To control or not to control colonization with MRSA … that’s the question!

Methicillin-resistant Staphylococcus aureus (MRSA) has become a common organism in most hospitals worldwide. In Europe, the prevalence of methicillin resistance among S. aureus isolates ranges from <1% in Scandinavia, to >30% in France, Spain, and Italy, with some hospitals reporting rates of 90% in high-risk units.\(^1,2\) In US hospitals, the prevalence of methicillin resistance among S. aureus isolates responsible for nosocomial infections increased from 2.4% in 1975 to 29% in 1991; importantly, the increase not only affected large tertiary care centres, but also small community hospitals.\(^3\) Countries such as Japan have been overwhelmed by the MRSA epidemic, with reported rates of methicillin resistance constantly higher than 80%. Finally, community-acquired MRSA has become a reality, no longer limited to intravenous drug abusers, and MRSA can no longer be considered solely a nosocomial pathogen.\(^4,5\)

A significant proportion—at least 30% according to studies—of in-patients who become colonized by MRSA will develop severe infection such as pneumonia, bacteraemia, or wound infection.\(^6,7\) The cohort of colonized or infected MRSA patients usually constitutes the most significant in-hospital reservoir from which MRSA is transmitted to other individuals;\(^6,8\) the larger the reservoir, the higher the incidence of cross-transmission and severe life-threatening infection. Outbreaks of MRSA infection are frequent in high-endemic-rate institutions (\(\geq 0.5\) MRSA cases per 100 hospital admissions) and are mostly associated with poor compliance with handwashing/hand disinfection practices.\(^7\) Less commonly, chronically colonized health-care workers can disseminate MRSA directly.\(^7,9,10\) Whereas in the past a predominant strain of MRSA used to be present in a single institution, clonal diversity is now commonly reported.

Once introduced in the health care setting, MRSA strains add to the overall burden of nosocomial infections,\(^6,11,12\) once present, they are difficult to eliminate. However, studies examining the impact of strictly-followed isolation measures to control MRSA transmission found a decrease in the incidence of endemic MRSA infection and cross-transmission.\(^6,7,13\)

When carefully studied, their implementation appeared to be cost-effective.\(^14\)

As recently highlighted by Patterson,\(^15\) approaches for control of MRSA have ranged from the most draconian to the laissez-faire. Arguments against controlling MRSA include the following: (i) MRSA is no more virulent than methicillin-sensitive S. aureus; (ii) nosocomial transmission is difficult to control; (iii) measures effective in a single institution may not be effective in another; (iv) control of MRSA can be expensive and labour-intensive, with estimated costs ranging from US $20 000 to 114 000 for control of focal outbreaks and US $28 000–1 600 000 per year for control of endemic MRSA; (v) giving antibiotics to colonized patients may not be in the interest of the individual patient; and (vi) decolonization regimens may lead to antimicrobial-resistant strains. On the other hand the main and compelling arguments for controlling MRSA are: (i) MRSA infections add to nosocomial infection rates and cause substantial morbidity and mortality; (ii) MRSA can spread rapidly within hospital wards and within hospitals; (iii) MRSA will develop severe infection such as pneumonia, bacteraemia, or wound infection.\(^6,7\) The cohort strains have a remarkable tendency to develop multiple resistance to antimicrobials, and the possibility of resistance being transferred to staphylococci and other Gram-positive organisms is worrying; (iv) once introduced into a facility, MRSA strains become endemic, and formidable efforts may be needed to eradicate them; (v) the size of the in-hospital reservoir of MRSA patients is correlated with the incidence of endemic MRSA infection and cross-transmission.\(^6,7,13\)

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rently-available satisfactory antimicrobial therapy, and such organisms have been shown to be responsible for nosocomial infections. Stringent policies have been proposed to limit the spread of vancomycin-resistant enterococci in health-care institutions;¹⁶ (viii) Last but not least, vancomycin-resistant *S. aureus*¹⁷ will certainly emerge in hospitals with high endemic rates of MRSA and increased associated use of vancomycin.

