

British Society for Antimicrobial Chemotherapy

SPRING MEETING 2008

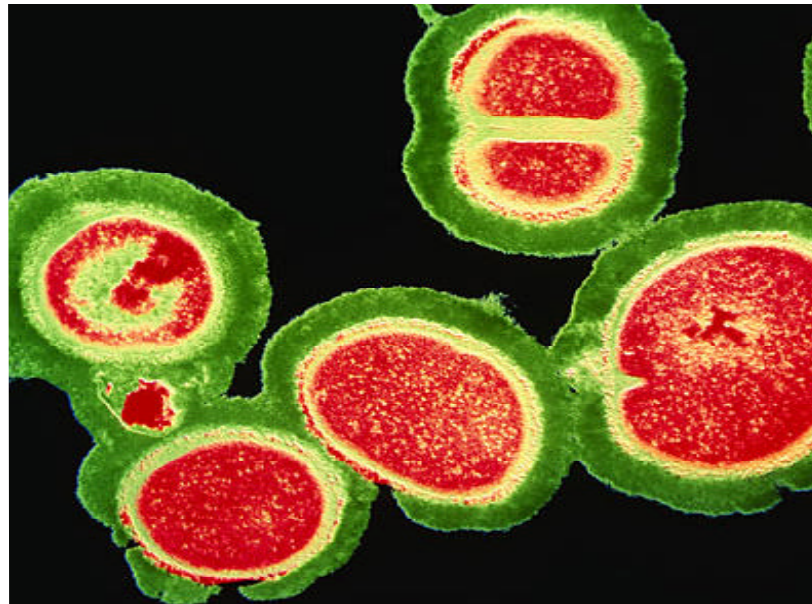
programme

the
blurred
boundary

CHALLENGES IN PREVENTING,
DIAGNOSING AND TREATING CA-MRSA

WEDNESDAY 19 MARCH 2008

Hall 11
International Convention Centre
Birmingham



contents

programme

3

poster abstracts

- **Audit of Staphylococcus aureus Bacteraemia in Edinburgh and East Lothian - October 2005 to March 2006** 4
Banavathi KVS, Hanson MF, *Lothian University Hospitals Division, Edinburgh*
- **A retrospective study of risk factors and associations of methicillin-resistant Staphylococcus aureus infection in cardiothoracic surgery patients** 4
Bretherick AD, MacDougall M, Gibb AP, *The Royal Infirmary of Edinburgh*
- **Recurrent CA-MRSA preseptal cellulitis in a Gaelic football player** 5
Collins CJ, Fennell J, Fraher M, Charalampidou S, Connell P, Acheson R, Lynch M, *Mater Misericordiae University Hospital, Dublin*
- **Gastrointestinal carriage of MRSA in cases of community and hospital acquired diarrhoea amongst the elderly** 5
Cope NK^{1,2}, Smullen J¹, Kerr KG^{1,2}, Snelling AM², ¹*Harrogate and District NHS Foundation Trust*, ²*University of Bradford*
- **Purpura fulminans- not always meningococcal infection** 5
Elvy J, Sarsfield P, Kearns A, Morgan M *Royal Devon and Exeter Foundation NHS Trust*
- **PVL Plymouth – Implementation of standard precautions to reduce risk of transmission of PVL producing SA** 6
Dale B, Campbell R, Williams J, *South West Peninsula Health Protection Unit, Dartington, Devon*
- **The importance of early recognition of Panton- Valentine Leukocidin associated MRSA in severe Community acquired pneumonia** 6
Doshi N, Purcell J, Cullen M, Hassan I, Isalska B, *Wythenshawe Hospital, Manchester*
- **Overuse and inappropriate prescribing of proton pump inhibitors in patients with Clostridium difficile-associated disease** 6
M Choudhry, H Soran, H Ziglam, *Manchester Royal Infirmary*
- **Case Series of CA-MRSA Bacteraemia in Injecting Drug Users** 7
Howard JC, Cooke FJ, Stone M, Kearns A, Carmichael A, Gkrania-Klotsas E, Brown NM, *Addenbrookes Hospital, Cambridge, HPA Staphylococcal Reference Laboratory, Colindale, The Wellcome Trust Sanger Institute*
- **MRSA septic arthritis of the shoulder treated with daptomycin: 2 case studies** 7
Cullimore JP, Gonzalez A, *Darent Valley Hospital, Darent Wood Road, Dartford*
- **Old Lesson, New Adversary; First reported British case of CA-MRSA Endocarditis** 7
Evans A, Gellett L, Kearns A, Morgan M *Royal Devon and Exeter NHS Foundation Trust*
- **Community acquired MRSA: the East Yorkshire experience** 8
Elston JWT², Jordan-Owers N¹, Meigh R¹, Wilson J¹, Musaad S¹, Newton A³, Barlow G², Meigh J¹
¹*Hull Royal Infirmary and East Yorkshire Hospitals NHS Trust*, ²*Castle Hill Hospital*, ³*Humber Health Protection Unit, East Yorkshire*
- **Treatment of PVL CA-MRSA – Are immunoglobulins the answer?** 8
Rambani R, Townsend R, *Northern General Hospital, Sheffield*
- **Cost savings achieved by re-positioning of the glyco/lipopeptides in a UK District General Hospital** 8
Gonzalez A, *Darent Valley Hospital, Dartford, Kent*
- **Infectious Disease Research Network – Promoting collaborative research in the UK** 9
Head M, Hayward A, Johnson A, Cooke M *University College London, Royal Free Campus, London*
- **How contagious is PVL-Staphylococcus aureus during resuscitation?** 9
Tilley R, Kearns A, Morgan M, *Royal Devon and Exeter Hospital*
- **Case Report - A case of osteomyelitis in the UK due to panton-valentine leukocidin positive community acquired methicillin resistant Staphylococcus aureus** 9
KL Chew¹, A Galloway¹, J Clark², ¹*Royal Victoria Infirmary, Newcastle Upon Tyne*, ²*Paediatric Immunology and Infectious Disease Service, Newcastle General Hospital*
- **Immunoglobulin in PVL-associated disease- does it make a difference?** 10
Morgan MS, Day C *Royal Devon and Exeter NHS Foundation Trust*
- **A prospective observational cohort of inpatients newly MRSA positive in the Royal Infirmary of Edinburgh** 10
Tappin SL, *The New Royal Infirmary of Edinburgh*
- **Necrotising pneumonia- a difficult diagnosis, but not to be missed** 11
Spot H, Day C, Dow A, Morgan M *Royal Devon and Exeter NHS Foundation Trust*

