Telavancin Activity Tested Against Gram-Positive Pathogens Responsible for Bloodstream Infections Collected During a Global Surveillance Program (2007–2008)

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ABSTRACT

Background. Telavancin is a lipoglycopeptide agent with dual mechanism of action against Gram-positive bacteria. Telavancin and comparator agent activities were evaluated against recent Gram-positive pathogens responsible for bloodstream infections collected in a global study.

Methods. Unique Gram-positive isolates (9344) were collected from 99 hospitals (27 countries) and sent to a central monitor. Identification was performed by standard algorithms and confirmed by Vitek 2. Isolates were tested for susceptibility by Clinical and Laboratory Standards Institute (CLSI) broth microdilution methods (M07-A8 and M100-S19).

Results. Isolates were from the USA (48.4%), Europe (33.0%), Asia-Pacific (6.6%), and Latin America (12.0%). Telavancin was very active against *Staphylococcus* spp. ($MIC_{50/90}$, 0.12/0.25 μg/mL), regardless of methicillin resistance ($MIC_{50/90}$ of methicillin (oxacillin)-resistant isolates, 0.12/0.25 μg/mL). When tested against staphylococci, telavancin (MIC_{90}, 0.25 μg/mL) was 4- to 8-fold more active than vancomycin (MIC_{90}, 1–2 μg/mL) or linezolid (1–2 μg/mL). Telavancin showed the lowest MIC_{90} values against vancomycin-susceptible *E. faecalis* (MIC_{90}, 0.5 μg/mL) or *E. faecium* (MIC_{90}, 0.12 μg/mL), while telavancin exhibited elevated MIC values against vancomycin-nonsusceptible enterococci (MIC_{90}, >2 μg/mL). Among the comparators, only daptomycin and linezolid were uniformly active against vancomycin-nonsusceptible enterococci (MIC_{90}, 2 μg/mL; ≥98.3% susceptible). Telavancin activity (MIC_{90}, 0.12 μg/mL; 100.0% susceptible) was most similar to that of penicillin (MIC_{90}, 0.06 μg/mL; 100.0% susceptible) against β-hemolytic streptococci. Telavancin showed MIC_{90} values (0.03 μg/mL) 16- to 64-fold lower than vancomycin (0.5 μg/mL), linezolid (1 μg/mL), and penicillin (2 μg/mL) against *S. pneumoniae*, while the telavancin MIC_{90} values (0.06 μg/mL) were 8- to 16-fold lower than vancomycin (0.5 μg/mL), linezolid, and penicillin (1 μg/mL) against viridans group. Telavancin displayed lower MIC_{90} values than the other comparators when tested against penicillin-resistant streptococci.

Conclusions. Telavancin exhibited potent activity against this current collection (2007–2008) of Gram-positive isolates responsible for bacteremias, with limited activity only against vancomycin-nonsusceptible enterococci. These results provide important data for continued monitoring of telavancin activity.

INTRODUCTION

- Health care–associated infections (HAIs) are a major cause of morbidity and mortality resulting in prolonged hospitalization and increased costs, particularly for bloodstream infections (BSI) and ventilator-associated pneumonia.[1-3]
- Gram-positive bacteria are the predominant cause of HAIs, especially BSI, where they may account for up to 70% of infections.[4]
  - *Staphylococcus aureus*, in particular, possesses the propensity to form biofilms, causing difficult-to-treat catheter and other device-related infections.[5]
- Infective endocarditis is a frequent complication of *S. aureus* BSI.[5]
  - Cases due to methicillin-resistant *S. aureus* (MRSA) trend toward a higher mortality rate compared with those caused by methicillin-susceptible strains.[5]
- Infections caused by multidrug-resistant Gram-positive organisms, mainly *S. aureus*, have challenged the limited antimicrobial therapies available.[6,7]
- Telavancin is a novel lipoglycopeptide antimicrobial agent recently approved in the US and Canada as a once-daily treatment in adults for complicated skin and skin-structure infections caused by *S. aureus* (including methicillin-resistant isolates), *Streptococcus pyogenes, S. agalactiae, S. anginosus* group and *Enterococcus faecalis* (vancomycin-susceptible isolates only).[8]
- The antimicrobial activity of telavancin and comparator agents were evaluated against recent Gram-positive pathogens responsible for BSI collected during a global surveillance study (2007–2008).