Control strategies for MRSA must be developed by each health-care institution on the basis of factors such as the MRSA endemic infection rate, the occurrence of MRSA outbreaks, and the resources available for infection control. In agreement with proposals by Boyce,¹⁸ we consider that (at least) the following circumstances mandate control measures: (i) institutions with a high incidence of severe MRSA infections; (ii) recent introduction of MRSA into institutions which had no colonized or infected patients; (iii) introduction of MRSA into a high-risk unit (intensive care or burn unit); (iv) increased prevalence of MRSA, resulting in increases in the empiric or prophylactic use of vancomycin; (v) MRSA outbreaks involving more than 20 patients, a condition associated with a significant reduction of changes for further eradication within the institution.¹⁸

According to a recent survey, 91% of US hospitals take infection control measures against MRSA.¹⁸ Similar figures are not available for Europe. Some European hospitals consider that they have been overwhelmed by the MRSA epidemic (D. Pittet, personal communication), and insufficient resources for infection control is frequently reported as the main argument for the absence of a control strategy; poor recognition of the magnitude and the possible consequences of the problem are also an issue, however.

Low-prevalence countries in Europe such as the Netherlands or Belgium try to prevent the escalating problem of MRSA by the use of draconian infection control and intervention measures.¹⁹,²⁰ In the Netherlands, all patients who carry MRSA are strictly isolated in single rooms; furthermore, since many of the MRSA strains were introduced in the country from abroad, patients admitted to Dutch hospitals or transferred from hospital outside the country are housed in single rooms for a few days and kept under isolation precautions until the results of microbiological screening for MRSA carriage are obtained.¹⁹

Whatever control strategy is chosen, it must be practical, and socially, psychologically and financially acceptable for the patients and the institution. Furthermore, any control strategy should be evaluated for a period much longer than the average duration of MRSA carriage to have a chance of demonstrating efficacy. It is still unsettled whether patients’ surveillance cultures for MRSA should be used as a routine measure to detect and estimate the importance of hospital reservoirs, or whether they should be performed during an outbreak only. This systematic approach appeared to be cost-effective in a recent report.¹³ Surveillance cultures from personnel may be justified, if epidemiological investigations suggest that a member of the staff is a permanent carrier, but are not recommended as a routine measure.

MRSA mostly spread from patient to patient via the transiently-colonized hands of health-care workers during patient contact or handling of contaminated materials. Thus, strict compliance with standard precautions such as handwashing/hand disinfection and the use of barriers against contact with blood and body fluids prevents most cases of cross-transmission, even without the need for recognition of individual MRSA carriers. Contact precautions (gloves and gown for any contact with MRSA patients) may be needed during an outbreak. The use of a mask is usually not recommended, except in conditions where aerosols could be produced (i.e. pneumonia, debridement of MRSA wound infection); some infection control practitioners recommend, however, that a mask should be used to increase the compliance with handwashing/hand disinfection practices. Special housekeeping efforts are usually not necessary, except in specific wards where environmental reservoirs could be implicated.⁷

As mentioned above, and to sum up, recommendations for MRSA control should be adapted to each institution according to the criteria outlined. At our institution, this has led to the following current strategy: (a) All patients colonized or infected with MRSA are placed on contact isolation. (b) Active surveillance cultures for MRSA colonization are performed, in particular in the setting of an outbreak. Roommates of newly identified MRSA patients are being screened. (c) Only patients with active, documented MRSA infections are treated with systemic antimicrobials. (d) Attempts to eradicate MRSA colonization are undertaken using nasal mupirocin ointment and chlorhexidine body wash, in particular in the setting of an outbreak. (e) Patients previously known to be MRSA carriers are isolated upon readmission to our institution, and negative surveillance cultures for MRSA are required to terminate contact isolation. Using hospital information-system-based automatic alerts for MRSA patients, we confirmed that at least on third of the hospital reservoir could be identified upon readmission through an admission identification list of all patients harbouring MRSA during a previous hospital stay; a high proportion (33% in our study) of those patients remained persistent carriers.⁸ (f) Antibiotic control should be promoted in all institutions, but in particular in those with endemic multiresistant organisms.

Last but not least, innovative infection control


References


