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A study of collagen dressing versus conventional dressings in burns at tertiary health care centre

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ABSTRACT

Background: Worldwide, burn injury is a problem and cause intense pain, biological dressings like collagen as it forms physiological interface prevents infection effective for burn wound healing. The objective of the study was to study of collagen dressing versus conventional dressings in burns at tertiary health care centre.

Methods: This was a cross sectional study carried out in the Department of Surgery during September 2018 to September 2019. Out of 50 patients, 25 were enrolled to collagen treatment group (group A) and remaining into conventional treatment group i.e. (group B). The statistical analysis was done by unpaired t-test and chi-square test.

Results: Average less time required for granulation tissue to appear p<0.001, df=48, t=4.56); average less time requires for sterile wound swab culture (weeks) (p<0.05, df=48, t=3.45); less discomfort score (0-10) (p<0.001, df=48, t=6.78); less dressing removal pain score (0-10) (p<0.0001, df=48, t=9.87); less average time required for complete healing (days) (p<0.001, df=48, t=7.79).

Conclusions: It can be concluded that collagen dressings were superior to conventional dressing in wound healing of burns.

Keywords: Collagen dressing, Conventional dressings, Burns

INTRODUCTION

Worldwide, burn injury is a problem and cause intense pain. Long-term morbidity is often a significant problem for burn survivors that create suffering for the individual as well as for family and community. ¹⁻³ Burn injuries usually results in significant morbidity and mortality around the globe in both developing and developed countries and have considerable physical, psychological and economic effects on the patients, their families and society. ^{4.5} The World Health Organization in 2008 reported that burden of burn injury is one that falls predominantly on the world's poor. Burn deaths and injuries not only more common in people of lower socioeconomic status but, also the economic burden

makes them more likely to be thrown into further poverty as a consequence.⁶ So here we have studied the whether the collagen dressings are effective as compared to conventional dressings or not.

METHODS

This was a cross sectional study carried out in the Department of General Surgery, Aarupadai Veedu Medical College and Hospital Puducherry during the one-year period i.e. August 2018 to August 2019. So during this period there were 50 patients with various types of burns were enrolled into the study by taking written and explained consent out of these 25 were enrolled to collagen treatment group; group A and remaining into

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conventional treatment group i.e. group B all the patients treated with standard treatment protocol and with all aseptic precaution.

Inclusion criteria

All cases of burn wounds willing to participate in the study were included in study.

Exclusion criteria

The patients with co-morbidities that could grossly affect the wound healing like uncontrolled diabetes mellitus, chronic liver or renal disease, other collagen disease or major nutritional deprivation were excluded.

The response to treatment was assessed by average time required for granulation tissue formation, average time requires for sterile wound swab culture to appear, severity of discomfort, dressing removal pain score, ease of dressing removal score was evaluated by the visual analogue scale (VAS) which rates for discomfort or pain by 0 to 10. The statistical analysis was done by using

SPSS 24.0 version and un-paired t-test and chi-square test.

RESULTS

Mean age of group A was 37.12 ± 3.45 years and that of group B was 38.43 ± 5.43 years. There is no difference in the mean age between two groups (p>0.05). Proportion of males were 36% in group A and 40% in group B. Proportion of females were 14% in group A and 10% in group B (p>0.05) (Table 1).

Average time required for granulation tissue to appear in group A was 6.59 ± 1.75 days and in group B was 9.52 ± 3.72 days. Average time requires for sterile wound swab culture in group A was 3.42 ± 1.92 weeks and in group B was 4.87 ± 2.58 weeks. Mean discomfort score in group A was 3.42 ± 2.73 and in group B was 7.62 ± 3.49 . Mean dressing removal pain score in group A was 2.73 ± 1.52 and in group B 5.67 ± 3.76 . Average time required for complete healing in group A was 8.15 ± 1.47 days and in group B was 15.67 ± 3.21 days (Table 2).

Table 1: Age and gender wise distribution of study population.