MATERIALS AND METHODS

Bacterial strain collection

- A total of 9344 unique Gram-positive clinical isolates collected from patients with documented BSI were selected for this study. The isolates were recovered from 99 hospitals (27 countries) located in Europe (3081 isolates), the United States (4527 isolates), the Asia-Pacific region (APAC; 615 isolates), and Latin America (1121 isolates).
- The BSI isolates in this investigation consisted of *S. aureus* (4291), *Enterococcus* spp. (2015), coagulase-negative staphylococci (CoNS; 1753), β-hemolytic streptococci (508), *S. pneumoniae* (443), viridans group streptococci (270), and a small number of miscellaneous Gram-positive bacteria (64; **Table 1**).
- Isolates were shipped to and processed by a central monitoring laboratory (JMI Laboratories, North Liberty, Iowa, USA). Bacterial identifications were performed by the local submitting sites and confirmed by the central monitor using conventional algorithms and the Vitek® 2 Microbial Identification Systems (bioMérieux, Nazelwood, Missouri, USA), when necessary.

Antimicrobial susceptibility test methods

- The isolates were tested for susceptibility by the Clinical and Laboratory Standards Institute (CLSI) broth microdilution method using commercially prepared and validated panels (TREK Diagnostic Systems, Cleveland, Ohio, USA) in cation-adjusted Mueller-Hinton broth (with 2–5% lysed horse blood added for testing of streptococci) (M07-A8).[9]
- Interpretation of minimum inhibitory concentration (MIC) results was in accordance with published CLSI (M100-S19) criteria.[10] Telavancin susceptible breakpoints for *S. aureus* (≤1 μg/mL), *E. faecalis* (≤1 μg/mL, for vancomycin-susceptible isolates only), viridans group streptococci, and β-hemolytic streptococci (≤0.12 μg/mL) were those recently approved by the FDA.[8] Quality control (QC) strains utilized were: *S. aureus* ATCC 29213, *E. faecalis* ATCC 29212, and *S. pneumoniae* ATCC 49619; all MIC results were within CLSI listed QC ranges.[10]

Table 1. Distribution of the most prevalent Gram-positive cocci isolates recovered from patients with bloodstream infections by geographic region

Organism	No. of isolates by region				
	Asia-Pacific (615)	Europe (3081)	Latin America (1121)	United States (4527)	Total (9344)
S. aureus	290 (37.9)[a]	1336 (26.6)	584 (42.5)	2081 (50.3)	4291 (41.0)
Enterococcus spp.[b]	109 (9.2)[c]	610 (10.5)	161 (18.6)	1135 (33.0)	2015 (23.8)
E. faecalis	68	344	115	667	1194
E. faecium	39	244	41	442	766
CoNS	90 (86.7)[d]	700 (80.7)	273 (77.3)	690 (73.2)	1753 (77.5)
β-hemolytic streptococci[e]	61	148	33	266	508
S. pneumoniae	38	147	56	202	443
Viridans group streptococci[f]	26	113	8	123	270

