

## **Evaluation frequency of class 1 and 2 integrons in *Acinetobacter baumannii* isolates collected from patients admitted to Ardabil university of medical sciences hospitals**

### **Abstract**

**Background:** *Acinetobacter baumannii* is a gram-negative and opportunistic coccobacillus. This opportunistic pathogen causes many problems due to its resistance to several drugs and has been considered as one of the most important causes of nosocomial infections, especially in the intensive care unit worldwide. Drug resistance studies in this bacterium have shown that a number of resistance genes are located on integrons.

**Aim:** The aim of this study was to investigate the frequency of class 1 and 2 integrons and their relationship with drug resistance.

**Materials and Methods:** In this descriptive, Cross-sectional and descriptive-analytical study, 100 isolates of *Acinetobacter baumannii* recovered from patients referred to Imam Khomeini and Bouali hospitals in Ardabil province during 2020-2018. After identification of isolates by biochemical and molecular methods, the pattern of their antibiotic resistance was determined by disk diffusion method and the minimum inhibitory concentration (MIC) of ciprofloxacin were determined by agar dilution methods according CLSI guidelines. The presence of class 1, 2, 3 and integrons of class 1 integron (*aadA1*) were evaluated using PCR technique. also, in this study, the presence of mutation in *gyrA* and *parC* genes and also, quinolone resistance genes including *qnrA*, *qepA*, *aac(6')-Ib-cr* was investigated using PCR and sequencing methods in this study and sequencing. The genetic relationship of the isolates was determined using ERIC-PCR method.

**Result:** In this study, the antibiotic resistance of the isolates were between %78 - %100. The highest resistance was related to cefazolin %100, ciprofloxacin %99, imipenem %99, cefotaxime %98 meropenem %98, ceftazidime %97, cefpime %89, gentamicin %82, amikacin %78 respectively. The highest sensitivity was observed in polymyxin B ( %100). The prevalence of MDR strains was %99. Class 1 integrons showed more prevalent among *Acinetobacter baumannii* strains than class 2 integrons. Class 1 and 2 integrons were observed in %70 and %21 of the strains, respectively, but class 3 integrons were not detected in any of the strains. There was no significant relationship between MDR strain and class 1 (P-value=0.243) and 2 (P-value=0.915) integrons. Class 1 integron gene cassette (*aadA1*) was detected 70 strains (%100) carrying class 1 integron. According to the results of MIC, %98/9 the strains were resistant to ciprofloxacin. A single amino acid substitution (S83L) was found in *gyrA* gene in 6 strains of *Acinetobacter baumannii* ( MIC $\geq$ 1024 ), but no mutation was observed in the *parC* gene. The *aac(6)-Ib-cr* gene was identified in two strains, but the *qnrA* and *qepA* genes were not found in either strain.

**Conclusions:** The findings showed that multidrug resistance increased, and a high prevalence of integrons was observed among clinical isolates. No significant relationship was observed between class 1, 2 integrons and multidrug resistance. Polymyxin B was the most effective drug against isolates. Our findings highlights the essential need for the continuous monitoring of resistance, adherence to health guidelines, and administration of appropriate doses of drugs to prevent the spread of resistant strains.

**Keywords:** *Acinetobacter baumannii*, nosocomial infections, integron, PCR