

Abstract

Background and Objectives: Antibiotic resistance has increased over the last few years and is going to become a serious global public health threat in the future. Integrons as mobile genetic elements, play a critical role in distributing drug resistance genes among bacteria. The aim of this study was to investigate the frequency of Class 1 and 2 integron in *Escherichia coli* isolates, isolated from patients with urinary tract infection referred to hospitals affiliated with the Ardabil University of Medical Sciences and determines the relationship of integrons with resistance to multiple drugs. Finally, genetic diversity of isolates was characterized using method ERIC-PCR.

Methods: In this descriptive cross-sectional study, a total of 163 samples of *E.coli* isolated from patients with urinary tract infection (UTI). *Escherichia coli* species was confirmed using biochemical and molecular tests. The susceptibility of these isolates to 12 common antibiotics which are used to treatment of UTI was investigated using the disk diffusion method based on CLSI guidelines. Multi-drug resistance, production of ESBL and AmpC enzymes were evaluated using both phenotypic diagnostic discs and molecular tests. Then by PCR method, the prevalence of Integron 1 and 2 genes and also the prevalence of CTX-M, SHV and TEM genes in relation to the production of ESBL enzymes were investigated. Finally, genetic diversity of isolates was analyzed using ERIC-PCR method.

Results: Of 163 samples, 138 (84.7%) samples had MDR resistance. The lowest and highest resistance was seen to nitrofurantoin (1.2%) and ampicillin (89.6 %) respectively. The frequency of class 1 and 2 integrongs was about 39.9% and 14.1% respectively. Class 3 integron was not detected in any of the samples. Statistical analysis indicated that there was a significant relationship between the presence of integrons and the multi-drug resistance. Also, there was a significant relationship between the presence of Class 1 integron and resistance to trimethoprim-sulfamethoxazole, class2 integron and resistance to trimethoprim-sulfamethoxazole and ciprofloxacin antibiotics. Of the 163 samples, 76 samples produced ESBLs enzymes and the prevalence of CTX-M, SHV and TEM genes were 16.0, 1.8, and 14.1%, respectively.

Conclusion: due to the significant relationship between the presence of integrons and the resistance to antibiotics, these elements contribute to the development of drug resistance. This study indicated that the rate of imipenem resistance has increased compared to previous studies. Also, amikacin and nitrofurantoin were the most effective drugs against the isolates. Our finding showed that the level of multi-drug resistance has increased and the rational *use* of antibiotics is urgently *needed*.

Key words: *Escherichia coli*, UTI, Multi-drug resistance, Integron