

Prevalence of CTX M Extended-Spectrum Beta-Lactamases in Clinical Gram-Negative Bacteria

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Background: Research reports about molecular characterization of CTX M extended spectrum β -lactamases are fragmentary from Bahrain.

Objective: To characterize Gram-negative bacterial isolates for the prevalence of specific Geno-groups and Geno-types of CTX M extended-spectrum β -lactamases.

Design: A Prospective Point Prevalence Study.

Setting: Pathology Department, King Hamad University Hospital, Bahrain.

Method: Forty-seven Gram-negative bacterial isolates resistant to third (3GC) and/or fourth-generation cephalosporins (4GC) and 16 Gram-negative isolates susceptible to these classes of cephalosporins were studied. The bacterial identification and antibiotics sensitivity was performed by automated systems. Isolates were further characterized for CTX M geno-groups and types by multiplex PCR, monoplex PCR and sequencing of the representative isolates.

Result: The majority of the isolates were found to be multiple-drug resistant showing concomitant resistance of cephalosporins with other classes, such as fluoroquinolones and aminoglycosides. However, this collection of bacterial isolates was persistently sensitive to carbapenems such as imipenem and meropenem. In addition, few isolates demonstrated resistance to tigecycline.

Sixty-three isolates were studied; 47 (74.6%) showed resistance to 3GC and/or 4GC. Multiplex PCR demonstrated the presence of blaCTX M in 45 (95.7%) isolates. Further confirmation with multiplex and monoplex PCR revealed 41 (91.1%) and 4 (8.9%) bacterial isolates harboring blaCTX M Geno-group 1 and blaCTX M Geno-group 9, respectively. Out of 16 3GC/4GC sensitive isolates, 3 (18.8%) had CTX M genes, all were Geno-group 1. Sequencing revealed the presence of CTX-M 15 type ESBL from Geno-group 1 positive isolates; however, Group 9 isolates did not reveal any CTX-M type, rather they were non-specific amplifications.

Conclusion: Bahraini G-ve bacterial population demonstrated multi-drug resistance to antibiotics. CTX M 15 type of ESBL is prevalent in Bahrain.

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