

## MRSA – a bit of a mixed bag

### **P1449** Community-acquired methicillin-resistant *Staphylococcus aureus* as a cause of pyonephrosis necessitating emergent nephrectomy. A new clinical entity

M. Koukoulaki, I. Baraboutis, E. Belesiotou, E. Platsouka, V. Papastamopoulos, D. Kontothanasis, K. Petraki, O. Paniara, A. Skoutelis (Athens, GR)

**Introduction:** Community acquired-methicillin-resistant *Staphylococcus aureus* (CA-MRSA) carrying the Pantone-Valentine leukocidin (PVL) toxin has been linked to skin and soft tissue infections and necrotising pneumonia. We report a new clinical syndrome related to this emerging pathogen.

**Case presentation:** An 84 year-old man, with history of diabetes mellitus type II, nephrolithiasis, recurrent urinary tract infections and prostatectomy, presented with constitutional symptoms and fever. He denied invasive procedures of the genitourinary tract in the last 2 years. Evaluation revealed tenderness of the right costophrenic angle, leukocytosis, CRP of 35.6mg/dl and preserved renal function. A computed tomography revealed a right-sided staghorn calculus, with dilatation of the pelvicalyceal system and attenuation of renal cortex. Further focal infection was noted at the upper and middle pole of the right kidney along with enlargement of right iliopsoas muscle. Blood and urine cultures collected on admission were positive for MRSA. The patient's initial therapy with ticarcillin/clavulanate and amikacin was changed on the third hospital day to meropenem and vancomycin. The patient gradually became septic, necessitating right nephrectomy on the fourth hospital day. At surgery, the kidney was found small, with multiple scars and also with pus inside the renal pelvis and ureter. Perirenal tissue and psoas muscle were inflamed. The MRSA strain had the "community" phenotype with preserved sensitivity to trimethoprim-sulfamethoxazole and clindamycin. The assay for PVL toxin was positive, while PCR for mecA type III and IV was negative (PCR for mecA type V has been scheduled). Histopathology analysis reported chronic obstructive pyelonephritis secondary to nephrolithiasis, along with interstitial nephritis with tubular atrophy and nephrosclerotic glomerulae. Further infection was extended to pyelocalyceal system, ureter and peri-renal fatty tissue. The patient completed three weeks of intravenous vancomycin and was discharged in good condition, albeit with residual renal insufficiency.

**Discussion:** Community-acquired-MRSA differs from healthcare associated MRSA both in epidemiology and genetic characteristics. Recent reports indicate that CA-MRSA strains have entered tertiary care hospitals and are the cause of healthcare infections. This is a novel type of syndrome caused by CA-MRSA. Interestingly, the patient involved did have risk factors for invasive MRSA infection.

### **P1450** Family recurrent episodes of skin and soft-tissue infections by methicillin-susceptible *Staphylococcus aureus* carrying Pantone-Valentine leukocidin

M. Álvarez-Martínez, F. Marco, C. Pitart, J. Mensa, M. Almela, J. Martínez, À. Soriano, M. Jiménez de Anta (Barcelona, ES)

**Objectives:** *Staphylococcus aureus* is a common pathogen able of causing a variety of infections in humans. Pathogenicity is due to several virulence factors, one of them is Pantone-Valentine leukocidin (PVL). The aim of this study is to show the association between recurrent episodes of skin and soft-tissue infections in members of the same family, previously healthy, and the presence of methicillin-susceptible *S.aureus* (MSSA) carrying PVL.

**Methods:** Because of recurrent skin and soft-tissue infections in the members of the same family, nasal swabs were collected in all members from March to September 2007. Antimicrobial susceptibility of *S.aureus* isolated strains was performed by disk-diffusion method. Genotype characterisation of PVL was made by coamplification of the genes lukS-PV and lukF-PV by PCR. Genomic DNA was extracted from cultures

grown on agar plates, by a modified DNAeasy tissue kit (QIAGEN) procedure. Genes were identified as a 433 pb band in the agarose gel after electrophoreses of amplified product.

**Results:** Recurrent skin and soft-tissue infections were diagnosed in 7 out of 8 members of the same family (father, mother, son #1, granddaughter, son #2, partner of son #2 and roommate of son #2; partner of son #1 was not affected) from April 2005 to September 2007, with no known exposure to healthcare establishments. Abscesses were located in armpit, back, thigh, knee, leg and buttocks. *S.aureus* was isolated in nasal swabs in 5 of the members; nasal swabs were negative in 2 members, and there were not data from the eighth. *S.aureus* was also recovered from one abscess in the armpit. All *S.aureus* isolates presented the same phenotype, resistance to penicillin, and susceptibility to oxacillin, clindamycin, gentamicin, levofloxacin, rifampin, TMP-SMX and vancomycin. The genes lukS-PV and lukF-PV were identified in all 5 of the *S.aureus* isolated in nasal swabs. All abscesses, except two, need surgical debridement. Treatment was made with amoxicillin-clavulanic. Because recurrence of abscesses despite the treatment and nasal decolonisation, patients carrying MSSA are being treated 5 days a month with nasal mupirocin and foamy chlorhexidine. At 6 months of follow up no recurrence has being reported.

