ABSTRACT

Organism collection: A total of 2,529 strains were consecutively collected from patients in eight Australian (1,826) and three New Zealand (703) medical centres in the 2008-2009 period. Organisms evaluated included: S. aureus (1,818 strains), coagulase-negative staphylococci (CoNS; 90), enterococci (251), β-haemolytic streptococci (301) and viridans group streptococci (VGS; 69).

Susceptibility testing: All strains were tested in validated broth microdilution panels manufactured by TREK Diagnostics (Cleveland, Ohio, USA). Mueller-Hinton broth adjusted to contain physiological levels of calcium (50 mg/L) was used when testing daptomycin. Daptomycin susceptible breakpoints approved by the United States (USA) Food and Drug Administration (FDA), CLSI and EUCAST (≤1 mg/L for staphylococci and β-haemolytic streptococci and ≤4 mg/L for enterococci) were applied. The following quality control organisms were concurrently tested: Enterococcus faecalis ATCC 29212, S. aureus ATCC 29213 and Streptococcus pneumoniae ATCC 49619.

RESULTS

- Daptomycin was highly active against MSSA and MRSA from Australia and New Zealand (MIC90, 0.25 mg/L and MIC90, 0.5 mg/L for isolates from both countries) and its activity was not adversely influenced by resistance to oxacillin. All S. aureus isolates were susceptible to daptomycin (Tables 1 and 2).
- Linezolid (MIC90, 0.5 mg/L and MIC90, 2 mg/L) and vancomycin (MIC90 and MIC90, 1 mg/L) were also very active against S. aureus, but four- to eight-fold less potent than daptomycin (Table 2).
- Daptomycin activity against CoNS (MIC90, 0.25 mg/L and MIC90, 1 mg/L) was similar to that observed against S. aureus and all isolates were inhibited at daptomycin susceptible breakpoint of ≤1 mg/L (Tables 1 and 2).
- Daptomycin was highly active against E. faecalis strains (MIC90, 1 mg/L and MIC90, 2 mg/L; 100% susceptible). Ampicillin (MIC90, 2 mg/L) and linezolid (MIC90, 2 mg/L) were also active against all E. faecalis strains tested and only one strain (Australia) was resistant to vancomycin (MIC90, 2-4 mg/L; Table 2).
- All E. faecium isolates were susceptible to daptomycin (MIC90, 2-4 mg/L and MIC90, 4 mg/L) and linezolid (MIC90 and MIC90, 2 mg/L). Two strains (7.1%) were vancomycin-non-susceptible (Table 2).
- Among E. faecium, 40.0 and 10.0% of strains were resistant to vancomycin (VRE) in Australia and New Zealand (only 10 isolates tested), respectively (Table 2). Daptomycin MIC distributions among VRE were very similar to that of vancomycin-susceptible strains, indicating that daptomycin activity was not adversely affected by resistance to vancomycin (Table 1).
- Daptomycin was highly active against β-haemolytic streptococci (MIC90, 0.25 mg/L) as were most comparison agents tested. Viridans group streptococci (MIC90 and MIC90, 0.5 mg/L) showed daptomycin MIC values slightly higher (two- to four-fold) than β-haemolytic streptococci (Table 2).
- Daptomycin was equally active against isolates from Australia and New Zealand for all organisms evaluated (Table 2).

INTRODUCTION

Daptomycin is a cyclic lipopeptide with potent bactericidal activity against most Gram-positive bacteria and a unique mechanism of action, which involves insertion of the lipophilic daptomycin tail into the bacterial cell membrane, causing rapid membrane depolarization and bacterial death. Furthermore, daptomycin remains bactericidal against stationary-phase cultures of both oxacillin (methicillin)-susceptible (MSSA) and -resistant Staphylococcus aureus (MRSA) present at high density (109 cfu) in a simulated endocarditis vegetation model.

Daptomycin has been used in the United States (USA) for the treatment of complicated skin and skin structure infections (cSSSI) since 2003 and for treatment of right-sided infective endocarditis (R to other antimicrobial classes did not adversely influence the DAP activity against these troublesome organisms).

MATERIALS AND METHODS

Organism collection: A total of 2,529 strains were consecutively collected from patients in eight Australian (1,826) and three New Zealand (703) medical centres in the 2008-2009 period. Organisms evaluated included: S. aureus (1,818 strains), coagulase-negative staphylococci (CoNS; 90), enterococci (251), β-haemolytic streptococci (301) and viridans group streptococci (VGS; 69).

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- Daptomycin was equally active against isolates from Australia and New Zealand for all organisms evaluated (Table 2).

CONCLUSIONS

- Daptomycin showed 100.0% susceptibility and high potencies against recent clinical isolates of Gram-positive organisms from Australia and New Zealand medical centres.
- Resistance to other antimicrobial classes did not adversely influence the daptomycin activity against these troublesome organisms.
- Daptomycin could represent an important treatment option for serious infections caused by Gram-positive cocci in Australia and New Zealand.

SELECTED REFERENCES