

MOLECULAR TYPING OF STAPHYLOCOCCUS AUREUS ISOLATES FROM AN INTENSIVE CARE UNIT

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SUMMARY

Seventeen *S. aureus* clinical isolates, collected from an Intensive Care Unit (ICU) during a seven-month period were analyzed to investigate their antimicrobial susceptibility and clonal diversity. Eleven isolates (65%) were found to be resistant to methicillin (MRSA). Pulsed-field gel electrophoresis (PFGE) profiles of genomic DNAs, and analysis of the polymorphisms of the variable regions of the protein A (*spa*) and coagulase (*coa*) genes revealed a lower clonal heterogeneity among MRSA than among methicillin-susceptible isolates (MSSA). Two of the MRSA clones were repeatedly isolated in different patients, within a variable period of time, suggesting the presence in the ward of a resident, endemic and multi-drug resistant MRSA population. Our results also emphasize the lower discriminatory power of *spa* and *coa* typing compared with PFGE typing.

KEY WORDS: *S. aureus*, molecular typing, intensive care unit

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INTRODUCTION

Methicillin-resistant *Staphylococcus aureus* (MRSA) has become increasingly common as a cause of nosocomial infections, and is one of the leading causes of infection in intensive care units (ICUs) (Eggiman and Pittet, 2001; Lowy, 1998; Shopsin *et al.*, 2000). The prevalence of MRSA is highly variable in different areas, and Italy is among the countries where the highest rates (81%) have been reported (Vincent *et al.*, 1995). Long-term hospitalization, prolonged exposure to antimicrobial agents, chronic diseases and invasive or surgical procedures have been recognised as risk factors for MRSA infections (Herold *et al.*, 1998). Transmission of MRSA occurs primarily from colonized or infected patients to other patients or staff and vice versa; the environment also contributes to this transmission (Herold *et al.*, 1998; Udo *et al.*, 1996). In

ICU, MRSA often cause outbreaks (Muller-Premru and Muzlovic, 1998; Guerin *et al.*, 2001), favoured by the high density patient population, close contact between colonized patients and healthcare workers, heavy use of broad spectrum antibiotics and frequent use of invasive procedures (Eggiman and Pittet, 2001).

Data from the Center for Disease Control and Prevention (CDC) National Nosocomial Infection Surveillance system showed that at least one third of nosocomial infections could be prevented through appropriate surveillance programs (Centers for Disease Control and Prevention, 1992; Widmer *et al.*, 1999), whereby strict microbiological monitoring and accurate epidemiological investigation represent essential measures for the control of nosocomial MRSA infections (Takeda *et al.*, 2000).

Several methods have been described for typing of *S. aureus* isolates (Shopsin and Kreiswirth,