Identification of mecA genes in environmental Staphylococcal isolates

H. Mkrtchyan\*, R. Cutler
Queen Mary University of London, London, United Kingdom

Background: In the past Hospital isolates of Staphylococcus aureus (MRSA) were considered more drug resistant than community acquired strains. However community acquired MRSA strains have now developed drug resistance commensurate to Hospital strains. The question arise as to what environmental factors have led to this development, is it just the widespread use of antibiotics in the non-hospital environment or are there potentially other factors. Recently, increased attention has been paid to multidrug-resistant coagulase-negative Staphylococci (MRCNS) in hospitals. These strains are recognized as opportunistic pathogens in the immuno-suppressed and hospital strains are also a potential reservoir for mecA genes. This current study was to investigate antibiotic resistance in Staphylococci isolated from a non-hospital environment in common use by humans, in this case from public washrooms.

Methods: Swabs taken from public washrooms were analysed. Staphylococci were identified using the Bruker MALDI-TOF biotype system. The minimum inhibitory concentrations (MIC) of Staphylococcal isolates against 30 antibiotics, including oxacillin, erythromycin, amoxicillin, and vancomycin were determined using the MicroScan Walkway 96 plus automated system (Simens Healthcare Diagnostics, CA, USA). For methicillin resistant Staphylococcal isolates, a rapid latex agglutination assay kit was used to determine PBP2′ according the manufacturer's instructions (Oxoid, Basingtoke, UK). Genomic DNA of the isolates was prepared and mec complex was determined by polymerase chain reaction (PCR).

Results: 33% of Staphylococcal isolates (both coagulase-positive and coagulase-negative) were multidrug resistant, including non-β-lactam antibiotics such as fusidic acid, gentamycin, erythromycin, chloramphenol. MICs for oxacillin varied from 0.75 to 64 mg/L. The presence of mecA was confirmed in all MRSA and MRCNS isolates. Moreover, we determined mec complexes were widely spread between isolates and represented all classes (A, B,C,C1,D) of mec complexes.

Conclusion: We have demonstrated that non-healthcare establishments such as washrooms are potential reservoir for antibiotic resistant Staphylococci. Using combination of PBP2′ agglutination test and PCR methods we have shown that all methicillin resistant environmental staphylococci isolates carried mecA. Such a widespread presence of drug resistance determinants in these human environments is a potential source to aid the spread, sustainability and development of drug-resistance both in hospitals and community strains.

http://dx.doi.org/10.1016/j.ijid.2012.05.593