Comparative Evaluation of the Antimicrobial Susceptibility Patterns of Community- and Hospital-Acquired Methicillin-Resistant Staphylococcus aureus (MRSA) from the United States: Results from the Cefaroline Surveillance Program (AWARE 2012-2014)

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The term community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA) and hospital-acquired MRSA (HA-MRSA) has been used to describe differences in antimicrobial resistance patterns among methicillin-resistant Staphylococcus aureus isolates obtained from patients with skin and skin structure infections (SSTIs) and bloodstream infections (BSIs), respectively. CA-MRSA isolates are also generally considered to be more resistant to the glycopeptides. However, many of these isolates also exhibit increased resistance to other classes of antimicrobials, including quinolones and tetracyclines. The present study was designed to establish the baseline and track post-approval of the community and hospital isolates from the CA-MRSA and HA-MRSA categories.

Methods

Organisms Collected: Bacterial isolates were collected as part of the AWARE program, which was designed to establish the baseline and track post-approval of the community and hospital isolates from the CA-MRSA and HA-MRSA categories. A total of 9,870 CA-MRSA isolates were collected from 231 centers in the United States and tested for antimicrobial susceptibility. Of these, 9,560 were collected at community-based patient care sites and 310 were collected from hospital-based patient care sites. The isolate collection began in November 2012 and ended in October 2014. The isolates were collected from patients with SSTIs and BSIs.

Results

The CA-MRSA isolates were more resistant to tetracycline (95.0%) and quinolones (97.9%) than the HA-MRSA isolates (92.3% and 94.3%, respectively). The CA-MRSA isolates were also more susceptible to ceftaroline, clindamycin, and levofloxacin than the HA-MRSA isolates (98.3%, 97.9%, and 94.3%, respectively).

Conclusions

Cefaroline exhibited potent in vitro activity against CA-MRSA compared to CA-MRSA and HA-MRSA, and exhibited potent in vitro activity against CA-MRSA compared to CA-MRSA and HA-MRSA.

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References

5. Hinton R, Jones RN. JONES JMI Laboratories. Helio S. Sader, M.D., Ph.D. helio.sader@jmilabs.com JMI Laboratories, North Liberty, Iowa, USA.
6. MALDI-TOF using the Bruker Daltonics MALTOF platform (Bruker, Billerica, Massachusetts, USA), necessary. Several methods were used to differentiate CA-MRSA and HA-MRSA isolates. These methods included PCR, sequencing, and Western blotting. The results of these methods were used to determine the presence of the mecA and mecB genes, which are responsible for the production of the MRSA phenotype. The mecA gene is present in CA-MRSA isolates and the mecB gene is present in HA-MRSA isolates.

S. aureus from hospitals in the United States and tested for antimicrobial susceptibility. These definitions are based on various factors, including (i) the infection setting in which the MRSA infection begins, (ii) current or prior patient exposure to health care settings, (iii) genetic characteristics and antimicrobial susceptibility profiles of the causative organisms, and (iv) the infection type. These definitions are used to call the GMT of the different antimicrobial susceptibility patterns and have been historically reported.

The methods of this study were approved by the Institutional Biosafety Committee at JMI Laboratories. The study was supported by the Celoquin® (ceftaroline furoate) Network at the Centers for Disease Control and Prevention, 2009-2010. The authors also acknowledge Abbott Laboratories (North Liberty, IA) for providing technical support.

The present study was designed to evaluate the in vitro activity of ceftaroline against CA-MRSA isolates obtained from patients with skin and skin structure infections (SSTIs) and bloodstream infections (BSIs). The study was conducted at 231 centers in the United States and included 9,870 CA-MRSA isolates.

The results of this study showed that ceftaroline exhibited potent in vitro activity against CA-MRSA isolates obtained from patients with skin and skin structure infections (SSTIs) and bloodstream infections (BSIs). The ceftaroline MICs were generally lower than the MICs for other classes of antimicrobials, including quinolones and tetracyclines. These results suggest that ceftaroline may be a promising agent for the treatment of infections caused by CA-MRSA isolates.