CoNS, coagulase-negative staphylococci.
[a] Percent of methicillin-resistant *S. aureus*.
[b] Includes *E. avium* (12 strains), *E. casseliflavus* (7 strains), *E. durans* (10 strains), *E. faecalis* (1194 strains), *E. faecium* (766 strains), *E. gallinarum* (16 strains), *E. hirae* (2 strains), *E. raffinosus* (4 strains), and unspecified *Enterococcus* spp. (4 strains).
[c] Percent of vancomycin-nonsusceptible enterococci.
[d] Percent of methicillin-resistant CoNS.
[e] Includes *S. dysgalactiae* (15 strains), *S. equi* (1 strain), *S. equisimilis* (2 strains), Group A streptococci (175 strains), Group B streptococci (253 strains), Group C streptococci (18 strains), Group F streptococci (2 strains), Group G streptococci (39 strains), and unspecified β-hemolytic streptococci (3 strains).
[f] Includes *S. acidominimus* (1 strain), *S. anginosus* (24 strains), *S. constellatus* (10 strains), *S. gordonii* (3 strains), *S. intermedius* (6 strains), *S. milleri* (8 strains), *S. mitis* (67 strains), *S. mutans* (3 strains), *S. oralis* (20 strains), *S. parasanguinis* (14 strains), *S. salivarius* (21 strains), *S. sanguinis* (15 strains), *S. vestibularis* (3 strains), unspecialized *Streptococcus* spp. (3 strains), unspecialized α-hemolytic streptococci (3 strains), and unspecialized viridans group streptococci (69 strains).

RESULTS

- The overall methicillin (oxacillin) resistance rate among *S. aureus* isolates was 41.0% and highest in the United States (50.3%), followed by Latin America (42.5%), APAC (37.9%), and Europe (26.6%; **Table 1**). Among CoNS, 77.5% of the strains were resistant to oxacillin.

RESULTS (cont.)

- Telavancin inhibited all *S. aureus* at ≤0.5 μg/mL (100.0% susceptible; **Table 2**). Telavancin ($MIC_{50/90}$, 0.12/0.25 μg/mL) was 2- to 8-fold more active than daptomycin ($MIC_{50/90}$, 0.25/0.5 μg/mL), quinupristin/dalfopristin ($MIC_{50/90}$, 0.5/0.5 μg/mL), vancomycin ($MIC_{50/90}$, 1/1 μg/mL), and linezolid ($MIC_{50/90}$, 1/2 μg/mL) when tested against MRSA (**Table 3**).
- Other comparator agents (levofloxacin, erythromycin, and clindamycin; ≤53.8% susceptible) had limited activity against MRSA, except for trimethoprim/sulfamethoxazole (MIC_{90}, ≤0.5 μg/mL; 95.6% susceptible; **Table 3**).
- High susceptibility rates (≥92.2% susceptible) were noted for most antimicrobial agents tested against methicillin-susceptible *S. aureus*, except erythromycin (78.5% susceptible; **Table 3**).
- Telavancin ($MIC_{50/90}$, 0.12/0.25 μg/mL) was ≥2-fold more potent than daptomycin ($MIC_{50/90}$, 0.25/0.5 μg/mL), quinupristin/dalfopristin ($MIC_{50/90}$, ≤0.25/0.5 μg/mL), linezolid ($MIC_{50/90}$, 1/1 μg/mL), vancomycin ($MIC_{50/90}$, 2/2 μg/mL), and teicoplanin ($MIC_{50/90}$, ≤2/8 μg/mL) when tested against methicillin-resistant CoNS. Susceptibility rates for these comparators ranged from 95.8% to 99.9% (**Table 3**).
- The highest vancomycin-nonsusceptible rate among enterococci was observed in the United States (33.0%), followed by Latin America (18.6%), Europe (10.5%), and APAC (9.2%; **Table 1**).
- Telavancin ($MIC_{50/90}$, 0.25/0.5 μg/mL; 100.0% susceptible) was very active against vancomycin-susceptible *E. faecalis*, as were ampicillin ($MIC_{50/90}$, ≤1/2 μg/mL; 100.0% susceptible), daptomycin ($MIC_{50/90}$, 1/2 μg/mL; 100.0% susceptible), linezolid ($MIC_{50/90}$, 1/2 μg/mL; 99.8% susceptible), and vancomycin ($MIC_{50/90}$, 1/2 μg/mL; 100.0% susceptible; **Table 3**).
- Telavancin was 4-fold more active against vancomycin-susceptible *E. faecium* (MIC_{90}, 0.06 μg/mL) compared with vancomycin-susceptible *E. faecalis* (MIC_{90}, 0.25 μg/mL). Vancomycin-nonsusceptible *E. faecalis* or *E. faecium*, however, exhibited elevated telavancin MIC values (**Tables 2** and **3**).
- All *S. pneumoniae*, viridans group streptococci (100.0% susceptible), and β-hemolytic streptococci (100.0% susceptible) were inhibited by ≤0.12 μg/mL of telavancin (MIC_{90}, 0.03–0.12 μg/mL; **Tables 2** and **3**).
- Among the antimicrobial agents tested against *S. pneumoniae* and viridans group streptococci, telavancin displayed the lowest MIC_{90} values (0.03 and 0.06 μg/mL, respectively).
- When tested against β-hemolytic streptococci, telavancin (MIC_{90}, 0.12 μg/mL; 100.0% susceptible) activity was comparable to that of penicillin (MIC_{90}, 0.06 μg/mL; 100.0% susceptible; **Table 3**).

