UNIVERSITI TEKNOLOGI MARA

EFFECT OF CALCIUM CHLORIDE ON WOUND HEALING IN RATS

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ABSTRACT

This study investigated the effect of topical administration of calcium chloride ($CaCl_2$) solution on the wound healing process in rats. Nine male Sprague Dawley rats were divided into three groups: (I) rats without treatment (n=3), (II) rats treated with 0.01 % $CaCl_2$ solution (n=3) and (III) rats treated with 5.4 % $CaCl_2$ solution (n=3). A partial thickness wound was created on the dorsal region of the rats. Wound healing was assessed through characterizing wound size, morphology and histological profiles with time. $CaCl_2$ did not promote wound healing when compared to the control group. Morphological observation showed that the wounds treated with $CaCl_2$ solution healed slower than the control group. This was supported by histological observation on 30^{th} day post-wounding where the extracellular matrix of control rats was arranged in an organized manner with densely packed collagen-elastin system unlike rats treated with $CaCl_2$ solution. $CaCl_2$ does not promote wound healing unlike previously reported incidences where calcium is essential for clotting and re-epithelialization.

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Skin plays numerous roles in our body such as regulation of body temperature, responsible for tactile sensation, excretion and absorption, synthesis of Vitamin D and serves as a blood reservoir and a protective barrier from the external environment (Tortora & Derrickson, 2008). Skin is located at the most external part of the body which makes it prone to wound or injury from trauma, heat and microbes. Wound healing involves composite and organized processes which are homeostasis, inflammation, proliferation, matrix formation and remodeling (Enoch & Leaper, 2008). A cutaneous scar results from an excessive healing response cause overgrowth of fibrous tissue (Juckett & Hartman-Adams, 2009). Fibrous tissue consists of collagen. Several studies support that TGF-B 1 plays a central role in scar formation by stimulating the production of collagen (Profyris, Tziotzios, & Do Vale, 2012; Z. Zhang *et al.*, 2009; Zunwen, Shizhen, Dewu, Yungui, & Pu, 2012). The synthesis of collagen is balanced by collagen degradation which is carried out by family of matrix metalloproteinases (MMPs).

Calcium has been found in having underlying roles in the normal homeostasis of mammalian skin (Lansdown, 2002). Besides promoting the proliferation and differentiation of keratinocyte, calcium is also important in wound healing process but