

Transfer of methicillin-resistance to a methicillin-susceptible *Staphylococcus aureus* strain resulting in a methicillin-resistant *Staphylococcus aureus* (MRSA) outbreak

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Horizontal, interspecies transfer of the staphylococcal cassette chromosome *mec* (SCC*mec*) is supposed to be an important factor in the emergence of new clones of MRSA but has been rarely observed in realtime. This report describes a MRSA outbreak caused by a health-care worker (HCW) carrying a Methicillin-Susceptible *Staphylococcus aureus* (MSSA) strain which acquired a SCC*mec*-cassette and was subsequently transmitted to patients. In september 2012 a patient of the oncology ward developed a methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia. Active contact tracing using surveillance cultures for MRSA was performed in all patients and HCWs which had been exposed to the index patient. All MRSA isolates were genotyped by spa-typing, Multiple-Locus Variable number tandem repeat Analysis (MLVA), amplified fragment length polymorphism (AFLP) and optical mapping (OM). MRSA surveillance revealed three (asymptomatic) MRSA carriers: two patients and one HCW. The HCW was tested MRSA positive in one culture side, perineum. No known risk factors for MRSA acquisition were present in the patients or HCW. All MRSA isolates were resistant to fusidic acid. This is a relatively rare antibiogram. In the past five years only 1% of all clinical isolates of *Staphylococcus aureus* (including MSSA and MRSA) in our laboratory, were resistant to fusidic acid. All isolates were genotyped by spa- and MLVA typing and found to be identical: spa-type t586, MLVA MT4065-MC0008. This MRSA type has not been identified before in the hospital. One and half year prior to this outbreak, a nose swab from the involved HCW had been cultured. A fusidic acid resistant MSSA was detected, however this isolate was not available for further testing. Prior to decolonisation of the HCW, the partner of the HCW was tested for MRSA carriage. No MRSA was found, only a fusidic acid resistant MSSA was detected in the nose. Results from showed that all isolates - MRSA and MSSA – were identical (see as an example AFLP in figure 1). AFLP genotyping showed that the MRSA isolate of the HCW was identical to the MSSA strain of the partner of the HCW. This finding supports the theory of horizontal transfer of an SCC*mec* to a methicillin-susceptible *S. aureus* strain, that subsequently caused an outbreak in oncology. It also shows the potential role of HCWs as a cause of MRSA outbreaks.



Figure 1. Amplified fragment length polymorphism pattern and dendrogram of MRSA/MSSA strains