

A COMPARATIVE STUDY OF COLLAGEN DRESSINGS VERSUS CONVENTIONAL DRESSINGS IN WOUND HEALING IN CHRONIC ULCER

Deepak Choudhary¹, Swapnil Garg Insen², Sandeep Goyal³, Umesh Chhabra⁴, Gopal Singal⁵

¹Senior Resident, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana.

²Associate Professor, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana.

³Assistant Professor, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana.

⁴Associate Professor, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana.

⁵Professor, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana.

ABSTRACT

BACKGROUND

Chronic ulcers are defined as a slow or non-healing breakdown of epidermal and dermal tissue that lasts more than 6 weeks. Regardless of aetiology, chronic ulcers cause considerable and prolonged distress for patients. The use of newer dressings with collagen dressing may increase the wound-healing potentials.

The aim of this study is to compare the efficacy of collagen dressing with that of conventional dressing in the management of chronic ulcers and their healing process.

MATERIALS AND METHODS

Prospective study was done on 60 patients who visited the surgery OPD or were admitted for chronic ulcers in Surgery Department. For 30 patients, collagen dressing was done and for rest conventional dressing. The recorded data from the patient's files regarding characteristics of ulcer as size, edge, floor characteristics, slough, granulation tissue, pathogenic organisms and wound swab or pus culture sensitivity results were noted and analysed.

RESULTS

The granulation tissue appeared in around 2 weeks in maximum cases in collagen dressing group, i.e. 63.4% and in around 4 weeks in conventional dressing group i.e. 46.7%. Average time for appearance of granulation tissue in collagen and conventional dressing group was around 3 weeks and 4.9 weeks respectively. Infection rate in our study in collagen and conventional dressing group was 6.67% and 13.33% respectively.

CONCLUSION

From above study, we concluded that collagen dressing is better than conventional dressing for the management of chronic ulcers.

KEYWORDS

Collagen, Conventional, Chronic.

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BACKGROUND

Chronic ulcers are defined as a slow or non-healing breakdown of epidermal and dermal tissue that lasts more than 6 weeks. Regardless of aetiology, chronic ulcers cause considerable and prolonged distress for patients. The use of newer dressings with collagen dressing may increase the wound-healing potentials. Study is conducted to compare the efficacy of collagen dressing with that of conventional dressing in the management of chronic ulcers and their healing process.

MATERIALS AND METHODS

A prospective study was conducted on patients with chronic ulcers attending the Department of Surgery, Maharaja Agrasen Medical College, Agroha (Hisar).

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Corresponding Author:

Dr. Deepak Choudhary,

Flat No-42, New Campus,

Maharaja Agrasen Medical College,

Agroha, Hisar.

E-mail: drdeepak29@yahoo.com

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Conventional dressing is done using normal saline, sterilised cotton and gauze, bandages, sterilised pus swabs for culture and sensitivity tests. For collagen dressing we used collagen granules/sheet, normal saline, sterile gauze pieces, sterilised pus swabs for culture and sensitivity tests. Patients included were patients with non-infected chronic ulcers, ready to give consent with or without diabetes. The pus samples were processed in the Microbiology Department by standard procedures. The study consisted of 60 patients coming to the surgical ward of Maharaja Agrasen Medical College, Agroha (Hisar), in which collagen dressing was done for 30 patients and conventional dressing for another 30 patients.

Patient admitted first was taken in the conventional group, the second into the collagen group and so on. In all cases, a relevant history of illness was recorded. A detailed general and local examination was conducted along with routine investigations. Before applying collagen dressing, the affected area was thoroughly cleaned, then collagen dressing was applied. A saline soaked sterilised gauze piece was placed over the dressing and covered with a bandage. The collagen dressing (granules) was changed every 3rd to 5th day. Pus swab for culture and sensitivity was taken as a routine investigation. The collagen dressing was applied over the wound surface for a maximum period of 12 weeks.

