International Surgery Journal
Dave TJ et al. Int Surg J. 2021 Jun;8(6):1730-1733
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20211958

Original Research Article

A retrospective study of comparison of collagen dressing versus conventional dressing for skin graft donor site

Tushar J. Dave[1]*, Shashirekha C. A.[2], Krishnaprasad K.[3]

Department of General Surgery, Sri Devraj URS Medical College, Kolar, Karnataka, India

Received: 21 April 2021
Revised: 16 May 2021
Accepted: 17 May 2021

***Correspondence:**
Dr. Tushar J. Dave,
E-mail: davetushar.83@gmail.com

ABSTRACT

Background: Split-skin grafting is commonly employed for covering skin defects in case of ulcers, deep burns and following trauma. It involves harvesting of the epidermis and upper 1/3rd of dermis resulting in a wound called donor site wound (DSW). These wounds pose a kind of burden to patients during the process and after the process of wound healing. These wounds tend to cause pain, are at risk of getting infected, pruritis and cosmetic inconvenience. DSW has been managed with closed or open dressings. Out of many methods, we aim to compare the efficacy of collagen dressing with that of conventional dressing in this study.
Methods: A retrospective study including 30 subjects were stratified into 2 groups; group A-collagen dressing and group B- conventional dressing. Patients aged between 18 to 60 years undergoing split thickness skin grafting were included. Patients who are immunocompromised, diabetic, with underlying skin disease and infected wounds were excluded. The outcome was compared in terms of pain, pruritis and scar assessment using Vancouver scar scale.
Results: In the present study there was significant difference in median pain score, pruritus and median Vancouver scar score in collagen group compared to conventional group at all the intervals. Also, the incidence of surgical site infection was lower in the collagen dressing group.
Conclusions: Collagen dressing is superior compared to conventional dressing in terms of lower pain score, pruritus score and Vancouver scar score.

Keywords: Collagen dressing, Conventional dressing, Skin graft donor site

INTRODUCTION

Split thickness skin grafting is commonly performed by surgeons for covering skin defects in cases of ulcers, burns and following trauma. Split-skin graft harvesting technique involves harvesting of the epidermis and upper 1/3rd of dermis resulting in a wound called donor site wound (DSW).[1,2]

These wounds pose a kind of burden to patients during and after the process of wound healing. These wounds tend to cause enormous pain, are at risk of getting infected, can cause itching (pruritis) and cosmetic inconvenience to the patient.

Donor site wound has been managed with closed or open dressings. The closed occlusive dressing results in very good outcomes with considerable reduction in duration of wound healing, good quality of the epithelium which is regenerated along with comfort to the patient.

Most commonly employed dressing at the donor site wound is using fine meshed gauze which is smeared commonly with petroleum jelly or chlorhexidine.

But if these dressings get soaked, it will become a media for bacterial invasion. Also, donor site dressing displacement produces shearing forces which impair epithelial cellular migration and cause patient discomfort

in terms of pain and burning sensation. Dressing will be firmly adherent and more prone to cause injury to the regrown epithelium at the time of its removal.

Collagen can be used as a natural material for wound dressing and it has certain specific actions that artificial materials for wound dressings do not have. Collagen dressings can provide anti- inflammatory, analgesic, anti-fibrotic and anti-infective properties, and collagen will also speed up the process of neo angiogenesis.[3]

Aims and objectives

Aims and objectives of the study were: to evaluate the efficacy of collagen dressing in skin graft donor site in terms of pain, pruritis and scar assessment using Vancouver scar scale; to evaluate the efficacy of conventional dressing in skin graft donor site in terms of pain, pruritis and scar assessment using Vancouver scar scale; and to compare the efficacy of collagen vs. conventional dressing in view of above parameters.

METHODS

University ethical committee approval was taken and a retrospective comparative study was conducted between June 2019 and September 2020 involving 30 patients with healing ulcers planned for split thickness skin grafting, admitted in general surgery in R. L. Jalappa Hospital and Research Centre, Kolar, Karnataka, India. Patients were stratified into two groups. Patients with collagen dressings were put into group A and patients with collagen dressings were put into group B.

Sample size was calculated based on better cosmesis achieved using Vancouver scar scale between collagen dressing and conventional dressing. The estimated sample size came to be 15 per group.

