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Susceptibility of Eravacycline among Carbapenem Resistant Enterobacteriaceae, Multidrug Resistant *Acinetobacter Baumannii Complex and Methicillin Resistant Staphylococcus aureus*

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Background

Antimicrobial resistance among carbapenem-resistant Enterobacteriaceae (CRE), multidrug-resistant Acinetobacter baumannii complex (MRAB), and methicillin-resistant Staphylococcus aureus (MRSA) has substantially reduced the effectiveness of conventional broad-spectrum therapies. Eravacycline, a third-generation tetracycline approved for the treatment of complicated intra-abdominal infections in adult patients in Hong Kong since 2022, has broad in vitro activity against multidrug-resistant pathogens, but local susceptibility data remain limited. We evaluated the in vitro susceptibility of clinical CRE, MRAB, and MRSA isolates to eravacycline and five other broad-spectrum antibiotics.

Methods

We conducted a single-center, retrospective laboratory data analysis at a tertiary private hospital in Hong Kong. Antibiotic susceptibility data were retrieved for all non-duplicate clinical specimens yielding CRE, MRAB, or MRSA by culture from October 2024 to April 2026 in which eravacycline or tigecycline susceptibility testing was performed. Follow-up samples from the same patient growing the same organism with the same resistant mechanism were excluded. Minimum inhibitory concentrations (MICs) for eravacycline and tigecycline were determined using Etest and interpreted according to the FDA-identified guideline for CRE and the EUCAST version 16 guideline for MRSA. Susceptibility to the other comparator antibiotics was determined using disk diffusion or broth microdilution and interpreted according to CLSI guidelines M100 2026.

Results

Thirty-two CRE isolates were included, comprising 21 NDM producers, 3 OXA-48-like producers, and 8 CRE without common carbapenemases. Among NDM producers, eravacycline and tigecycline showed similar susceptibility rates (85.0% and 83.3%, respectively) while 81.0% were susceptible to cefiderocol. None of the OXA-48-like producers were susceptible to eravacycline or tigecycline, whereas cefiderocol and ceftazidime–avibactam each demonstrated 100% susceptibility. Among CRE without detectable carbapenemase, 71.4% were susceptible to both eravacycline and tigecycline; all were susceptible to cefiderocol, and 75.0% were susceptible to ceftazidime–avibactam. All tested CRE isolates remained susceptible to colistin. Aztreonam (without avibactam) was active against 47.6% of NDM-producing isolates. All tested MRSA isolates were susceptible to eravacycline and tigecycline. Among six MRAB isolates, eravacycline and tigecycline MICs ranged from 0.5–2 mg/L (median 1.5 mg/L) and 1–4 mg/L (median 1.75 mg/L), respectively; all MRAB isolates were susceptible to cefiderocol and colistin, and none were susceptible to ceftazidime–avibactam.

	Eravacyclin	Tigecyclin	Cefiderocol	Ceftazedime-avibactam	Aztreonam	Fosfomycin#	Colistin
	% Sensitive (No. of sensitive/ No. tested)						
NDM-producing Enterobacteriaceae N=21	85% (18/20)	83.3% (16/18)	81.0.0% (17/21)*	9.5% (2/21)	47.7% (10/21)	86.7% (13/15)	100% (12/12)
OXA-48-like producing Enterobacteriaceae N=3	0% (0/3)	0% (0/3)	100% (2/2)	100% (3/3)	33.3% (1/3)	33.3% (1/3)	100% (3/3)
CRE with no common carbapenemase detected N=8	71.4% (5/7)	71.4% (5/7)	100% (8/8)	75% (6/8)	0% (0/3)	33.3% (1/3)	100% (2/2)
MRAB N=6			100% (5/5)	0% (0/4)		0% (0/2)	100% (3/3)
MRSA N=23	100% 23/23	100% 20/20					

	Eravacyclin MIC range and Median (mg/L)	Tigecyclin MIC range and Median (mg/L)
NDM-producing Enterobacteriaceae	N=20 MIC 0.064-12 Median = 0.19	N=18 MIC 0.064-16 Median = 0.22
OXA-48-like producing Enterobacteriaceae	N=3 MIC 0.75-2 Median = 1	N=3 MIC 0.75-3 Median =1.5
CRE with no common carbapenemase detected	N=8 MIC 0.125-0.75 Median = 0.5	N=8 MIC 0.19-1 Median = 0.47
multidrug-resistant *Acinetobacter baumannii complex*	N=6 MIC 0.5-2 Median = 1.5	N=6 MIC 1-4 Median = 1.75
methicillin-resistant *Staphylococcus aureus*	N=23 MIC 0.023-0.25 Median = 0.047	N=20 MIC 0.008-0.19 Median = 0.079

CLSI disc diffusion cutoff for E. Coli used for non-urine and non-E Coli isolates
*17/21 sensitive and 4/12 intermediate, no resistant isolate

Limitations

This study has several limitations. First, it was a single-center, retrospective analysis from a tertiary private hospital in Hong Kong, which may limit generalizability to other settings and patient populations. Second, the overall sample size was small, reducing the precision of susceptibility estimates. Finally, MICs were determined using Etest and interpreted using multiple guideline sources, which may introduce variability when comparing results across studies.

Conclusion

Eravacycline demonstrated moderate in vitro activity against NDM-producing and non-carbapenemase-producing CRE but no activity against OXA-48-like producers, whereas cefiderocol and colistin were the most consistently active agents against CRE overall in this cohort. Eravacycline and tigecycline retained excellent in vitro activity against MRSA, and eravacycline showed low MICs against MRAB, although formal breakpoints are lacking. These findings suggest that eravacycline may represent a useful carbapenem-sparing option for selected multidrug-resistant Gram-negative and Gram-positive infections in our setting, while cefiderocol and colistin remain key agents for OXA-48-like and other highly resistant CRE, but larger multicenter studies with clinical outcome data are needed to validate these observations.