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Poster Session IV
Molecular epidemiology and surveillance of MDR Pseudomonas and Acinetobacter

EMERGENCE AND SPREAD OF BLANDM-1 ALONG WITH BLAOXA-23 AMONG ACINETOBACTER BAUMANNII CLINICAL ISOLATES FROM EGYPT

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Background

The emergence of multidrug-resistant *Acinetobacter baumannii* human infections, especially in intensive care units, has become a serious problem worldwide. *A. baumannii* has acquired resistance almost to all antimicrobial agents, including broad-spectrum beta-lactams, aminoglycosides, and quinolones. Resistance to carbapenems has emerged as a major public health problem worldwide that was mainly mediated by D carbapenamases. However, NDM-1, a class B metallobetalactamase, has recently emerged as a new gene conferring resistance to carbapenems that is able to spread in *A. baumannii.*

Objectives

The main objective of this study was to decipher the molecular mechanism of carbapenem resistance in a large series of *A. baumannii* clinical isolates from several Egyptian hospitals.

Methods

In our study a total number of 950 specimens from 950 patients were collected from inpatients and outpatients at Mabart-El-Asafrah hospital (Alexandria), El-Demerdash hospital and National Cancer Institute Cairo-Egypt from July 2012 to September 2013. Out of 950 bacterial isolates, 150 isolates (15.79%) were identified as *A. baumannii* primarily by biochemical tests and VITEK-2c system and confirmed by matrix-assisted laser desorption ionization–time of flight (MALDI-TOF) mass spectrometry. Antibiotic susceptibility testing was performed by Kirby Bauer disc diffusion method and the minimum inhibitory concentration (MIC) was determined using VITEK-2c system and confirmed by E-test. Phenotypic detection of carbapenemase activity was done using Modified Hodge test which confirmed carbapenemase activity and Combination EDTA disc synergy test which confirmed the presence of metallo-β-lactamase activity. Carbapenamase activity was further confirmed using Ultraflex MALDI-TOF as previously reported. The presence of carbapenem resistance genes was detected by real time PCR as well as PCR amplification and sequencing.

Results

A total of 131 out of 150 (87.33%) isolates were found to be resistant to carbapenems. Among them, 125 isolates were positive for Modified Hodge test, 59 isolates were EDTA disc synergy test positive and 125 isolates which were positive for Modified Hodge test were confirmed as positive using the MALDI-TOF carbapenemase assay. Carbapenem resistance encoding genes detected were as follows: 59 isolates out of 150 harboured the $bla_{\text{NDM-1}}$ gene (39.33%) while 115/150 isolates harboured the $bla_{\text{OXA-23}}$ gene (76.66%). Co-occurence of $bla_{\text{NDM-1}}$ with $bla_{\text{OXA-23}}$ was found for 53 isolates out of 150 (35.33%).

Conclusion

Our study showed for the first time the emergence and rapid spread of $bla_{\text{NDM-1}}$ in *A. baumannii* clinical isolates from Egyptian hospitals that represents a serious public health problem that should be urgently monitored in our country.