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Original Research Article

To assess the effectiveness & duration of treatment of classical collagen sheet with small diameter collagen particles dressing in the management of diabetic wound

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Abstract

Background & Methods: The aim of the study is to assess the effectiveness & duration of treatment of classical collagen sheet with small diameter collagen particles dressing in the management of diabetic wound. The collagen sheets are prepared from intestine of freshly dead cattle collagen is extra cellular protein playing major roll in connective tissue. It is the most abundant protein in human. Collagen as a biomaterial and its role in wound management well documented.

Results: Greatest dimension in collagen sheet group was 6.7cm, and 7.3cm in granule group. 100% reduction in size of wound within 2 weeks in 14 patients of collagen sheet group while it was 20 in collagen granule group. 10 Patient has taken 4 weeks duration for 100% healing

Conclusion: Collagen granule dressing is better than collagen sheet dressing in diabetic wounds. Heeling of diabetic wound is improved by collagen dressing if the patient is kept normoglycemic. Diabetic wound heals earlier with the Collagen granule dressing than collagen sheet dressing. Collagen granule dressing is less costly than collagen sheet dressings. Collagen granule dressing is techniquely more easier than collagen sheet dressing.

Keywords: effectiveness, collagen, diabetic & wound.
Study Design: Observational Study.

1. Introduction

The earliest history of wound healing dates back 2000 B.C., when the Sumerians employed two modes of treatment: a spiritual method consisting of incantations, and a physical method of applying poultice-like materials to the wound[1]. The Egyptians were the first to differentiate between infected and diseased wounds compared to non-infected wounds. The 1650B.C. Edwin Smith Surgical Papyrus, a copy of a much older document, describes at least 48 different types of wounds[2].

A later document relates the use of concoctions containing honey (antibacterial properties), lint (absorbent properties), and grease (barrier) for treating wounds[3]. These same properties are still considered essential in contemporary daily wound management.

Egyptian treated wounds by applying the mixture of gum, goat hair and milk of a woman who gave birth to a son between 5-6 centuries B.C. The Chinese and Japanese used tinctures

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and extract of tea leaves on wound. Hippo crates (430 B.C) proposed soaked dressing of warm vinegar to relieve the pain of burn[4].
Hypertrophy of epidermal cells begins with in 24 hr of injury and may extend for a distance of 3-4 mm from the wound margin the upper most layers of the cells becomes keratinized following complete epithealiazation[5]. Although mitotic activity ceases the hypertrophy epidermis persist for some days or even weeks returning to the normal cellular size. In the first 24 hours, there are mainly polymorphs and lymphocytes, thereafter, macrophages become more numerous and from about the thirty day onwards, fibroblasts become prominent. New capillaries advance into the wound are by budding, and extra-cellular material also accumulates[6].

2. Material and Methods

Present study was conducted at Index Medical College Hospital & Research Centre, Indore, M.P. on 80 cases, the collagen sheets are prepared from intestine of freshly dead cattle collagen is extra cellular protein playing major roll in connective tissue. It is the most abundant protein in human. Collagen as a biomaterial and its role in wound management well documented. Collagen encourages wound healing through the deposition and organization of freshly formed fibers and granulation tissue in the wound bed and thus creating a conducive environment to wound heeling
Collagen in its pure form does not cause any antigenic reaction when implanted in living animal tissue, it can be stored up to 5 years at room temperature at least 19 known forms of collagen. type 1 collagen, the most abundant form of collagen in humans is found in all connective tissues except hyaline cartilage and basement membranes.

Inclusion Criteria:
1. Patient has been registered irrespective of their age and sex.
2. At the time of admission patients diabetic status has been checked. it was ensured that the patient should be euglycemic during the treatment.

3. Result

Table 1: AGE DISTRIBUTION

Group	30-50 years	51-70 years
Collagen sheet	26	14
Collagen granules	20	20
Total	46	34

In our study 46 patients were 30-50 years of age and 34 patients were 51-70 years of age.

Table 2: INITIAL SIZE OF WOUNDS

Group	Horizontal	Vertical	Depth
I	6.7 CM	5.6 CM	1.05 CM
II	7.3 CM	4.3 CM	1.11 CM

Greatest dimension in collagen sheet group was 6.7cm, and 7.3cm in granule group.

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Table 3: NO. OF WOUNDS SHOWING 100%, 99-75%, 74-50%, 49-25%, <25%REDUCTION IN SIZE AFTER 2 WEEK

Group	100%	99-75%	74-50%	49-25%	<25	Total no. of Wounds
I	14	12	10	04		40
II	20	06	12	02		40
TOTAL	34	18	22	06		80

100% reduction in size of wound within 2 weeks in 14 patients of collagen sheet group while it was 20 in collagen granule group.

Table 4: WOUND SHOWING 100% REDUCTION IN SIZE WITH COLLAGEN SHEET

No. of Weeks	01	02	03	04	05	06	07	8
No. of patients with 100% reduction	-	14	16	10	-	-	-	-

10 Patient has taken 4 weeks duration for 100% healing

4. Discussion

Healing of a diabetic wound has been a subject of great importance to surgeons as well as the making from time immemorial.

The post decades been as been as explosive growth of diabetic wound healing research that promises to facilitate clinical wound repair[7].

Inspite of great advancement in the field of wound healing it was still not possible to make certain wound to heal.

Any breach in the continuity of skin or mucous membrane usually by progressive destruction of surface tissue is an ulcer. The healing of such wounds has always been in central consideration in surgical practice because it exposes the deeper tissue structures to the danger of infection[8].

Simple clean wound do not pose much problems as open wounds especially those with tissue loss usually heals by secondary intention if the area is too large to be covered with epithelisation contraction the wound becomes chronic open ulcer.

Diabetic ulcer remain one of the most costly unsolved problem in the healthcare accounting for about 15% of diabetic patients who finally results in amputation. Chronic ulcers are pain full and usually refractory to the treatment[9].

Surgeons who treat chronic non-healing ulcers including diabetic ulcers and pressure ulcers etc, face a real challenge when it comes to the closure of the wound due to inadequacies of conventional treatment protocols and complexities of ulcers. The result is catastrophic and traumatic. Quality of life suffers as many patients get in to the stage of amputations especially in the case of diabetic ulcer. This for this reason, useful biomaterials like collagen play a very important role in the management to alleviate the sufferings of millions of victims in this category.

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5. Conclusion

Collagen granule dressing is better than collagen sheet dressing in diabetic wounds. Heeling of diabetic wound is improved by collagen dressing if the patient is kept normoglycemic. Diabetic wound heals earlier with the Collagen granule dressing than collagen sheet dressing. Collagen granule dressing is less costly than collagen sheet dressings. Collagen granule dressing is techniquely more easier than collagen sheet dressing.

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