

BRITISH PAEDIATRIC SURVEILLANCE UNIT

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MRSA bacteraemia in children

Abstract Reports of bacteraemia in children due to methicillin-resistant *Staphylococcus aureus* (MRSA) have increased in recent years. The aims of this study are to obtain a robust estimate of the incidence of MRSA bacteraemia in children, and to define the demographic and clinical features of the patient population, with particular regard to the proportion of cases that are healthcare-associated or community-acquired. Isolates of MRSA from children will be characterised in terms of their antibiotic resistance pattern, strain type and biological properties (particularly virulence traits). Possible associations between organism type and clinical features of infection will be investigated.

Principal Investigators

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Coverage United Kingdom and the Republic of Ireland

Duration June 2005 – June 2006 (13 months)

Background Routine national surveillance has identified a worrying increase in MRSA bacteraemia, with the number of reported cases rising from 4 in 1990 to 77 in 2000.¹ Over half of the 376 cases of MRSA bacteraemia in children reported between 1990 and 2001 involved infants less than 12 months of age, although substantial numbers of infected infants aged one to four years were also reported.

As the above data were derived from voluntary reporting of cases they almost certainly reflect an under-estimate of the true incidence of infection. The main aim of this study is to obtain a robust estimate of the incidence of MRSA bacteraemia in children. In addition the study aims to define the demographic and descriptive epidemiological features of the patient population, in particular, the proportion of cases that are either healthcare-associated or community-acquired. Infections due to MRSA have historically been primarily acquired in hospitals, however, in the last few years, there have been reports from other countries, particularly the USA, of MRSA infections in children that have been acquired in the community and which have no demonstrable links to the hospital environment.²⁻⁵

The consolidation of microbiological, epidemiological and clinical information will allow us to determine if community-acquired MRSA bacteraemia has emerged in the UK. These findings will have significant implication for the management of severe paediatric infections due to *S. aureus* in the community.

Case Definition Isolation of methicillin-resistant *Staphylococcus aureus* (MRSA) from blood cultures of children less than 16 years of age

Research Questions

1. To determine the incidence of Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteraemia in children aged <16 years.
2. To determine whether the incidence of MRSA bacteraemia varies between children of different ages.
3. To document the spectrum of clinical features and patterns of presentation of MRSA bacteraemia in children.
4. To determine whether MRSA bacteraemia in children is mainly nosocomial in origin or is a community-acquired infection.
5. To determine whether cases of MRSA bacteraemia in children tend to occur in particular hospital units or specialties.
6. To determine whether strains of MRSA that cause bacteraemia in children have particular biological characteristics. In particular:
 - i. Are the strain types similar to those found in hospitalised adults?
 - ii. Are the strain types similar to those associated with community-acquired infections reported from other countries?
 - iii. Do the strains possess particular virulence traits, such as Panton-Valentine leucocidin?

Methodology

Paediatricians will be asked on a monthly basis to report all cases meeting the case definition via the Orange card system. Paediatricians will then be sent a questionnaire seeking demographic details and clinical information.

In addition to cases ascertained through the BPSU, cases will also be sought using the following sources:

1. Reports of MRSA bacteraemia routinely reported to the Health Protection Agency (HPA) from hospitals in England, Wales and Northern Ireland.
2. Cases of MRSA bacteraemia in children reported to the Health Protection Agency, Health Protection Scotland (formerly the Scottish Centre for Infection and Environmental Health) or the National Disease Surveillance Centre (Dublin) by hospitals participating in the European Antimicrobial Resistance Surveillance System (EARSS), a pan-European surveillance programme looking at antimicrobial resistance in a number of pathogenic bacteria including *S. aureus*. About 30 hospitals in England and Wales, and all hospitals in Scotland and the Republic of Ireland participate in EARSS.
3. Cases identified following referral of blood culture isolates of MRSA from children to reference laboratories including the HPA Laboratory of Healthcare Associated Infection or the HPA Antimicrobial Resistance Monitoring and Reference Laboratory (based on the same site in London), the Scottish MRSA Reference Laboratory (Glasgow) or the National MRSA Reference Laboratory (Dublin).

Microbiology laboratories that have not submitted the isolate to Laboratory of Healthcare Associated Infection will be asked to do so. Data from these sources will be pooled and reconciled to identify a unique set of cases.

Reporting Instructions

Please report any cases seen within the last month that meet the case definition. Please note that BPSU surveillance does not replace other forms of routine *S.aureus* reporting to the HPA.

Funding

Department of Health

Ethical approval

This study has been approved by the Eastern MREC.

References

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