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Original Research Article

Outcome of Placental Extract Dressing versus Collagen Sheet Dressing for Partial Thickness Burns: A Comparative Study

Siva Mandadap[1], Sharanabasavaraj Javali[2]

[1]Assistant Professor, Department of General Surgery, Vydehi Institute of Medical Sciences, Bangalore, Karnataka

[2]Associate Professor, Department of General Surgery, Vydehi Institute of Medical Sciences, Bangalore, Karnataka

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Corresponding author: Dr. Sharanabasavaraj Javali

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Abstract

Introduction: Burns are major morbid health issues with complex pathophysiology. Topical management of burns is a challenging task for surgeon. Effective topical agent should have less duration of healing, less duration of hospitalization, pain reduction, better scar formation and less incidence of infection properties. The present study designed to assess placental extract dressing on collagen sheet dressing for partial thickness burns.

Material and Methods: Seventy-six cases attended with partial thickness burns (<40%) under 55 years of age were recruited. Cases were randomly divided into two study groups i.e. group P treated with placental extract gel and group C treated with collagen dressing. Parameters like duration of wound healing, texture of healed area, contour of healed area and duration of hospital stay were assessed.

Results: The duration of healing was 25.31 days and 20.28 days and duration of hospital stay was 18.22 days and 13.65 days in group C and Group P respectively. This difference between two study groups was statistically significant ($p<0.05$). Infection after treatment was observed more in cases of group C (71.05%) than cases of group P (31.57%).

Conclusion: Placental gel extract has superior efficacy in terms of less duration of healing time, less duration of hospital stays and less incidence of infection.

Keywords: Partial thickness burns, Placental extract gel, Collagen dressing, Efficacy, Infection

Introduction

Burn injuries are major public health burden in many developing countries like India. WHO reported over 180000 deaths every year reportedly due to burn injuries worldwide [1-3]. In India, the estimated annual incidence of burn injuries was approximately 6-7 million [4]. Burn injuries cause retardation of normal skin barrier and disable several anti-infection defensive properties [5,6]. Healing of burn injuries was interspersed by excess inflammation that delaying the healing and enhance pain [7]. In addition, formation of scar tissue, incomplete reepithelialization, and absence of collagen remodeling are influencing healing of burn injuries [8].

Negligence or irrelevant management process may instigate severe complications like infection, or loss of skin, which spread into adjacent tissue and even to entire organ [9].

Partial thickness burns can be successfully managed by maintaining moist wound bed,

sufficient vascular supply and infection control [10].

Several dressing methods and extracts are available in the management. Placental extract dressings successfully stimulate the migration of keratinocytes and lining epithelium, also improve neurovascularization and promote the effective wound healing [11]. Placental extracts also considered as treasure house for biologically active compounds due to its anti-inflammatory, analgesic and wound healing property [12]. Collagen is a constituent of dermal matrix generated by fibroblasts, which protects migrating epithelial cells in the developing skin. Several studies have been reported that collagen sheet facilitates fewer complications, less infection, early recovery and infection [13]. Collagen based dressing is extensively used method in India. With limited availability of literature, the present study was designed to assess the efficacy of placental extract dressing versus collagen sheet dressing for less than 40% partial thickness burns.

Materials and Methods

The present prospective study was conducted in the Department of General surgery at vydehi institute of medical sciences and research centre, Bangalore during January 2021 to April 2022. A total of 76 cases attended emergency department with partial thickness burns below 55 years of age fulfilling inclusion criteria were recruited. Cases attended emergency department with fresh burns, burns without infection and burns with <40% total body surface area involvement were included. Cases above 55 years of age, burns with >40% total body surface area, burns presenting with infection, burns presenting more than 24 hours, systemic complications and not willing to participate in the study were excluded. Written informed consent was obtained from all the participants and guardians (if age <18 years). The study protocol was approved by institutional ethics committee.

Study participants were randomly divided into two study groups i.e. group P treated with placental extract gel and group C treated with collagen dressing. Before undergoing study procedure, burns were cleaned thoroughly with antiseptic solution. Placental extract gel was applied over the burns of group P cases and collagen sheets were applied burns of group C cases. Cases were followed to observe the side effects of dressing and complications on day 1, 3, 5, 7, 14 and 30. Parameters like duration of wound healing, texture of healed area, contour of healed area and duration of hospital stay were recorded. Data was analyzed by using SPSS version 23.0. Categorical variables were analyzed and present in frequency and percentage using descriptive statistics. Association analysis was conducted using chi-square test, fishers' exact test. $P<0.05$ was considered as statistically significant result.

