



ORIGINAL RESEARCH PAPER

General Surgery

CASE STUDY ON DIABETIC FOOT- MEDICATED COLLAGEN DRESSING VERSUS CONVENTIONAL DRESSING.

KEY WORDS: Medicated collagen powder, wound healing, diabetic foot ulcer.

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ABSTRACT

Aims and Objectives: The aim is to evaluate the clinical efficacy of medicated collagen dressing versus conventional dressing, as topical dressing material in diabetic ulcer to promote healing. In terms of:

- 1) Healing time
- 2) Duration of antibiotics
- 3) Duration of length of stay in hospital.

Background: Diabetic foot ulcers are a major source of morbidity, limb loss, and mortality. A prolonged inflammatory response, extracellular matrix degradation irregularities, and increased bacteria presence have all been hypothesized a major contributing factors in the delayed healing of diabetic wounds. Collagen components such as fibroblast and keratinocytes are fundamental to the process of wound healing and skin formation. Wound dressings that contain collagen products create a biological scaffold matrix that supports the regulation of extracellular components and promotes wound healing **Methods:** The study was conducted in patients admitted with diabetic foot ulcer in the Department of General Surgery, GMERS Hospital, Vadoadara. The no. of patients included in the study was 30, out of which, 15 in Group A-Topical dressing with medicated collagen powder (medicated with metronidazole and mupirocin) were applied with operative/bedside surgical debridement whenever indicated and 15 in Group B- Conventional Topical dressing with operative/bedside surgical debridement. Data was analyzed using appropriate software.

Results: The results concluded that healing time, duration of antibiotics and duration of stay in hospital were comparatively low in Group A patients then in Group B patients. **Conclusion:** Medicated Collagen powder dressing is safe and effective in the treatment of diabetic foot ulcer and significantly reduces healing time, duration of antibiotic therapy and duration of stay in hospital.

INTRODUCTION

During the last decade, various new dressing materials developed, like calcium alginate, hydro-colloid membranes and fine mesh gauze. These have a disadvantage in that they become permeable to bacteria. Biological dressings like medicated collagen powder on the other hand, create the most physiological interface between the wound surface and environment, and are impermeable to bacteria. Medicated collagen powder dressings have other advantages over conventional dressings in terms of ease of application and being natural, non-immunogenic, nonpyrogenic, hypo-allergenic, and pain-free. The present study has been conducted to compare the efficacy of medicated collagen powder dressing with that of conventional dressing materials like povidone iodine, hydrogen peroxide, in the management diabetic foot ulcers.

METHODS

- This is prospective, comparative study carried out during the February 2022 to August 2022 in the Department of General Surgery, GMERS Hospital, Vadoadara
- Total 30 patients were included under study.
- All patients underwent a standard clinical and laboratory evaluation.
- Briefly, information about age, known DM duration, smoking habits, arterial blood pressure, and anthropometric measurements was collected, if required initial surgical debridement was done.
- At the same time swab from an ulcer was taken and sent for culture and sensitivity.
- All the patients received antibiotic treatment (oral or parenteral) according to severity of their infections.
- Smooth control of diabetes was achieved by dietary measures + oral hypoglycaemic agents or inj. Insulin according to dosage which was regulated by urine sugar, fasting blood sugar and post-prandial blood sugar.

Inclusion criteria:

- Age >30 years

- Patients with diabetic foot ulcers.

Exclusion criteria:

- Critically ill patients.
- Any evidence of underlying bone osteomyelitis.

Efficacy evaluation of study was based on appearance of healthy granulation tissue, duration of antibiotics required and duration of stay at hospital.

The method of dressing in Group A patients, which was done with medicated collagen powder, the wound was first cleaned with normal saline, all the discharge or pus wiped out, and bedside debridement done and then medicated collagen powder was filled in the wound and packed with gauze piece with normal saline in it and was packed for 48 hours.

The method of dressing in Group B patients, was conventional one and the wound first was cleaned with normal saline, all the discharge or pus wiped out, and bedside debridement if needed was done, then with the help of betadine and hydrogen peroxide solution it was cleaned and again with saline gauze it was cleaned and then packed. All the patients were followed up on regular basis till 12 weeks.

RESULTS AND OBSERVATION

The 30 patients of diabetic foot which required dressing were divided in Group A, 15 patients, which had medicated collagen powder and Group B, 15 patients, which had conventional methods, respectively and were studied. The results of the study are as follows:

Table 1:

AGE GROUP (in years)	NO. OF PATIENTS IN PRESENT STUDY (30)(%)	
	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
20-39 YEARS	2 (14%)	1 (7%)

40-59 YEARS	7 (47%)	9 (60%)
60-79 YEARS	6 (39%)	5 (33%)

In both the groups, i.e. Group A and Group B, maximum no. of patients were in age group of 40-59 years.

