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Research Article

Genotypically Different Clones of *Staphylococcus aureus* Are Diverse in the Antimicrobial Susceptibility Patterns and Biofilm Formations

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This study evaluated whether genotypically different clinical isolates of *S. aureus* have similar susceptibilities to individual antibiotics. It further aims to check the impact of biofilm on the *in vitro* activity of vancomycin, daptomycin, linezolid, and tigecycline against *S. aureus* clones. The study used a total of 60 different clinical MSSA and MRSA isolates. Susceptibilities were performed in planktonic cultures by macrobroth dilution and epsilon-test (*E test*) system. Biofilm production was determined using an adherent plate assay. The efficacy of antimicrobial activities against biofilms formation was checked using confocal laser scanning microscopy (CLSM). The study found that similar and different *spa*, MLST, and SCC*mec* types displayed high variation in their susceptibilities to antibiotics with tigecycline and daptomycin being the most effective. The biofilms were found resistant to high concentrations of most antibiotics tested with daptomycin being the most effective drug used in adhesive biofilms. A considerable difference exists among similar and various clone types against antibiotics tested. This variation could have contributed to the degree of virulence even within the same clonal genotype and enhanced heterogeneity in the infection potential. Thus, the development of a rapid and precise identification profile for each clone in human infections is important.

1. Introduction

Staphylococcus aureus is an important nosocomial and community-acquired pathogen for which few existing antibiotics are efficacious [1]. Modern MRSA has evolved from several successful clonal lineages of MSSA strains via acquisition of a mobile genetic element called staphylococcal cassette chromosome *mec* (SCC*mec*) [2]. Both methicillin—sensitive and—resistant *S. aureus* (MSSA and MRSA) are considered to have different genetic characteristics and the predominant genotypes differ geographically [3]. In the United States, ST36 and ST30 strains were epidemic in hospital and community settings [4]. After 2000, the USA300 clone (carrying the SCC*mec* IV and PVL loci) was dominant, emerging worldwide [5]. In Malaysia, most of the hospital-acquired MRSA strains were of MLST sequence type ST239, belonging to clonal cluster 8 (CC8) [6]. Whereas the most common MSSA clones circulating in Malaysia were 98