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Disclosure: Jennifer Garcia has disclosed no relevant financial relationships.

From Medscape Medical News

MRSA: Vanco Susceptibility Doesn't Accurately Predict Death

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June 13, 2012 — Among patients with methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, vancomycin susceptibility is not as significant a factor in predicting risk for death as are advanced age, living in a nursing home, severity of bacteremia, and impaired organ function.

In the current study, [published online](#) June 13 in *Emerging Infectious Diseases*, Mina Pastagia, MD, from the Rockefeller University, New York, New York, and colleagues, retrospectively examined data from 699 episodes of MRSA bacteremia involving 603 patients. The researchers found that the 90-day all-cause mortality rate was 31.5% for the 603 patients and that the MRSA strain type was not associated with risk for death.

Residence in a nursing home, older age, severe bacteremia, and organ dysfunction (such as cirrhosis or renal impairment) were independently associated with an increased risk for death, and each factor increased the risk for death by 4% to 15%. Consultation with an infectious disease specialist, on the other hand, decreased the risk for death by 11%. The researchers also found that patients with diabetes mellitus actually had a lower risk for death.

"The idealized model for the treatment of patients with infectious diseases incorporates the triad of host, organism, and drug. Organisms and drugs are more easily classified and hence more accessible for systematic study," write Dr. Pastagia and colleagues. "Our study of the 5-year experience with MRSA infections in adults at a major New York City medical center illustrates why such a dyadic approach might be insufficient."

Assessing Risk Beyond the MIC

Patients included in the analysis were admitted between 2002 and 2007 to an academic medical center in New York City. Researchers compared demographic and clinical characteristics of adult patients with MRSA bacteremia, which included concurrent illnesses, place of residence before hospitalization (facility vs community), the severity of bacteremia, and previous healthcare exposures.

MRSA infections were classified as vancomycin susceptible, vancomycin intermediate *S aureus* (VISA), or heteroresistant vancomycin intermediate *S aureus* (hVISA). The vancomycin minimum inhibitory concentrations (MICs) were 2 µg/mL or less for all isolates, and some isolates were sent to an outside laboratory for blinded testing and retesting. No discrepancies were noted between in-house and outside testing.

The researchers found that patients with VISA were more likely to have had a recent vancomycin exposure (62%; 95% confidence interval [CI], 47.7% - 65.3%) than patients with hVISA (42%; 95% CI, 29.4% - 59%) or other MRSA strains (47%; 95% CI, 41.3% - 49.7%).

The researchers found that in a subanalysis of vancomycin MICs among patients who died in the hospital, the mean MIC was 1.7 µg/mL; the current breakpoint for vancomycin susceptibility is 2 µg/mL. This finding supports findings from several other studies that vancomycin MIC is not an accurate predictor of death.

"Our findings can help clinicians estimate the risk that a patient with MRSA bacteremia will die. For example, an elderly patient with liver cirrhosis and MRSA bacteremia who lived in a nursing home before hospital admission would have an extremely poor prognosis. Conversely, an otherwise healthy patient with diabetes mellitus might have a better prognosis that could be improved even more by consultation with an infectious disease specialist," the study authors write.

Study limitations include the retrospective design, focus on a single academic institution, and derivation of MICs from microdilution.

Individualized Treatment Is Key

In an interview with *Medscape Medical News*, William R. Jarvis, MD, from Jason and Jarvis Associates, an infectious disease consulting firm, said, "This study shows that vancomycin susceptibility is not a significant factor when appropriate antimicrobials are used for treatment. [The] study emphasizes the importance of underlying diseases and shows that we should be individualizing the treatment of patients depending upon their age and underlying diseases."

"This study again documents that healthcare-associated MRSA infections are a major cause of morbidity and mortality. This may lead to the more rapid assessment and implementation of appropriate therapy for patients with MRSA [bloodstream infections] and to lead to individualization of treatment for those with specific underlying conditions, particularly renal and liver disease," said Dr. Jarvis.

Funding for this study was provided in part by a grant from Cubist Pharmaceuticals for reagent material and travel for presentations. Certain isolates used in the trial were obtained from the Network of Antimicrobial Resistance in Staphylococcus aureus program, supported by the National Institutes of Health/National Institute of Allergy and Infectious Diseases. The study authors and independent commentator have disclosed no relevant financial relationships.

Emerg Infect Dis. Published online June 13, 2012. [Full text](#)

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