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Pathogenic potential of biofilm-producing methicillin-resistant *Staphylococcus aureus* in BALB/c mice

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Biofilm-forming methicillin-resistant *Staphylococcus aureus* (MRSA) is an emerging pathogen that adversely affects animal and human health. World Health Organization (WHO) has designated MRSA as a high-priority pathogen for research and development. In this study, we have investigated the pathogenic potential of MRSA recovered from mastitic milk of cow. The MRSA was initially characterized for coagulase, haemolytic and DNase activity followed by its biofilm forming ability. Further, an intravenous murine model of MRSA was developed using multiparameter approach comprising of disease activity score, viable bacterial count in blood and tissues; and, detection of biofilm mass in tissue. Infection was successfully established in mice following intravenous inoculation of 3×10^8 colony forming unit (CFU) per mL of MRSA. Fifty percent of MRSA-challenged mice died after infection whereas mice survived exhibited disease activity score >25. Significantly higher MRSA count was recorded in blood, liver and kidney of MRSA-challenged mice as compared to healthy mice (P <0.05). Gram staining revealed the presence of varied size of multiple clusters of Gram-positive biofilm mass in the liver and kidney of MRSA-challenged mice. This study on pathogenesis of MRSA in mice would be useful in not only controlling the MRSA infection, but also in the development of effective therapeutics.

Keywords: Cow milk, Disease activity score (DAS), Mastitic milk, MRSA pathogenesis, Multidrug resistance (MDR)

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