Antimicrobial Activity of Dalbavancin and Comparators against *Staphylococcus aureus* causing Pneumonia in Patients with and without Cystic Fibrosis

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INTRODUCTION

- *Staphylococcus aureus* is the most commonly isolated organism in cystic fibrosis (CF) patients with respiratory tract infections as well the primary cause of recurrent acute pulmonary infection and progressive decline in lung function.
- Antimicrobial treatment is recommended for CF patients with symptoms and in those with persistent detection of *S. aureus,* but the best antibiotic approach has not been established yet.
- Dalbavancin is a lipoglycopeptide with a very long half-life that allows the treatment of serious infections with once weekly or biweekly administration.
- We evaluated the activity of dalbavancin and comparator agents against *S. aureus* isolated from the lower respiratory tract of CF and non-CF patients with pneumonia.

MATERIALS AND METHODS

- A total of 357 *S. aureus* isolates were collected from CF patients (1/patient) in 36 medical centers in 2018-2019.
- Antimicrobial susceptibility results from these 357 CF isolates were compared to 726 *S. aureus* isolates consecutively collected from non-CF patients with pneumonia from the same medical centers during the same period.
- Only bacterial isolates determined to be significant by local criteria as the reported probable cause of pneumonia were included in the investigation.
- CF isolates were mainly from North America (n=193; 54.1%) and Europe (n=141; 39.5%).
- Susceptibility testing was performed by reference broth microdilution methods at a central laboratory (JMI Laboratories, North Liberty, Iowa).
- Antimicrobial agents tested include dalbavancin (DALBA), ceftaroline (CPT), oxacillin (OXA), clindamycin (CLI), levofloxacin (LEV), tetracycline (TET), trimethoprim-sulfamethoxazole (TMP-SMX), daptomycin, linezolid, and vancomycin.

RESULTS

- Dalbavancin exhibited potent activity ($MIC_{50/90}$, 0.03/0.03 mg/L) and complete coverage (100.0% susceptibility) against isolates from CF and non-CF patients (Figures 1 and 2).
- Susceptibility profiles were very similar among *S. aureus* isolates from CF and non-CF patients (Figure 2).
- Ceftaroline ($MIC_{50/90}$, 0.25/1 mg/L) was active against 97.8% and 98.1% of isolates from CF and non-CF patients, respectively (Figure 2).
- Oxacillin resistance (MRSA) rates were 27.7% among CF and 28.7% among non-CF patients (Figure 2).
- All isolates from CF and non-CF patients were susceptible to daptomycin ($MIC_{50/90}$, 0.25/0.25 mg/L), linezolid ($MIC_{50/90}$, 1/2 mg/L), and vancomycin ($MIC_{50/90}$, 0.5-1/1 mg/L; data not shown).
- Among MRSA isolates from CF/non-CF patients (n=99/208), susceptibility to ceftaroline, clindamycin, levofloxacin, and tetracycline was 91.9%/93.3%, 58.6%/64.4%, 40.4%/29.3%, and 83.8%/89.4%, respectively (Figure 3).

CONCLUSIONS

- Dalbavancin demonstrated high potency (low MIC values) and broad spectrum against *S. aureus* from CF and non-CF patients.
- *S. aureus* causing pneumonia in CF patients exhibited an antimicrobial susceptibility profile very similar to those *S. aureus* isolates from non-CF patients with pneumonia.
- Dalbavancin may represent a valuable option to treat CF patients with *S. aureus* pneumonia.