EXHIBITORS

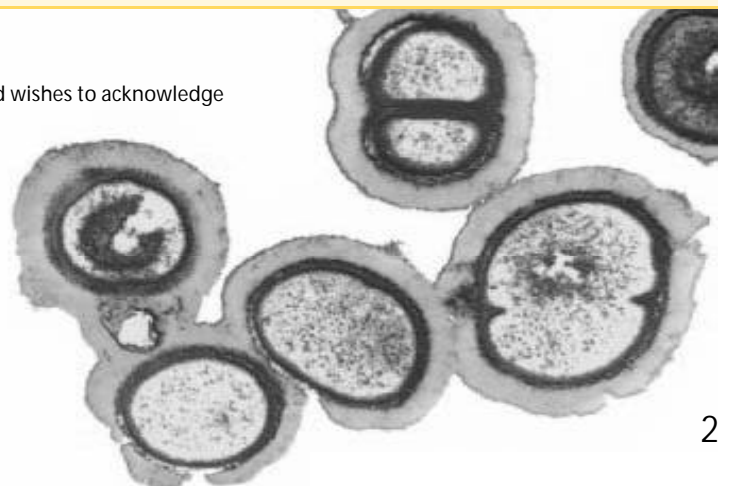
The Society is grateful for the support it has received from industry and wishes to acknowledge the following companies:

Exhibitors

3M Health Care Limited
Astra Zeneca UK Limited
Bard Limited
Bio Rad Laboratories Ltd
BSAC Resistance Surveillance Programme
Cepheid Europe s.a.
Merck Sharp & Dohme Limited
Pfizer Ltd
Wyeth Pharmaceuticals

Meeting sponsors

Pfizer Ltd
Janssen - Cilag Ltd



the
blurred
boundary

**CHALLENGES IN PREVENTING,
DIAGNOSING AND TREATING CA-MRSA**

PROGRAMME

0900 - 0950	REGISTRATION & COFFEE
0950 - 1000	Welcome address
1000 - 1115	SESSION ONE Chair: Dilip Nathwani, Dundee 1000 - 1025 Impact of CA-MRSA in a low prevalence country - Denmark: what can the UK learn from this? Robert Skov, Denmark 1025 - 1050 CA-MRSA and PVL in the UK: epidemiology and clinical burden Angela Kearns, London 1050 - 1115 Review of community acquired MRSA: European perspective Margreet Vos, Netherlands
1115 - 1145	COFFEE & POSTER VIEWING
1145 - 1245	SESSION TWO CA-MRSA Chair: Dilip Nathwani, Dundee 1145 - 1200 CA-MRSA- what guidelines? Dilip Nathwani, Dundee 1200 - 1215 CA-MRSA- infection prevention? Georgia Duckworth, London 1215 - 1245 CA-MRSA- role of pets and animals ? Peter Clegg, Liverpool
1245 - 1315	ANNUAL GENERAL MEETING
1245 - 1345	LUNCH & POSTER VIEWING
1345 - 1415	GARROD LECTURE Antimicrobial Resistance: Animals and the Environment Lord Soulsby of Swaffham Prior
1415 - 1545	SESSION THREE: CLINICAL CASE SCENARIOS AND MANAGEMENT ALGORITHMS FOR CA-MRSA Chair: tbc <i>These presentations aim to bring guidance into a pragmatic real life setting. Through presentations and discussion, delegates should gain an improved understanding of the clinical decision making for managing these and similar problems. Attendees will receive copies of management ALGORITHMS for each case scenario.</i> 1415 CASE SCENARIO ONE: Patient with a skin infection What should be the management ALGORITHM (when to suspect, when to culture, severity assessment, when, what and how to treat)? Matthew Dryden, Winchester 1445 CASE SCENARIO TWO: Patient with severe CAP When should CA-MRSA & PVL be considered, discussion of management ALGORITHM pathway (when to suspect, when to culture and when to treat) Marina Morgan, Exeter 1515 CASE SCENARIO THREE: Patient with an infected leg ulcer Could it be CA-MRSA? What should be the management ALGORITHM (when to suspect, when to culture and when to treat)? David Enoch, Cambridge
1545	CLOSING REMARKS

Audit of *Staphylococcus aureus* Bacteraemia in Edinburgh and East Lothian - October 2005 to March 2006

Banavathi KVS, Hanson MF

Department of Microbiology Lothian University Hospitals Division, Edinburgh

An audit was carried out to obtain information about the distribution of *Staphylococcus aureus* bacteraemia cases in Edinburgh and East Lothian NHS hospitals and the features associated with those infections. A list of patients with *S. aureus* bacteraemia for the period 1st October 2005 to 31st March 2006 was obtained. A short proforma was used to collect details on patients with *S. aureus* bacteraemia from the laboratory computer records (Apex) and the clinical microbiology notes. Isolates included in the study were first isolates for each patient. If *S. aureus* was isolated after a gap of 28 days, this isolate was taken as being from a new episode of bacteraemia.

During the 6 month period, *S. aureus* bacteraemia occurred in 201 patients, of whom 104 (51.7%) had methicillin resistant *S. aureus* (MRSA) bacteraemia. Of the 49 patients who had *S. aureus* positive blood cultures on admission to hospital, 37 had Methicillin Sensitive *S. aureus* (MSSA), and 12 had MRSA bacteraemia (5/12 were known MRSA positive from other body sites and 10/12 had previous hospital admission in the last two years). Of the further 10 patients with MRSA bacteraemia whose blood cultures were positive 1-2 days after admission, 7/10 were known to have had MRSA in the past and 10/10 had previous hospital admission in the last two years. Sixty-six patients (31.8%) were bacteraemic (MSSA and MRSA) at or soon after admission. However 20/22 (90%) with MRSA bacteraemia had a hospital admission in the previous two years and these are unlikely to be true community acquired infections. The antibiogram of the two MRSA strains that could have possibly been acquired in the community were similar to the hospital strains.