Variable	Group A (n=25)	Group B (n=25)	P value	
Age (in years)	37.12±3.45	38.43±5.43	P>0.05; t=1.0181, df=48	
Sex				
Male	18 (36%)	20 (40%)	P>0.05, X ²⁼ 0.4386, df=1	
Female	7 (14%)	5 (10%)		

Table 2: Comparison between two groups as per wound characteristics.

Characteristics	Group A (n=25)	Group B (n=25)	P value
Average time required for granulation tissue to appear	6.59±1.75	9.52±3.72	P<0.001, df=48, t=4.56
Average time requires for sterile wound swab culture (weeks)	3.42±1.92	4.87±2.58	P<0.05, df=48, t=3.45
Discomfort score (0-10)	3.42±2.73	7.62±3.49	P<0.001, df=48, t=6.78
Dressing removal pain score (0-10)	2.73±1.52	5.67±3.76	P<0.0001, df=48, t=9.87
Average time required for complete healing (days)	8.15±1.47	15.67±3.21	P<0.001, df=48, t=7.79



Figure 1: Burn day 1.



Figure 2: Application with collagen dressing.



Figure 3: Burn day 15.



Figure 4: Burn day 21.

DISCUSSION

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 collagen on the other hand, create the most physiological interface between the wound surface and environment, and are impermeable to bacteria.⁷ Collagen dressings have other advantages over conventional dressings in terms of ease of application and being natural, non-immunogenic, non-pyrogenic, hypoallergenic, and pain-free.^{8,9} The use of collagen dressing has been found to inhibit the action of metalloproteinases.¹⁰ Collagen is a biomaterial that encourages wound healing through deposition and organization of freshly formed fibres and granulation tissue in the wound bed thus creating a good environment for wound healing.¹¹ Collagen sheets, when applied to a wound, not only promote angiogenesis, but also enhance body's repair mechanisms. While acting as a mechanical support these reduce oedema and loss of fluids from the wound site, along with facilitation of migration of fibroblasts into the wound and enhancing the metabolic activity of the granulation tissue. 11-13 Moreover, it is easy to apply and has the additional advantage of stopping bleeding.14

The average age in both the groups was comparable i.e. 37.12 ± 3.45 years and 38.43 ± 5.43 (p>0.05; t=1.0181, df=48) the male female composition was also comparable i.e. 2.57:1 and 4:1 (p>0.05, X^2 =0.4386, df=1).

Wound healing properties were average time required for granulation tissue to appear (mean \pm SD) was 6.59 \pm 1.75 and 9.52 \pm 3.72 (p<0.001, df=48, t=4.56); average time requires for sterile wound swab culture (weeks) was 3.42 \pm 1.92 and 4.87 \pm 2.58 (p<0.05, df=48, t=3.45).

Discomfort score (0-10) was 3.42 ± 2.73 and 7.62 ± 3.49 (p<0.001, df=48, t=6.78); dressing removal pain score (0-10) was 2.73 ± 1.52 and 5.67 ± 3.76 (p<0.0001, df=48, t=9.87). Average time required for complete healing (days)-8.15±1.47 and 15.67 ± 3.21 (p<0.001, df=48, t=7.79).

These findings were similar to Singh et al they found with two weeks of treatment, 60% of the 'collagen group' wounds and only 42% of the 'conventional group' wounds were sterile (p=0.03). Healthy granulation tissue appeared earlier over collagen-dressed wounds than over conventionally treated wounds (p=0.03). After eight weeks, 52 (87%) of 'collagen group' wounds and 48 (80%) of 'conventional group' wounds were >75% healed (p=0.21). Also, Ramesh et al (collagen dressing) group had lesser pain than control group. 16

CONCLUSION

It can be concluded from our study that collagen dressing was superior to conventional dressings with respect to average less time requires for sterile wound swab culture, less discomfort score, less dressing removal pain score, less average time required for complete healing.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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