**Conclusions:** Interfamily transmission of MSSA PVL-carrying strain could be the cause of the recurrent skin and soft-tissue infections. The decolonisation of nasal carriers of MSSA and hygienic measures could clear up the problem of recurrence of infections.

### **P1451** Stress! An investigation of emotional and information needs of three types of methicillin-resistant *Staphylococcus aureus*-carriers in the home situation

S. Vonderhorst, F. Verhoeven, L. van Gemert-Pijnen, M.G.R. Hendrix, A.W. Friedrich, I. Daniels-Haardt for the Euregio MRSA-net Twente/Münsterland

**Objectives:** To analyse emotional and information needs of Methicillin Resistant *Staphylococcus aureus* (MRSA)-carriers in the home situation, in order to optimise patient education.

**Methods:** Semi-structured in-depth interviews were conducted with carriers of three different MRSA-types (n=32): Community-Acquired (CA-MRSA; n=3), Veterinary-Acquired (VA-MRSA; n=3) and Hospital-Associated (HA-MRSA; n=3), based on cognitive and emotional coping strategies. A focusgroup with representants of the three MRSA-types (n=3) was performed to validate the interview results. Critical Incident Theory was used to detect stress incidents caused by MRSA-colonisation.

**Results:** MRSA-colonisation was particularly perceived as stressful by CA- and HA-MRSA carriers. Of the 826 reported stress events, 295 (36%) were mentioned by CA-MRSA carriers and 340 (41%) by HA-MRSA carriers. They experienced stress mainly because of feeling stigmatised and a lack of knowledge, leading to emotional problems and information needs (174 and 233 of 505 needs citations, respectively). Used strategies for emotional coping were seeking social support with family, friends, and colleagues. Information needs were met by actively searching for background and practical information.

VA-MRSA carriers reported relatively less stress events compared to CA- and HA-MRSA carriers (191 of 826; 23%). Their coping strategies could be characterised by denial, suppression, and escapism.

In order to fulfil information needs, all carriers actively searched for information on the internet (51 of 164 citations on information resources), although the internet was perceived as an unreliable source providing ambiguous information. To fulfil emotional needs, CA-MRSA-carriers consulted the public health department, and HA-MRSA-carriers contacted the microbiologist, whose information was valued as insufficient to handle their complaints.

**Conclusions:** MRSA-colonisation turned out to be a stressful event for CA- and HA-MRSA-carriers, and therefore they had much more emotional and information needs compared to VA-MRSA carriers. Therefore, the provided patient education should depend on the type of MRSA. CA- and HA-MRSA-carriers have to be addressed more

personally, e.g., by a personal conversation with a healthcare provider so that emotional needs are met. VA-MRSA-carriers' needs can be met by providing them facts about MRSA.

#### **P1452** First outbreak of MRSA ST398 in a Dutch hospital

*M.W.H. Wulf, A. Markestein, F.T.P.M. van der Linden, A. Voss, C.H.W. Klaassen, C.M. Verduin (Veldhoven, Geldrop, Nijmegen, NL)*

**Background:** In the Netherlands the rate of Meticillin resistant *Staphylococcus aureus* infections in hospitals is still low, but community acquired MRSA occurs more frequently. This increase is mainly caused by so called 'non-typable' MRSA (NT-MRSA, = not typable by PFGE using SmaI) belonging to MLST type ST398. This strain is widely disseminated among pigs, veal calves and people in contact with pigs. Transmission within families as well as solitary cases of colonised healthcare workers have been described but until now no nosocomial transmission to multiple patients or HCWs had occurred.

**Outbreak:** In June 2007 MRSA was isolated from a diabetic foot ulcer of a patient on a surgical ward. Subsequent screening of contacts among patients and healthcare workers revealed four additional patients with MRSA colonisation and/or infection and five HCW who carried MRSA. All strains were resistant to tetracycline and non-typable by PFGE. Spa typing showed that all strains to be t567, a type previously found in pigs. None of the patients had contact with pigs and/or veal calves. One healthcare worker lived on a pig farm but neither she nor her partner came into contact with pigs.

**Conclusions:** We describe the first outbreak of NT-MRSA among patients and HCW on a surgical ward. While the source is not fully established it could be the HCW living on a pig farm. This outbreak makes clear that transmission on a larger scale can occur, even with NT-MRSA.

#### **P1453** Meticillin-resistant *Staphylococcus aureus* in horses and horse personnel at the Finnish veterinary teaching hospital, 2006–2007

*M. Rantala, K. Thomson, A-L. Myllyniemi, A. Pitkälä, J. Seppänen, M. Kanerva, J. Vuopio-Värkila, A. Väinö, O. Lyytikäinen (Budapest, HU; Helsinki, FI)*

**Objectives:** We report the emergence of MRSA in horses at the Helsinki University Veterinary Teaching Hospital, in Finland during October 2006-June 2007.

