

**The phenotypic and genotypic identification of carbapenemase producing  
*Escherichia coli* isolates from patients with urinary tract infections, referring  
to Ardabil University of Medical Sciences affiliated hospitals, in 2017**

**Abstract**

**Background and Objective:** Urinary tract infection (UTI) is one of the most prevalent infectious along with upper respiratory tract infection. Due to the importance of uropathogenic bacteria in the advancement of life-threatening infections in children, resistance to extended-spectrum-beta-lactamase (ESBLs) is the most significant health problems. Beta-lactamases that hydrolyze carbapenems are potent beta-lactamases that can hydrolyze almost all of the  $\beta$ -lactams. *Escherichia coli* and *Klebsiella pneumoniae* are the most consistent among the bacteria implicated in UTI.

**Methods:** Urine samples (early morning mid-stream) for 6 months in hospitals affiliated to Ardabil University of Medical Science along with gathering social and demographic characteristics like gender, age, residency, and special disease from eligible patients. we conducted an empirical study to determine the MIC and resistance pattern to carbapenems in *E. coli* isolates(n=200). In order to detect carbapenemases by phenotypic methods, CIM and Carba NP tests were performed and genotypic PCR assay was performed. ERIC-PCR was performed to determine the clonal relationship between strains resistant to carbapenem. In order to determine the frequency of O25-ST131 clone, a PCR was performed for all samples collected, and sequencing was performed using multiple PCR product assays to ensure results.

**Results:** According to Antibiogram results, 33% were resistant, 3% were intermediate and 64% were imipenem sensitive. According to MIC through the imipenem utilization, 37% of the samples were resistant, 6% intermediate and 57% sensitive. 100% of samples that did not have carbapenemase genes, in the CIM and Carba NP test, had negative results.

In this study, genes encoding antibiotic resistance were not proved by the PCR method; however, factors such as permeability, efflux pump and ... are playing an important role in carbapenem resistance.

ERIC-PCR method was used to determine the molecular association of isolated bacteria and became clear that the strains are classified in the 39 cluster with a similarity percentage of 80.

By performing PCR, it was found that among the collected samples, O25-ST131 clone prevalence is 99%.

**Conclusion:** The results of our study showed that *Escherichia coli* is the most common cause of urinary tract infection among urine samples collected from hospitals in Ardabil city. Also, the data obtained from our study are consistent with the results of other studies in Iran.

**Keywords:** *Escherichia coli*, carbapenemas, urinary tract infections