Patients aged between 18 to 60 years undergoing split thickness skin grafting were included in the study. Patients who are immunocompromised, diabetic, with underlying skin disease and infected wounds were excluded. The outcome was compared in terms of pain, pruritus and scar assessment using Vancouver scar scale.

Post-operative pain was assessed on day 3, 7 and 10 using visual analogue scale. Pruritis was assessed on post-operative day 14 and 21 using simple numeric scale from (0-10). Scar assessment was done in a blinded fashion using Vancouver scar scale.

Statistical methods

Data was analysed using IBS statistical package for the social sciences (SPSS) version 22. Categorical data were compared using chi-square test or Fisher's exact test and continuous data were compared using independent sample t-test. P≤0.050 at 95% confidence interval was statistically significant.[4]

RESULTS

Mean age of subjects in collagen group was 49.8±11.6 years and in conventional group was 49.67±15.2 years. In collagen group, 53.3% were males and 46.7% were females and in conventional group, 80% were males and 20% were females. There was no significant difference in mean age and gender distribution between 2 groups.

In the study there was significant difference in median pain score between two groups on post-operative day (POD) 3, POD 7 and POD 10. Pain score was low in collagen group compared to conventional group at all the intervals.

In the study there was significant difference in median Vancouver scar score between two groups on POD 10, POD 14 and POD 21. Vancouver scar score was low in collagen group compared to conventional group at all the intervals. Hence collagen group had better healing compared to conventional group.

In the collagen group 6.7% had surgical site infection and in conventional group 13.3% had surgical site infection. There was no significant difference in surgical site infection between two groups.

Table 1: Profile of subjects' distribution between 2 groups.

Characteristics	Group				P value
	Collagen group		Conventional group		
	Count	%	Count	%	
Age (in years)					
<40	4	26.7	6	40.0	0.519
41 to 50	3	20.0	2	13.3	
51 to 60	6	40.0	3	20.0	
>60	2	13.3	4	26.7	
Mean±SD	49.8±11.6		49.67±15.2		
Gender					
Female	7	46.7	3	20.0	0.121
Male	8	53.3	12	80.0	

Table 2: Pain score comparison between 2 groups at different periods of follow up.

Post-operative pain	Group						P value
	Collagen group			Conventional group			
	Mean	SD	Median	Mean	SD	Median	
POD 3	5.8	0.8	6	7.1	0.8	7	<0.001*
POD 7	2.9	0.6	3	4.9	0.7	5	<0.001*
POD 10	1.6	0.6	2	2.3	0.7	2	0.011*

Table 3: Vancouver scar score comparison between 2 groups at different periods of follow up.

POD	Group						P value
	Collagen group			Conventional group			
	Mean	SD	Median	Mean	SD	Median	
POD 10	2.9	1.2	3	6.4	1.5	6	<0.001*
POD 14	3.1	1.0	3	5.4	1.0	5	<0.001*
POD 21	1.7	0.7	2	2.9	1.1	3	0.002*

Table 4: Surgical site infection comparison between 2 groups.

Surgical site infection	Group				P value
	Collagen group		Conventional group		
	Count	%	Count	%	
Absent	14	93.3	13	86.7	0.543
Present	1	6.7	2	13.3	

DISCUSSION

Collagen is an endogenous substance, which forms an important structural component in connective tissue and is of special importance in the skin. The importance of collagen in healing has been appreciated for many years for the simple reason that the end result of wound healing is always a scar which is composed of collagenous fibres.

In the present study there was significant difference in median pain score between two groups on POD 3, POD 7 and POD 10. Pain score was low in collagen group compared to conventional group at all the intervals. Similarly there was significant difference in median Vancouver scar score between two groups on POD 10, POD 14 and POD 21. Vancouver scar score was low in collagen group compared to conventional group at all the intervals. In the collagen group 6.7% had surgical site infection and in conventional group 13.3% had surgical site infection.

In the study by Singh et al 60% of the 'collagen group' wounds and 42% of the 'conventional group' wounds were sterile (p=0.03).[5] 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). Eight patients in the 'collagen group' and 12 in the 'conventional group' needed partial split-skin grafting (p=0.04). Collagen-treated patients enjoyed early and more subjective mobility.

