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Antimicrobials: Epidemiology of MDR-Gram-negatives

Antimicrobial resistance and carbapenem resistance mechanisms of *Acinetobacter baumannii* strains in Spain

T. Garcia Lucas¹, C. Salvador Garcia², G. Yague Guirao², M. Segovia Hernandez²

¹Microbiology, Virgen de la Arrixaca University Hospital., MURCIA, Spain ; ²Microbiology, Virgen de la Arrixaca University Hospital. University of Murcia, MURCIA, Spain

OBJECTIVES

Carbapenem resistance in *Acinetobacter baumannii* limits significantly therapeutic options in nosocomial infections caused by this microorganism. In this study we investigate the antimicrobial resistance and carbapenems resistance mechanisms in *A. baumannii* isolates recovered from two intensive care units of a University Spanish hospital in 2010-2011.

METHODS

We studied 101, no duplicated, *Acinetobacter calcoaceticus-Acinetobacter baumannii* complex clinical isolates from patients hospitalized in two intensive care units (surgical and general) between 2010-2011 from a hospital in Murcia, Spain.

Identification and antibiotic susceptibility testing were performed by use of the Vitek 2® system (bioMérieux). A modified Hodge test was performed to screen carbapenemase production. The isolates were screened for the presence of *bla*_{OXA} genes using a multiplex PCR method. Four different groups of oxacillinases were detected (group 1 included *bla*_{OXA-24}, OXA-25, OXA-26, OXA-33, OXA-40, OXA-72; group 2 included *bla*_{OXA-23}, OXA-27, OXA-49; group 3 with *bla*_{OXA-51}, OXA-58, OXA-64, OXA-69, OXA-70, OXA-71, OXA-75, OXA-78 and group 58 with *bla*_{OXA-58}). The identities of PCR products were confirmed by sequence analysis.

RESULTS

A total of 97% (98/101) isolates were resistant to carbapenems, and 93% were susceptible to colistin. The percentage of susceptibility for other antibiotics was 46% amikacin, 45% cotrimoxazol, 17% tobramycin, 12% ampicillin-sulbactam, 4% cefepime and gentamicin, and 3% ceftazidime, ciprofloxacin, levofloxacin and piperacillin-tazobactam, respectively.

Among the 98 imipenem-resistant *A. baumannii* isolates, the phenotypic assay demonstrating production of carbapenemases (modified Hodge test) was positive in 71 strains. The intrinsic OXA-51 carbapenemase was detected in a 97% (95/98) of carbapenem resistant isolates and in a 94% (89/95) of these strains group 1 of oxacillinases was amplified. The sequences of some of these isolates were identified as OXA-24. The results showed lack of group 2 and group 58 enzymes. The OXA-51 is chromosomal localized in *A. baumannii* strains but it is not found in other *Acinetobacter* species of the complex. Its presence in 95 isolates confirmed the identification as *A. baumannii*.

CONCLUSION

A high percentage of multiresistant isolates of *Acinetobacter calcoaceticus-Acinetobacter baumannii* complex was observed, and 97% were resistant to carbapenems. Most of these strains were identified as *A. baumannii*. Colistin was the most active antibiotic. The modified Hodge test was not always useful in the phenotypic detection of carbapenemases. OXA-24 carbapenemases production was the principal mechanism of carbapenem resistance.