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Detection of high levels of resistance to antimicrobials including Linezolid and Vancomycin in *Staphylococcus aureus*

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Both MRSA (Methicillin resistant *Staphylococcus aureus*) and MSSA (Methicillin sensitive *Staphylococcus aureus*) are rapidly overcoming the current array of drugs. Two hundred isolates from a hospital were studied for resistance to 27 drugs representing various generations of 11 groups. Important findings were substantiated by targeting of genetic loci. Seventy two (36.0%) isolates were MRSA. Antimicrobial sensitivity results were obtained by disc diffusion method and E-test. Generally, these isolates were resistant to almost all β -lactams, fluoroquinolones, and aminoglycosides. Oxacillin, Ofloxacin, Ceftazidime, Meropenem, Aztreonem, and Gentamicin were significantly more active against MSSA. Both MRSA and MSSA showed high level of resistance towards Linezolid, figures being 41.6% and 12.5% respectively. Vancomycin resistance was remarkable in MRSA (12.5%) but relatively low in MSSA (4.7%). The *cfr* gene was detected in 80% Linezolid resistant isolates and *vanA* locus in 76% Vancomycin resistant isolates. This level of resistance

against Linezolid and Vancomycin is unprecedented. There were 8 MRSA isolates which were phenotypically resistant to all drugs. None of MRSA isolates showed less than 60% resistance to tested drugs and all were MDR. Among the MSSA isolates, 65% were MDR. These results are alarming and highlight the threat of non-treatable *Staphylococcus aureus* strains. We also studied the leading virulence factors associated with these pathogens. α -toxin, the major cytotoxic factor, was detected in 40% whereas β -hemolysin was found in 25% cases. Panton Valentine leucocidin was detected in 8.33% and toxic shock syndrome toxin in 5% cases. Two multiplex PCRs were developed which when run simultaneously can provide vital information about methicillin resistance and virulence status of the isolate within a few hours as compared to several days needed by routine procedures.

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