

SUMMARY

One hundred and seventy one strains of *Staphylococcus aureus* were isolated from specimens processed in the laboratory of the Department of Microbiology, Faculty of Medicine Colombo between August 1991 to September 1992.

These strains were characterized by antibiotic sensitivity tests, namely - disc diffusion test; heterogeneous and homogeneous resistance to methicillin; and minimum inhibitory concentration for methicillin; and other characterization tests, namely - coagulase production with human and rabbit plasma; urea hydrolysis at 24 and 48 hours; protein A levels; and pigment production.

Of the total *S. aureus* isolates, seventy were methicillin resistant accounting for a 40.9% prevalence of methicillin resistant *S. aureus* (MRSA). The proportion of MRSA was highest (80%) in the burns unit. Other specialized units (plastic surgery unit PSU - 48%, premature baby unit- 33.3%) and the surgical ward (45.5%) also had a high prevalence of MRSA.

Antibiotic sensitivity tests for Methicillin sensitive *S. aureus* (MSSA) and MRSA showed a multiple resistance character of MRSA when compared to MSSA. 45% and 30% of MSSA were resistant to 2 and 3 antibiotics

respectively in comparison with 32% and 46% of MRSA which were resistant to 8 and 9 antibiotics respectively.

97% of MRSA were resistant to at least one aminoglycoside tested. Resistance to fusidic acid (8%), clindamicin (8%) and rifampicin (4.6%) was rare in MRSA's. All MRSA strains were sensitive to vancomycin.

A unique resistant trait was identified in 45 MRSA strains (group A); they were resistant to the same seven antibiotics in addition to methicillin. This was the predominant strain type in the surgical ward, PSU and burns unit.

The majority of MRSA strains (81.5%) were heterogeneously resistant to methicillin. 12 of 65 (18.5%) strains exhibited homogeneously methicillin resistant characteristic.

Minimum inhibitory concentrations (MIC) for methicillin of all MSSA were within the sensitive range (1.25ug/ml - < 8 ug/ml) when tested by the E test.

Comparison of MIC 'S for methicillin of heterogeneously and homogeneously resistant MRSA strains showed that homogeneously resistant MRSA had high MIC's (>200 ug/ml), where as all the heterogeneous strains had MIC values of < 100 ug/ml.

Detection of clumping ~~factor~~ was more efficient with human plasma than with rabbit plasma.

In the characterization tests, MSSA strains differed significantly from the MRSA's; Coagulase production with human plasma and urea hydrolysis at 48 hours was greater in the MSSA's ($P < 0.05$ and $P < 0.00001$).

The multi resistant strain type (group A) differed from the miscellaneous strains (group B); they were marginally stronger in the coagulase test than group B, urea hydrolysis was greater at 24 and 48 hours ($P = 0.0125$ and $P = 0.0165$), protein A levels were marginally higher and the strains were more pigmented. Protein A levels were however low in all the MRSA's when compared to the Cowan strain of *S. aureus*.

The group A strain to some extent showed the biological characteristics of epidemic strains of MRSA (EMRSA) described in the literature, which have spread easily and caused serious outbreaks of hospital infections.