Meticillin-resistant Staphylococcus aureus (MRSA) Outbreak in a Neonatal Unit carrying an unusual genotype of macrolide-lincosamide-resistance: ermC plus lnuA genes

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Background and aims: MRSA is an important clinical pathogen causing outbreaks, and the acquisition of multidrug-resistance limits the antimicrobial treatment. The most frequent macrolide-lincosamide-resistant phenotypes are MLSb (methylase) constitutive(c) and inducible(i) mediated by erm genes, and MSb (efflux) by msrA. Recently, S. aureus showing L phenotype mediated by lnuA gene with eritromycin(ERY)/clindamycin(CLI) susceptibility and lincomycin(LIN) resistance emerged in our country.
Aim: to characterize a MRSA outbreak in a neonatal unit with an unusual macrolide-lincosamide phenotype.
Methods: During January-May 2006, seven MRSA (one MRSA per patient) were recovered from blood samples. Additionally, 39 health-care workers (HCW) were evaluated for nasal carriage. Macrolide-lincosamide-resistant phenotypes were evaluated by triple-disc diffusion assay (ERY-CLI-LIN). Disc diffusion and MICs (agar dilution) assays were performed by CLSI. PCR for ermA, ermC, msrA and lnuA genes, and molecular typing by SmaI-PFGE were evaluated.
Results: 9/39 (23%) HCW were colonized by S. aureus, and 6 of them (15%) were MRSA. Twelve MRSA (7patients/5HCW) isolates were resistant to gentamicin (MIC=32-128mg/L), and susceptible to tetracycline (MIC=0.25-0.5mg/L), minocycline (MIC=0.5mg/L), chloramphenicol (MIC=8mg/L), trimethoprim-sulfamethoxazole (MIC=0.06mg/L), rifampin (MIC=0.5-2mg/L), ciprofloxacin (MIC=0.25mg/L), and vancomycin (MIC=0.5-1mg/L). Inducible expression of MLSb phenotype was observed in all strains, but 10/12 also showed reduced LIN disc inhibitory zone (7 MRSA=6mm; 3 MRSA=10-15mm). MIC´s to macrolide-lincosamide were: ERY >512mg/L, CLI=0.25-0.5mg/L. Ten MRSA were LIN-resistant (MIC=16-32mg/L), and 2 were susceptible (MIC=0.5mg/L). All strains were positive for ermC and 10 were also positive for lnuA gene. All 12 MRSA (7patients/5HCW) belong to the same clonal type.
Conclusion: 1) HCW were nasally colonized by the same MRSA clone than patients, suggesting cross transmission; 2) here we report the first outbreak produced by a MRSA clone carrying both ermC and lnuA genes.