Our audit showed that true community acquired MRSA bacteraemia is uncommon in Edinburgh and East Lothian. The MRSA bacteraemia surveillance programme should pick up any possible community acquired strain, which can then be further investigated.

A retrospective study of risk factors and associations of methicillin-resistant *Staphylococcus aureus* infection in cardiothoracic surgery patients

Bretherick AD, MacDougall M, Gibb AP

The Royal Infirmary of Edinburgh

Aim: This study was undertaken to identify risk factors and associations of MRSA in a population of cardiothoracic surgery patients.

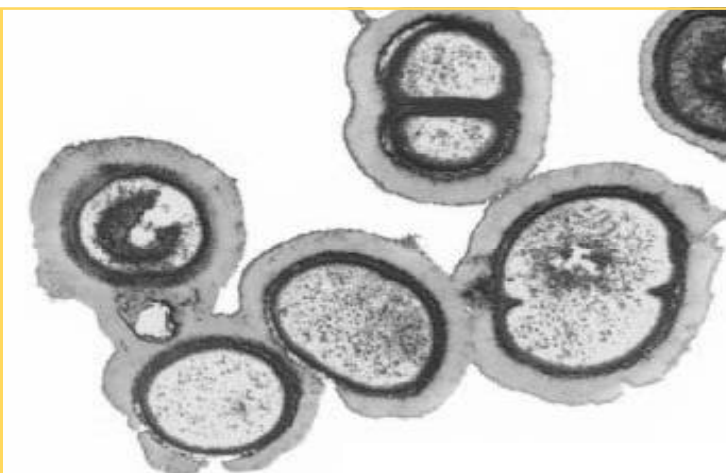
Method: A retrospective case-control study of all cardiothoracic patients from the Royal Infirmary of Edinburgh (UK) over a 15-month period (1 Jan 2006 - 31 Mar 2007); examining hospital electronic records, hospital coding data and microbiology laboratory data. Univariate and Mantel-Haenszel analyses (controlling for sex and age over 70 years) were performed.

Results: 2035 patients were included in the study. The prevalence of MRSA was found to be 4.82% (98/2035), the in hospital incidence 4.08% (83/2035) and the mortality rate amongst MRSA positive patients was 8.16% (8/98). Length of hospital stay ($p < 0.001$), older age on admission ($p < 0.001$), ICU stay (odds ratio (OR) 1.70, 95% confidence interval (95%CI) 1.13-2.57, $p = 0.015$), heart disease (ischemic OR 1.56, 95%CI 1.04-2.34, $p = 0.041$; 'other' OR 2.28, 95%CI 1.52-3.42, $p < 0.001$), pneumonia (OR 2.68, 95%CI 1.19-6.06, $p = 0.025$), tracheostomy (OR 14.55, 95%CI 6.36-33.31, $p < 0.001$), transluminal heart assist operations (OR 3.16, 95%CI 1.67-6.00, $p = 0.001$) and blood transfusions (OR 3.06, 95%CI 1.47-6.35, $p = 0.006$) were all found to be associated with MRSA.

Discussion: Results are largely in support of the current (limited) literature on the subject. MRSA associations not well described in the literature were also identified, including heart disease, tracheostomy and transluminal heart assist operations. These factors may be indicators of more severe disease and this study demonstrates these intuitive associations as statistically significant.

Conclusion: In combination with the current literature a risk factor profile of increased risk of MRSA in cardiothoracic patients and its associated features emerges. An older patient (over 70 years) with a long length of hospital stay in numerous wards, especially ICU, with multiple co-morbidities appears to be at greatest risk of MRSA.

BSAC
Spring Meeting
2008
poster abstracts



Recurrent CA-MRSA preseptal cellulitis in a Gaelic football player.

Collins CJ, Fennell J, Fraher M, Charalampidou S, Connell P, Acheson R, Lynch M.

Mater Misericordiae University Hospital, Dublin

Published case report: Preseptal cellulitis caused by community acquired methicillin resistant *Staphylococcus aureus* (CAMRSA). Charalampidou et al. *Br J Ophthalmol* 2007; 91:1723-1724

Introduction: Participation in close contact sports is a recognised risk factor for infection with community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA). We report a case of recurrent preseptal cellulitis in a young healthy gaelic football player in Ireland.

Case History: A 20-year old student with a history of eczema presented to the eye department with a 5-day history of left periorbital swelling and preseptal cellulitis. He had a number of crusted lesions on his neck, back, and right calf. Conjunctival and calf swabs cultured *Staphylococcus aureus*, resistant only to flucloxacillin and fucidic acid. Reference laboratory analysis found the isolate to have an unfamiliar antibiogram-resistance (AR) type but was similar to multilocus sequence type (MLST) 80, the most commonly found genotype of CA-MRSA in Europe. It was Panton-Valentine leukocidin cytotoxin positive. It emerged that he was a member of a gaelic football team and that a member of his team had similar lesions 6 weeks earlier which settled spontaneously. He was treated with a 3-week course of oral linezolid and vancomycin eye drops with a rapid clinical response. The patient re-presented with identical symptoms on a number of subsequent separate occasions with cultures positive for the same strain of MRSA. A similar treatment regimen with the addition of oral rifampicin resulted in good clinical response each time. Family members were screened but results were negative. No football team member presented for screening despite encouragement. An MRSA decolonisation regimen and control of his eczema resulted in clearance of this strain of MRSA and the patient has remained well since.

Comment: Reports of infection with CA-MRSA with ocular manifestations (some reports in North America). To our knowledge this is the first European report of such an infection in a young healthy sports player.

Gastrointestinal carriage of MRSA in cases of community and hospital acquired diarrhoea amongst the elderly

Cope NK^{1,2}, Smullen J¹, Kerr KG^{1,2}, Snelling AM²

¹Harrogate and District NHS Foundation Trust, Harrogate, UK and ²University of Bradford, Bradford

The anterior nares are considered the primary site of colonisation for *Staphylococcus aureus*, but there has been comparatively little investigation of other reservoirs, particularly the gastrointestinal tract, even though the bacterium is known to colonise the gut. We assessed the prevalence of *S. aureus* in diarrhoeal samples from community and in-patients aged >65 yrs.

