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In vitro analysis of colistin-carbapenem combination activity against Acinetobacter spp infection

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Abstract

Introduction: Increasing carbapenem resistance in *Acinetobacter* spp calls for the appraisal of alternative strategies in *Acinetobacter* spp infection therapy. This study aims at evaluating colistin-carbapenem combination against *Acinetobacter* spp using the checkerboard, Etest, and time-kill methods.

Methodology: One hundred nonrepetitive *Acinetobacter* spp isolates were collected from patients admitted at the Saint-George-Hospital-University-Medical-Center over a one year period. The identification was performed using the API20NE and confirmed by the amplification of the *bla*$_{\text{OXA-51-like}}$. Susceptibility to colistin, and carbapenems were determined using the Etest, microdilution methods and interpreted according to the CLSI, 2015. Detection of the carbapenemases was performed by PCR amplification method. Clonality was determined by the 3-Locus PCR-typing and ERIC-PCR methods. The synergistic potential of the combination was determined by calculating the Fractional-Inhibitory-Concentration-Index, which determines a synergistic, additive, indifferent or antagonistic effect.

Results: In our study (84%) of the isolates were carbapenem resistant. Only one strain showed resistance to colistin. (99%) and (77%) of the *Acinetobacter* spp isolates harbored *bla*$_{\text{OXA-51-like}}$ and *bla*$_{\text{OXA-23-like}}$ respectively. (86.2%) of the *A.baumannii* isolates pertained to the International Clone II. An additive effect of the colistin-carbapenem combination was determined using the 3 methods. A decrease of 2.6 and 2.8 folds in the MIC of colistin was showed in colistin-meropenem and colistin-imipenem, respectively ($p < 0.001$). The Colistin-meropenem showed better effects when compared to colistin-imipenem ($p < 0.05$). Only a few isolates showed a synergistic effect in the time-kill assay.

Conclusion: Our study showed that the decrease in the MIC of colistin following colistin-carbapenem combination might be a promising antimicrobial approach for treating carbapenem-resistant *Acinetobacter* spp.

Key words: *Acinetobacter* spp; additive combination; ICII.

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