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BATTERIOLOGIA

HOW CAN MOLECULAR ASSAYS EXPEDITE THE DETECTION OF ANTIBIOTIC RESISTANCE GENES, INFECTION CONTROL PRACTICES AND APPROPRIATE THERAPY IN PATIENTS WITH BACTERIAL LOWER RESPIRATORY TRACT INFECTION?

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INTRODUZIONE

The detection of carbapenemase and extended-spectrum beta-lactamase (ESBL) producers Enterobacteriales as wells as methicillin resistant S. aureus (MRSA) has become a major issue, especially in health care associated infections, due to their impact on appropriate empirical antimicrobial therapy and infection control measures. Molecular tests targeting carbapenemase and ESBL encoding genes as well as both S. aureus and methicillin resistance genes have been successfully used directly from blood culture but limited data are available about their performance on respiratory samples. Our aim was to determine whether molecular assays would expedite the detection of carbapenemase- and ESBL as well as the S. aureus and resistance determinants encoding genes directly from respiratory samples.

METODI

The CRE and ESBL ELITe MGB® kits are two qualitative multiplex real-time PCR assays for the detection of the most prevalent carbapenemase and ESBL encoding genes in EB, respectively. The MRSA/SA ELITe MGB® kit is a multiplexed assay designed to simultaneously detect a conserved sequence of the S. aureus, mecA gene and its homologue variant mecALGA251 (mecC). ELITe MGB® assays were performed directly on 354 respiratory specimens sampled from 318 patients. The CRE and ESBL ELITe MGB® kits were assayed on sputum (n=7), tracheal aspirate (TA, n=16), bronchoaspirate (BA, n=16) and bronchoalveolar lavage (BAL, n=202), whereas the MRSA/SA ELITe MGB® kit was tested on sputum (n=37), TA (n=27), BA (n=16) and BAL (n=39). Molecular results were then compared to routine culture-based diagnostics results to estimate the concordance between genotypic and phenotypic data.

RISULTATI

The overall concordance, sensitivity, specificity, positive predictive value (PPN) and negative predictive value (NPV) of the CRE ELITe MGB® kit were 97.1%, 100%, 100%, 75.9% and 100%, respectively. The overall concordance, sensitivity, specificity, PPN and NPV of the ESBL ELITe MGB® kit were 97.1%, 91.3%, 97.7%, 80.8% and 99.1%, respectively. The overall concordance, sensitivity, specificity, PPN and NPV of the MRSA/SA ELITe MGB® kit were 96.4%/99.2%, 95.7%/98.8%, 96.8%/100%, 91.7%/100% and 98.4%/96.8%, respectively.

CONCLUSIONI

Excellent agreement results between genotypic and phenotypic results were obtained. In addition to the real-time PCR cycle threshold values analysis and its correlation with bacterial load quantification, this study adds significantly to the literature presenting how molecular assays detecting the main carbapenemase, ESBL, S. aureus and methicillin resistance encoding genes provides an interestingly tool for expediting infection control practices and appropriate therapy in patients with bacterial lower respiratory tract infection.