



A Comparative Study of Collagen Dressing Versus Conventional Wound Dressings In Non-Healing Diabetic Ulcer

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ABSTRACT

Aim: To assess the efficiency of collagen compared to conventional wound care in improving the healing process in non healing diabetic ulcers and prove that collagen can be used as relatively low cost, and a better alternate in management diabetic ulcers.

Material and methods: This is a randomised comparative study where data from 100 patients with non healing diabetic ulcer collected. Of which 50 underwent collagen dressings, remaining 50 underwent conventional wound care. The results were compared after 14 days. The variables were compared based on rate of granulation tissue formation as percentage of ulcer area covered and duration of hospital stay. The categorical variable was compared by chi square test and continuous variable by student t-test. A p value < 0.005 was considered significant.

Results: 50 patients who underwent topical collagen, after 14 days mean rate of granulation tissue formation was 84%. Mean graft take up was 86.32% and mean hospital stay was 40.50 days. Remaining 50 patients who underwent conventional wound care mean rate of granulation formation was 58.72%. The Mean graft take up was only 74.74% of total ulcer surface area, mean hospital stay was 58.52 days.

Conclusion: To conclude, collagen helps in faster healing of the diabetic ulcer and better graft take up and reduces hospital stay of these patients.

KEYWORDS : Topical collagen moist wound dressing, diabetic ulcers, rate of granulation tissue formation, graft take up.

Introduction

Diabetes mellitus comprises a group of common metabolic disorder that share the phenotype of hyperglycaemia. In this millennium where mankind has succeeded in deciphering the human genetic code, the issue of chronic wound management still remains an enigmatic challenge. Chronic wounds, especially non healing types, are one of the most common surgical conditions a surgeon comes across. From time immemorial Doctors have been trying many methods to treat these types of wounds. The metabolic dysregulation associated with diabetes causes secondary pathophysiologic changes in multiple organ systems that imposes a tremendous burden on individual. The peculiarity of a chronic wound is that, whatever management you give, they refuse to heal, especially pressure ulcers or bed sores. The notion that wounds should be kept dry, although still held by a considerable number of clinicians, is steadily losing ground. We now know that wounds re-epithelial much faster or develop granulation tissue faster when treated with dressings which allow moist wound healing. We recognize that occluding wounds does not lead to infection. Even though many modalities of wound care have come up to assist a surgeon, example the use of compression bandages to treat venous ulcers, the problem of chronic wound still remains

A wound care revolution is currently in the making. Many techniques have been tried over the centuries to heal chronic leg ulcers. Although wound dressing have been used for at least two millennia, there exist no ideal dressing. Surgical dressing of both open and closed wound is based mainly on tradition, training and surgeons own philosophy. During the last two decades a wide variety of innovative dressings have been introduced. Neuropathy presents in many forms including focal neuropathy and polyneuropathy and autonomous neuropathy. Patient with distal sensory neuropathy are predisposed to develop Charcot's joint which may mimic gout or degenerative joints. Treatment involves surgical debridement and antibiotic treatment. Diabetic neuropathy has been defined as peripheral nerve dysfunction after exclusion of other causes which may range from hereditary, traumatic, compressive, metabolic, toxic, nutritional infectious, immune mediated neoplastic and any other secondary systemic illness.

Aim Of The Study

To compare the efficacy of collagen with that of a control group using conventional wound dressings, in healing of diabetic ulcers, in terms of Number of days required for healing, Rate of granulations tissue

formation., Rate of reduction in mean ulcer surface area. Quality of graft bed, Skin graft take up, Serial culture and sensitivity of wound swabs to assess the effect of collagen granules on bacterial load.

Materials And Methodology

This prospective randomized comparative study included 100 patients with diabetic ulcers. Satisfying all the inclusion criteria mentioned below after the clearance from the ethical committee was obtained.

Inclusion criteria

- Patients with age between 25 - 75 years
- Patients with chronic ulcers with diabetic mellitus.
- Wound size < 5% TBSA
- Patients giving consent for collagen dressing

Exclusion criteria

Chronic non-healing wounds of other etiology. Diabetes mellitus with gangrenous changes. Other co-morbid condition like renal failure, generalized debility and other factors, which adversely affect wound healing.

