

A Prospective Randomized, Controlled Study on Comparison of Wound Healing with Type I Collagen Dressing & Conventional Dressing in Burns Patients

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Abstract:

Introduction: The wound healing mechanism has changed in an exciting manner. The planned sequence of events consists of a beautiful cascade of happenings. The science of wound healing has evolved dramatically during the past several decades. Wound treatment used to be purely reliant on historical observations and tales, which might date back millennia in certain cases. This research compared wound healing with type I collagen dressing against traditional dressing with ointment and gauze.

Aim of Study: This Prospective Randomized Controlled study was conducted to compare the wound healing with Type I collagen dressing and conventional dressing with ointment, gauze-pad & bandage, with respect to the following criteria:

- Their efficacy on wound healing in Burn patients
- The ability to prevent infection
- The effect on the morbidity
- The cost effectiveness

Results: The type-1 collagen group achieved full wound healing in 14-18 days, but the standard dressing group needed 16-26 days. 50% of patients in the traditional dressing group had infection, but more than 90% of patients in the type-1 collagen dressing group had no infection. morbidity such as discomfort, leaking, and odour are more prevalent in the traditional dressing group, however early mobilisation, and capacity to care for the shelf are more prevalent in the type-1 collagen dressing group. Change of dressing was least with collagen.

Conclusion: Collagen dressing has the extra virtue of not requiring any skin grafting. There is a greater prevalence of wound infection, increased leaking, and odour from the wound in the standard dressing group. Infections are substantially less common when type-1 collagen dressing is utilised. As a result, type-1 collagen dressing has a superior reaction to burn patients than traditional dressing.

Keywords: Burn Dressing, Collagen Vs Conventional Dressing, Healing.

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Introduction

The wound healing mechanism has changed in an exciting manner. The planned sequence of events consists of a beautiful cascade of happenings. The science of wound healing has evolved dramatically during the past several decades. Wound treatment used to be purely reliant on historical observations and tales, which might date back millennia in certain cases. Man has tried every substance and approach he knows to speed up wound healing.[1,2]

We now have several choices for assisting wound healing in different ways. Our newfound interest in wound healing has inspired a reconsideration of its fundamental components and how they are altered individually by biological, mechanical, and

physical influences.[3,4] The objective of clinical wound healing management is to manipulate the healing process safely and easily - and we are getting closer to that goal than ever before. Skin Healing - the biggest organ in the human body and the most researched.[5,6] The Department of Surgery at our Srirama Chandra Bhanja Medical College Hospital sees the most patients in the state who have burns from different sources.[7] kind I collagen dressing, a kind of Biological Occlusive skin replacement wound covering dressing, is utilised on occasion in this setting.[8,9]

This research compared wound healing with type I collagen dressing against traditional dressing with ointment and gauze.[10]

Aim of Study

This Prospective Randomized Controlled study was conducted to compare the wound healing with Type I collagen dressing and conventional dressing with ointment, gauze-pad & bandage, with respect to the following criteria:

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Materials and Methods

This two-year prospective randomised controlled trial was undertaken in the Department of General Surgery at SCB Medical College Hospital in Cuttack from August 2020 to July 2022.

The majority, if not all, of the city's burn victims are brought to this hospital, and the research was done on these individuals. The study's goal was to see whether Type I Collagen dressing might speed up wound healing. To begin, a procedure was developed and a proforma chart was created. Patients with burns were resuscitated and their overall health was stabilised upon arrival at the hospital, according to procedure.

Then they were assessed clinically as to:

1. % Body Surface Area involvement - using Lund & Browder Chart.
2. The Degree of Burns.
3. Whether to be treated as Out Patient or In Patient.

Mode of treatment

Collagen dressing or conventional method Suitable samples were selected as per the inclusion criteria and necessary exclusions were made as per the exclusion criteria given below:

Inclusion Criteria

- Patients who sustained burns in 10 to 40% of Body Surface Area were included in the study.
- Patients with Superficial Second-degree burns were included. These wounds are expected to heal completely within 3 weeks without any surgical intervention.
- Patients who were of age below 40 years were included in the study.
- Patients who came to the hospital within 24 hours of sustaining the burns were included.
- Patients who sustained burns over extremities & body were preferred. Patients who were literate & who were expected to come for regular follow-up were preferred.

