The Comparative Study of the Wound Healing Efficacy of Chitin-PAA Hydrogel and Intrasite® gel in Wistar Rats

Sangjun N[1], Sringernyuang D[2], Tanodekaew S[3], Phulsuksombati D[1] and Pilakasiri K[2]

[1]Armed Forces Research Institute of Medical Sciences, [2]Faculty of Medicine Siriraj Hospital, Mahidol University, [3]National Metal and Materials Technology Center

Abstract

Background: The Chitin-PAA was the biomaterial application of chitin which was prepared with the aim of obtaining a hydrogel characteristic for wound dressing application.
Objectives: To compare of the efficacy of hydrogel biomaterial preparation from chitin-PAA and commercial product (Intrasite® gel) for deep wound healing in Wistar rats.
Methods: Two full-thickness wounds sized 1x1 cm were made on the dorsal skin of rats and then each was individually covered with Chitin-PAA hydrogel and Intrasite® gel. The areas of wounds were visually observed, photographed and calculated by image analysis program on day 3, 7, 9, 12, 15 and18 post operation. The wound tissues were processed for routine histological and indirect immunoperoxidase staining method.
Results: The appearance and the size of wound surfaces dressed with both dressing materials showed progressive well healing process in all experimental days. All of Chitin-PAA hydrogel dressed wound were completely covered with well developed epidermis on day 15 while those of Intrasite® gel on day 18. Also, the wounds dressed with Chitin-PAA hydrogel revealed the higher average percentages of the proliferation cell nuclear antigen (PCNA) positive cells than those of Intrasite® gel on day 7 to day 18. Histological finding demonstrated that there were more advanced granulation tissues and less inflammation in the wound dressed with Chitin-PAA hydrogel than those of Intrasite® gel. Moreover, the dressing residues still remained in wounds dressed with Intrasite® gel than those of Chitin-PAA hydrogel.
Conclusions: All results demonstrated that the Chitin-PAA hydrogel was not only biocompatible and biodegradable but also promoted the healing efficacy more than that of Intrasite® gel. Therefore, Chitin-PAA hydrogel could be used to dress the full thickness open wound and exhibited suitable properties of ideal wound dressing.

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