ABSTRACT

MUTANT PREVENTION CONCENTRATION OF MEROPENEM FOR MEROPENEM SENSITIVE AND RESISTANT ACINETOBACTER BAUMANNII FROM ISOLATES OF ICU PATIENTS

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Acinetobacter baumannii are opportunistic bacteria that are increasingly implicated in severe nosocomial infections. Meropenem is commonly used for the treatment of infections with these organisms for critically ill patients. However, there are increasing reports of meropenem resistance among these bacteria worldwide. Meropenem resistance in Acinetobacter baumannii may occur through several mechanisms, which include outer membrane changes, production of efflux pumps, and β-lactamases production to hydrolyze meropenem. Several approaches have been done to decrease the emergence of resistance during the treatment course in order to improve treatment outcomes and keep the antibiotics for future use. One such approach is the implementation of the Mutant Prevention Concentration (MPC). The MPC is a pharmacodynamic parameter that is aimed at suppressing the emergence of resistance throughout antimicrobial treatment. It is defined as the concentration that prevent the growth of the first stepmutants. The Mutant Selection Window (MSW) or MPC/MIC ratio is the difference between the MPC and the MIC (Minimum Inhibitory Concentration) and it describes the concentration range in which microorganisms tend to mutate and are selected for.

Purpose: The aim of this study are to determine MPC of meropenem for Acinetobacter baumannii isolates from ICU patients, to analyze the MPC difference of meropenem among clinical isolates of meropenem sensitive and resistant Acinetobacter baumannii, and to determine MPC/MIC ratio of meropenem among clinical isolates of meropenem sensitive and resistant Acinetobacter baumannii.

Method: A total of 6 clinical isolates of meropenem sensitive and 20 clinical isolates of meropenem resistant Acinetobacter baumannii were tested. The MIC was determined according to the CLSI guidelines for meropenem using broth macrodilution method. The MPC was determined using the agar plate dilution method.

Result: The mean MPC of meropenem among meropenem sensitive group was lower than meropenem resistant Acinetobacter baumannii group, P=0,124 ([122,67 ± 104,02] vs [252,8 ± 189,7]). Mean MPC/MIC ratio of meropenem among meropenem sensitive group was greater than meropenem resistant Acinetobacter baumannii group, P=0,000 ([172,00 ± 173,34] vs [2,10 ± 0,91]). MPC value of meropenem for Acinetobacter baumannii isolates from ICU patients is 512 μg/mL because this value will cover all meropenem sensitive and resistant Acinetobacter baumannii isolates.

Conclusion: There is no difference in MPC of meropenem between sensitive and resistant Acinetobacter baumannii clinical isolates. The MPC/MIC ratio of meropenem among meropenem sensitive group is greater than meropenem resistant Acinetobacter baumannii group. The MPC value of meropenem for
Acinetobacter baumannii isolates that should be given in ICU patients is 512 μg/mL.

**Keyword:** Acinetobacter baumannii, Mutant Prevention Concentration, Meropenem, Intensive Care Unit