Methods: Over 12-months, faecal samples submitted to our laboratory for investigation of diarrhoea were screened for *S. aureus*. Samples were cultured on mannitol salt agar at 37 °C in aerobic conditions for 48h and putative isolates were identified by latex agglutination and production of DNase. Methicillin resistance was confirmed by resistance to cefoxitin.

Results: Of 1171 faecal samples, 576 were from community patients and 595 inpatients. 81 (14.1%) of the former were positive *S. aureus*. Of these, 64 (11.1% of all community samples) yielded methicillin susceptible *S. aureus* (MSSA) and 17 (3.0%) yielded MRSA. 16/17 of MRSA isolates came from people aged >75y. The incidence of MRSA in the >75s was thus 5.4% for the community samples. 81 (13.6%) specimens from inpatients grew *S. aureus*. Of these, 34 (5.7% all samples) yielded MSSA and 47 (7.9%) MRSA. The prevalence of MRSA increased to 8.3% in in-patients >75y. Chi squared analysis showed no statistical difference between the groups tested.

Conclusions: The overall prevalence of MRSA in the faeces of the study population was 5.5%; with no significant difference between hospital and community patients. Those aged >75y were much more likely to be colonised with MRSA than younger patients. This finding may have important implications for the design of infection control strategies for MRSA in both hospital and care home settings and further work to determine the precise epidemiological significance of gut colonisation with MRSA is clearly of interest. Our study focussed on patients with diarrhoeal illness and we also intend to screen individuals without these symptoms to identify colonisation rates in this group. Nevertheless, it is worth noting that some MRSA clones carry enterotoxin genes and it is possible that, in the absence of other aetiological agents, these bacteria may cause primary GI infection, especially in the elderly. Currently we are screening our isolates for enterotoxin production.

Purpura fulminans- not always meningococcal infection

Elvy J, Sarsfield P, Kearns A, Morgan M

Royal Devon and Exeter Foundation NHS Trust, Exeter

We present two cases of Panton Valentine Leukocidin (PVL)-positive *Staphylococcus aureus* septicaemia presenting as purpura fulminans, with typical cutaneous lesions and overwhelming fatal sepsis in previously fit and healthy young men.

Both produced hemoptysis on resuscitation and chest X-rays showed widespread multilobar consolidation and early cavitation.

Only one case of PVL-associated purpura fulminans has been reported previously in the UK. Our cases, presented with histology and post mortem photographs, show the fulminant nature of this overwhelming infection.

Although both patients presented too late to be effectively treated, clinicians should be aware that meningococcal septicaemia is not the only cause of presentation with sepsis and a non blanching rash. Staphylococcal sepsis should also be added to the list of causes of purpura fulminans.

Furthermore, with increasing numbers of CA-MRSA in the UK, empirical antimicrobial therapy which includes treatment for MRSA should be considered.

PVL Plymouth – Implementation of standard precautions to reduce risk of transmission of PVL producing SA

Dale B, Campbell R, Williams J

South West Peninsula Health Protection Unit, Dartington, Devon

We report the identification of increasing linked numbers of PVL-SA SSTIs in Care Homes largely due to a single strain of PVL MSSA. There was a need to develop a joint strategy to facilitate diagnosis and advise evidence based treatment and clearance of infections and colonization. We involve the PCT, local GPs, HPA Centre for infections, CSCI, local authority environmental health, local microbiologists, local care homes and our local infection control link group.

Infection control audit and risk assessment in these homes revealed a need both for education about PVL-SA and also about standard infection control precautions and PPE.

As a result of this needs assessment, written guidelines and information sheets have been developed, together with audit support and training days. These initiatives are coordinated through a multidisciplinary management group which monitors trends in PVL-SA infections and isolations in Plymouth and considers methods of managing this ongoing problem.

Local records suggest that the local 'Plymouth' strain of PVL-MSSA, identified by its characteristic antibiogram, has been in existence locally for about 10 yrs. Over this time a total of 41 care homes have been affected with SSTIs. In the last 5 yrs a higher level of activity has been evident, with 28 care homes affected involving approximately 135 clients and staff being PVL-MSSA positive. The peak appears to have been in 2006/7 when 16 care homes were affected simultaneously, this has now fallen to 7 with a current problem.

It thus appears that the combined initiatives may have reduced the incidence rate of new cases; however we accept that some transmission of PVL SA in such settings is inevitable.

A positive outcome has been achieved through the diversion of substantial resource by all agencies involved. This level of commitment needs to continue if PVL-SA is to be kept in check.

The importance of early recognition of Pantone-Valentine Leukocidin associated MRSA in severe Community acquired pneumonia

Doshi N, Purcell J, Cullen M, Hassan I, Isalska B

Department of Microbiology, Wythenshawe Hospital, Manchester

Pantone-Valentine Leukocidin (PVL) is carried by less than 2% of *Staphylococcus aureus* in the UK. It is commonly associated with skin and soft tissue infections and can cause devastating necrotising pneumonia in young and fit adults. We report a case of a 23 year old pregnant Estonian lady who presented to the accident and emergency department with acute respiratory distress, chest pain and high grade fever, after a 3 day history of flu-like symptoms. She was empirically started on cefotaxime, clarithromycin and flucloxacillin intravenously and moved to intensive care unit where she was ventilated. X-ray and CT imaging showed bilateral lung consolidation, cavitation and left pneumothorax, confirming the diagnosis of severe community acquired pneumonia. Blood cultures, sputum and MRSA screen, taken on admission, grew MRSA. Progressive deterioration and distinct antibiogram raised the possibility of PVL –CA MRSA infection. Linezolid, clindamycin and rifampicin were subsequently introduced. The patient received adjunct therapies with IVIG and extra-corporeal membrane oxygenation. Molecular typing of the strain confirmed the presence of toxin gene-luk PV.

The patient successfully weaned from the ventilator after 32 days and completed 4 weeks of antibiotics. Her long term lung function remains unclear. Baby boy was delivered by emergency caesarean section at 32 weeks.

