

Antibacterial activity of Eravacycline, a novel fluorocycline, compared to established antimicrobials, against contemporary clinical isolates from Tanta, Egypt

M. M. El-Bouseary^{1,2}, J. M. Tyrrell², T. R. Walsh², M. Olesky³

¹ Department of Pharmaceutical Microbiology, Faculty of Pharmacy, Tanta University, Egypt; ² Department of Medical Microbiology and Infectious Diseases, Cardiff University, Heath Park, Cardiff, UK; ³ Tetrphase Pharmaceuticals, Watertown, MA, USA



2575
27th ECCMID
Apr 22nd – 25th
2017
Vienna
Austria

Introduction

Infections caused by multidrug-resistant (MDR) and extensively drug-resistant (XDR) Gram-negative bacteria are a serious global public health concern and remain a driving force for antibiotic drug discovery efforts. Eravacycline (ERV, Tetrphase Pharmaceuticals) is a novel, fully-synthetic fluorocycline antibacterial drug that retains activity against the primary acquired mechanisms of resistance against tetracycline-class antibiotics (i.e., efflux and ribosomal protection). Herein we evaluate the *in vitro* antimicrobial activity of ERV against clinical Gram-negative pathogens, including *Enterobacteriaceae*, *Pseudomonas* spp., and *Acinetobacter* spp., from hospitalized patients in Tanta, Egypt.

Material/methods

MICs for ERV and selected comparator antibiotics were determined using microbroth dilution assays.

Results were interpreted using EUCAST guidelines.

Results

Isolates tested were: *Klebsiella pneumoniae* (n=123), *Escherichia coli* (n=83), *Providencia* spp. (n=52), *Enterobacter* spp. (n=19), *Proteus* spp. (n=23), *Pseudomonas* spp. (n=67), *Acinetobacter* spp. (n=16), and a miscellaneous group (n=27). Genes encoding carbapenemases were: *bla*_{NDM}-positive (33.5%), *bla*_{VIM}-positive (20%) *bla*_{OXA-48}-positive (7%) and *bla*_{CTX-M}-positive (39%).

MIC₉₀s of all comparator antibiotics against both *Enterobacteriaceae* and *Non-Enterobacteriaceae* were above resistance breakpoints as defined by EUCAST. ERV recorded MIC₅₀ and MIC₉₀ of 1µg/ml and 8µg/ml against *Enterobacteriaceae*; favourable to all antibiotics tested except colistin (Table 1). In the case of *Non-Enterobacteriaceae*, ERV showed a MIC_{50/90} values of 0.125/8 µg/ml against *Acinetobacter* spp. and 16/32 µg/ml against *Pseudomonas* spp.

MIC_{50/90} values of ERV against *bla*_{NDM}-positive, *bla*_{VIM}-positive and *bla*_{OXA-48}-positive *Enterobacteriaceae* were 1/4 µg/ml, 2/4 µg/ml and 1/>2 µg/ml respectively.

Conclusions

- ERV showed a valuable *in vitro* antimicrobial activity against tested MDR/XDR Gram-negative organisms which is demonstrated by the lowest MIC₅₀s and MIC₉₀s values.
- ERV demonstrated potent activity against wide range of clinical, pathogenic bacterial species.
- ERV may be a potential therapeutic option for the management of multidrug-resistant organisms.

Email: el-bousearym@cardiff.ac.uk

Table 1: MIC_{50/90} values of *Enterobacteriaceae* (n=327) & *Non-Enterobacteriaceae* (n=83) against Eravacycline and comparator antimicrobials.

Antibiotic	<i>Enterobacteriaceae</i>					<i>Non-Enterobacteriaceae</i>		
	Total n=410	<i>K. pneumoniae</i> n=123	<i>E. coli</i> n=83	<i>Providencia</i> spp. n=52	<i>Enterobacter</i> spp. n=19	Total n=83	<i>Acinetobacter</i> spp. n=16	<i>Pseudomonas</i> spp. n=67
Eravacycline	1 / 8	1 / 4	0.25 / 2	2 / 8	1 / 4	16 / 32	0.125 / 8	16 / 32
Tigecycline	4 / 8	4 / 8	2 / 4	8 / 8	4 / 8	16 / 32	2 / 16	32 / >32
Tetracycline	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8
Minocycline	-	-	-	-	-	>16 / >16	0.25 / >16	>16 / >16
Colistin	0.5 / >2	0.5 / >2	0.5 / 1	>2 / >2	0.5 / >2	1 / >4	1 / >4	1 / >4
Cefepime	>8 / >8	>8 / >8	>8 / >8	8 / >8	>8 / >8	>16 / >16	8 / >16	>16 / >16
Ceftazidime	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>32 / >32	32 / >32	>32 / >32
Cefotaxime	>2 / >2	>2 / >2	>2 / >2	>2 / >2	>2 / >2	-	-	-
Gentamicin	>8 / >8	>8 / >8	>8 / >8	>8 / >8	>8 / >8	-	-	-
Amikacin	-	-	-	-	-	>32 / >32	1 / >32	>32 / >32
Levofloxacin	>2 / >2	>2 / >2	>2 / >2	>2 / >2	1 / >2	>8 / >8	0.5 / 8	>8 / >8
Meropenem	-	-	-	-	-	>16 / >16	4 / >16	>16 / >16
Ertapenem	>2 / >2	>2 / >2	>2 / >2	2 / >2	>2 / >2	-	-	-
Pip/Tazo	>64 / >64	>64 / >64	>64 / >64	>64 / >64	>64 / >64	>128 / >128	128 / >128	>128 / >128
Trim/Sulf	-	-	-	-	-	>32/608 / >32/608	>32/608 / >32/608	>32/608 / >32/608