The sample population was divided into two equal and comparable groups based on willingness for undergoing collagen dressing for the wound. Those who were not willing were subjected to conventional wound care, forming the control group. Selection of patients was done by purposive sampling method. All patients underwent detailed clinical examination and relevant investigations and the wounds were thoroughly debrided and the ulcer dimensions as well as the surface area assessed using vernier calipers, before both types of dressings were applied. The patients were followed up on a daily basis for 14 days in both study and control groups. The control group and study group were subjected to twice-daily dressing.

Application of Dressing:

Collagen dressing:

Collagen granules were taken and sprinkled all over the wound in equal proportion over the wound approximately at 20mg/cm² of TBSA.

Conventional Dressing

It was done with 5% w/v povidone - iodine solution. Before applying both dressing daily wound is cleaned with normal saline. At the end

of 14 days the wounds in both the groups were inspected and the wounds were compared based on the following parameters.

Rate of granulation tissue formation as percentage of the ulcer surface, Quality of the ulcer bed Present dimensions and surface area of the ulcer Once these parameters were assessed, both the groups were subjected to split thickness skin grafting. Both groups were given the same systemic antibiotics during the postoperative period. The wounds were reassessed at the end of the fifth postoperative day and the following parameters were accounted for Skin graft take up as a percentage of ulcer surface area, Number of days of hospitalization .After discharge patients were followed up in the outpatient department after one month to assess post skin grafting complications like contractures, itching, pain and infection. The results obtained were statistically evaluated and the main parameters which were analysed are rate of granulation tissue formation graft survival and take up duration of hospital stay. The mean rate of granulation tissue formation, graft survival and hospital stay was calculated and compared for both groups. The variables were compared using the Unpaired Student's t-test. A P value < 0.05 was considered significant.

Observation And Results

The 100 patients admitted for the study were divided into two equal and comparable groups. Patients subjected to collagen dressing were classified under Study and those who underwent conventional moist wound dressings were classified as control.

Age Distribution

The age of the patients were varied from 25 to 75 years. Maximum number of cases (57%) belong to the age group of 45 to 65 years. The average diabetic foot lesion in our country is 60 years. The mean age in study group was 48.96 ± 12.49 years and in control group was 49.74 ± 10.9 years.

Sex Wise Distribution

In both study and control group diabetes is more common among males compared to females. Among them 67% of the patients were male and 33% were female.

Rate of granulation

The rate of granulation tissue formation was assessed at the end of 2 weeks 81 to 90% granulation was seen in study group. The patients in both the groups were subjected to split thickness skin graft as the final treatment modality. The graft take up was assessed on the fifth post operative day. In study group 84% cases graft take up was good and 70% in the control group.

Percentage of Negative culture sensitivity at the end of 14 days

Patient in both the groups were assessed for effect of topical agents on the bacterial load as percentage of people who are culture sensitivity negative at 14 days The mean hospital stay in study group was 40.50 ± 5.70 (sd) days and that in control was 58.52 ± 9.9 (sd) days. In both the groups, no complications occurred during the application of dressing, skin grafting or in the post operative period. The patients were followed up after one month of discharge. The main post operative parameters were

- wound size
- contractures
- pain
- infection

All the parameters were less in study as compared to control

Discussion and Conclusion

Wound dressings have evolved from the status of providing physical protection to the raw surface, absorbing exudates and controlling local infections by local medications to the level of providing adequate environment promoting wound healing. This has been achieved by modern wound dressing equines promoting granulation tissue formation. The concept of moist wound dressings which came into vogue in 1960 which revolutionized wound care .This led to further research in this direction leading to influx of many products .People have tried various non conventional topical agents in wound healing such as aloe vera, antacids , benzoyl per-oxide, gentian violet, impregnated guaze, insulin, mercurochrome oxygen therapy, sugar and vinegar. Each claiming a better wound healing rate than the others. As

the concept of outcome based medicine evolved, the need for better wound dressing modality became more acute. Now wound dressing systems were compared not only on the basis of the rate of granulation tissue formed or the rate of wound healing but also on the cost and duration of hospital stay of the patient which was considered as a measure of the morbidity of the patient. In our present study it was concluded that the rate of granulation tissue formation, overall graft survival and patient compliance was better in topical collagen dressing group as compared to conventional dressing group. It was also seen that the overall hospital stay and post operative complications were less in the topical collagen dressing group. Thus, topical collagen moist wound dressing can be considered as a superior option in the management of diabetic ulcers .

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