Acta Microbiol Immunol Hung . 2022 Jun 28.

Activity of meropenem-vaborbactam against different beta-lactamase producing Klebsiella pneumoniae and Escherichia coli isolates in Iran

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Abstract

We evaluated the activity of meropenem-vaborbactam against different beta-lactamase producing Klebsiella pneumoniae and Escherichia coli isolates. In our study antibiotic susceptibility testing, double disk synergy test, modified Hodge test were applied. Detection of ESBL, AmpC, and carbapenemase genes was performed by PCR. Multilocus sequence typing (MLST) analysis was done on OXA-48 producing K. pneumoniae strains. Our results showed that among E. coli and K. pneumoniae isolates, 41.1% and 40% of strains produced ESBL, respectively. Additionally, the prevalence of AmpC producing K. pneumoniae and E. coli was 4% and 45.5%, respectively. Altogether 64.2% of K. pneumoniae strains and one E. coli isolate produced carbapenemase. Among OXA-48 producing K. pneumoniae strains ST3500 and ST2528 were detected by MLST. Based on the phenotypic results of this study, vaborbactam was an effective inhibitor on the third-generation cephalosporin-resistant isolates ($P < 0.0001$). Meropenem-vaborbactam combination had the highest efficacy on KPC producing strains, and it had limited activity on isolates producing OXA-48 type beta-lactamases, whereas no effect was observed on NDM-1 producing isolates. Our study provided valuable information regarding the vaborbactam inhibitory effect on β-lactamase-producing strains.

Keywords: AmpC; E. coli; ESBL; K. pneumoniae; KPC; vaborbactam.