The Effect of Topical Insulin Gel on Epithelialization Process, Fibroblast Proliferation Collagen Synthesis, and Blood Glucose Levelof Full-Thickness Wound on Wistar-Strain rat (Rattus norvegicus)

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ABSTRACT

Background : There is a lot of knowledges about wound treatments, either surgery, and pharmacology in accordance with wound healing problems, including topical insulin. Insulin that is still used in the treatment of diabetes mellitus, has the ability in accelerating wound healing whether occurred in patients with diabetes or not. This is because insulin can activate growth factor and has a very important role of glucose utilization when producing collagen by fibroblasts. Insulin also stimulates the proliferation and migration of endothelial cells that is required for the formation of new blood vessels. Angiogenesis provides nutrients and oxygen needed for injured tissue. In this study we aimed to determine the effect of insulin gel on wound healing process in laboratory rats by means of stereological and histological analyses.

Material and method : 27 male Rattus novergicus rats each with a 2 cm x 2 cm full thickness wound on their backs were divided into three groups. First group that received short acting insulin gel, second group that received long acting insulin gel and third group treated with only Carboxymethylcellulose Sodium Gel (Base of gel) as a control. Duration of the study was 5 days. Wound closure rate, epithelialization, the thickness of the epithelium, fibroblast proliferation, collagen bundles synthesis and blood glucose levels were determined.

Result : At the end of study, there are differences thickness of the epithelium, the proliferation of fibroblasts and collagen bundles synthesis, revealing statistically significant differences ($p < 0,05$). Experimental group that treated with long acting insulin gel improves the wound healing in rats skin better than the group that treated with short acting insulin gel and base of gel.

Conclusion : Topical application of insulin gel enhances wound healing. However further researches are still needed to find the exact mechanism, so it can be applied in humans.

Keywords: short acting insulin, long acting insulin, wound healing, epithelialization, fibroblast proliferation, Collagen bundles, blood glucose levels.

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