Antimicrobial Activity and Spectrum of the Novel Cephalosporin Ceftaroline Tested Against Bacterial Isolates Causing Skin and Skin Structure Infections in USA Medical Centers

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I. Background

Ceftaroline (CPT), the active form of Ceftriaxone (CRO), is a novel cephalosporin which has been shown to have activity against Gram-positive bacteria, including methicillin-resistant Staphylococcus aureus (MRSA) and Gram-negative bacteria, including Pseudomonas aeruginosa (PA) and Escherichia coli. This study aimed to determine the in vitro activity of CPT against bacterial isolates collected from patients with acute bacterial skin and skin structure infections (ABSSSI) in the USA.

II. Methods

Bacterial isolates were collected from patients hospitalized with ABSSSI in USA medical centers. Methods for dilution antimicrobial susceptibility tests for bacteria were utilized for this study. A total of 1917 isolates were collected, including 8 strains of Klebsiella oxytoca, 8 strains of Staphylococcus epidermidis, and 1 strain of Enterococcus faecalis. The MIC90 values of CPT against 93 strains of MRSA were 0.25 μg/mL compared to 1.0 μg/mL for CRO. CPT was also active against Gram-negative bacteria, including P. aeruginosa and E. coli, with MIC90 values of 0.25 and 0.5 μg/mL, respectively.

III. Results

Against Gram-negative bacteria, CPT was 64-, 32- and 4-fold more active than CRO. CPT was also more active against Gram-positive bacteria, including MRSA and Staphylococcus aureus (MIC90, 0.25 μg/mL). CPT was slightly more active against Staphylococcus epidermidis (MIC90, 0.06 μg/mL) compared to CRO (MIC90, 0.12 μg/mL). In contrast, CPT was slightly less active against Staphylococcus lugdunensis (MIC90, 0.12 μg/mL) compared to CRO (MIC90, 0.06 μg/mL).

IV. Conclusions

Ceftaroline was highly active in vitro against Gram-positive and Gram-negative bacteria, including methicillin-resistant Staphylococcus aureus and Enterococcus faecalis. CPT was also active against Pseudomonas aeruginosa and Escherichia coli. This study provides important information for the selection of appropriate antimicrobial agents for the treatment of ABSSSI in the USA.