

Increased Prevalence of Community-Acquired Methicillin-Resistant *Staphylococcus aureus* in Hand Infections at an Urban Medical Center

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Dr. Mitra and colleagues present a retrospective analysis of a single institution's 21-month experience with hand and wrist infections. Culture results demonstrate a significant increase in prevalence of community-acquired methicillin-resistant *Staphylococcus aureus*. An algorithm is presented that represents a change in management to include the early use of an antibiotic regimen with empiric methicillin-resistant *S. aureus* coverage.

The emergence of methicillin-resistant *S. aureus* as a widespread pathogen has been well documented in the medical and surgical literature.¹⁻⁴ Only within the past decade has its importance in complex infections of the hand and upper extremity been described. In response to a perceived rise within their urban center, the authors examined their experience with hand infections and found community-acquired methicillin-resistant *S. aureus* to be associated with 23 percent ($n = 75$) of 343 patients. To our knowledge, the authors report the largest volume of methicillin-resistant *S. aureus*-associated hand infections in the current literature, underscoring its mounting prevalence.

These authors arbitrarily divide the study duration into three 7-month periods and have shown a statistically significant increase in community-acquired methicillin-resistant *S. aureus* hand infections, from 14 to 40 percent. The underlying reason for this increase is not completely explored, however. As cited in the text, many demographic risk factors have been associated with a higher incidence of community-acquired methicillin-resistant *S. aureus*. A demographic analysis is presented that specifically looks at changes in age and sex by 7-month period. The authors did not find any statistical significance in this regard, which is not entirely

surprising given that age and sex, in and of themselves, are not risk factors for community-acquired methicillin-resistant *S. aureus*. An interesting addition to this article would have been an analysis of the demographic patterns by period, using chi-square testing to determine the statistical significance. The increase in the incidence of community-acquired methicillin-resistant *S. aureus* in the last 7-month period may have been due to a change in the demographics of the patients seen at this urban center, potentially favoring known subpopulations more likely to harbor community-acquired methicillin-resistant *S. aureus*. However, this remains unresolved in the article. Clearly, *something* must have happened, given that the incidence was exactly the same in the first two periods (14 percent and 14 percent, respectively) and then jumped to 40 percent in the third period.

Other literature has suggested that the prevalence of community-acquired methicillin-resistant *S. aureus* infections among patients without any predisposing risk factors is increasing.^{1,2} Perhaps this rise instead simply reflects a change in community-wide resistance patterns. A decrease in the prevalence of methicillin-sensitive *S. aureus* would be expected to parallel the emergence of community-acquired methicillin-resistant *S. aureus* in this situation. It would be beneficial to the reader if these data were presented in the article as well.

We have performed a similar retrospective analysis of culture results obtained from hand infection patients at Parkland Memorial Hospital in Dallas, Texas, from 2001 to 2003, and our article has been accepted for publication by this same *Journal*. This urban medical center serves a largely indigent population, similar to the population treated at the Temple University Hospital. Culture results were available for more than 400 patients in the 3-year period studied. Our analysis demonstrated a similar rise in prevalence of methicillin-resistant *S. aureus*, which nearly doubled and reached 61 percent in 2003.⁵ The prevalence of methicillin-sensitive *S. aureus* declined proportionately over this time period, likely representing increasing community-

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wide resistance patterns. In our experience, the community-acquired methicillin-resistant *S. aureus* isolates demonstrated susceptibility to many intravenous and oral broad-spectrum antibiotics, including gentamicin, rifampin, trimethoprim/sulfamethoxazole, tetracycline, and levofloxacin. Unfortunately, resistance patterns in our analysis continue to evolve, and there are rising patterns of intermediate and complete resistance to these antimicrobials.

The increasing incidence of community-acquired methicillin-resistant *S. aureus* is clinically relevant. In case-control analysis for matched infections of methicillin-resistant and methicillin-sensitive *S. aureus*, patients with methicillin-resistant infections had worse clinical and economic outcomes.⁶ Infections have also been shown to prolong hospitalizations and increase medical costs.⁷

Because of this pertinence, several issues merit special consideration. First, obtaining aerobic and anaerobic cultures in hand infection patients needs to become the standard of care. Rising and quickly adapting resistance patterns require the development of institution-specific, community-specific, and perhaps even demographic-specific “antibiograms” to most appropriately guide therapy. As an example, Dr. Mitra and his colleagues report the empiric use of clindamycin, but do caution against overuse. We echo and emphasize the importance of this. At our urban institution, we noticed a rapid development of clindamycin resistance. In fact, resistance has become so prevalent that our laboratory discontinued routine testing of clindamycin susceptibility in 2002. Methicillin-resistant *S. aureus* isolates can be induced to develop clindamycin resistance by exposure to various antibiotics, and inducible resistance to clindamycin has been prevalent in the Dallas urban community since 1999.⁸ We would expect the experiences of other urban centers to parallel our own, and therefore discourage inclusion of this antibiotic as part of an empiric treatment regimen.

Next, we agree that traditional management practices should be altered to reflect the rising prevalence of community-acquired methicillin-resistant *S. aureus* in hand infections. Adequate and early surgical drainage is essential to proper treatment, and this may be all that is required for simple subcutaneous abscesses.⁹ For complex hand infections, however, we believe that wide surgical drainage should be coupled with early use of antibiotics that empirically treat community-acquired methicillin-resistant *S. aureus*. It must be stressed that such algorithms are *not* readily transferable.

Instead, antimicrobial therapy must be carefully selected and frequently reevaluated to match the population being treated. Global application of these urban center protocols will simply boost the emergence of multidrug-resistant bacteria and contribute to the larger, ongoing crisis of antimicrobial inadequacy.

Finally, retrospective analysis of historical data and culture results is an imperfect method for determining whether a strain of methicillin-resistant *S. aureus* is community acquired or healthcare associated. Electrophoresis¹⁰ and exotoxin analysis¹¹ are superior but, of course, more expensive options. We applaud the efforts of these authors and certainly recognize these limitations as we performed our own similar retrospective analysis, as briefly described above.

In 2005, we began enrolling all patients with complex hand infections in a prospective randomized control trial. Patients were randomized at admission to receive empiric treatment with either a methicillin-resistant *S. aureus*-specific agent or a traditional antimicrobial. Prospective demographic information and detailed microbiology data are being recorded to overcome limitations of a retrospective approach. The outcomes of this trial will answer whether early, empiric methicillin-resistant *S. aureus* treatment will reduce the length of hospital stays, reduce costs, and ultimately improve patient care. Potentially, results will also identify those patients most likely to harbor community-acquired methicillin-resistant *S. aureus* and therefore be most likely to benefit from this protocol. In the meantime, we welcome this valuable addition to the literature and commend the authors on their efforts to bring a growing problem to light.

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