Exclusion Criteria

- Patients with more than 40% BSA burns were excluded from the study because of prevailing high mortality rate.
- Patients with less than 10% BSA burns were also excluded, because they were treated as Out patients and they were not expected to come for regular follow-up.
- Deep second degree & third-degree burns were excluded, since these wounds will heal only with Partial thickness skin grafting.
- Elderly people were excluded due to comorbid conditions coming into play in them, which might alter the wound healing.
- Patients who came 24 hours after sustaining the injury were excluded since these wounds might have already become infected. Some of these patients might have been treated outside & already become unsuitable for collagen application because of the previous treatment modality followed earlier.
- Patients who were not expected to come for regular follow-up were excluded from the study.

The patients that were chosen were recruited in the research with their Consent. Thus, a total of 60 patients were studied, with 30 randomly assigned to the Type-1 collagen dressing group and treated with collagen dressing, and 30 others in the Conventional dressing group treated with conventional dressing, which included Silver Sulphadiazine ointment, gauze-pad, and bandage dressing. The victims were all admitted to the burn's unit. Our hospital's admittance policy stated that burns patients with more than 10% BSA involvement would be treated as inpatients.

Observation & Results

As seen in the table, most patients in the type-1 collagen dressing group had quicker wound healing. The research included sixty patients. Thirty patients are in the traditional group, and thirty are in the type-1 collagen dressing group. There are thirty male patients and thirty female patients among the samples. In more than 90% of instances, the burn site healed fully in 14-18 days using type-1 collagen dressing. Wound healing was delayed in the standard dressing group. Within 16-26 days, the wound totally healed. Infection was the most prevalent limiting factor causing wound healing delays. There was no infection in 96% of the type-1 collagen dressing group. The prevalent hospital acquired strains of bacteria infected 52% of the standard dressing group. The burn wound caused discomfort in 28% of the type-I collagen dressing group, which gradually improved in intensity. 88% of those in the standard dressing group reported discomfort. This is due to frequent dressing changes. The traditional dressing group had

increased leaking and odour from the wound, but the type-1 collagen dressing group did not.

Most of the type-1 collagen dressing group could be mobilised quickly and took care of their own daily requirements. In the early post-burn days, patients in the standard clothing group had difficulties mobilising and relied on close relatives for personal necessities.

One patient from each group was lost to follow-up. Despite numerous efforts, they could not be contacted by letter or in person. Three patients in the traditional dressing group required Split Thickness Skin Grafting due to delayed wound healing, which took more than twice the time to complete.

Time Taken for Complete Wound Healing

Table 1:

No. of Days	Collagen dressing	Conventional dressing
10	-	-
12	1	-
14	5	1
16	12	2
18	10	2
20	1	12
22	-	1
24	-	8
26	-	3
28	-	-
30	-	-

According to the above data, the type-1 collagen group achieved full wound healing in 14-18 days, but the standard dressing group needed 16-26 days. It may be deduced that the type-1 collagen dressing group required fewer days to cure the wound fully.

Infection

Table 2:

Infection	Collagen Dressing	Conventional dressing
Absent	29	14
Present	1	16

According to the above data, more than 50% of patients in the traditional dressing group had infection, but more than 90% of patients in the type-1 collagen dressing group had no infection.

Morbidity

Table 3:

	Collagen Dressing		Conventional Dressing	
	Absent	Present	Absent	Present
Pain	23	7	4	26
Ooze	29	1	23	7
Smell	29	1	20	10
Early Mobilisation	1	29	6	24
Ability To Take Care Of Self	2	28	12	18

The above data reveals that morbidity such as discomfort, leaking, and odour are more prevalent in the traditional dressing group, however early mobilisation and capacity to care for the self are more prevalent in the type-1 collagen dressing group.

