

Determination of Carbapenem Resistance and Mutant Prevention Concentration *Escherichia Coli* and *Klebsiella Pneumoniae* Strains Producing Extended Spectrum Beta Lactamases and Plasmid Mediated Ampc Beta Lactamases

Gülşen Altınkanat Gelmez, Güner Söyletir

Marmara University, School of Medicine, Department of Medical Microbiology, İstanbul

Objective: To determine mutant prevention concentrations of carbapenems and resistance development during carbapenem treatment of infections due to extended spectrum beta lactamase (ESBL) and/or pAmpC beta-lactamase producing bacteria.

Method: *Escherichia coli* and *Klebsiella pneumoniae* isolates having imipenem and meropenem MIC=<1mg/L and producing at least one of ESBL, pAmpC or carbapenemase enzymes (n=80) as test group and, isolates negative for all tested enzymes as control group were included in the study. Imipenem, meropenem, doripenem, ertapenem MIC and MPC values were determined by agar dilution method for tested organisms.

Results: MPC90 values were in susceptible range for ESBL negative isolates however, MPC90 values increased to 2-8 mg/L for ESBL positive and pAmpC positive isolates. MPC values were higher as 2-9 dilutions in ESBL producing strains compared to non-ESBL strains; mutant selection rate was not affected by any of ESBL enzymes (TEM, SHV, CTX-M). All strains that were carbapenemase producer but having MICs in susceptible category for carbapenems demonstrated very high MPCs(>256 µg/ml). In ESBL(+) strains, imipenem and meropenem even in very low MICs (0,015-0,06 µg/ml) have selected carbapenem resistant mutants in a rate of 50%.

Conclusion: According to the results, i) ESBL and pAmpC production bring about selection of carbapenem resistant mutants even though strains are carbapenem susceptible in routine tests, ii) Infections caused by strains with carbapenem MICs in susceptible range but producing carbapenemase may have high probability of treatment failure, iii) Among carbapenems, doripenem and ertapenem have the lowest imipenem and meropenem have the highest potential for mutant selection.

Key words: Mutant Prevention Concentration (MPC), carbapenem resistance, enterobacteriaceae