ACKNOWLEDGEMENTS

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Figure 1. Antimicrobial activity (MIC distributions) of dalbavancin tested against *S. aureus* isolates from CF and non-CF patients collected worldwide (2018–2019)

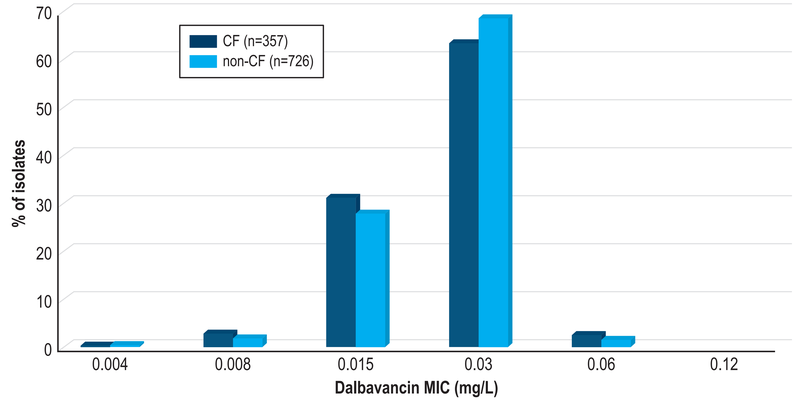
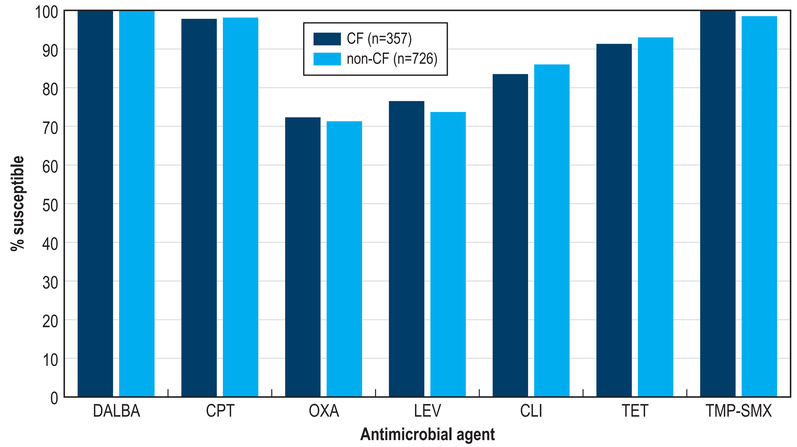
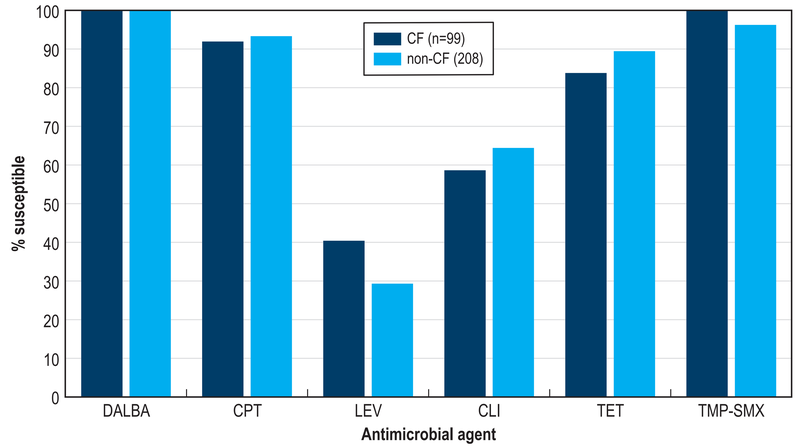


Figure 2. Antimicrobial susceptibility of *S. aureus* isolates collected from CF and non-CF patients in medical centers located worldwide (2018–2019)



Abbreviations: DALBA, dalbavancin; CPT, ceftaroline; OXA, oxacillin; LEV, levofloxacin; CLI, clindamycin; TET, tetracycline; TMP-SMX, trimethoprim-sulfamethoxazole.

Figure 3. Antimicrobial susceptibility of MRSA isolates collected from CF and non-CF patients in medical centers located worldwide (2018–2019)



Abbreviations: DALBA, dalbavancin; CPT, ceftaroline; LEV, levofloxacin; CLI, clindamycin; TET, tetracycline; TMP-SMX, trimethoprim-sulfamethoxazole.