

Multiplex PCR assays for the detection of clinically relevant antibiotic resistance genes in *Staphylococcus aureus* isolated from Malaysian hospitals.

ABSTRACT

Multiple drug resistant *Staphylococcus aureus* is one of the most common nosocomial pathogens worldwide. The timely identification of this hospital-acquired pathogen and detection of the various antibiotic-resistant genes harbored is one of the most important functions of the microbiology laboratory. In this study, we report the development of a multiplex PCR system for the diagnosis of *S. aureus* and the detection of clinically relevant antibiotic resistance genes harbored by some isolates. This system was designed to identify *S. aureus* at the species level and to detect methicillin, gentamycin, erythromycin, vancomycin and mupirocin resistance genes, respectively from a single colony in a single tube reaction. All isolates amplified a 108 bp fragment (conserved in *S. aureus*) confirming the identity of *S. aureus*, 23 isolates produced a band at the position of 533 bp, 28 isolates at 139 bp and 30 isolates at 174 bp evidencing the presence of *mecA* (methicillin or oxacillin resistance), *ermA* (erythromycin resistance), *aac* (6')-aph (2'') (gentamycin resistance) genes. None of the isolates amplified *vanA* (vancomycin resistance) and *ileS-2* (mupirocin resistance) genes showing the absence of their resistance in the isolates studied. These genotypic results when compared with classical antibiotic susceptibility tests showed less correlation. Overall, we found a correlation between phenotypic and genotypic methods of 60% for methicillin, 36.7% for gentamycin, 43.3% for erythromycin, 100% for vancomycin and mupirocin. This suggests that classical antibiotic sensitivity tests are not accurate, but need to be supplemented with other methods to be applied in a clinical laboratory. The system developed in this study offers a rapid, simple, specific and accurate detection of multiple antibiotic-resistant genes in clinical *S. aureus* isolates and thus could be systematically applied as a diagnostic test in clinical microbiology laboratories, facilitating the design and use of antibiotic therapy.

Keyword: *Staphylococcus aureus*; Antibiotic resistance; Multiplex PCR; Primer; Nosocomial; Malaysia.