

Study of the Prevalence and Antibiotic Resistance Pattern in Broad-Spectrum Beta-Lactamase Producing Enterobacteriaceae of Phenotypic and Genotypic Isolated From Clinical Specimens in University Medical Science Hospitals in Arak by Using PCR

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Background & Objectives: Broad-spectrum beta-lactamase producing bacteria (ESBL) due to the ability to hydrolyze most beta-lactam antibiotics are considered as a serious problem. Since the incidence of infections caused by ESBL-producing Enterobacteriaceae is increasing worldwide, the aim of this study was to determine the antibiotic resistance pattern and prevalence of broad-spectrum beta-lactamase producing Enterobacteriaceae isolated from clinical specimens in Arak teaching Hospitals using PCR.

Methods: In this study ,350 of Enterobacteriaceae isolated from clinical specimens in university medical science Hospitals Were cultured and identified according to standard Methods. Antibiotic sensitivity test was performed using disk-diffusion Methods according to instructions CLSI(Clinical and Laboratory Standards Institute). To final approval production ESBL of resistant isolates to Ceftazidime and Cefotaxime were studied to Combined Disk methods. The MICs were determined using Micro broth Dilution Methods .DNA extracted chromosomal by simple boiling Methods ,The existence beta-lactamase genes using specific primers for each gene were examined by PCR methods.

Results: In this study resistance of Enterobacteriaceae strains to antibiotics Amoxycylav, Ceftriaxone, Cefotaxime, Ceftazidime, Cefoxitin, Cefotetan, Meropenem and Imipenem were respectively:81.7% ,68.5% ,56.5%, 48.8%, 28%, 12% ,5.7% ,2%. Also ,154 strains (44%) were ESBL positive, 49 strains (14%) were ESBL negative. The MICs of the resistant isolates for Ceftazidime ranged between 16 and $\geq 512\mu\text{g/ml}$, whereas for Cefotaxime they ranged between 64 and $\geq 512\mu\text{g/ml}$. According PCR Methods were TEM positive in 144 strains (93.5%), SHV positive in 59 strains (38.3%), CTX-M1 positive in 142 strains (92.2%), CTX-M2 positive in 44 strains (28.5%), CTX-M8 positive in 28 strains (17.5%) and CTX-M9 positive in 59 strains (38.3%).

Conclusion:The result of this study Imipenem is the most effective antibiotic, on the other hand, this study suggests that since the bacteria of ESBL- producing Enterobacteriaceae family among patients have a high prevalence. Increasing species is often due irrational prescribing antibiotics that resolve this problem is requires deployment new antimicrobial agents and increased utilization of infection control tools.

Keywords: Antibiotic Resistance; Extended Spectrum Beta-lactamase (ESBLs); Combined Disk Methods; Minimum Inhibitory Concentration(MICs); Beta Lactamases Genes; PCR