Ulcers of the patients in the conventional group were dressed with normal saline under complete aseptic methods and dressing was changed on alternate day or daily depending upon condition of ulcer.

All patients were instructed to return for followup and were re-evaluated weekly, till wound was healed or up to 12 weeks.

Response to the treatment and patient's outcome were noted in terms of progression of wound healing, granulation tissue formation, changes in edges of wounds and need of skin grafts.

Data hence collected was entered in Microsoft Excel 2007 and then transferred to SPSS version 20.0 for analysis. Data were described using descriptive data like mean and percentage. Test of significance was done using Chi-square test and Fisher exact test. P-value of < 0.05 was taken as significant.

RESULTS

Table 1 shows that average age in both collagen and conventional group was 47 years. Maximum patients were in between 41 to 60 years range.

Most common type of ulcer in this study was traumatic followed by diabetic ulcer.

Table 4 shows that most ulcers were less than 20 cm², i.e. around 66.7% and 63.3% in collagen and conventional dressing groups respectively. There was no significant difference in ulcer size in both the groups.

Table 6 shows that granulation tissue appeared early in case of collagen dressing. Average time taken in collagen and conventional dressing was 3 weeks and 4.9 weeks respectively. P value is 0.002, which is statistically significant. So, reduction of healing time by 39% in chronic ulcers in collagen dressing group.

As per Table 7 overall infection rate in the study was 20%, out of which collagen dressing group contributed only 6.67% and conventional dressing group 13.33%; p value was < 0.00 which was highly significant. This suggests that collagen group had higher safety profile.

There is no relationship of appearance of granulation tissue with age of the patient and size of ulcer as Pearson correlation coefficient signifies weak correlation.

Age (In Years)	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
0 - 20	1 (3.34%)	3 (10%)
21 - 40	10 (33.33%)	9 (30%)
41 - 60	16 (53.33%)	13 (43.33%)
61 - 80	3 (10%)	4 (13.33%)
> 80	0	1 (3.34%)
Average	47 years	47 years

Table 1. Age Distribution

Sex	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
Male	25 (83.4%)	25 (83.4%)
Female	5 (16.6%)	5 (16.6%)

Table 2. Sex Ratio

Type	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
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Traumatic	23 (76.7%)	25 (83.4%)
Diabetic	5 (16.7%)	3 (10%)
Pressure	1 (3.3%)	1 (3.3%)
Venous	1 (3.3%)	1 (3.3%)

Table 3. Type of Ulcers

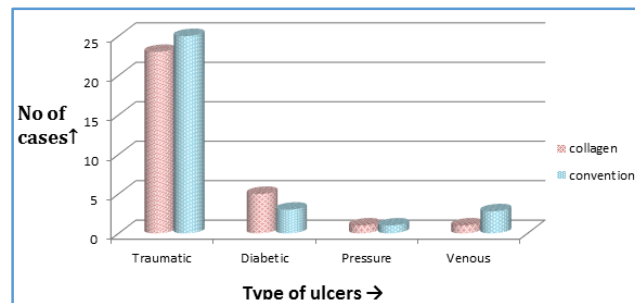


Figure 1

Size of Ulcer (cm ²)	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
1 - 20	20 (66.7%)	19 (63.3%)
21 - 40	6 (20%)	7 (23.3%)
41 - 60	3 (10%)	2 (6.7%)
61 - 80	0	2 (6.7%)
> 80	1 (3.3%)	0
Average	22.9 cm ²	23.7 cm ²

Table 4. Size of Ulcers

Duration (Weeks)	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
6 - 8	21 (70%)	20 (66.7%)
8 - 10	4 (13.4%)	5 (16.7%)
10 - 12	3 (10%)	2 (6.7%)
12 - 14	0	0
14 - 16	1 (3.3%)	1 (3.3%)
> 16	1 (3.3%)	2 (6.6%)
Median	9.2 Weeks	8.8 Weeks