Similarly in the study by Ayaz et al, significant reduction in pain and pruritus in patients with collagen dressing was noted on POD 1 and POD 14 respectively.[6] Considerable reduction in use of analgesics especially opioids observed with collagen dressing and also reduction in the duration of use of analgesics was observed with collagen dressing.

Similarly in the study by Sreekumar et al the pain was less in the collagen area when compared to the paraffin gauze area.[7] The difference was highest for the first 3 days (2.16 versus 5.86, p<0.01) reduced for the next 4 days (0.4 versus 3.4, p<0.01) and was minimal for the last 3 days (0 versus 1, p>0.02).

There have been few more studies conducted to determine the effect of collagen on skin graft donor sites. Pontén and Nordgaard used collagen film as dressing for skin graft donor site in 55 patients.[8] They reported that the donor sites were not painful and the nursing staff could reduce or eliminate time-consuming work with frequent dressings. Horch and Stark compared collagen to polyurethane dressings in 20 patients.[9] They noticed improved rate of epithelialization, reduced patient discomfort and more convenience with collagen. Carvalho et al compared three dressing modalities-bovine collagen calcium-alginate dressing and transparent polyurethane film, transparent polyurethane film alone and cellulose soaked in normal saline.[10] They observed greatest epithelialization and less pain in subjects managed with the bovine collagen calcium-alginate dressing covered with a transparent polyurethane film. Halankar et al compared collagen dressing to paraffin impregnated gauze dressing in 30

patients. They proposed collagen to be the ideal donor site dressing.[3]

Limitations

Smaller sample size was taken due to the COVID-19 pandemic. Hence higher sample size to be considered for future studies.

CONCLUSION

From the study it can be concluded that Collagen dressing had a significantly lower pain score and Vancouver scar score as compared to conventional group. Hence collagen dressings can be employed for covering donor site wound in cases of split thickness skin graft.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Johnson TM, Ratner D, Nelson BR. Soft tissue reconstruction with skin grafting. J Am Acad Dermatol. 1992;27(2):151-65.
2. Stephenson AJ, Griffiths RW, La Hausse-Brown TP. Patterns of contraction in human full thickness skin grafts. Br J Plast Surg. 2000;53(5):397-402.
3. Halankar P, Gomes DC, Chaudhari C. Collagen dressing in the management of donor site of split thickness skin grafts. Bombay Hosp J. Available at: http://www.bhj.org.in/journal/april2005/htm/original_Collagen_114.htm. Accessed on 02 March 2017.
4. Elenbaas, RM, Elenbaas, JK, Cuddy, PG. Evaluating the medical literature, part II: Statistical analysis. Ann Emerg Med. 1983;12:610-20.
5. Singh O, Gupta SS, Soni M, Moses S, Shukla S,Mathur RK. Collagen dressing versus conventional dressings in burn and chronic wounds: A retrospective study. J Cutan Aesthet Surg. 2011;4:12-6.
6. Ayaz SM, Pai MV, Rai BKS, Bhat RR. Comparative Study between Collagen Dressing and Conventional Vaseline Gauze Dressing in Healing of Donor Site Wound in Split Skin Graft. J Dent Med Sci. 2016;15(10):34-41.
7. Sreekumar NC, Bhandari PL, Praveen N. Comparative study of collagen and paraffin gauze dressing on skin graft donor site. Indian J Burns 2015;23:81-3.
8. Pontén B, Nordgaard JO. The use of collagen film (Cutycol) as a dressing for donor areas in split skin grafting. Scand J Plast Reconstr Surg. 1976;10:237-40.
9. Horch RE, Stark GB. Comparison of the effect of a collagen dressing and a polyurethane dressing on the healing of split thickness skin graft (STSG) donor sites. Scand J Plast Reconstr Surg Hand Surg. 1998;32:407-13.
10. Fernandes de Carvalho V, Paggiaro AO, Isaac C, Gringlas J, Ferreira MC. Clinical trial comparing 3 different wound dressings for the management of partial-thickness skin graft donor sites. J Wound Ostomy Continence Nurs. 2011;38:643-7.

Cite this article as: Dave TJ, Shashirekha CA, Krishnaprasad K. A retrospective study of comparison of collagen dressing versus conventional dressing for skin graft donor site. Int Surg J 2021;8:1730-3.