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A European survey of antibiotic management of methicillin-resistant *Staphylococcus aureus* infection: current clinical opinion and practice

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Abstract

Although the epidemiology of methicillin-resistant *Staphylococcus aureus* (MRSA) varies across Europe, healthcare-associated MRSA infections are common in many countries. Despite several national guidelines, the approach to treatment of MRSA infections varies across the continent, and there are multiple areas of management uncertainty for which there is little clinical evidence to guide practice. A faculty, convened to explore some of these areas, devised a survey that was used to compare the perspectives of infection specialists from across Europe on the management of MRSA infections with those of the faculty specialists. The survey instrument, a web-based questionnaire, was sent to 3840 registered delegates of the 19th European Congress of Clinical Microbiology and Infectious Diseases, held in April 2009. Of the 501 (13%) respondents to the survey, 84% were infection/microbiology specialists and 80% were from Europe. This article reports the survey results from European respondents, and shows a broad range of opinion and practice on a variety of issues pertaining to the management of minor and serious MRSA infections, such as pneumonia, bacteraemia, and skin and soft tissue infections. The issues include changing epidemiology, when and when not to treat, choice of treatment, and duration and route of treatment. The survey identified areas where practice can be improved and where further research is needed, and also identified areas of pan-European consensus of opinion that could be applied to European guidelines for the management of MRSA infection.

Keywords: antibiotic management, bacteraemia, healthcare-associated pneumonia, Methicillin-resistant *Staphylococcus aureus*, skin and soft tissue infection

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Introduction

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a common cause of healthcare-associated infections and a major problem in hospitals and intensive-care units (ICUs) worldwide. MRSA is associated with a wide range of infections, including skin and soft tissue infections (SSTIs), pneumonia, bacteraemia, endocarditis, osteomyelitis, prosthetic joint infections, and catheter-related infections [1,2]. The past decade has seen an increase in the incidence of MRSA in hospital settings in Europe [3], and more recently the emergence of community-acquired MRSA (CA-MRSA). The proportion of *S. aureus* infections due to MRSA varies among countries in Europe, ranging from <1% in the north to >50% in the south, and rates above 60% have been reported in some ICUs [3]. Recently, however, several European countries have seen a decline in the prevalence of

healthcare-associated MRSA (HCA-MRSA) infections, possibly reflecting the effect of improved efforts in infection control, antimicrobial stewardship, and management involvement [4].

The successful management of MRSA infections depends on making appropriate clinical decisions about the site and severity of infection, likely antibiotic susceptibility of the pathogen, indication for surgery and/or antibacterial therapy, and, if the latter is chosen, type and length of antibacterial therapy [5]. Management decisions must also take into consideration the removal of possible sources of infection, e.g. indwelling device, foreign body, or abscess, that can influence the efficacy of antibiotic therapy.

Several reviews, consensus statements and guidelines have been published recently to address aspects of the diagnosis and treatment of MRSA infections in the USA [6–9], Canada [10], and some European countries [11–15], but a broad consensus for Europe has been lacking. To address this gap, a consensus conference sponsored by the European Society of Clinical Microbiology and Infectious Diseases in 2007 covered selected aspects of the prevention, control and management of MRSA infections [16], including a review of available antibiotics [5]. However, many questions on the most appropriate approach to treatment of MRSA infections remain unresolved, and there are a number of practical aspects of management of MRSA infections for which there is simply no published evidence.

Therefore, a faculty of infection specialists was convened to address some of these questions through the development of a questionnaire that could be used to survey infection specialists across Europe, with the awareness that there may be no single answer to some of these questions, and recognizing that single solutions may not be applicable to practice in every European country. The aims of the survey were to explore opinion and exchange ideas, to provide a broad base of opinion on a variety of issues pertaining to the management of MRSA infection from infection specialists across Europe, and to compare those responses with those of the faculty specialists. It was hoped that the survey might determine whether the creation of pan-European MRSA infection management guidelines was practical and, if so, inform the development of those guidelines with conclusions/recommendations based on the answers to each question.

This article reports the findings of the survey, which targeted a variety of issues pertaining to the management of MRSA infections, including changing epidemiology, when and when not to treat, choice of treatment, duration and route of treatment, and treatment of minor or serious infections.

Materials and Methods

MRSA workshops and development of the MRSA survey

An expert faculty was chosen by the Chair to represent several European countries and to include leaders in infectious diseases, intensive care and clinical microbiology with experience in the development of country-specific guidelines. The faculty met in two workshops in London, UK, and Washington DC, USA, in September and October 2008, to identify areas where discussion on management strategies was needed and to develop a list of controversial or commonly asked questions on the antibiotic treatment of MRSA infections.

In the first workshop, the faculty identified key topics, and members were each assigned a topic for review, based on their areas of expertise. Faculty members were instructed to prepare the following for the second meeting: background information on their topics; challenging or controversial issues in those topics (e.g. which oral combination treatment is preferred or what duration of therapy is optimal); and four or five questions. During the second meeting, members presented their topics, issues, and questions. The questions were reviewed and edited by the faculty, and possible answers to the questions were discussed.

After the workshops, the Chair collated a final list of 30 predefined questions and responses that was circulated to all the faculty members for their agreement on inclusion in the survey. Response formats varied, with some questions asking respondents to select the most preferred option from among a list, others to select the top three options from among a list, and some to select any or all options from among a list.

Survey administration. The questionnaire was administered via the Internet using software developed by an online vendor, Survey Monkey (http://www.surveymonkey.com). All responses were anonymous.

Each faculty member was sent an E-mail from the Chair, introducing the survey and providing a weblink and password. To survey European specialists, an E-mail invitation to participate in the survey was sent on behalf of the Chair to all registered delegates of the 19th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID; held on 16–19 May 2009) on 16 and 29 April 2009, again providing a weblink and password. Delegates were asked to answer the questions on the basis of their personal opinion and practice.

Analysis. Simple counts and proportions were calculated for the survey responses. These were based on the number of