Antibiotic resistance pattern and assessment of Temorina gene in clinical strains of extended-spectrum beta-lactamase enzyme producing *Escherichia coli* isolated from patients, Babol City, Mazandaran Province

Zohreh Eslam Doost[1], Esmaeil Fattahi[1], Samaneh Rouhi[2], Karo Servatyari[3], Pegah Shakib[4], Saba Asadollahi[5], Fatemeh Zaboli[1]*

1Department of Biology, Faculty of Agriculture and Food Industry, Ayatollah Amoli Branch, Islamic Azad University, Amol, Iran; 2Medical Microbiology Research Center, Qazvin University of Medical Sciences, Qazvin, Iran; 3Student Research Committee, Kurdistan University of Medical Sciences, Sanandaj, Iran; 4Razi Herbal Medicines Center, Lorestan University of Medical Sciences, Khorramabad, Iran; 5Student Research Committee, Department of Microbiology, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran.

Correspondence: Fatemeh Zaboli. Department of Biology, Ayatollah Amoli Branch, Islamic Azad University, Amol, Iran.microbiol_sci@yahoo.com

ABSTRACT

Introduction: Escherichia coli (E. coli) bacteria are a common cause of various clinical infections. Resistance of this bacteria to several common antibiotics due to production of extended spectrum beta-lactamase (ESBL) enzyme has caused therapeutic problems. The aim of this study was to determine the resistance pattern to beta-lactam antibiotics and also to assess the Temorina (TEM) gen in the E. coli strains isolated from the patients in Babol, Iran.

Methods: This cross-sectional study was conducted in 2014 at Babol County, Iran. The E. coli strains were isolated and identified by standard laboratory tests. The sensitivity test to beta-lactam antibiotics was performed by combined disk method. The TEM gene was identified in the resistant strains by the polymerase chain reaction (PCR) method. The data were analyzed by SPSS 20 and by using T-test and Chi-squared tests.

Results: Of the 10,341 clinical samples, 525 E. coli isolated of which 200 (38%) were ESBL-producing strains. Piperacillin-tazobactam, amikacin, ampicillin-sulbactam and ampicillin (98%, 90.33%, 86.4% and 76.60%, respectively) had the most inhibition effect on the strains. Highest antibiotic resistance was observed for ceftriaxone (43.80%) and ciprofloxacin (38.74%). PCR showed that 80% (n=160) of the resistant strains had the TEM gene. There was a significant correlation between TEM gene and the production of ESBL ($P < 0.05$).

Conclusion: Resistance to antibiotics was observed in this study. Resistant and ESBL-producing strains of E. coli had TEM gene. The clinicians should be aware of antibiotic resistant pattern to choose effective medicines for treatment of these infections.

Keywords: Escherichia coli Antibiotic resistance pattern Extended-spectrum beta-lactamase Temorina