**Methods:** After the first MRSA isolate in a horse was detected through routine wound infection surveillance in October 2006, active MRSA screening of horses at risk (hospitalised >24h) was implemented. Swabs were obtained from nostrils, oral mucosa, perineum, and wounds. Voluntary screening of personnel (nostrils and skin lesions on hands) was performed on two occasions in 2006 and 2007. MRSA was confirmed by PCR of *mecA* and *S. aureus* specific *nuc* genes. MRSA isolates were characterised by pulsed-field gel electrophoresis (PFGE), *spa* typing, SCCmec and multilocus sequence typing (MLST). A case was defined as a horse or staff member with MRSA positive culture result. MRSA positive horses were handled with barrier nursing precautions in isolation or cohorts. The importance of hand hygiene and aseptic techniques in different procedures were emphasised.

**Results:** The first MRSA cluster with 2 wound infections and 3 colonisations among 98 horses (attack rate, AR 5%) occurred during October-December in 2006; all 24 screened personnel was negative. The 5 isolates were resistant to macrolides, fluoroquinolones and aminoglycosides, and identical in PFGE. MRSA strains were of ST125, *spa* type t1399, and SCCmec IVA. The second outbreak appeared in May 2007, and was also detected through wound infection surveillance. This cluster involved 3 infections and 10 colonisations among 61 horses (AR 21%). The index patient was a horse which was hospitalised during the first outbreak but was MRSA negative at that time. In staff screening, 1/25 person was colonised with MRSA. All 14 isolates were resistant to aminoglycosides and tetracyclines, but susceptible to fluoroquinolones

and macrolides, were non-typable by PFGE and possessed ST398, *spa* type t011, and SCCmec IV.

**Conclusion:** These are the first MRSA infections detected in horses in Finland. ST125 has been only seldom reported in humans in Finland, whilst ST398 is a new strain type in our country. Routine wound infection surveillance in the hospital was crucial in detecting MRSA. Early outbreak control measures, active screening of patients and staff training are necessary to prevent spread of MRSA in veterinary premises. Emerging MRSA infections in animals can cause a public health risk since strains causing infections in animals cause infections in humans and vice versa.

#### **P1454** Prevalence of meticillin-resistant *Staphylococcus aureus* amongst residents and staff of nursing homes

*N. Baldwin, D.F. Gilpin, M. Tunney, P. Kearney, A. Gardiner, C. Hughes (Belfast, Antrim, UK)*

**Objectives:** It has been suggested that nursing homes can act as a reservoir for MRSA within the community and may contribute significantly to the spread of MRSA within hospitals when colonised residents are admitted for medical care. The aim of this study was, therefore, to determine the prevalence of MRSA amongst residents and staff in private nursing homes within the Northern Health and Social Care Trust (NHSCT) in Northern Ireland, and to compare strains isolated from nursing homes to those currently in circulation in local hospitals.

**Methods:** Swabs from the anterior nares were taken from 1,111 nursing home residents and 553 staff in 45 private nursing homes and processed by inoculation onto cefoxitin-containing chromogenic agar. After 48 h incubation, positive colonies were confirmed as MRSA by multiplex PCR using primers to detect staphylococcal 16S, *nuc* and *mecA* genes. MRSA strains were further analysed by restriction enzyme digestion (SmaI), followed by pulsed field gel electrophoresis (PFGE) and compared with strains isolated in local hospitals.

**Results:** The overall prevalence rate among residents was 23%, with individual home prevalences ranging from 0% to 73%. The overall prevalence among staff was found to be 7%, and again this ranged from 0% to 28%. Staff who were found to be colonised were employed in various positions throughout the nursing homes, ranging from care assistants to kitchen workers and maintenance. PFGE analysis showed that within a home, several MRSA strains could be present, but often, identical strains were shown to have colonised several individuals within one home. Staff were found to be colonised with the same strains as residents. No significant differences were determined by PFGE between nursing home and hospital MRSA isolates.

**Conclusions:** The results show that MRSA is prevalent within nursing homes in the NHSCT in Northern Ireland, although the extent of this prevalence may vary widely between nursing homes. Transmission of MRSA between nursing homes and hospitals is indicated by the identification of similar strains in both environments. Colonisation of staff was not limited to only those staff with a direct role in patient care and this possibly contributes to the transmission of MRSA within the nursing home environment. These results highlight the need for tailored infection control guidance for nursing homes.

#### **P1455** The general public's beliefs about meticillin-resistant *Staphylococcus aureus*: a Mental Models approach

*F. Verhoeven, J.E.W.C. van Gemert-Pijnen, M.G.R. Hendrix, A.W. Friedrich, I. Daniels-Haardt for the Euregio MRSA-net Twente/Münsterland*

**Objectives:** Meticillin Resistant *Staphylococcus aureus* (MRSA) is becoming an increasing public health threat. Risk communication strategies should create public awareness in order to prevent misconceptions leading to non-compliance with infection control measures. Therefore, risk communication should be matched to the general public's beliefs about MRSA. These beliefs were determined in this study.

**Methods:** The Mental Models Approach was applied. Based on the literature, a conceptual model was created which was used as an