Antimicrobial Activity of Ceftaroline Tested against Staphylococcus aureus from Surgical Skin and Skin Structure Infections in USA Medical Centers

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Abstract

Background: Ceftriaxone (CPT), the active form of CPT fax, is a cephalosporin approved by the United States Food and Drug Administration (USA-FDA) for treatment of acute bacterial skin and skin structure infection, including those caused by methicillin-resistant S. aureus (MRSA). We evaluated the activity of CPT and comparator agents tested against S. aureus strains isolated from surgical skin and skin structure infections (SSSI).

Methods: Clinically significant isolates (one per patient) were consecutively collected from 64 medical centers in the USA over a six-year period (2008-2013) and tested for susceptibility by reference CLSI broth microdilution methods against ceftriaxone and several comparator agents.

Results: A total of 794 strains were tested and 50.5% were MRSA. CPT was active against oxacillin-susceptible S. aureus (MIC$_{50}$, 0.25 μg/mL; MIC$_{90}$, 1 μg/mL). Against MSSA, CPT was 16-fold more potent than vancomycin (MIC$_{50}$, 8 μg/mL) and levofloxacin (MIC$_{50}$, 4 μg/mL) were active against all isolates. Against MRSA, CPT was only 0.5 μg/mL and four- to eight-fold more potent than vancomycin (MIC$_{50}$, 0.25 μg/mL; MIC$_{90}$, 1 μg/mL). The highest ceftriaxone MIC among MSSA was only 0.5 μg/mL and 82.4% of strains had a ceftriaxone MIC of 0.25 μg/mL (Figure 1).

Conclusions

• Resistance to clindamycin (MIC$_{50}$, 0.25 μg/mL; MIC$_{90}$, >2 μg/mL) and levofloxacin (MIC$_{50}$, 4 μg/mL; MIC$_{90}$, >4 μg/mL) were 27.4% and 67.3% among MRSA strains, respectively (Table 1).

• Ceftaroline exhibited potent in vitro activity against S. aureus, including MRSA, including MSSA (MIC$_{50}$ and MIC$_{90}$, 0.25 μg/mL) and MRSA (MIC$_{50}$ and MIC$_{90}$, 0.12 μg/mL) (97.5% susceptible; Table 1 and Figure 1).

• Ceftaroline was only 0.5 μg/mL and four- to eight-fold more potent than vancomycin (MIC$_{50}$, 0.25 μg/mL; MIC$_{90}$, 1 μg/mL). Against MRSA, CPT was 16-fold more potent than vancomycin (MIC$_{50}$, 8 μg/mL) and levofloxacin (MIC$_{50}$, 4 μg/mL) were active against all isolates.

• MRSA accounted for 50.5% of S. aureus and ceftriaxone was active against MSSA (MIC$_{50}$ and MIC$_{90}$, 0.25 μg/mL) and MRSA (MIC$_{50}$ and MIC$_{90}$, 1 μg/mL) (97.5% susceptible; Table 1 and Figure 1).

• Against MRSA, ceftriaxone (MIC$_{50}$ and MIC$_{90}$, 0.25 μg/mL) was 16-fold more potent than vancomycin (MIC$_{50}$, 8 μg/mL; MIC$_{90}$, >4 μg/mL) and linezolid (MIC$_{50}$, 1 μg/mL) and tigecycline (MIC$_{50}$, 2 μg/mL). Similar to ceftriaxone (data not shown), the highest CPT MIC among MSSA was only 0.5 μg/mL. Among MRSA, 97.5% and 100.0% of strains were inhibited at 1 and 2 μg/mL of CPT, respectively (Table 1).

- Ceftriaxone activity when tested against 793 S. aureus isolates from surgical skin and skin structure infections (SSSI).

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