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Update on the *In Vitro* Activity of Ceftaroline against *Staphylococcus aureus* from United States (US) Medical Centers Stratified by Infection Type (2018–2020)

HS Sader, M Castanheira, LR Duncan, RE Mendes

JMI Laboratories, North Liberty, Iowa, USA

CONCLUSIONS

Ceftaroline remained very active against contemporary (2018–2020) *S. aureus* from US medical centers, independent of infection type.

Ceftaroline retained good activity against MRSA and isolates resistant to erythromycin, levofloxacin, tetracycline, and/or TMP-SMX.

RESULTS

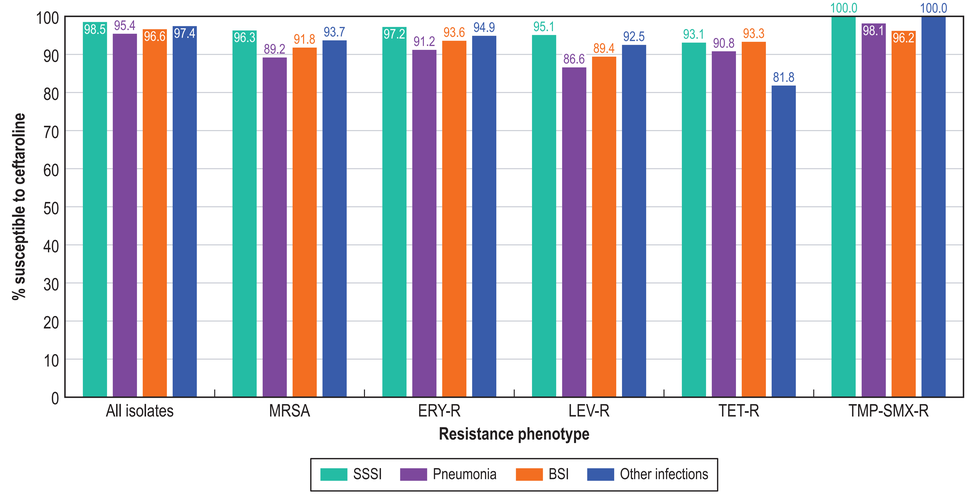
- Ceftaroline ($MIC_{50/90}$, 0.25/1 mg/L) susceptibility ranged from 98.5% (SSSI) to 95.4% (pneumonia) and was 97.2% overall (Table 1 and Figure 1).
- Ceftaroline retained potent activity and a broad spectrum against methicillin-resistant *S. aureus* (MRSA; 41.9% of isolates), with susceptibility rates varying from 96.3% (SSSI) to 89.2% (pneumonia) and 93.4% overall (Table 1 and Figure 1).
- Overall susceptibility rates to erythromycin, levofloxacin, tetracycline, and trimethoprim-sulfamethoxazole (TMP-SMX) were 44.0%, 67.9%, 94.1%, and 97.5%, respectively (Table 1).
- Ceftaroline retained good activity against *S. aureus* resistant to erythromycin (94.8%S), levofloxacin (91.4%S), tetracycline (92.3%S), and/or TMP-SMX (98.7%S; Figure 1).
- Among the resistant subsets, ceftaroline susceptibility rates were generally highest among isolates from SSSI (93.1%–100.0%), followed by other infections (81.8%–100.0%), BSI (89.4%–96.2%), and pneumonia (86.6%–98.1%; Figure 1).
- Dalbavancin (MIC_{90}, 0.03 mg/L) and vancomycin (MIC_{90}, 1 mg/L) exhibited complete activity (100.0% susceptible), whereas daptomycin (MIC_{90}, 0.5 mg/L) and linezolid (MIC_{90}, 2 mg/L) were active against >99.9% of isolates (Table 1).

