

## **Molecular analysis of fluoroquinolones resistance in clinical isolates of *Pseudomonas aeruginosa* in Ardabil**

### **Abstract**

**Background:** Ciprofloxacin is one of the most effective antibiotics against *Pseudomonas aeruginosa* (*P. aeruginosa*) infections. However, the prevalence of ciprofloxacin-resistant *P. aeruginosa* isolates is increasing in the world.

**Aim:** In the current study, we assessed ciprofloxacin resistance rate, the mechanism of resistance to ciprofloxacin and also clonal relationships among ciprofloxacin-resistant *P. aeruginosa* in Ardabil.

**Materials and Methods:** Applying phenotypic and genotypic methods, a total of 84 isolates of *P. aeruginosa* were collected from clinical specimens in Ardabil hospitals. *P. aeruginosa* resistance to ciprofloxacin antibiotic was evaluated using disk diffusion test. Genomic DNA was extracted using boiling method. Amplification of the *gyrA*, *gyrB*, *parC* and *parE* genes and analysis of gene mutations and amino acid alterations were performed through polymerase chain reaction (PCR) and sequencing assays. Finally, genetic diversity of ciprofloxacin-resistant *P. aeruginosa* isolates was determined by the enterobacterial repetitive intergenic consensus-PCR (ERIC-PCR) typing method.

**Results:** *P. aeruginosa* resistance to ciprofloxacin was 48.8%. The most prevalent missense mutations in the QRDR regions of target genes were as follows: Thr83Ile and Asp87Asn in the GyrA subunit, and Ser87Leu and Ser87Trp in the ParC subunit. There were no amino acid alterations in the GyrB and ParE subunits in ciprofloxacin-resistant *P. aeruginosa* isolates. In addition, ciprofloxacin-resistant *P. aeruginosa* were divided into 34 ERIC-PCR types, out of which type 27 was the most prevalent genotype.

**Conclusion:** *P. aeruginosa* resistance to ciprofloxacin was high in our study and missense mutations were involved in ciprofloxacin resistance. Hence, continuous monitoring of ciprofloxacin resistance along with genotyping of resistant isolates and identification of other mechanisms of resistance are recommended for a better management of *P. aeruginosa* infections.

**Key words:** *Pseudomonas aeruginosa*; antibiotic resistance; mutation; ciprofloxacin.