Table 2. Activity of telavancin against organism species/groups and resistant subsets recovered from bloodstream infections (2007–2008)

Organism (no. tested)	MIC (μg/mL)		Number (%) inhibited at each telavancin MIC (μg/mL)							
	50%	90%	≤0.03	0.06	0.12	0.25	0.5	1	2	>2
S. aureus (4291)	0.12	0.25	11 (0.3)	164 (3.8)	2556 (59.6)	1460 (34.0)	100 (2.3)	-	-	-
MSSA (2531)	0.12	0.25	7 (0.3)	111 (4.4)	1586 (62.7)	790 (31.2)	37 (1.5)	-	-	-
MRSA (1760)	0.12	0.25	4 (0.2)	53 (3.0)	970 (55.1)	670 (38.0)	63 (3.5)	-	-	-
CoNS (1753)	0.12	0.25	23 (1.3)	154 (8.8)	960 (54.8)	567 (32.3)	49 (2.8)	-	-	-
MSCoNS (394)	0.12	0.25	12 (3.0)	46 (11.7)	215 (54.6)	114 (28.9)	7 (1.8)	-	-	-
MRCoNS (1359)	0.12	0.25	11 (0.8)	108 (7.9)	745 (54.8)	453 (33.3)	42 (3.1)	-	-	-
Vancomycin-susceptible *E. faecium* (348)	0.06	0.12	114 (32.8)	81 (23.3)	134 (38.5)	19 (5.5)	-	-	-	-
Vancomycin-nonsusceptible *E. faecium* (418)	2	>2	5 (1.2)	7 (1.7)	13 (3.1)	7 (1.7)	4 (1.0)	24 (5.7)	195 (46.6)	163 (39.0)
Vancomycin-susceptible *E. faecalis* (1140)	0.25	0.5	-	2 (0.2)	149 (13.1)	531 (46.6)	442 (38.8)	16 (1.4)	-	-
Vancomycin-nonsusceptible *E. faecalis* (54)	>2	>2	-	-	-	10 (18.5)	2 (3.7)	2 (3.7)	1 (1.8)	41 (75.9)
S. pneumoniae (443)	≤0.015	0.03	442 (99.8)	1 (0.2)	-	-	-	-	-	-
β-hemolytic streptococci (508)	0.06	0.12	253 (49.8)	172 (33.9)	83 (16.3)	-	-	-	-	-
Viridans group streptococci (270)	0.03	0.06	216 (80.0)	41 (15.2)	13 (4.8)	-	-	-	-	-

MIC, minimum inhibitory concentration; MSSA, methicillin (oxacillin)-susceptible *S. aureus*; MRSA, methicillin-resistant *S. aureus*; CoNS, coagulase-negative staphylococci; MSCoNS, methicillin-susceptible coagulase-negative staphylococci; MRCoNS, methicillin-resistant coagulase-negative staphylococci.

