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Comparative study of efficacy and cost effectiveness of topical sucralfate and conventional dressings in diabetic ulcers

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Abstract

Diabetic ulcers are one of the most frequently encountered surgical problems. Historically, different methods have been employed in treatment of these ulcers. The notion that ulcers should be kept dry is steadily losing ground. During the past quarter of a century, a wide range of innovative dressings have been introduced. Recent literature says that an ulcer re-epithelializes more rapidly when treated with a dressing that allows moist wound healing. This study compares the effect of sucralfate and conventional dressing in the healing of Diabetic ulcers. A total of 50 patients with diabetic ulcers, after undergoing a detailed clinical examination, and appropriate work up, satisfying the inclusion & exclusion criteria were divided into 2 groups and participated in the study. Comparison of the effects of topical sucralfate and conventional study in terms of appearance of granulation tissue and weeks of recovery was done. At the end of the study, it was observed that participants treated with sucralfate dressing as compared to the control group receiving only conventional dressing were taken up for skin grafting or secondary suturing in less than two weeks where as in case of patient getting conventional dressings took more than 3 weeks and thus have a faster healing and better area of reduction. In conclusion Sucralfate dressing are an effective modality to facilitate faster healing in patients suffering from diabetic ulcers and can be used as an adjunct to conventional mode of treatment (conventional dressings and debridement) for faster recovery.

Keywords: Topical sucralfate, diabetic ulcers, wound healing

Introduction

Diabetic ulcers is one of the most frequently encountered surgical problems. It has become a significant health care problem by affecting 15% of all diabetics during their lifetime of which 15%-20% can lead to amputation. Major etiological factors leading to amputation are

- Neuropathy
- Foot deformity
- Ischemia

For many decades various topical agents have been tried like sucralfate dressing, mupirocin dressing, haemocoagulase dressing, oxum solution etc. Recent literature says that an ulcer re-epithelializes more rapidly when treated with a dressing that allows moist wound healing ^[1]. This study compares the efficacy of sucralfate and conventional dressing in the healing of Diabetic ulcers.

Materials and Methods

This is a prospective comparative study conducted on 50 patients admitted in Jss hospital between 2017-2019 with the diagnosis of diabetic ulcers after taking the consent. They were randomly allocated into two groups and one group underwent Topical Sucralfate dressing and the other group underwent conventional dressing (Conventional dressing is done with 5% povidone iodine solution and hydrogen peroxide wash followed by povidone iodine dressing.) after taking thorough history, general physical examination, local and loco regional examination. Baseline blood investigation, arterial doppler, x-ray was taken, diabetic status was evaluated and treated. Pus culture sensitivity was done on admission, 7th day & 14th day and appropriate antibiotics were given. The outcomes were measured in terms of decrease in wound size, appearance of granulation tissue, weeks of recovery.

Results

Mean in each dressing group was, 56 years in conventional dressing group and 58 years in Sucralfate group.

Table 1: Mean age in each study group

Dressing Type	Average Age
Conventional Dressing	56
Sucralfate	58

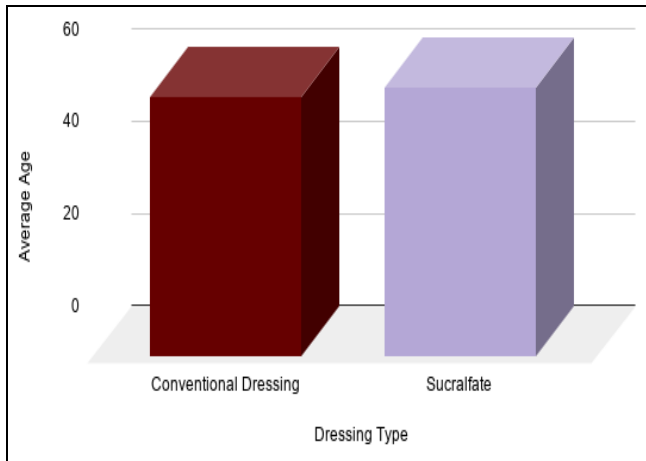


Fig 1: Average age vs dressing type

Table 2: Male-female ratio in each group:

