

Comparative Evaluation of Disc Diffusion Measurements with Minimum Inhibitory Concentration values in Meropenem Susceptibility of Enterobacteriaceae Isolates

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Abstract

Meropenem is a broad-spectrum antibiotic used to treat resistant bacterial infections. Disc diffusion testing is the routine method used for antibiotic sensitivity. Knowledge on Minimum Inhibitory Concentration (MIC) of sensitive and resistant isolates is important in treatment decisions and predicting the future usefulness of the drug. The study aimed to determine the most effective susceptibility test for meropenem against Enterobacteriaceae by comparing MIC values from Epsilometer test (E test) with disc diffusion test. Sixty isolates resistant to first line antibiotics from patient clinical specimens were collected. Meropenem sensitivity was tested and read using disc diffusion method according to Clinical Laboratory Standards Institute 2022 standards and MIC was determined using E test strips. Data demonstrated a normal distribution ($p=0.32$) where 51.7% of total samples ($n=31$) reported as resistant and 48.3% of total samples ($n=29$) reported as sensitive for both test approaches. MIC of sensitive samples was in 0.016 - 1 μ g/ml range and the interpreted results were correlated with disc diffusion measurement results. No statistical difference in results was observed between two test methods ($p=0.34$). However, MIC values of 46.7% was not detected by E test suggesting their MIC values lie beyond the E strip range (0.002 - 32 μ g/ml). A significant correlation ($p=0$) and a perfect agreement ($\kappa=1$) between E test and disc diffusion methods were reported indicating susceptibility interpreted from the two test approaches were compatible. In conclusion, both approaches were effective susceptibility tests of meropenem for Enterobacteriaceae isolates.

Keywords: *E test, Disc diffusion, Meropenem.*