Results

Table 1: Demographic details of study participants

Demographic variables	Group P (n=38)	Group C (n=38)
	Frequency (%)	Frequency (%)
Age (In years)		
1-20	09 (23.68%)	10 (26.32%)
21-40	18 (4.36%)	16 (42.10%)
41-55	11 (28.94%)	12 (31.58%)
Gender		
Male	24 (63.16%)	22 (57.90%)
Female	14 (36.84%)	16 (42.10%)
Occupation		
Industrial worker	20 (52.63%)	24 (63.16%)

House wives	06 (15.78%)	08 (21.05%)
Skilled workers	05 (13.16%)	03 (7.90%)
Unskilled workers	05 (13.16%)	02 (5.26%)
Professional employees	02 (5.26%)	01 (2.63%)

Table 2: Details of burns among study participants

Sociodemographic variables	Group P (n=38) Frequency (%)	Group C (n=38) Frequency (%)	Chi-square value	p-value
Degree of burns				
First degree	22 (57.90%)	20 (52.63%)	0.438	0.374
Second degree	16 (42.10%)	18 (47.36%)		
Percentage of burns (% of TBSA)				
≤10	01 (2.63%)	-	0.856	0.281
11-15	03 (7.90%)	02 (5.26%)		
15-20	03 (7.92%)	05 (13.16%)		
21-25	05 (13.16%)	09 (23.68%)		
26-30	08 (21.05%)	08 (21.05%)		
31-35	08 (21.05%)	07 (18.42%)		
36-40	10 (26.31%)	07 (18.42%)		
Texture of scar				
Normal	26 (68.42%)	14 (36.84%)	0.482	0.0316
Hard	01 (2.63%)	03 (7.90%)		
Palpable	08 (21.05%)	18 (47.36%)		
Firm	03 (7.90%)	03 (7.90%)		
Contour of scar				
Indented	11 (28.95%)	11 (28.95%)	0.825	0.001
Flushed	23 (60.52%)	19 (50%)		
Hypertrophic	03 (7.90%)	07 (18.42%)		
Keloid	01 (2.63%)	01 (2.63%)		
Details of infection				
Observed	12 (31.57%)	27 (71.05%)	0.742	0.0296
Not observed	26 (68.42%)	11 (28.95%)		
Contracture				
Observed	01 (2.63%)	12 (31.58%)	0.530	0.0324
Not observed	37 (97.36%)	26 (68.42%)		
Associated treatment methods				
Wound debridement	02 (5.26%)	05 (13.16%)	0.892	0.386
Split skin graft	05 (13.16%)	06 (15.78%)		
Fasciotomy	01 (2.63%)	03 (7.90%)		
Tangential excision	-	01 (2.63%)		

