

The Lebanese LSIDCM

Prevalence of carbapenem resistance genes and corresponding MIC₉₀ in *Enterobacteriaceae* at a tertiary care center in Lebanon

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Abstract

Introduction: The aim of this study was to correlate genes involved in carbapenem resistance to MIC levels among clinical ESBL and non-ESBL producing carbapenem resistant *Enterobacteriaceae* (CRE) isolates of *Escherichia coli* and *Klebsiella pneumoniae*.

Methodology: *E. coli* (n = 76) and *K. pneumoniae* (n = 54), collected between July 2008 and July 2014, were analyzed. The MICs were determined against ertapenem (ERT), imipenem (IMP) and meropenem (MER). PCR was performed on all 130 isolates to amplify the resistance and outer membrane proteins (OMPs) encoding genes: *bla*_{OXA-48}, *bla*_{NDM-1}, *bla*_{TEM-1}, *bla*_{CTX-M-15}, *ompC* and *ompF*. Sequencing was performed on selected isolates.

Results: The prevalence of *bla*_{OXA-48}, *bla*_{NDM-1}, *bla*_{TEM-1}, and/or *bla*_{CTX-M-15} among *E. coli* isolates were 36%, 12%, 20% and 80%, respectively, while among *K. pneumoniae* they were 37%, 28%, 28% and 72%, respectively. *K. pneumoniae* isolates positive for any of these genes had an MIC₉₀ > 32µg/mL against ERT, IMP and MER, while in *E. coli* isolates there was a variation in the MIC₉₀ values. Porin impermeabilities were due to mutations in *ompC* and *ompF* genes in *E. coli*, and loss of *ompC* and *ompF* genes in *K. pneumoniae*, and increased MIC₉₀ values.

Conclusion: The presence of more than one carbapenem resistance encoding gene and/or ESBL encoding gene did not have an effect on the MIC₉₀ value in *K. pneumoniae* isolates, while in *E. coli* it showed higher MIC₉₀ values.

Key words: Enterobacteriaceae; CRE; MIC₉₀.

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