Dressing Type	Male	Female
Conventional Dressing	20	5
Sucralfate	24	1

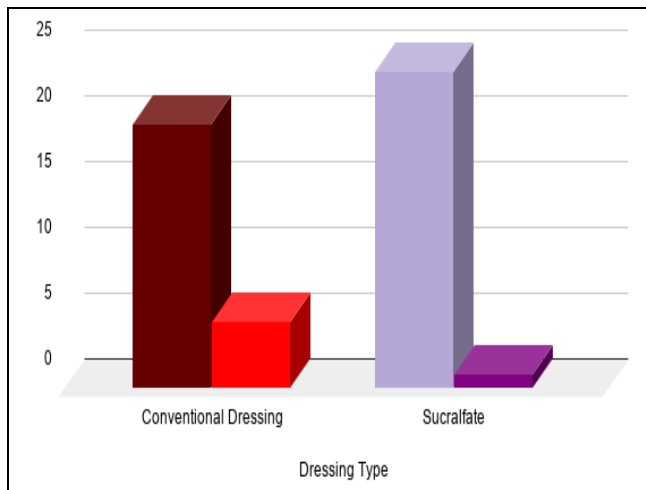


Fig 2: Male and Females

Average reduction in area of the wound

Mean area reduction in age group was 14.682% in conventional and 34.995% in Sucralfate group with a statistically significant p value ($p < 0.0001$)

Table 3: Average area reduction in each group

Dressing type	Average area reduction
Conventional dressing	14.6826712
Sucralfate	34.99547937

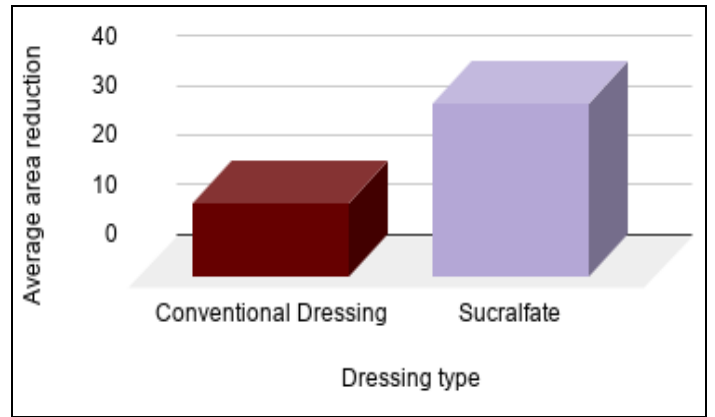


Fig 3: Average area reduction vs dressing

Percentage reduction in wound area in each group

Percentage reduction in wound area in Conventional group was 29.6% whereas in Sucralfate group it was 70.4%.

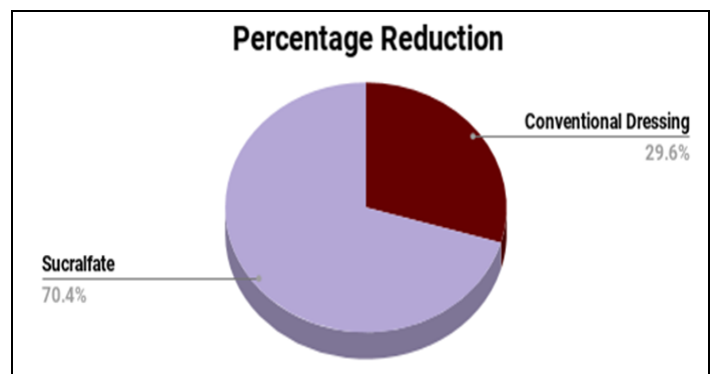


Fig 4: Percentage reduction

Trend in reduction of ulcer area with time

On observing the trend in reduction of ulcer area in each group, it was found that the sucralfate group had a faster reduction in ulcer area.

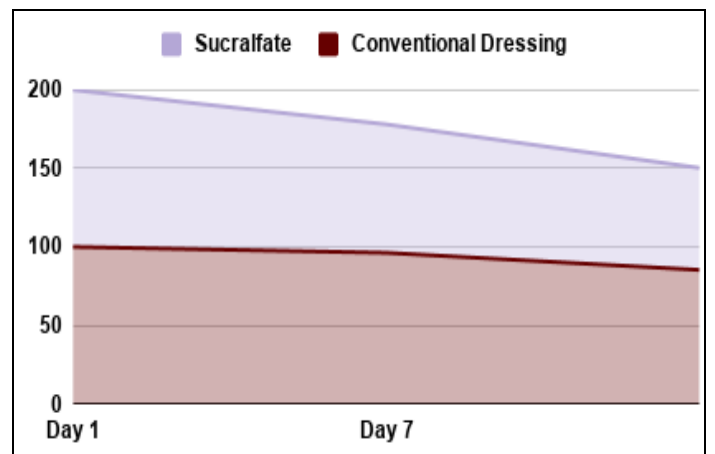


Fig 5: Trend in reduction of ulcer area

Cost effectiveness

On comparing the average cost incurred for each type of dressing for complete wound healing, it was found that conventional dressing group had a very high average cost.