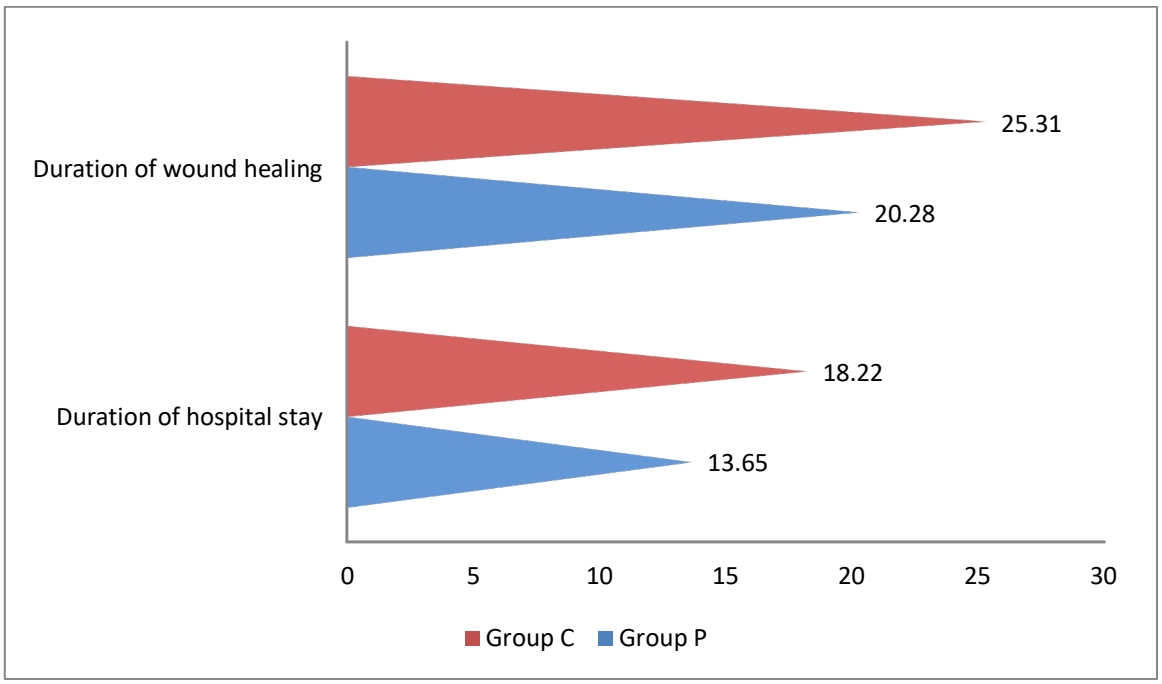

Figure 1: Duration of hospital stay and wound healing in the study participants

Discussion

Burn injuries have major effect on the mental health and quality of life of an individual. Partial thickness burns have the ability of healing with proper management. The present study was designed to evaluate the efficacy of placental extract dressing versus collagen sheet dressing for less than 40% partial thickness burns. Majority participants were above 21 years of age in both study groups. Male participants were common in both study groups. Majority participants were industrial workers (25.63% in group P & 63.16% in group C), followed by house wives (15.78% in group P & 21.05% in group C), skilled workers (13.16% in group P & 7.90% in group C) and unskilled workers (13.16% in group P & 5.26% in group C) (Table 1). A study by Sanjay C *et al*., on efficacy of human placental extract over beta glucan collagen sheets in partial thickness burn patients noticed more male participants than females and majority participants were present within12-24hours after burn injury [12]. First degree burns (57.90% in group P & 52.63% in group C) were commonly noticed than second degree (42.10% in group P & 47.36% in group C). The difference was statistically not significant between the groups (p=0.374). 81.57% of cases had more than 25% of burns in both study groups, which was statistically not significant (p=0.281). Scar due to burns was normal (68.42%) in majority cases of group P and slightly palpable scar (47.36) and normal scar (36.84%) was observed in more cases of group C.

Flushed type scar (60.52% in group P & 50% in group C) was commonly encountered followed by indented type (28.95% in group P & 28.95% in group C), hypertrophic (7.90% in group P & 18.42% in group C) and keloid type (2.63% in group P & 2.63% in group C) in both study groups. The difference of contour of scars between two study groups was statistically significant (p<0.001). Infection after treatment was observed more in cases of group C (71.05%) than cases of group P (31.57%). Contracture was seen in 31.58% of cases in group C and 2.63% cases of group P. The difference of infection and contracture between two study groups was statistically significant (P<0.05). Split skin graft, wound debridement and fasciotomy were commonly associated treatment method in both groups. However, it was

more in group C (p>0.05). A study by Sanjay C *et al*., found similar infection pattern in beta glucan collagen sheets group (24.07%) and human placental extract group (25.59%) [12].

The duration of healing was 25.31 days and 20.28 days and duration of hospital stay was 18.22 days and 13.65 days in group C and Group P respectively. This difference between two study groups was statistically significant (p<0.05). A study by Sanjay C *et al*., reported that the mean healing time and mean duration of hospital stay was 17.4 days & 11.59 days in beta glucan collagen sheets group and 18.27 days & 13.35 days in human placental extract group and the difference was statistically significant between two study groups (p<0.001) [12]. A study Tiwary SK *et al*., observed that cases treated with placental extract cream showed 4% wound healing after eight weeks of initial treatment [13,14]. Similarly, in this study, cases treated with placental extract gel showed less duration of healing and less duration of hospital stay tha collagen dressing group.

A study by Sanjay C *et al*., reported that beta glucan collagen sheets are effective in terms of less duration of hospital stay, less healing time, and less pain score than human placental extract. However, human placental extract was cost effective [12]. Tiwary SK *et al*., concluded that placental extract gel and placental extract cream are effective in the management of chronic non healing wounds. However, placental extract cream has reported less pain and discomfort during dressing change [14]. Chandanwale A *et al*., concluded that purified placental extract and povidone iodine are comparatively effective in the management of surgical wounds [15]. Waghmare M *et al*., on one hundred pediatric burn cases managed with collagen dressing reported good outcome in terms of early recovery with minimal pain and with no side effects [16]. Katkurwar A *et al*., reported that placental gel extract is effective approach with high patient satisfaction rate and faster healing in the management of raw wound area of depigmented gingiva [17]. Mohan KA *et al*., reported that collagen sheet can be prescribed as temporary biological dressing material in partial thickness burns and it has early healing capability and reduces the incidence of infection [18]. Singh O *et al*., reported that collagen sheet dressing was not superior than conventional dressing in terms of healing [19]. Similarly, the present study found placental gel extract has better efficacy than collagen gel dressing in the management of partial thickness burns.

Conclusion

Partial thickness burn injuries can be successfully managed with proper suitable methods. Maintaining adequate circulation, moist wound environment and infection control can improve the successful outcome. The results showed that cases treated with placental gel extract has superior efficacy in terms of less duration of healing time, less duration of hospital stay and less incidence of infection.

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