Table 5. Duration of Ulcers

Duration (Weeks)	Collagen Dressing No. (Percentage)	Conventional Dressing No. (Percentage)
2	19 (63.4%)	11 (36.7%)
4	10 (33.3%)	14 (46.7%)
12	1 (3.3%)	4 (13.3%)
> 12	0	1 (3.3%)
Average	3 Weeks	4.9 Weeks

Table 6. Appearance of Granulation Tissue

Infection Rate (Overall)	Collagen Dressing No. (Percentages)	Conventional Dressing No. (Percentages)
12 (20%)	4 (6.67%)	8 (13.33%)

Table 7. Wound Infection

Grafting	Collagen No. (Percentage)	Conventional No. (Percentage)
Yes	23 (76.67%)	25 (83.33%)
No	7 (23.33%)	5 (16.67%)

Table 8. Requirement of Split Skin Grafting

DISCUSSION

Chronic ulcers are defined as a slow or non-healing breakdown of epidermal and dermal tissue that lasts more than 6 weeks. Majority of ulcers are associated with venous disease, peripheral arterial disease, mixed arteriovenous disease and diabetes. Women suffer more than men from lower limb ulcers, outnumbering them by a ratio of more than 2:1.¹ Wound healing is a complex process that involves the timely expression of numerous growth factors that promote cellular migration and proliferation, production of new connective tissue matrix and collagen deposition.² In addition, chronic wounds are stuck in the inflammation phase and show a cessation of epidermal growth or migration over the wound surface.³ The use of newer dressings with collagen dressings may increase the wound-healing potentials. Collagen is a biomaterial that encourages wound healing through deposition and organisation of freshly formed fibres and granulation tissue in the wound bed, thus creating a good environment for wound healing.

The average age distribution of patients in this study was forty seven years. Average age in studies done by Veves et al⁴ and Rao et al⁵ were comparable to our study, but average age in study by Singh O et al⁶ was less than that included in our study, as most of the patients in our studies belonged to low socioeconomic status and were labourers by occupation even in older ages.

The average duration of ulcer in collagen dressing group was 9.2 weeks and in conventional group was 8.8 weeks. This is comparable to the study done by Veves et al.⁴ Most of the ulcers (65%) were less than 20 cm², which was quite large as compared to Veves et al⁴ and Rao et al.⁵

The infection rate in conventional group was much higher than collagen group, which suggests collagen sponge has higher safety profile than that of conventional dressing. This finding was same as that shown by study by Rao et al.⁵

A common characteristic of all chronic wounds is the elevation of the levels of matrix metalloproteinases, which results in increased proteolytic activity and inactivation of the growth factors involved in the wound-healing process. The use of collagen sponge dressing has been shown to specifically inhibit the action of these proteases without affecting the activity of the growth factors. Thus, theoretically, collagen sponge dressing may be an advantageous alternative to the moistened gauze that is the current standard of care.

The average healing time in collagen group was 3 weeks, whereas it was 4.9 weeks in conventional group and p value is 0.002 being highly significant. This has a lot of impact on patient's life. Once healing time is reduced, patient can go back to work. Another factor in collagen group which was

satisfying to the patients was that once collagen was completely adherent to their wound and no more lysing they could go back to work and resume normal activities. Their hospital visits were then reduced to once per week for followup. Hence, the quality of life was significantly better in this group.⁷ Healing time was reduced by 39% in the collagen group. This finding was comparable to other studies, i.e. Veves et al,⁴ Singh O et al⁶ and Rao et al.⁵

Need of grafting was more in conventional group as compared to collagen in present study as well as studies by Singh O et al⁶ and Rao H et al.⁵

CONCLUSION

From the above study it was concluded that dressing with collagen granules is associated with early appearance of granulation tissue, better quality of life and less infection rate. So collagen dressing is superior to conventional dressing.

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