

TITLE: Effect of antibiotics on Biofilm formation by Oxacillin-resistant *Staphylococcus spp.* isolated from hospitalized patients with osteomyelitis

AUTHORS: Pereira-Ribeiro, P.M.A.; Esmeraldo, M.S.; Cabral-Goulart, G.; Ribeiro, F.C.; Olivella, J.B.; Nogueira, B.A.; Sued-Karam, B.R.; Mattos-Guaraldi, A.L.

INSTITUTION: Departamento de Microbiologia, Imunologia e Parasitologia, Faculdade de Ciências Médicas, Rio de Janeiro, RJ, Brasil.

ABSTRACT:

Osteomyelitis is an inflammatory bone disease that is caused by an infecting microorganism and leads to progressive bone destruction and loss. Bacterial osteomyelitis is notoriously difficult to treat, in part because of the widespread antimicrobial resistance in the preeminent etiologic agent, the Gram-positive bacterium *Staphylococcus spp.* Staphylococcal infections are becoming an increasing global concern, partially due to the resistance mechanisms developed by these bacteria to evade the host immune system and antibiotic treatment difficult. In addition to the ability of staphylococci biofilm formation has been increasingly described as a multifactorial and multistep process associated with infection. The aim of this study was to evaluate the epidemiological and microbiological aspects of osteomyelitis infectious caused by different strains of multi-drug resistance *Staphylococcus spp.* from patients hospitalized. The identification at species level of *Staphylococcus* was performed by the MALDI-TOF method. Antimicrobial resistance was performed by the Disc Diffusion method on agar and the minimum inhibitory concentrations (MIC) of antimicrobials (oxacillin and vancomycin) and the ability of biofilm formation on abiotic surface (polystyrene method) in the presence of oxacillin/vancomycin were analyzed. Polymerase chain reaction (PCR) assays were performed to detect *mecA* and *icaA* genes. Strains were identified as *S.epidermidis* (n = 3), *S.aureus* (n = 2), *S.captis* (n = 1) and *S.warnerii* (n = 1). All strains were oxacillin-resistant and 3 *S.epidermidis* strains were vancomycin-intermediate. The presence of the *icaA* and *mecA* genes were detected in four and five strains, respectively. All strains were able to produce biofilm on the polystyrene surface in different levels independent of the presence of the *icaA* and *mecA* genes. Oxacillin and vancomycin did not inhibit biofilm formation on abiotic surface. The increase in the number of cases of infections and the multifactorial aspects that favor the pathogenicity of *Staphylococcus spp.* should continue to be investigated, since the spread of microorganisms in the hospital environment has become a growing public health challenge.

KEYWORDS: *Staphylococcus spp.*; Osteomyelitis; Oxacillin resistance; Biofilm.

DEVELOPMENT AGENCY: CNPq, UERJ SR2, FAPERJ, CAPES.