ABSTRACT

The emergence of multidrug resistant S. aureus has spurred the need for development new antimicrobial agents. Lysostaphin, a novel therapeutic agent, rapidly lyses S. aureus through proteolysis of the staphylococcal cell wall. The present study was aimed to evaluate in vitro and in vivo bactericidal activity of lysostaphin against MRSA isolates. In vitro activity tested by disc diffusion assay with 50 µg of lysostaphin showed 14 to 15 mm zone of inhibition. The MIC ranged from 0.125 to 2 µg/ml. Lysostaphin showed rapid bactericidal activity and maintained >99.99% of growth inhibition at MIC concentration. Lysostaphin was found to be effective at four-fold lower concentration compared to linezolid and vancomycin to inhibit the biofilm formation. In addition, lysostaphin also showed synergistic effect with linezolid and oxacillin, additive effect with vancomycin. In vivo efficacy of 0.25% lysostaphin gel on MRSA burn wound infection model and nasal colonization model, showed >5 log_{10} reductions in bacterial count compared to the untreated group, whereas mupirocin showed only 3 log_{10} reduction. Our study shows lysostaphin is bactericidal against MRSA isolates and lysostaphin topical gel can be used as an alternative to mupirocin. However, further clinical evaluation is needed.