Table 1. Antimicrobial activity of ceftaroline and comparator agents against *S. aureus* from US medical centers

Organism/antimicrobial (no. tested)	All isolates			% Susceptible per CLSI (no. of isolates)			
	MIC_{50} [a]	MIC_{90} [a]	%S[a]	SSSI	Pneumonia	BSI	Others
S. aureus (9,268)				(4,343)	(2,260)	(2,235)	(430)
Ceftaroline	0.25	1	97.2	98.5	95.4	96.6	97.4
Oxacillin	0.5	>2	58.1	57.8	57.6	58.7	59.3
Clindamycin	0.06	>2	86.4	88.6	83.3	85.5	84.7
Dalbavancin	0.03	0.03	100.0	100.0	100.0	100.0	100.0
Daptomycin	0.25	0.5	>99.9	100.0	>99.9	>99.9	99.8
Erythromycin	8	>8	44.0	44.5	43.3	43.8	44.4
Levofloxacin	0.25	>4	67.9	69.5	65.8	67.6	65.6
Linezolid	1	2	>99.9	>99.9	100.0	100.0	100.0
Tetracycline	≤0.5	1	94.1	93.4	94.1	95.1	96.3
TMP-SMX	≤0.5	≤0.5	97.5	97.4	97.7	97.7	97.0
Vancomycin	1	1	100.0	100.0	100.0	100.0	100.0
MRSA (3,887)				(1,831)	(959)	(922)	(175)
Ceftaroline	1	1	93.4	96.3	89.2	91.8	93.7
Oxacillin	>2	>2	0.0	0.0	0.0	0.0	0.0
Clindamycin	0.06	>2	73.4	78.5	66.6	71.3	68.0
Dalbavancin	0.03	0.03	100.0	100.0	100.0	100.0	100.0
Daptomycin	0.25	0.5	99.9	100.0	99.9	100.0	99.4
Erythromycin	>8	>8	14.2	15.2	13.8	12.7	13.7
Levofloxacin	4	>4	35.7	39.6	30.1	33.8	34.9
Linezolid	1	2	>99.9	99.9	100.0	100.0	100.0
Tetracycline	≤0.5	2	91.8	91.2	91.5	92.7	94.9
TMP-SMX	≤0.5	≤0.5	94.9	94.7	95.3	95.1	93.7
Vancomycin	1	1	100.0	100.0	100.0	100.0	100.0

[a]MIC_{50}, MIC_{90}, and susceptibility rate for the isolate collection combined.
Abbreviations: MRSA, methicillin-resistant *S. aureus*; SSSI, skin and skin structure infection; BSI, bloodstream infection; TMP-SMX, trimethoprim-sulfamethoxazole.

Figure 1. Antimicrobial activity of ceftaroline against *S. aureus* from US medical centers (2018–2020)



Abbreviations: MRSA, methicillin-resistant *S. aureus*; ERY, erythromycin; R, resistant; LEV, levofloxacin; TET, tetracycline; TMP-SMX, trimethoprim-sulfamethoxazole; SSSI, skin and skin structure infection; BSI, bloodstream infection.

INTRODUCTION

- Ceftaroline is an advanced-generation cephalosporin active against methicillin-susceptible (MSSA) and methicillin-resistant *Staphylococcus aureus* (MRSA).
- Ceftaroline was approved by the US FDA for the treatment of community-acquired bacterial pneumonia (CABP) and acute bacterial skin and skin structure infections (ABSSSI) in 2010.
- US FDA approval was extended in 2015 to treat patients with ABSSSI and CABP who developed bacteremia.
- Ceftaroline has also been used off-label to treat other infection types, such as bloodstream infection (BSI) and infective endocarditis.
- We evaluated the *in vitro* activity of ceftaroline against *S. aureus* isolated in US medical centers in 2018–2020.

METHODS

- A total of 9,268 *S. aureus* isolates were consecutively collected from 33 US medical centers in 2018–2020.
- Isolates were determined to be clinically significant based on local guidelines and were submitted to a central monitoring laboratory (JMI Laboratories, North Liberty, Iowa, USA).
- Participating laboratories initially identified isolates and JMI confirmed bacterial identifications by standard algorithms and/or MALDI-TOF.
- Isolates were tested for susceptibility by broth microdilution following CLSI M07 (2018) standards.
- Results were stratified by infection type and resistance profile.

DISCLOSURES

Contact Information

Helio S. Sader, MD, PhD
JMI Laboratories
345 Beaver Kreek Centre, Suite A
North Liberty, IA 52317
Phone: (319) 665-3370
Fax: (319) 665-3371
Email: helio-sader@jmilabs.com

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