All the 30 patients which were included in the study, had undergone surgical debridement

Table 2: Size Of Ulcer After Initial Surgery

SIZE (cm*cm)	NO. OF PATIENTS IN PRESENT STUDY (30)(%)	
	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
5-7 cm	8(54%)	9 (60%)
8-10 cm	4 (27%)	4 (27%)
>10 cm	3 (19%)	2 (13%)
Average size	5 to 7 cm	5 to 7 cm

In both the groups, i.e. Group A and Group B the average ulcer size was found to be same, i.e. 5 to 7 cms.

Table 3: Appearance Of Healthy Granulation Tissue.

DAYS	NO. OF PATIENTS IN PRESENT STUDY (30)(%)	
	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
1-10	8(54%)	2 (14%)
11-15	3 (20%)	6 (40%)
16-20	2 (14%)	2 (14%)
21-25	1 (11%)	3 (20%)
26-30	1 (11%)	2 (14%)
Average Days	9 Days	15 Days

In Group A, 8(54%) patients had appearance of healthy granulation tissue within 9 days on average, whereas in Group B, average days for appearance of healthy granulation tissue was 15 days.

Table 4:

DAYS	NO. OF PATIENTS IN PRESENT STUDY (30)(%)	
	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
0-5	7 (47%)	5 (34%)
6-10	5 (34%)	5 (34%)
11-15	3 (19%)	4 (27%)
16-20	0(0%)	1 (5%)
Average Days	5 Days	8 Days

The duration of antibiotics required were determined with the help of wound swab culture, which was sent on regular basis, and antibiotics were stopped when the 2 consecutive swab culture report came negative.

Average requirement of antibiotics in Group A was found to be 5 days, whereas average requirement of antibiotics in Group B was found to be 8 days.

Table 5: Total Hospital Stay.

DAYS	NO. OF PATIENTS IN PRESENT STUDY (30)(%)	
	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
1-10	2 (14%)	0 (0%)
11-15	8 (54%)	3 (20%)
16-20	4 (27%)	4 (27%)
21-25	1 (5%)	6 (40%)
26-30	0 (0%)	2 (13%)
Average Stay	13 Days	21 Days

The average hospital stay in Group A is 13 days, whereas the average hospital stay in Group B is 21 days.

DISCUSSION

- In the present study, we have found an overall benefit of medicated collagen powder on the appearance of healthy granulation tissue compared with conventional dressing.
- The appearance of healthy granulation was significantly lower in patients receiving medicated collagen powder dressing (9 days) as compared to conventional dressing (15 days).
- Further, the duration of antibiotics required was significantly lower in medicated collagen powder dressing patients (5 days) as compared to conventional dressing patients (8 days).
- We also found significantly less total duration of hospital stay in medicated collagen powder treated patients (13 days) as compared to patients receiving conventional dressing (21 days).
- Our results showed that collagen dressing is effective in promoting complete wound healing in the studied patient population.
- The analysis indicated that collagen dressing was of greater benefit, compared with conventional dressing, in treating diabetic foot ulcers.
- In a study by Vevesin 276 patients with diabetic foot ulcer, after 12 weeks of treatment, 51 (37.0%)
- Collagen/oxidized regenerated cellulose dressing-treated patients had complete wound closure as compared to 39 (28.3%) patients of control group (moistened gauze), but this difference was not statistically significant (P=0.12).
- In this study, we found an overall benefit of medicated collagen powder on the rate of wound healing compared with conventional dressing.
- Although a subjective finding, most patients with collagen dressing reported to enjoy early and greater degree of mobilization and more comfort as compared to those who were applied with conventional dressing.
- The wound healing process involves phenomena such as proliferation, migration, and cell differentiation—all of which are influenced by the presence of collagen. In the final stage of repair with a continuity tissue solution, the maturation of collagen takes place and collagen fibers create a bridge between the edges of the damaged tissues, going on to form or favor a scar with elasticity and mechanical strength.

The present study has two limitations:

- First, the study was not randomized therefore unequal number of patients get enrolled in the groups.
- Significantly high mean age; duration of ulcer; and wound size in were observed in conventional dressing patients because of non-randomized nature of the study.
- Second, the sample size was less.

CONCLUSION

- Medicated Collagen powder dressing increases the rate of wound healing as compared to conventional dressing.
- Further, it also reduces the follow up period and antibiotic use significantly as compared to conventional dressing.
- Probably, its spongy network contributes to exudate absorption and blocking of possible extensions of the wound, preventing bacterial growth that would delay the healing process.

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