Table 3. Activity of telavancin and comparator antimicrobial agents against Gram-positive isolates responsible for bloodstream infections (2007–2008)

Organism (no. tested)/Antimicrobial agent	MIC (μg/mL)[a]			% by category[b]	
	Range	50%	90%	Susceptible	Resistant
MSSA (2531)					
Telavancin	0.03 – 0.5	0.12	0.25	100.0	–
Vancomycin	0.25 – 2	1	1	100.0	0.0
Teicoplanin	≤2 – 4	≤2	≤2	100.0	0.0
Daptomycin	≤0.06 – 1	0.25	0.5	100.0	–
Linezolid	0.25 – 2	2	2	100.0	–
Quinupristin/dalfopristin	≤0.25 – 2	≤0.25	0.5	>99.9	0.0
Levofloxacin	≤0.5 – >4	≤0.5	≤0.5	92.2	7.5
Erythromycin	≤0.25 – >2	≤0.25	>2	78.5	20.9
Clindamycin	≤0.25 – >2	≤0.25	≤0.25	96.2	3.7
Trimethoprim/sulfamethoxazole	≤0.5 – >2	≤0.5	≤0.5	99.1	0.9
MRSA (1760)					
Telavancin	≤0.015 – 0.5	0.12	0.25	100.0	–
Vancomycin	0.25 – 4	1	1	99.9	0.0
Teicoplanin	≤2 – 8	≤2	≤2	100.0	0.0
Daptomycin	≤0.06 – 4	0.25	0.5	99.7	–
Linezolid	0.5 – 2	1	2	100.0	–
Quinupristin/dalfopristin	≤0.25 – >2	0.5	0.5	99.4	0.2
Levofloxacin	≤0.5 – >4	>4	>4	18.0	81.5
Erythromycin	≤0.25 – >2	>2	>2	13.2	85.8
Clindamycin	≤0.25 – >2	≤0.25	>2	53.8	45.9
Trimethoprim/sulfamethoxazole	≤0.5 – >2	≤0.5	≤0.5	95.6	4.4
MSCoNS (394)					
Telavancin	≤0.015 – 0.5	0.12	0.25	–	–
Vancomycin	0.25 – 4	1	2	100.0	0.0
Teicoplanin	≤2 – 16	≤2	4	99.2	0.0
Daptomycin	≤0.06 – 4	0.25	0.5	99.2	–
Linezolid	≤0.06 – >8	1	1	99.7	–
Quinupristin/dalfopristin	≤0.25 – 1	≤0.25	≤0.25	100.0	0.0
Levofloxacin	≤0.5 – >4	≤0.5	4	86.3	12.9
Erythromycin	≤0.25 – >2	≤0.25	>2	62.7	37.3
Clindamycin	≤0.25 – >2	≤0.25	≤0.25	92.9	5.3
Trimethoprim/sulfamethoxazole	≤0.5 – >2	≤0.5	>2	85.5	14.5
MRCoNS (1359)					
Telavancin	≤0.015 – 0.5	0.12	0.25	–	–
Vancomycin	≤0.12 – 8	2	2	99.9	0.0
Teicoplanin	≤2 – >16	≤2	8	95.8	0.7
Daptomycin	≤0.06 – 4	0.25	0.5	99.8	–
Linezolid	≤0.06 – >8	1	1	99.0	–
Quinupristin/dalfopristin	≤0.25 – >2	≤0.25	0.5	98.9	0.7
Levofloxacin	≤0.5 – >4	>4	>4	25.9	70.7
Erythromycin	≤0.25 – >2	>2	>2	22.1	77.6