This case has raised several important issues namely the need of awareness for this life threatening infection, clinical features that can help to recognise it, the collection of appropriate samples for microbiology, and the right choice of empirical antitoxin antibiotics. This case highlights that early suspicion of PVL infection in young healthy adults without typical risk factors for MRSA can change the outcome. Infection control is also paramount both in terms of screening and PPE. We welcome the recent UK DoH draft guidelines on PVL associated *Staphylococcal aureus* infections.

Overuse and inappropriate prescribing of proton pump inhibitors in patients with Clostridium difficile-associated disease

Choudhry M, Soran H, Ziglam H

Manchester Royal Infirmary

BACKGROUND:

Clostridium difficile is the main infectious cause of colitis and has been increasingly diagnosed in hospitalized patients. The number of prescriptions for proton pump inhibitors (PPIs) has also increased significantly over time. Few studies have reported an association between *Clostridium difficile* associated disease (CDAD) and PPI use. AIM: to assess the extent and appropriateness of PPI prescribing in patients diagnosed with *C. difficile* infection. METHODS: We prospectively reviewed of PPI use in 138 patients developed *C. difficile* infection at the hospital over a 4-month period. *C. difficile* infections were diagnosed by the presence of *C. difficile* toxin in the stools. The appropriateness of prescription and relevant investigations were identified by interview of patients and review of patient records. RESULTS: Sixty Four percent (88 of 138) of all patients developed *C. difficile* infections were on PPIs. A valid indication for therapy was not apparent in 63% of the patients on PPIs. CONCLUSION: There appears to be a widespread and inappropriate use of PPIs in hospital practice. Reduction of unnecessary PPI use may be an additional strategy to reduce the incidence of this infection.

Case Series of CA-MRSA Bacteraemia in Injecting Drug Users

Howard JC, Cooke FJ, Stone M, Kearns A, Carmichael A, Gkrania-Klotsas E, Brown NM

Addenbrooke's Hospital, Cambridge; HPA Staphylococcal Reference Laboratory, Colindale; The Wellcome Trust Sanger Institute

Objectives: To describe the clinical features and microbiological characteristics of a case series of CA-MRSA bacteraemia in injecting drug users (IDU) that presented to our hospital between October 2006 and February 2007.

Methods: Retrospective review of medical notes. Microbiological characterisation of isolates (antibiogram; Phage Typing; PFGE; toxin testing; MLST and SCCmec typing) in collaboration with the Staphylococcal Reference Laboratory and The Wellcome Trust Sanger Institute.

Results: There were 4 confirmed cases of CA-MRSA bacteraemia in IDU within a period of 4 months. All were male and the age range was 24 to 40 years. At presentation, all patients had more than one focus of infection. These included injection site abscesses (in 3 patients); pneumonia with pulmonary abscesses (2); empyema (2); osteomyelitis (2) and diskitis (1). Patients were managed with a variety of oral and intravenous antibiotics. Mean length of hospital stay was 30 days (range 5-60 days, median 33) but two patients left early against medical advice.

Laboratory characterisation revealed that all 4 isolates were ciprofloxacin sensitive and resistant to erythromycin and fusidic acid. All were phage type A, PVL toxin negative, generated an identical PFGE profile with *Sma1* and were ST1 by MLST. SCCmec typing of these isolates is currently inconclusive, but they may harbour a variant of the SCCmecIV element. These features are all in keeping with a known clone circulating in IDUs elsewhere in the UK.

Conclusions: Clinical presentation of CA-MRSA bacteraemia in IDU is complex, as all 4 of our patients had more than one likely focus of infection. These cases were particularly difficult to manage. Molecular characterisation demonstrated that all 4 of these CA-MRSA isolates from IDU in Cambridge were part of a known UK clone circulating in this subpopulation.

MRSA septic arthritis of the shoulder treated with daptomycin: 2 case studies

Cullimore JP, Gonzalez A

Darent Valley Hospital, Darent Wood Road, Dartford

2 cases of MRSA septic arthritis of the shoulder were successfully treated with daptomycin. Both patients had liver disease, precluding the use of other antibiotics.

Case 1: A 73 year old male patient (discharged 5 days previously from our hospital after surgical intervention for an incarcerated hernia) presented with right shoulder pain and swelling and jaundice. Upon investigation was found to have MRSA septic arthritis. Daptomycin was commenced at a dose of 440mg (6mg/kg) IV od, and ciprofloxacin at a dose of 500mg PO bd. He was given a total of 30 days of daptomycin and 27 days of ciprofloxacin. Due to the patient's comorbidities, he was initially managed with repeat aspirations of the joint and treated with daptomycin and ciprofloxacin. Arthroscopic washout of the shoulder joint was eventually carried out on day 22 as his general condition had improved. On day 30 the patient's right elbow also became inflamed, indicating the possible spread of infection. Daptomycin dose was increased to 560mg (8mg/kg) IV od and linezolid 600mg bd po commenced. However, midway through the first infusion of the increased dose of daptomycin the patient developed a possible infusion related reaction with diarrhoea and cardiovascular instability and daptomycin was stopped. Treatment with IV linezolid was continued for 5 days. Upon discharge he was started on a 5 week course of oral linezolid and doxycycline. On follow-up as an outpatient he is noted to have made satisfactory progress, and the septic arthritis has now resolved.

Case 2: An 84 year-old female patient who developed MRSA septic arthritis of the right shoulder whilst admitted for oesophageal varices. She was managed with an arthroscopic washout, a course of IV daptomycin, at an initial dose of 6mg/kg/day, which was increased to 8mg/kg/day on day 4 of treatment. Daptomycin was administered for a total of 16 days, followed by an 18 day course of clindamycin 300mg QDS orally. The septic arthritis responded well to treatment with complete resolution by day 37 when the patient was discharged.

Old Lesson, New Adversary; First reported British case of Community -Associated MRSA Endocarditis

Evans A, Gellert L, Kearns A, Morgan M

Royal Devon and Exeter NHS Foundation Trust, Exeter

A 32 yr old intravenous drug user was admitted with community acquired pneumonia. Treated with doxycycline and amoxicillin He was discharged after 2 days. A systolic murmur was noted but no other stigmata of endocarditis were present. Cultures were not taken. When the patient represented 10 days later, having failed to respond to amoxicillin and doxycycline, our standard treatment for community acquired pneumonia, the murmur was still present, and the patient was in right heart failure with developing renal failure and liver impairment. The diagnosis of right sided endocarditis with septic pulmonary emboli, possible PVL producing *Staphylococcus aureus*, was considered. With a working diagnosis of possible endocarditis and cavitating lung lesions, possibly due to PVL-producing staphylococci, he was commenced on vancomycin, co-amoxycylav, and flucloxacillin. CA-MRSA, the European clone, resistant to methicillin and doxycycline but sensitive to clindamycin and linezolid was isolated from blood cultures and sputum. He underwent curative tricuspid valve repair.