Table 4: Average expenditure in each group

Dressing method	Average cost
Conventional dressing	9522
Sucralfate	3698.4

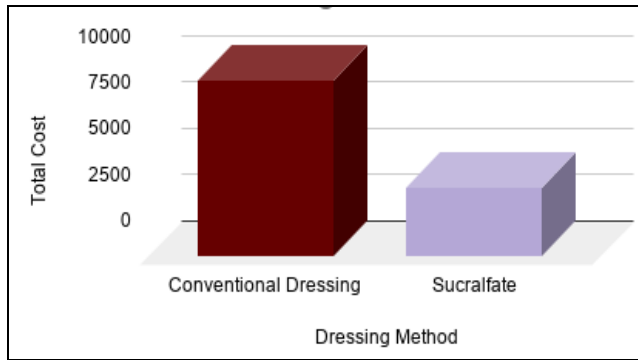


Fig 6: Average cost

The average number dressings required for the complete healing of the wound in conventional dressing method was about 31 and in Sucralfate group it was 12.

Table 5: Average number dressings required in each group

Dressing type	Average number of dressings required
Conventional Dressing	31
Sucralfate	12

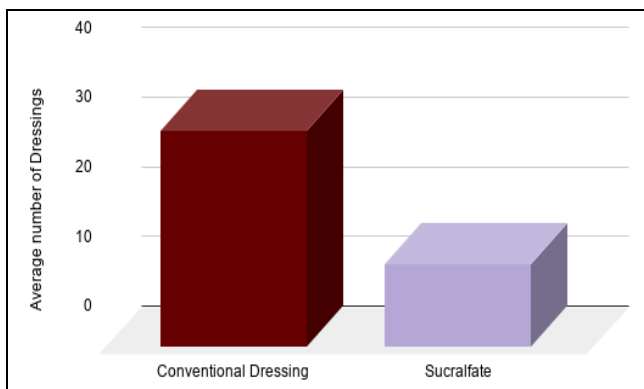


Fig 7: Average number of dressings

Table 6: Average duration of Hospital stay in each group

Dressing type	Average duration of hospital stay
Conventional Dressing	27.76
Sucralfate	16.96

The average duration of hospital stay in Conventional group was 27.76 days and Sucralfate 16.96 days.

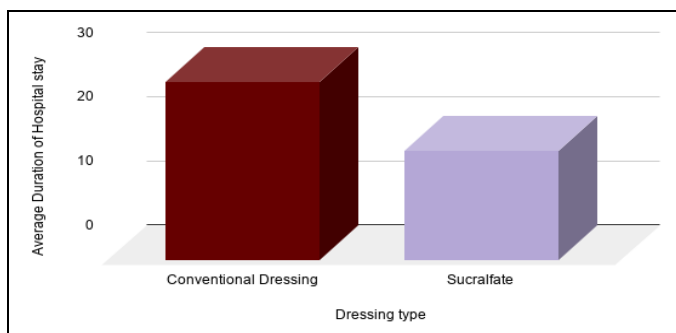


Fig 8: Average duration of hospital stay vs dressing type

Discussion

Sucralfate, primarily indicated for the treatment of active duodenal ulcers, is also used for the treating gastroesophageal reflux disease and stress ulcers. It shows potential utility in the healing of skin wounds [2]. Sucralfate induces proliferation of dermal fibroblasts and keratinocytes. It also enhances prostaglandin E2 synthesis in basal keratinocytes, enhances interleukin-1-stimulated interleukin-6 release from fibroblasts [3-5]. When applied to full-thickness wounds daily, sucralfate increased the thickness of granulation tissue. It also promotes rapid epithelialization of 2nd degree burns. A series of studies has shown that application of sucralfate to a wound enhances the wound repair process. Sucralfate has been demonstrated in preclinical studies to promote the granulation tissue formation and thus, promoting cutaneous ulcer healing [6]. An ideal dressing is every surgeon’s desire, a dressing that promotes chronic ulcer healing without any complications. Successful wound dressing should keep the wound moist and be devoid of any adverse reactions such as infection, maceration, and allergy.

Conclusion

At the end this study, we would like to conclude that, Topical Sucralfate significantly increases the wound healing by formation of granulation tissue, reducing the slough, discharge and bacterial load ultimately causing wound contraction & healing. In this study sucralfate dressing was found to be more efficacious over conventional dressing as the average number of days taken for healing was 2.4 weeks in sucralfate group while in conventional group it was 3.9 weeks. It was also found that topical sucralfate is cost effective when compared to conventional dressing group, with respect to number of dressings required and duration of hospital stay. The duration of stay in hospital is decreased significantly, hence being cost effective for the patient.

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