶

The two main standards for testing are 1) a broth microdilution minimum inhibitory concentration test and 2) an cefoxitin disk diffusion test. Oxacillin was long used as a gold standard, but it is no longer used since results with cefoxitin are easier to interpret yielding a higher sensitivity.¹⁶

Molecular testing is also becoming more prevalent. MRSA has a *mecA* gene, which susceptible strains do not possess. Polymerase Chain Reaction (PCR) has been used to detect isolates from clinical specimens within a few hours.¹⁷

Consultation and treatment by an experienced physician in infectious diseases are often warranted. Although there are numerous antibiotics available to the clinician, few drugs remain to treat patients with infections caused by MRSA/CAMRSA. There are multiple oral and intravenous (IV) drugs that are appropriate for treatment. As with all medication, each drug has advantages and disadvantages that must be considered prior to treatment. Initial coverage with oral agents, which are appropriate for non-complicated disease, may prove effective in eradicating the infection and prevent patients from dealing with the more severe side effects and the higher cost of IV drug treatments.

References

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