



COMPARATIVE STUDY BETWEEN THE EFFICACY OF TOPICAL INSULIN AND CONVENTIONAL SALINE DRESSING IN OF DIABETIC FOOT ULCERS

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ABSTRACT

Introduction: Diabetic foot ulcer is one of the major preventable complications in diabetic patients if intervened early. 6-40% of diabetes patient with ulcer undergo amputation if early treatment was not given. Many type of dressings and other modalities were tried for many years and yet results and very minimal. The present study was aimed to compare the effect of topical insulin and normal saline dressing in healing of diabetic foot ulcers. **Material And Methods:** The present four months hospital based randomized controlled trial was conducted in the Department of General Surgery, Cuddalore Government Medical College and Hospital. A total of 60 patients with diabetic foot ulcers were studied. Based on the envelop method, patients were divided into two groups of 30 patients each that is group A (topical insulin) and group B (normal saline). **Conclusion:** Overall topical insulin dressing provided favourable outcome in patients with diabetic foot ulcer by significant reduction in ulcer wound dimension when compared to normal saline dressing and it had positive role in reducing the wound infection if present.

KEYWORDS : Diabetic Foot Ulcer, chronic ulcer, Saline dressing, Topical Insulin Dressing, Wound Healing, limb salvage procedure.

INTRODUCTION

India is the capital of diabetes mellitus. Diabetic foot ulcer is one of the commonest complication present in patients of DM. It is treated with adequate dressing blood glucose control and appropriate antibiotics. 6-40 percent of persons undergo amputation if the ulcer is not treated adequately.¹⁻⁴

This study was undertaken to compare the effect of topical insulin and normal saline dressing in healing of diabetic foot ulcers. The objective of the present study was to compare the effect of topical insulin with normal saline dressing in healing of diabetic foot ulcers.⁶

MATERIALS AND METHODS

A total of 60 cases from April 2020 to September 2022 were divided into two groups that is, 30 each in topical insulin (Purified human biosynthetic neutral plain insulin) and normal saline were studied. Based on the envelope method patients were randomized divided into two groups that is;

Group A (n=30) - Patients in this group underwent dressing with topical insulin

Group B (n=30) - Patients in this group underwent dressing with normal saline.

Selection Criteria

Inclusion

- All adult patient who are diabetic
- Patients having ulcers measuring more than one cm below ankle in dorsum of foot.
- Patients with grade I and II ulcers of Wegener's classification.⁷

Exclusion

- Patients with grade III, IV and V ulcers of Wegener's classification.
- Patients with absent peripheral pulses in lower limb
- Patients who were not on regular follow-up.
- Patients who have osteomyelitis

Blinding

Syringes were filled with normal saline and insulin and were labelled by pharmacist and both patient and surgeon who did the dressing were blinded.

Procedure

After getting informed and written consent form patient, study will be conducted. Daily wound clinical pic was taken and stored for followup was done. Wound discharge was sent for culture and sensitivity if present. Appropriate antibiotics were given according to culture sensitivity debridement whenever necessary was done.

In Group A, one cc normal saline with 10 IU insulin for each 10cm² wound was used.

In group B plain normal saline was used which was one of the standard procedure for ulcer dressings.

Ulcer was assessed by the investigator at the beginning of the study and at the end of the study (Investigator being the staff and residents who were blinded to study). Ulcer size was measured and recorded.

Size was measured twice and mean of both the measurements were considered as size of the wound. The dressing was changed every day. Final wound area was measured on 14 day. During the course of dressing wound was observed for granulation, tissue quality, discharge and control of infection at the end of each week and recorded. Outcome was measured by wound size reduction between the two groups. Data was entered and the two groups were compared with reference to area and percentage of reduction of ulcer size.

DISCUSSION

Principles of Surgical Management in diabetic ulcer

1. Early recognition and prompt intervention
2. Control of blood glucose
3. Complete rest of injured area
4. Debridement and drainage of all involved areas

5. Appropriate antibiotic
6. Wound care and dressings
7. Appropriate vascular reconstructions
8. Careful follow up including foot care

In this study among patients with group A significant reduction of mean ulcer area was observed ($317.33 \pm 152.89 \text{ mm}^2$) with higher mean percentage reduction (34.19 ± 20.00 percent) whereas in group B the mean percentage reduction was significantly less (19.82 ± 3.06 percent) with less reduction of mean final ulcer area ($150.90 \pm 63.45 \text{ mm}^2$). The difference between the percentage reduction and reduction of final ulcer area was statistically significant ($p < 0.001$). Diabetic foot ulcers are common and estimated to affect 10-40% of all diabetic individual during their lifetime. Patient suffering from diabetic ulcer often require hospitalization and several financial instability. One of the major causes of non-healing of ulcer in diabetes is infection. It is caused by a various micro-organism. Most common are *Staphylococcus Aureus* and *Pseudomonas Aeruginosa*.¹⁹

In the present study, the wound culture on day 14 was negative in 70.33% patients in group A compared 50.67% in group B. However no statistically significant difference was observed between the two groups ($p = 0.176$). The most common isolate on day 14 was *P. vulgaris* in group B (30.33%) and in group A it was *E. Coli* and *P. Vulgaris* (23%). Overall, in this study, topical insulin dressing has higher efficacy in patients with diabetic foot ulcer by significant reduction in wound area when compared to normal saline dressing had positive role in reducing the infection if present.²⁰

CONCLUSION

Diabetic ulcers come with cost and morbidity for patients and society also. Topical insulin is a safe, simple, inexpensive procedure. In our study, topical insulin is found to be useful in enhancing the wound healing in chronic ulcers without any adverse events. The mean percentage area of reduction of ulcer in the study is 73.0124% which is a very significant reduction in the area of the ulcer. Hence insulin dressing proves to be an effective method in healing of chronic ulcers. The results of the study justify further research into the use of topical insulin in treatment of various wounds and ulcers.

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