This is the first reported case of CA-MRSA tricuspid valve endocarditis and pneumonia in an injecting drug user in the UK. Sequential Chest X-rays and computed tomography scans illustrate the progressions and characteristic signs associated with PVL-MRSA pneumonia.

Conclusion

Endocarditis must never be overlooked as a possible cause of severe pneumonia in the setting of intravenous drug usage, and the possibility of CA-MRSA must be considered when choosing antimicrobials.

Community acquired MRSA: the East Yorkshire experience

Elston JWT², Jordan-Owers N¹, Meigh R¹, Wilson J¹, Musaad S¹, Newton A³, Barlow G², Meigh J¹

¹ Department of Microbiology, Hull Royal Infirmary, Hull and East Yorkshire Hospitals NHS Trust. ² Department of Infection and Tropical Medicine, Castle Hill Hospital, ³ Humber Health Protection Unit, Health Protection Agency, East Yorkshire

Objectives: To describe the epidemiology, microbiology and clinical burden of community acquired MRSA (CA-MRSA) in our locality.

Methods: All MRSA isolates susceptible to ciprofloxacin, submitted to our service from January 2005 until September 2007, were identified. Those that underwent genotypic analysis (based on PGFE and toxin gene profiling) at the Staphylococcal Reference Laboratory and were distinct from epidemic MRSA were included in the study. Where multiple isolates were obtained from a single patient, one (deemed most clinically significant) was selected. Information concerning the site, nature and source of the specimen, and patient demographics, was obtained from laboratory data. Medical notes of patients from whom invasive isolates were obtained, were reviewed. Prevalence of ciprofloxacin susceptible MRSA was determined separately by analysis of laboratory data held for the period January 2006 to September 2007 inclusive.

Results: 179 isolates were identified. 118 of these were received by the Staphylococcal Reference Laboratory of which 86 met inclusion criteria. These represented 40 male and 46 female patients, age range of 5 days to 95 years (median 44 years). 51 (59%) of the isolates were collected in primary care or the hospital outpatient setting. The remaining 35 (41%) specimens originated from hospital inpatients of which 9 were received from the high dependency or intensive care units. Isolates were most frequently recovered from superficial swabs of skin lesions or wounds (n=37, 43%) and screening swabs originating from nose, axilla or groin (n=31, 36%). Isolates were also recovered from blood cultures (n=2), bronchial washings (n=1) and pleural fluid (n=1). Panton-Valentine Leukocidin (PVL) production was a feature of 37 (43%) of the isolates. Prevalence of ciprofloxacin susceptible MRSA with respect to overall MRSA isolation was 4% (115 /2890 isolates).

Conclusions: CA-MRSA is established in our community. Whilst the vast majority of the isolates represent colonisation or relatively minor soft tissue infection, serious infection attributed to CA-MRSA, including septicaemia was noted during the study period. Cases will be presented and important clinical features highlighted.

Treatment of PVL CA-MRSA – Are immunoglobulins the answer?

Rambani R, Townsend R

Department of Microbiology, Northern General Hospital, Sheffield

Objective: To examine the role of immunoglobulins in the treatment of CA-MRSA, with reference to a CA-MRSA case-study.

The Case: A 14 year old boy admitted with pneumonia, septic arthritis and severe cellulitis preceded by initial sporting injury. ITU support required due to clinical deterioration. Microbiology investigations revealed Mec A positive Staph. aureus in blood culture, bronchial lavage and knee aspirate, this proved to be a Ciprofloxacin sensitive PVL CA-MRSA. No improvement on Linezolid and Rifampicin by day 3. A 2 day course of IV immunoglobulins was commenced on day 5.

Dramatic clinical improvement (temperature, BP, CRP) seen within 48 hours of treatment with IV immunoglobulins. Patient left ward after 5 days and eventually left hospital after rehabilitation.

Conclusion: This case study whilst anecdotal is one of several which highlight the potentially life-saving role of immunoglobulins in the treatment of PVL CA-MRSA.

Cost savings achieved by re-positioning of the glyco/lipopeptides in a UK District General Hospital

Gonzalez A

Darent Valley Hospital, Dartford, Kent

When making decisions about the pre-emptive treatment of patients at risk of MRSA in the high risk population, the site of infection, antibacterial activity of the chosen antibiotic and the source infection have to be considered. After reviewing recently published recommendations and guidelines, a decision was taken to re-position all of the antibiotics with anti-MRSA activity included on our formulary. High doses and drug monitoring contribute to the hidden costs of therapy. The BSAC guidelines recommend the use of vancomycin over teicoplanin for the treatment of *S. aureus* bacteraemias unless high doses (>6 mg/kg, 800 to 1200 mg/day) are used or drug monitoring is performed.

Teicoplanin was replaced by daptomycin for the empiric treatment of complicated skin and soft tissue infections (CSSTIs), Staphylococcal bacteraemia and hospital-acquired Gram-positive sepsis. In the ITU we optimised treatment of serious Gram-positive infections by substituting teicoplanin with vancomycin administered by continuous infusion. Costs were calculated using BNF prices and costs for therapeutic drug monitoring. The total costs for 7 days therapy with vancomycin 2 and 4 g/day were calculated as £244 and £469, respectively. For teicoplanin (600 mg/d and 1200mg/d) the total cost for 7 days therapy was £520 and £840 respectively, and for daptomycin 350 and 500 mg/d was £434 and £620, respectively.