Number of Dressing changes

Table 4:

No of dressing	Collagen Dressing	Conventional Dressing
1	28	
2	1	
3	-	
4	-	
5	-	
6	-	2
7	-	2
8	-	4
9	-	11
10	-	2
11	-	5
12	-	3

13	-	-
14	-	-
15	-	-

The above table shows that single dressing was needed in type-1 collagen dressing group while in conventional dressing group dressing was changed multiple times.

Discussion

The purpose of this Prospective Randomised Control research was to evaluate the efficacy of Type I Collagen Wound Cover dressing to the conventional modality of dressing with ointment, gauze-pad, and bandage.

In terms of wound healing, 90% of the Type-1 collagen dressing group healed completely in 14-18 days, while the Conventional dressing group needed 16-26 days even in the absence of infection. Winter established without question in 1962 that the rate of epithelialization under an occlusive dressing was double that of wounds left untreated. Even though both types of wound dressings utilised in this research were Occlusive dressings, they exhibited differences in wound healing acceleration. This is owing to the Type I Collagen dressing's intrinsic qualities. When the collagen sheet is put over the wound, it creates a foundation for epithelialization to proceed. The ointment, gauzepad, and bandage dressing do not give this. Collagen binds to important wound exudates, which are high in cytokines that speed up wound healing in an acute wound. In the traditional dressing, this exudate is wipped away from the wound.

When compared to the type-1 collagen dressing group, the burn sites of the patients in the conventional dressing group were consistently contaminated owing to bacterial colonisation. Wound infection occurred in 52% of the conventional dressing group but not in 96% of the type-1 collagen dressing group. In the standard dressing group, infection was the most significant factor that slowed wound healing. The morbidity experienced by the usual dressing group was noteworthy. These individuals developed wound infection, increased leaking, and an unpleasant odour from the wound. They felt increased discomfort, particularly while bathing and changing their dressings. Because they could not be mobilised quickly, many patients had to rely on close relatives for their daily personal requirements. In this regard, the type-1 collagen dressing group performed well. They had no clothing changes and had less discomfort. They had no or very little oozing and odour from the incision. They might be activated quickly. These patients were able to care for themselves without the assistance of close family.

In terms of cost, whereas Type I Collagen dressing originally looked to be more expensive, it is really less expensive when compared to the standard dressing group. The cost of the dressing materials, the man-power required for its preparation and application, the income loss incurred by close relatives when they had to accompany the patient to the department for dressing - all of this adds up to be significantly more expensive than the cost of the collagen treatment. The most appealing component to be highlighted in this research is the comfort reported by the collagen group.

Summary and Conclusion

In the department of General Surgery of S.C.B Medical college and Hospital, Cuttack, 60 superficial burn patients were taken in the prospective comparison study between type-1 collagen dressing and conventional dressing with Silver Sulphadiazine ointment, gauzepad & bandage. Various advantages were found by using type-1 collagen dressing over conventional dressing, these are summarised below:

1. Accelerates the wound healing and thereby reduced the hospital stay
2. Prevents the incidence of Infection
3. Reduces the morbidity suffered by the patients
3. Cost effective

Burns are one of the most common causes of disability adjusted life years (DALY). In a developing nation like India, most burn patients come from poor socioeconomic backgrounds and are burned as a result of incidents at home or at work.

These terrible accidents place a significant emotional and financial strain on individuals as a result of lost working days. It is also a burden on the Health Department, as well as the patient and his or her attendant.

In the standard dressing group, a burn patient's dressing is changed every two days, accumulating to numerous times throughout the stay, which is exceedingly unpleasant. Most patients are hesitant to change the dressing and, at times, refuse to comply, resulting in infections and increased morbidity. A lengthier hospital stay and delayed wound healing cause pain for patients. Some patients may need skin transplantation. Many of these individuals get depressed as a result of such time-consuming retreatment. Although collagen dressing seems to be more expensive than standard dressing at first glance, it is necessary to replace the dressing on a regular basis. This results in a far

lower total cost than traditional dressing. Collagen dressing has the extra virtue of not requiring any skin grafting. There is a greater prevalence of wound infection, increased leaking, and odour from the wound in the standard dressing group. Infections are substantially less common when type-1 collagen dressing is utilised. As a result, type-1 collagen dressing has a superior reaction to burn patients than traditional dressing.

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