Optimization of silver nanocrystalline dressing production to control the growth of common bacteria in burn infections

Background: Silver nanocrystalline dressings have recently received a great deal of attention due to their effect on various bacteria present in wound infections. The most important factor in choosing a dressing is the effect of disinfection, its effect on epithelium and its ability to control wound infection. In addition, it reduces the use of painkillers and narcotics and reduces the stress of changing the dressing by 50%. All of these solutions require optimization to achieve the best conditions with the least amount of time and cost.

Methods: In this study, the preparation of silver nanoparticles, the study of silver fabrics in terms of sterility, the design of experiments using the Taguchi method and the study of silver fabrics in terms of microbial effectiveness have been performed.

Results: The best state predicted by the software includes 45 grams per liter of silver nitrate, 14 grams per liter of glucose, 280 microliters of sodium hydroxide, 60 seconds mixing time and 4 hours drying time. In this case, the average diameter of the growth inhibition halo was predicted to be 4.5 cm. In the laboratory, the average diameter of the no-growth halo in this case was equal to 4.25.

Conclusion: Obtaining a solution for optimizing of silver nanocrystalline dressing production as well as obtaining the diameter of the non-growth halo, which indicates the more effective performance of this dressing, is of particular importance.

Key Words: Silver dressing, optimization, design of experiments

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