Original Article

The Effect of Kiwifruit Therapeutics in the Treatment of Diabetic Foot Ulcer

The International Journal of Lower Extremity Wounds
1–7

DOI: 10.1177/1534734619851700
journals.sagepub.com/home/ijl
SAGE

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Abstract

Diabetes mellitus is considered a silent disease with possible late chronic complications such as diabetic foot ulcer. This condition is managed by surgical debridement. To improve surgical outcome, some surgeons use proteolytic agents after surgery. Kiwifruit contains a type of proteolytic enzyme called actinidin that may play a role in the treatment of such complication. In the current study, we evaluate the role of kiwifruit extract in the treatment of diabetic foot ulcer. Eighteen diabetic foot ulcer patients were included in a randomized, double-blind clinical trial. The patients were divided randomly to control and experimental groups. Patients in the control group underwent daily wound dressing using base ointment (Eucerin). In the experimental group, we added kiwifruit extract to the standard wound dressing. Clinical data including general appearance of wound (according to recorded photographs before and after medical intervention) were analyzed using SPSS version 22. The mean wound area of the experimental group was significantly less than in the control group ($P = .005$) after 4 weeks of treatment. Comparison of the average of size difference, before and after the treatment in the experimental group and the control group, shows that kiwifruit can have a good impact on wound healing ($P = .0001$). In patients with diabetic foot ulcer, wound dressing using kiwifruit extract may help reduce time of treatment and may replace surgical debridement for some selected cases.

Keywords

diabetic foot ulcer, kiwifruit, debridement, actinidin

Introduction

Diabetes mellitus is a chronic disease that affects various organ systems and patient quality of life. One of the main concerns in diabetic patients is foot ulcer.[1] About 10% to 15% of diabetic patients develop this complication during their life.[2] This disorder is caused by neuropathy and vasculopathy in diabetic patients. Vasculopathy could lead to reduction of blood flow in the distal end of the limb, increasing the risk of ischemia and trauma, which it in turn makes wound healing difficult. Lack of adequate treatment and insufficient blood flow results in development of necrotic tissues, infection, and increases the risk of amputation.[1,3] One of the useful treatments of diabetic foot ulcers is debridement. Debridement is normally performed by surgery, which based on the severity of the wound has different levels. Sometimes the elimination of dead tissue is done to clean and heal the wound, and sometimes bypass surgery is necessary to improve the blood flow in the feet and prevent amputation.[4-6] Many patients are afraid of surgical debridement and thus do not accept this treatment method. So, in recent decades, several different topical treatments are suggested for diabetic foot ulcers such as using the insect larvae, platelet-derived growth factor, skin transplantation, use of high-pressure oxygen, granulocyte colony–stimulating factor,[7-11] and proteolytic enzymes.[12]

The kiwifruit is a fruit that contains proteolytic enzymes and antibacterial agents. Previous studies showed a protective effect of kiwifruit on ulcers such as pressure sore. Thus, the present study investigated a topical drug for enzymatic debridement with kiwifruit. With regard to protein nature of necrotic tissues,[13] the enzyme actinidin in kiwifruit can help

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