

COMMENT

Can We Control MRSA?

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Methicillin Resistant Staphylococcus Aureus (MRSA) continues to evolve and spread. From causing 4% of Staphylococcus Aureus (SA) bacteraemias in the UK in 1992 the figure is now 40%, one of the highest in Europe.^{1,2} Most importantly, this represents a huge increase in the burden of infection in the hospital population as MRSA has not simply replaced SA but is additional to it.

Mortality and length of hospital stay from MRSA infections seem to be double that of SA in many studies although the reasons for this are unclear.³ Certainly, the predictable delay in administration of appropriate therapy for serious infection may explain some, but probably not all, of this difference. New strains continue to develop, often more resistant and more virulent.⁴ Vancomycin resistance⁵ is still uncommon, but strains of reduced susceptibility to teicoplanin are widespread.⁶ New strains with their origin in the community are spreading into hospitals. These strains differ in having more adaptable genetic elements associated with integrases and pathogenicity islands, allowing accumulation of many virulence factors such as Pantone-Valentine leucocidin, enterotoxins and scalded skin syndrome toxin.^{4,7}

Against this background, the Edinburgh and Glasgow Royal Colleges' Bicollegiate Scottish Infection Standards and Strategy Group (SISS) has produced guidance⁸ for Scottish hospitals to improve control of what is the biggest single cause of healthcare-associated infection in living memory, costing the NHS in Scotland many tens of millions of pounds per annum in excess bed stay alone. The main thrust of the new guidance is the risk assessment of patients on admission to acute

clinical units, so that those at perceived higher likelihood of being MRSA carriers may be promptly isolated or cohorted. These patients are also to undergo nasal swabbing for MRSA, so that the actual carriers may be precisely identified.

The importance of such admission screening and isolation has increased over the past decade as the MRSA epidemic has created a large asymptomatic and unknown pool of patients in the community following hospital discharge or care home residency.⁹ On (re)admission to hospital, these patients are a hazard both to themselves and to other patients and staff. On average, patients who became colonised with MRSA seem to carry it for about a year,¹⁰ and during this time up to half of them will develop significant clinical disease.¹¹ Allowing this situation to continue will see a continuation of a spiralling vicious circle which has led to approximately 60% of hospital SA being MRSA in the USA¹² and 80% in the Far East.¹³

No amount of implementation of "standard precautions", however rigorously applied, will stop spread of MRSA from these inapparent carriers unless they are identified and isolated in the same way as patients with MRSA infections. It is now very clear that specimens sent to the microbiology laboratory for clinical reasons detect only a small proportion of the total pool of MRSA in a hospital.¹⁴

Reports of the success of programmes similar to those advocated in the SISS guidance are appearing with increasing frequency, and there is now a large body of fairly robust and consistent scientific literature showing that such an approach, when fully integrated into a well-coordinated

infection control plan (including excellent standards of hand hygiene and domestic cleaning, and a policy for screening contacts of known MRSA cases) can be highly cost effective, saving many fold the initial investment and reducing MRSA infection rates significantly.^{15,16,17,18} Mathematical models have forecast the possibility of full MRSA control within 5 years.¹⁹ The literature is equally divided on whether the SISS approach of risk assessment or the approach taken in a recent draft Health Technology assessment²⁰ of screening all admissions is the better one but SISS considered the risk assessment approach better in that, in the absence of near patient testing or laboratory-based PCR tests for MRSA carriage, it allows pro-active isolation of high risk patients 48-72 hours before the results of cultures are known.

Such a risk assessment and targeted screening programme would not necessarily be very expensive using conventional laboratory culture methods, the best of which permit reliable isolation and identification of MRSA from a specimen in 24 hours.²¹ The introduction of DNA technology, giving results in a matter of a few hours, would however add significant costs.²² More difficult for many hospitals in the short term would be the ability to isolate all patients identified as known or suspected MRSA carriers, the number of which would initially increase substantially. This would undoubtedly place significant logistical and financial burdens on most hospitals, although money would be saved in the longer term.

Faced with a pathogen which is not only unequalled for its nuisance value in our hospitals, but is an increasing cause of potentially serious and life-threatening infection, the question is becoming not "how" but "when" do we start to take effective action to control it. Most attempts so far in the UK have been demonstrably unsuccessful. The SISS recommendations are the most radical and far-reaching yet proposed and are worthy of serious consideration.

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