TITLE: CHARACTERIZATION OF THE STAPHYLOCOCCAL CASSETTE CHROMOSOME mec (SCCmec) IN METHICILIN-RESISTANT Staphylococcus intermedius GROUP ISOLATED FROM DOGS


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ABSTRACT:

Staphylococcus pseudintermedius, a species of the Staphylococcus intermedius group (SIG), is a commensal bacterium of the skin and mucosae of dogs and other animals, and also main cause of canine infections. An increasing number of methicillin-resistant S. pseudintermedius (MRSP) associated to severe infections in dogs has been reported in the last years. In Staphylococcus spp., methicillin resistance is mediated by the expression of PBP2a, a penicillin binding protein encoded by the mecA gene, which is mobilized by the Staphylococcal Chromosomal Cassette (SCCmec). In this context, the goals of this study were to investigate the presence of the mecA gene and to detect SCCmec types in SIG strains isolated from clinical samples recovered from dogs affected by bacterial infection. A total of 40 SIG strains (oxacillin MIC ≥ 0,5 μg/ml) from different clinical samples of dogs were selected for this study. Identification of the bacterial isolates and susceptibility to oxacillin were performed using the Becton Dickinson Phoenix Automated System. Minimum inhibitory concentration (MIC) to oxacillin was determined by broth microdilution testing (CLSI). PCR-based assay using a specific primer set was carried out to assign SCCmec elements. The types II and III SCCmec were found in 22.5% and 33% of the isolates, respectively. All SIG strains with type II SCCmec, in addition to ccrAB2, they also carried the ccrC gene, whereas SIG strains with type III SCCmec carried ccrAB4 or ccrAB4 plus ccrC, in addition to ccrAB3. Among the SIG strains that carried the type II SCCmec element, four exhibited oxacillin MICs ≤ 64 μg/ml, and five, oxacillin MIC ≥ 128 μg/ml. All SIG strains with type III SCCmec exhibited oxacillin MICs > 256 μg/ml. We observed in this study a significant number of SIG strains (30%) containing non-typable SCCmec elements, suggesting that multiple rearrangements are occurring in their genomes. These findings indicate that pets, like dogs, and veterinarians may be potential sources of MRSP in Brazil. The spread of MRSP in clinical settings has been a serious concern since oxacillin is one of the few therapeutic options to treat bacterial infections in dogs caused by this zoonotic pathogen.

Keywords: Staphylococcus pseudintermedius, canine infections, SCCmec, oxacillin resistance

Development Agency: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).