Identification and Characterization of Panton-Valentine Leukocidin-Positive Staphylococcus aureus Isolated in Okinawa, Japan

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Abstract: We experienced hospital-acquired infection in March 2008 that three nurses became infected with Panton-Valentine leukocidin (PVL)-positive methicillin-resistant Staphylococcus aureus (MRSA). Accordingly, we performed the retrospective study to determine the prevalence of PVL-positive S. aureus in Okinawa. A total of 731 clinical isolates, consisting of 600 MRSA and 131 methicillin-susceptible isolates in Okinawa, were included. Of the isolates, 16 were positive for PVL gene (lukS-PV-lukF-PV). All the PVL-positive isolates were MRSA and the first appeared in March 2008. The isolates from the University Hospital were characterized as staphylococcal chromosomal cassette mec type IVa. Through the analysis of pulsed-field gel electrophoresis (PFGE), 16 PVL-positive MRSA isolates were divided in three groups. One isolate (the first group) from the other hospital was less similar (<40% similarity) when compared with the remaining 15 isolates from the University Hospital. The second group consisted of two respective paired isolates from the same department wards, and those were very similar with each other, indicating possible patient-to-patient transmission. The 11 isolates were characterized as the third group with >80% similarity. The DiversiLab system (bioMérieux) based on repetitive-sequence-based PCR typing demonstrated that the isolates of the third group were similar and indistinguishable with the strains of USA300 clone. However, the first and second groups were not determinable which USA clone was the origin. With these, we could conclude that the PVL-positive MRSA close to USA300 clone first appeared in Okinawa in 2008 and is now becoming prevalent multi-focally. Also, person-to-person transmission is already likely in a hospital setting.

Key words: Panton-Valentine leukocidin (バントン・バレンタイン・ロイコシジン), staphylococcal chromosomal cassette mec; SCCmec (メチシリシン耐性領域カセット), methicillin-resistant Staphylococcus aureus; MRSA (メチシリシン耐性黄色ブドウ球菌), community-acquired MRSA; CA-MRSA (市中感染型 MRSA), genotyping (遺伝子型別)