Daptomycin (350 mg/d) use was associated with a cost saving per 7 days treatment of £86 and vancomycin with £50 (4 g/d) to £276 (daily dose 2 g/d) compared to the 600mg teicoplanin dose. Our own formulary re-positioning of glyco/lipopeptides, i.e. the preferential use of vancomycin in the ITU and substitution of teicoplanin with daptomycin, is cost-effective and provides better therapeutic alternatives. Continuous vancomycin infusion in the ITU setting guarantees optimal dosing for severely ill patients. Daptomycin use on surgical and medical wards, apart from being marginally cheaper than teicoplanin, guarantees optimal dosing without the need for drug monitoring.

Infectious Disease Research Network – Promoting collaborative research in the UK, www.idrn.org

Head M, Hayward A, Johnson A, Cooke M

Department of Primary Care & Population Sciences, University College London, Royal Free Campus, London

The Infectious Disease Research Network (IDRN) promotes multi-disciplinary collaborations, provides information on funding opportunities, organizes training events, and acts as a forum for encouraging high quality infectious disease research. The IDRN was formed in 2001 and is funded by the National Co-ordinating Centre for Research Capacity Development (the NCCRCDC, now included as part of the National Institute for Health Research). It was initially piloted as a London network, and now works with researchers across the UK. The Network has over 1100 members.

The IDRN has been involved in the development of a wide range of research projects. These have included the National Patients Safety Agency funded National Observational Study of the Effectiveness of the CleanYourHands campaign, and a successful MRC fellowship working on Staphylococcal infections in the community.

Amongst our most popular electronic resources are the funding and training bulletins. These highlight forthcoming conferences, training courses and postgraduate study that may be of interest to infectious disease researchers, as well as research grants, travel bursaries and meeting prizes. We also advertise research jobs that cover infection, has completed a research mapping exercise that identifies researchers and infection-related projects by region in the UK, plus there is the facility to provide webspace and design webpages. Examples of this include the Association of Clinical Microbiologists meetings, and studies such as the Care Pathways for STIs in Primary Care, the Accelerated Partner Therapy (APT) Research Study, and the ORION statement.

The IDRN provides a model of how a small administrative infrastructure, with academic input from Network members, can initiate and support a wide range of collaborations, training events and information resources, ultimately leading to better collaborative research.

How contagious is PVL-*Staphylococcus aureus* during resuscitation?

Tilley R, Kearns A, Morgan M

Royal Devon and Exeter Hospital, Exeter

An 18 year old, previously fit man was admitted to hospital having been found unconscious at home. Resuscitation was commenced by his father, including mouth-to-mouth ventilation, before intubation by paramedics and continuing efforts in accordance with the Resuscitation Council (UK) Adult Advanced Life Support algorithm. After transfer to the emergency department by air ambulance the patient was re-intubated and resuscitation continued up to a total of 105 minutes, before death was pronounced. No masks were worn by any of the treating team throughout the resuscitation. The initial clinical picture suggested meningococcal septicaemia, with purpura fulminans and circulatory collapse, thus 2g cefotaxime was administered on admission. Due to the suspicion of Panton Valentine Leukocidin (PVL)-staphylococcal septicaemia, 600mg linezolid and 240mg Gentamicin intravenously were added to the antimicrobial regimen. During the resuscitation frothy red sputum was aspirated from the endotracheal tube. The chest X-ray appearance was supportive of a diagnosis of necrotising pneumonia. PVL-producing MSSA was subsequently isolated from blood cultures. No post mortem was carried out, nor was the possibility of recent influenza infection investigated. The Public Health consultant was notified.

To our knowledge, there has only been one report of transmission of PVL-positive staphylococci to a physician during resuscitation. In view of the close physical contact of many people with respiratory secretions during the resuscitation, including possible aerosol spread during 1 failed and a subsequent successful intubation, nose and throat screening swabs were performed the following day and repeated 10 days-14 days later. Of 14 contacts screened, 4 carriers of nasal MSSA were identified, with one contact incidentally found to be a carrier of MRSA, who was subsequently successfully decolonised. None of the contacts screened was found to be a carrier of PVL-MSSA.

This study, the first reported study of transmission, or lack of transmission of PVL-associated staphylococci during resuscitation, suggests that the risk profile for transmission in the acute care setting is different to the documented risks of prolonged close contact, for example in schools and intrafamilial spread, and that despite exposure to high levels of presumably infectious respiratory secretion and bodily fluids, risk of transmission was lower than might be expected. Interim guidance from the Department of Health suggests that, in cases of necrotising pneumonia, surgical masks be worn for intubation and physiotherapy and that closed tracheal suction be used to reduce the risk of nosocomial spread. Screening of close contacts for carriage of PVL-positive *S. aureus* has been advised. Further studies are warranted to confirm the findings of this study, however, there appears to be no indication for routine prophylaxis following resuscitation procedures where PVL staphylococcal exposure has occurred, although a high index of suspicion should be maintained in such contacts presenting with symptoms suggestive of staphylococcal infection.

Case Report - A CASE OF OSTEOMYELITIS IN THE UK DUE TO PANTON-VALENTINE LEUKOCIDIN TOXIN POSITIVE COMMUNITY ACQUIRED METHICILLIN RESISTANT *Staphylococcus aureus*

Chew KL, Galloway A^a, Clark J^b

^aDepartment of Microbiology, Royal Victoria Infirmary, Newcastle Upon Tyne, ^bPaediatric Immunology and Infectious Disease Service, Newcastle General Hospital, Newcastle Upon Tyne

Infection with community acquired methicillin resistant *Staphylococcus aureus* (CA-MRSA) is increasing. We describe a case of CA-MRSA osteomyelitis in a 10 month old boy with associated bacteraemia requiring combination antibiotics as well as surgical intervention. Situs inversus was incidentally discovered. The MRSA was found to be a Panton-Valentine Leukocidin (PVL) toxin producing strain. This case illustrates a new dilemma in empirical antibiotic treatment for severe soft tissue and bone infection originating from the community, as MRSA is no longer confined to causing nosocomial infections.

Immunoglobulin in PVL-associated disease- does it make a difference?

Morgan MS, Day C

Royal Devon and Exeter NHS Foundation Trust

We present 2 cases where usage of intravenous immunoglobulin (IVIG) made a dramatic impact, including the first usage of nebulised IVIG in PVL-staphylococcal pneumonia.

