

Genotypic Versus Phenotypic Methods to Detect Extended-Spectrum Beta-Lactamases (ESBLs) in Uropathogenic *Escherichia coli*

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Background & Objectives: The rapid spread of resistance to broad-spectrum beta-lactams in pathogenic strains of bacteria has recently become a major health problem in the world. It causes antibiotics ineffectiveness, increased severity of illness and cost of treatment. The aim of this study was to compare phenotypic and genotypic methods to determine the susceptibility pattern of *E.coli* isolates to beta-lactam antibiotics.

Methods: A total of 246 *E. coli* samples were isolated from different clinical laboratories located in the city of Tehran and confirmed by biochemical tests. The antibiotic susceptibility of *E. coli* isolates were determined by disc-diffusion methods. Antimicrobial agents tested included Cefoxatime, Ceftazidime, Imipenem, Nalidixic acid, and Ciprofloxacin. The combined disc test was used to confirm the results. The results were compared with Clinical and Laboratory Standards Institute (CLSI). All samples were thereafter investigated for the presence of CTX-M, TEM, and SHV genes by PCR.

Results: Out of 246 *E. coli* isolates tested, 116 were resistant to Cefotaxime and Ceftazidime, of which 109 (44.3%) were ESBL positive by combined disc test. However, the number of isolates determined positive for ESBL by genotypic methods was 143 (58.1%). of 109 isolates determined positive by phenotypic methods, 41 (37.6%) included all three genes. A number of 34(13.8%) isolates showed to be ESBL positive by PCR but negative by combined disc test.

Conclusion: The results of this study showed that some antibiotic sensitive isolates were carrying resistance genes. Such strains have the potential to turn into resistance. Therefore, the genotypic methods due to detection of resistance genes has a higher specificity and sensitivity in compare to the phenotypic methods, and is suggested to be used as the methods of choice for detection of ESBL producing strains of *E. coli*.

Keywords: ESBL; *Escherichia coli*; CTX-M; TEM; SHV Genes