Clindamycin	≤0.25 – >2	≤0.25	>2	54.8	43.9
Trimethoprim/sulfamethoxazole	≤0.5 – >2	>2	>2	47.2	52.8
Vancomycin-susceptible *E. faecalis* (1140)					
Telavancin	0.06 – 1	0.25	0.5	100.0	–
Ampicillin	≤1 – 8	≤1	2	100.0	0.0
Vancomycin	0.5 – 4	1	2	100.0	0.0
Teicoplanin	≤2 – 4	≤2	≤2	100.0	0.0
Daptomycin	≤0.06 – 4	1	2	100.0	–
Linezolid	0.25 – >8	1	2	99.8	0.1
Quinupristin/dalfopristin	≤0.25 – >2	>2	>2	1.0	95.4
Levofloxacin	≤0.5 – >4	1	>4	64.7	34.6
Gentamicin (HL)	≤500 – >1000	≤500	>1000	67.1	32.9
Streptomycin (HL)	≤1000 – >2000	≤1000	>2000	71.7	28.3
Vancomycin-nonsusceptible *E. faecalis* (54)					
Telavancin	0.25 – >2	>2	>2	–	–
Ampicillin	≤1 – 8	≤1	4	100.0	0.0
Vancomycin	8 – >16	>16	>16	0.0	94.4
Teicoplanin	≤2 – >16	>16	>16	24.1	75.9
Daptomycin	≤0.06 – 2	1	1	100.0	–
Linezolid	0.5 – 2	1	2	100.0	0.0
Quinupristin/dalfopristin	2 – >2	>2	>2	0.0	98.1
Levofloxacin	1 – >4	>4	>4	3.7	96.3
Gentamicin (HL)	≤500 – >1000	>1000	>1000	17.0	83.0
Streptomycin (HL)	≤1000 – >2000	2000	>2000	48.1	51.9
Vancomycin-susceptible *E. faecium* (348)					
Telavancin	≤0.015 – 0.25	0.06	0.12	–	–
Ampicillin	≤1 – >16	>16	>16	11.8	88.2
Vancomycin	0.25 – 4	1	1	100.0	0.0
Teicoplanin	≤2 – 4	≤2	≤2	100.0	0.0
Daptomycin	0.12 – 8	2	4	99.4	–
Linezolid	0.5 – >8	1	2	99.4	0.3
Quinupristin/dalfopristin	≤0.25 – >2	1	>2	73.0	16.7
Levofloxacin	1 – >4	>4	>4	11.5	82.5
Gentamicin (HL)	≤500 – >1000	≤500	>1000	66.4	33.6
Streptomycin(HL)	≤1000 – >2000	≤1000	>2000	54.6	45.4
Vancomycin-nonsusceptible *E. faecium* (418)					
Telavancin	0.03 – >2	2	>2	–	–
Ampicillin	16 – >16	>16	>16	0.0	100.0
Vancomycin	8 – >16	>16	>16	0.0	98.3
Teicoplanin	≤2 – >16	>16	>16	8.6	86.6
Daptomycin	≤0.06 – 8	2	2	99.8	–
Linezolid	0.5 – >8	1	2	98.1	1.7
Quinupristin/dalfopristin	≤0.25 – >2	0.5	1	95.0	2.6
Levofloxacin	2 – >4	>4	>4	0.2	99.5
Gentamicin (HL)	≤500 – >1000	≤500	>1000	77.9	22.1
Streptomycin (HL)	≤1000 – >2000	≤1000	>2000	53.3	46.7

