

TITLE: CHARACTERIZATION OF THE STAPHYLOCOCCAL CASSETTE CHROMOSOME *mec* (SCC*mec*) 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 (SCC*mec*). In this context, the goals of this study were to investigate the presence of the *mecA* gene and to detect SCC*mec* types in SIG strains isolated from clinical samples recovered from dogs affected by bacterial infection. A total of 40 SIG strains (oxacillin MIC $\geq 0,5$ $\mu\text{g/ml}$) 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 SCC*mec* elements. The types II and III SCC*mec* were found in 22.5% and 33% of the isolates, respectively. All SIG strains with type II SCC*mec*, in addition to *ccrAB2*, they also carried the *ccrC* gene, whereas SIG strains with type III SCC*mec* carried *ccrAB4* or *ccrAB4* plus *ccrC*, in addition to *ccrAB3*. Among the SIG strains that carried the type II SCC*mec* element, four exhibited oxacillin MICs ≤ 64 $\mu\text{g/ml}$, and five, oxacillin MIC ≥ 128 $\mu\text{g/ml}$. All SIG strains with type III SCC*mec* exhibited oxacillin MICs > 256 $\mu\text{g/ml}$. We observed in this study a significant number of SIG strains (30%) containing non-typable SCC*mec* 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, SCC*mec*, oxacillin resistance

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