Case 1

A 30 year old previously healthy female presented in extremis with severe haemoptysis and fulminating necrotising pneumonia, following an influenza-like illness. Her CRP was 512 mg/L and neutrophil count was $0.24 \times 10^9/L$. The CX-ray showed multilobular infiltrates. Gram stain of the bloody sputum yielded sheets of staphylococci and few neutrophils. With a clinical diagnosis of PVL-associated pneumonia, intravenous linezolid, rifampicin and clindamycin were commenced. After 6 hours of intensive ventilatory and circulatory support, the prognosis was pronounced hopeless.

However, following our successes with IVIG in toxic shock syndrome, we instituted IVIG therapy, 2G/kg, resulting in a dramatic systemic improvement. However, the following day she became more difficult to ventilate, and 4 days later, respiratory failure and death supervened. Post mortem revealed massive areas of consolidation and necrotic lung tissue, suggested failure of ventilation resulted from continuing necrosis due to pre-formed active toxins, deep in the lung substance out of reach of systemic IVIG. In retrospect, whilst further IVIG may have been beneficial, there are few similar cases reported, and the degree of penetration of IVIG to necrotic tissue is unknown.

Case 2

An athlete presented with community acquired pneumonia. A rapidly falling peripheral white cell count, and pleural effusions developing on a background of minor haemoptysis, with Gram positive cocci seen in the foot wound pus, suggested PVL-related disease. IVIG 2G/kg was administered intravenously, but this time simultaneously with nebulised 4.5gms nebulised IVIG in 0.5% solution over 30 minutes, 8 hourly for 5 doses. The patient made a full recovery.

Conclusion

The necrotising process due to PVL continues inexorably in the absence of neutralising agents, causing death despite successful eradication of the pathogen. IVIG has an immunomodulatory effect as well as neutralising PVL directly in vitro. Our experience suggests that IVIG can benefit patients with severe PVL disease, and that the mode of delivery by inhalation may be worth further study.

A prospective observational cohort of inpatients newly MRSA positive in the Royal Infirmary of Edinburgh

Tappin, SL (Gibb AP)

The New Royal Infirmary of Edinburgh

Background

MRSA colonisation is a well recognised risk factor for MRSA infection and bacteraemia and associated complications. Although considered a hospital acquired problem, acquisition in the community is on the increase. Community-acquired strains in the UK are at present largely the same as hospital acquired strains (mainly EMRSA-15 and -16) and differentiation of hospital versus community acquired is based on timing of hospital exposure.

Aim

This study aims to identify demographic profiles, risk factors, and clinical outcomes of patients presenting for the first time with MRSA in the Royal Infirmary of Edinburgh.

Methods

Patients newly colonised or infected with MRSA were identified from daily laboratory alerts between 1st March and 20th June 2007, and followed up for 28 days. A standardised data form was completed by reviewing clinical notes on the ward, and consulting hospital information systems.

Results

Seventy four newly MRSA positive cases were identified (39 male, 35 female, average age 65.4 years), a third of whom were tested within 48 hours of admission (n=25, 34%) thus would be considered community acquired. Those identified were distributed across medical and surgical disciplines. Half of patients newly colonised were also MRSA infected during follow up including 8 MRSA bacteraemias (10%) 11 infected wounds (15%). Roughly half were isolated once their status was known, and a third prescribed either eradication therapy or IV vancomycin. The average length of stay was 33 days, but less than half were discharged by 28-days post MRSA identification, and 20% had died.

Conclusion

This study confirms that acquisition of MRSA in hospital is associated with significant morbidity, mortality, and extended length of hospital stay. The report describes a diverse MRSA population in the RIE with similarly diverse outcomes highlighting the ambiguity that exists in recognising who is colonised or infected, who needs 'treatment', and what happens to those who remain colonised when discharged back into the community.

Necrotising pneumonia- a difficult diagnosis, but not to be missed

Sprot H, Day C, Dow A, Morgan M

Royal Devon and Exeter NHS Foundation Trust, Exeter

A 27 year old athlete developed a flu-like illness and pleurisy after lancing a foot abscess. Admitted with pneumonia, with occasional flecks of blood in his sputum, he was normotensive with a respiratory rate of 20/min and temperature of 37.6°C...

His C-reactive protein (CRP) was 225 mg/L, his neutrophil count was $13.6 \times 10^9/L$, and left lower lobar consolidation and multiple opacities were present on CX-ray. (With a possible diagnosis of PVL-staphylococcal pneumonia, therapy was amended to intravenous linezolid 600 mg bd and clindamycin 1.8gms qds, with instruction to observe closely for any clinical deterioration necessitating addition of intravenous immunoglobulin. (IVIG), as he was not considered unwell enough for Intensive Care Unit admission. However, six hours later, a dramatic decline, with worsening dyspnoea, haemoptysis, falling WBC ($9.7 \times 10^9/L$) thrombocytopenia and decreased oxygen saturations, necessitated transfer for ventilation. By now, small metastatic abscesses and large bilateral pleural effusions were seen on CT scan.

Pleurocentesis and IVIG 2gm/kg infusion was commenced. An additional 4.5gms nebulised IVIG in 0.5% solution was given over 30 minutes, 8 hourly for 5 doses. Transoesophageal echocardiography (TOE) revealed no vegetations or thrombus. Intravenous rifampicin, 600 mg bd was added on day 5, when a second CT lung scan demonstrated nodular infarcts, and after periods of prone ventilation, and a tracheostomy he began to improve. Methicillin sensitive *Staphylococcus aureus*, with the *pvl* & *seg* loci was eventually isolated from blood cultures, sputa, and foot pus.

Conclusion: Despite the delay in IVIG administration, there was a dramatic systemic improvement shortly after commencing infusion. IVIG neutralises the cytopathic effect of PVL and other circulating toxins. Used in 6 patients with PVL pneumonia to date our novel additional use of nebulised IVIG was an attempt to inactivate toxins sequestered in necrotic tissue out of reach of the systemic IVIG, and warrants further evaluation.

Organising Secretariat

Philippa McCoy
British Society for Antimicrobial Chemotherapy

11 The Wharf
16 Bridge Street

Birmingham

B1 2JS

T: 0121 633 0410

F: 0121 634 9497

E: pjmccoy@bsac.org.uk

W: www.bsac.org.uk