Table 3 (cont.). Activity of telavancin and comparator antimicrobial agents against Gram-positive isolates responsible for bloodstream infections (2007–2008)

Organism (no. tested)/Antimicrobial agent	MIC (μg/mL)[a]			% by category[b]	
	Range	50%	90%	Susceptible	Resistant
S. pneumoniae (443)					
Telavancin	≤0.015 – 0.06	≤0.015	0.03	–	–
Penicillin[c]	≤0.015 – 8	≤0.015	2	94.1	0.5
Penicillin[d]	≤0.015 – 8	≤0.015	2	74.0	11.1
Vancomycin	≤0.12 – 1	0.25	0.5	100.0	–
Teicoplanin	≤2	≤2	≤2	–	–
Daptomycin	≤0.06 – 1	0.12	0.25	–	–
Linezolid	≤0.06 – 2	1	1	100.0	–
Quinupristin/dalfopristin	≤0.25 – 1	0.5	0.5	100.0	0.0
Levofloxacin	≤0.5 – >4	1	1	99.8	0.2
Erythromycin	≤0.25 – >2	≤0.25	>2	73.8	25.7
Clindamycin	≤0.25 – >2	≤0.25	>2	85.8	14.2
Tetracycline	≤2 – >8	≤2	>8	83.3	16.3
Viridans group streptococci (270)					
Telavancin	≤0.015 – 0.12	0.03	0.06	100.0	–
Penicillin	≤0.015 – >32	0.06	1	70.7	6.7
Vancomycin	0.25 – 1	0.5	0.5	100.0	–
Teicoplanin	≤2 – 4	≤2	≤2	–	–
Daptomycin	≤0.06 – 2	0.25	0.5	99.3	–
Linezolid	0.12 – 2	1	1	100.0	–
Quinupristin/dalfopristin	≤0.25 – 2	0.5	1	98.5	0.0
Levofloxacin	≤0.5 – >4	1	2	92.6	6.3
Erythromycin	≤0.25 – >2	≤0.25	>2	51.9	46.3
Clindamycin	≤0.25 – >2	≤0.25	≤0.25	91.9	7.4
Tetracycline	≤2 – >8	≤2	>8	71.9	24.8
β-hemolytic streptococci (508)					
Telavancin	≤0.015 – 0.12	0.06	0.12	100.0	–
Penicillin	≤0.015 – 0.12	≤0.015	0.06	100.0	–
Vancomycin	0.25 – 1	0.5	0.5	100.0	–
Teicoplanin	≤2 – 4	≤2	≤2	–	–
Daptomycin	≤0.06 – 0.5	≤0.06	0.25	100.0	–
Linezolid	0.25 – 2	1	1	100.0	–
Quinupristin/dalfopristin	≤0.25 – 1	≤0.25	0.5	100.0	0.0
Levofloxacin	≤0.5 – >4	≤0.5	1	99.2	0.8
Erythromycin	≤0.25 – >2	≤0.25	>2	78.1	21.3
Clindamycin	≤0.25 – >2	≤0.25	>2	88.2	11.2
Tetracycline	≤2 – >8	4	>8	48.0	49.4

MIC, minimum inhibitory concentration; MSSA, methicillin (oxacillin)-susceptible *S. aureus*; MRSA, methicillin-resistant *S. aureus*; MSCoNS, methicillin-susceptible coagulase-negative staphylococci; MRCoNS, methicillin-resistant coagulase-negative staphylococci; HL, high-level aminoglycoside resistance.
[a] 50% and 90% MIC encompassing 50% and 90% of isolates tested, respectively.
[b] Criteria for susceptible and resistant as published by the Clinical and Laboratory Standards Institute (CLSI) (M100-S19, 2009). Telavancin susceptible breakpoints for *S. aureus* (≤1 μg/mL), *E. faecalis* (≤1 μg/mL, for vancomycin-susceptible isolates only), viridans group streptococci, and β-hemolytic streptococci (≤0.12 μg/mL) were those recently approved by the US Food and Drug Administration.[8] Dashes (–) indicate lack of interpretive criteria.
[c] Criteria as published by the CLSI (2009) for penicillin parenteral (nonmeningitis).
[d] Criteria as published by the CLSI (2009) for penicillin (oral penicillin V).

CONCLUSIONS

- Telavancin was the most potent antimicrobial agent tested against *S. aureus* (100.0% susceptible) and CoNS (MIC_{90} values for both, 0.25 μg/mL) and inhibited all isolates at ≤0.5 μg/mL, regardless of methicillin-resistance phenotype.
- Telavancin was highly active against vancomycin-susceptible *E. faecium* (MIC_{90}, 0.12 μg/mL) and *E. faecalis* (MIC_{90}, 0.5 μg/mL; 100.0% susceptible). However, vancomycin-nonsusceptible enterococci exhibited reduced susceptibility to telavancin.
- Telavancin inhibited all *S. pneumoniae*, viridans group streptococci, and β-hemolytic streptococci at ≤0.06, ≤0.12, and ≤0.12 μg/mL, respectively.
- The in vitro data presented here document the activity of telavancin against Gram-positive isolates from BSI cultures. Continued longitudinal surveillance to monitor telavancin activity is warranted.

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