Short Communication

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Phenotypic Identification and Genotypic Characterization of Plasmid-Mediated AmpC β -Lactamase-Producing *Escherichia coli* and *Klebsiella pneumoniae* Isolates in Iran

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Abstract

One of the mechanisms of *Klebsiella pneumoniae* and *Escherichia coli* resistance to β -lactam antibiotics is the production of β -lactamase enzymes. Among these are the AmpC β -lactamases, which confer resistance to a class of antibiotics. However, little is known about the AmpC β -lactamases of *K. pneumoniae* and *E. coli* clinical isolates in Qazvin, Iran. This study was designed to assess the AmpC β -lactamases-producing strains and also identify the prevalence of AmpC β -lactamases genes. Antimicrobial susceptibility tests were performed on 435 *K. pneumoniae* and *E. coli* isolates using disk diffusion technique. Plasmid-mediated AmpC genes were studied using a multiplex PCR assay. The AmpC β -lactamase-producer isolates were studied by employing cefoxitin disk diffusion test, AmpC induction test, AmpC cefoxitin-EDTA test, and boronic acid disk test. Our results showed that of 46 (18.4%) cefoxitin-insensitive *E. coli* isolates, 10 (21.7%) were positive for AmpC β -lactamase genes, among them 4 (8.69%) isolates were positive for *bla*_{DHA} genes and 6 (13%) for *bla*_{CIT} genes. Of 57 (30.4%) cefoxitin-insensitive *K. pneumoniae* isolates, 10 (17.5%) were positive for AmpC gene with 4 (6.34%) and 6 (9.5%) isolates positive for *bla*_{DHA} and *bla*_{CIT} genes, respectively. However, no *MOX*, *ACC*, *FOX*, or *EBC* genes were detected in the isolates. Considering the results of different confirmatory phenotypic tests, the AmpC cefoxitin-EDTA test showed a higher discriminatory power for detecting AmpC β -lactamase-producing strains. The specificity and sensitivity of AmpC cefoxitin-EDTA were 77%, 100% for *K. pneumoniae* and 70%, 90% for *E. coli* higher than the other two tests, respectively. Also, the authors demonstrated high prevalence rate for resistance to certain antibiotics, such as cefuroxime, trimethoprim-sulfamethoxazole, ampicillin, and cefotaxime. In conclusion, our study provided valuable information regarding the plasmid-mediated AmpC β -lactamase gene content, antibiotic resistance, and confirmatory phenotypic tests for AmpC β -lactamases in *E. coli* and *K. pneumoniae* isolates from clinical sources.