Emergence of Gram-Negative Bacilli with Concomitant bla NDM-1 -and bla OXA-48 -Like Genes in Egypt

Abstract: Multidrug-resistant Gram-negative organisms have emerged as a major threat to hospitalized patients, and are associated with serious morbidity and mortality. This study aimed to characterize carbapenem resistance genes among Gramnegative bacilli isolated from clinical samples from patients in the intensive care unit of Cairo University Hospital. A total of 211 samples were collected from patients showing clinical evidence of infection. Bacteria were isolated and identified by conventional microbiological methods. *Acinetobacter baumannii* isolates were furtherly characterized by polymerase chain reaction (PCR), using primers specific for *bla*$_{\text{OXA-51}}$-like genes. The Kirby Bauer disc diffusion method was used to determine susceptibility patterns of isolates, and carbapenem resistance was further examined by a modified Hodge test. Positive isolates were tested for the presence of *bla*$_{\text{KPC}}$, *bla*$_{\text{OXA-48}}$, and *bla*$_{\text{NDM}}$-like genes by PCR. NDM gene types were determined by direct sequencing. From the 211 samples, 229 Gram-negative bacilli were isolated. Fifty isolates (21.2%) were resistant to carbapenem. PCR analysis showed that none of the 50 isolates carried *bla*$_{\text{KPC}}$-like genes, while 24 (48%) isolates carried *bla*$_{\text{OXA-48}}$-like genes, 8 (16%) carried *bla*$_{\text{NDM-1}}$, and five isolates (10%) carried both *bla*$_{\text{NDM-1}}$ and *bla*$_{\text{OXA-48}}$-like genes. These results indicate that continuous surveillance of these multidrug-resistant pathogens is urgently required. And that is very important is to activate the antimicrobial stewardship programs of which the most important is restriction of the big gun antibiotics like carbapenems, colistin, tigecyclin and vancomycin and restricting their prescription to privileged specialties.

Keywords: Carbapenem Resistance, Gram-negative Bacilli, *bla*$_{\text{OXA-48}}$, *bla*$_{\text{NDM-1}}$