

The effect of chitosan hydrogel containing the adipose derived mesenchymal stem cells on burn wound healing in rats

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Background

Cell therapy is one of the most challenging methods in the world in repairing burn wounds. The aim of this study was to determine the effect of chitosan hydrogel containing adipose-derived mesenchymal stem cells on burn wound healing in an animal model.

Methods

This study was performed experimentally using 24 Wistar rats. Burn wounds were created on the skin of rats and the animals were divided into two groups (control treated with normal saline) and the group treated with Chitosan hydrogel containing adipose tissue-derived mesenchymal stem cells. The healing process of burn wounds was evaluated quantitatively and qualitatively after treatment on days 7, 14 and 21 compared to the day 0. The data were analyzed using one-way analysis of variance.

Results

Concentration of 10% chitosan had no significant cytotoxic effect on mesenchymal stem cells and had proper consistency and clarity and SEM microscopy showed suitable porosity in chitosan. The expression of specific markers in mesenchymal stem cells and their potential for differentiation into adipocytes and bone cells confirmed the mesenchymal nature of the cells. Wound area on days 7, 14 and 21 in the chitosan-treated group containing mesenchymal cells was significantly smaller than the control group.

Conclusion

Mesenchymal stem cells transferred by chitosan to the wound site cause accelerated healing of burn wound and therefore, it is important to evaluate the use of this dressing in the healing of burn wounds in patients.