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ORIGINAL RESEARCH

A study to compare the effect of collagen and paraffin gauze dressing over donor site wound in split skin grafting (SSG) by the rate of epithelialisation

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ABSTRACT
Split skin grafting (SSG) is commonly employed by surgeons for covering skin defects in case of ulcers, deep burns and following trauma. It is still the gold standard to cover large areas of skin loss[4] and is relatively easy to perform. It involves harvesting of the epidermis and upper 1/3rd of dermis resulting in a wound called donor site wound (DSW). The cases are assessed according to the objectives like Rate of Epithelialisation, pain, pruritus, need of analgesia post-operatively. All the patients were explained about the basis of the study and informed consent is obtained. In our study of 70 patients, on post-operative day 7, 61(87.14%) patients showed spotty or scattered epithelialisation, out of which 26(74.29%) from group A & 35(100%) from group B, totally 9(12.86%) patients were infected or showed no epithelialisation, out of which all were from group A and none from group B. None of the patients from both groups show complete epithelialisation. 'p' value is significant in this group.

Key words: Collagen and paraffin gauze dressing, Split Skin Grafting (SSG), rate of epithelialisation

INTRODUCTION

The skin or integument is the largest organ in the human body. The skin constitutes approximately 8% of our total body weight, has a total surface area of 1.5-2.2 m.The thickness of skin varies from 0.5-4.0 mm and depends on age, maturation and regional stress. The skin covers the entire external surface of the body, including the walls of the external acoustic meatus and the lateral tympanic membrane[1].

The main function of skin is to protect body contents from the environment, including pathogens, temperature, and excessive water loss. The other important functions include Insulation, temperature regulation, sensation, immune function, and synthesis of vitamin D[2].

The loss of skin has a direct influence on the various aspects of well-being of the individual including susceptibility to infection, nutrient and electrolyte imbalance, derangements in mobility and economical aspect of life, disfigurements and psychological impacts. So, the restoration of the lost skin is of paramount importance, which can be accomplished by various techniques such as primary closure, healing by secondary intention, split skin grafting, or full thickness skin grafting, or using pedicle or free flaps[3].

Split skin grafting (SSG) is commonly employed by surgeons for covering skin defects in case of ulcers, deep burns and following trauma. It is still the gold standard to cover large areas of skin loss and is relatively easy to perform. It involves harvesting of the epidermis and upper 1/3rd of dermis resulting in a wound called donor site wound (DSW). Common sites for harvesting split skin graft (SSG) are thighs, legs, buttocks, and back[4].

METHODOLOGY

The study was conducted over patients who are admitted in department of general surgery for split skin grafting, during the study period.

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METHOD OF COLLECTION OF DATA

The cases are assessed according to the objectives like Rate of Epithelialisation, pain, pruritus, need of analgesia post-operatively. All the patients were explained about the basis of the study and informed consent is obtained.

The patients are selected based on the following inclusion and exclusion criteria.

STUDY DESIGN: Prospective study.

SAMPLE SIZE: 70 patients of either sex between age group 18 to 65 years undergoing split skin grafting for any reason were divided into two groups of 35 patients each who fulfilled the inclusion and exclusion criteria, according to flow chart mentioned below.

INCLUSION CRITERIA

1. Donor site wound (DSW) after taking split skin graft (SSG) for any indication.
2. Minimum size of donor site wound (DSW) should be 15*10cm.

EXCLUSION CRITERIA

1. Age < 18years and >65years.
2. Patients who are not candidates for split skin grafting for any reason.
3. Patients who may require a combination of grafts i.e. split-thickness + full-thickness grafts.
4. Size of donor site wound less than 15 * 10cm.
5. Patient refusal.
6. Morbid illness interfering with healing like:

a) Immuno-compromised state.
b) Malignancy, local irradiation.
c) Uncontrolled diabetes mellitus.
d) Collagen vascular disease.
e) Severe anaemia and hypo-proteinaemia.

7. Hypersensitivity to collagen.

The patients fulfilling these criteria are selected and assessed with pre-formed questionnaire and clinical examination. The following investigations are carried out in each of the patients.

1. Routine haematological and pre-operative investigations including blood counts and haemoglobin level.
2. Serum albumin levels.
3. Hba1c levels.
4. HIV and HbsAg.

The serum albumin and blood haemoglobin level were carried out using the standard techniques available in the hospital laboratory.

All the wounds were prepared pre-operatively for grafting. This included debridement, administration of antibiotics, regular dressings till the wound is covered with healthy granulation tissue.

RESULTS

In our study of 70 patients, age ranging from 18 years to 65 years. The highest incidence of cases from group A was in the age group 48-57 years, which included 37.14% of the study participants followed by age group of 28-37years and the highest incidence of cases from group B was in the age group 58-65 years, which included 31.43% of the study participants followed by age group of 28-37years with the mean age in group A and group B being 44.26 and 43.86 respectively.

Table 1: comparison of cases and controls by Age groups

Age groups	Group A	%	Group B	%	Total	%
18-27yrs	2	5.71	7	20.00	9	12.86
28-37yrs	9	25.71	8	22.86	17	24.29
38-47yrs	8	22.86	4	11.43	12	17.14
48-57yrs	13	37.14	5	14.29	18	25.71
58-65yrs	3	8.57	11	31.43	14	20.00
Total	35	100.00	35	100.00	70	100.00
Chi-square=12.297 P = 0.0150*						

Table 2: Comparison of group A and group B by mean age

Groups	n	Mean	SD	SE	t-value	P-value
Group A	35	44.26	11.44	1.93	0.1202	0.9047
Group B	35	43.86	16.02	2.71		

Out of 70 patients, 57 (81.43%) patients were males and 13(18.57%) were female among which 29(82.86%) & 6(17.14%) patients were male & female, 28(80.00%) & 7(20.00%) patients were male & female in group A& group B respectively. i.e. our study shows male preponderance of undergoing split skin grafting for any conditions. The p value for gender distribution in our study comes out to be 0.7592 which is statistically insignificant.

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Table 3: Gender distribution of the study participants

Gender	Group A	%	Group B	%	Total	%
Male	29	82.86	28	80.00	57	81.43
Female	6	17.14	7	20.00	13	18.57
Total	35	100.00	35	100.00	70	100.00
Chi-square=0.0941 P = 0.7592						

In our study of 70patients, 15 patients (21.43%) had hypertension with 9 & 6 among group A & B respectively and 9 patients (12.86%) had both diabetes and hypertension 3&6 among group A & B respectively. Diabetes and hypertension was the most common co-morbidity present in our study population. Out of 35 patients in each group patient with diabetes and hypertension in group B had better outcome in all objectives compared to group A. The rest 46 patients (65.71%) in the study population had no associated co-morbidities.

Table 4: Comparison of Group A and Group B with presence of co-morbidities

Co-morbidities	Group A	%	Group B	%	Total	%
Hypertension	9	25.71	6	17.14	15	21.43
Diabetic and hypertension	3	8.57	6	17.14	9	12.86
No comorbidity	23	65.71	23	65.71	46	65.71
Total	35	100.00	35	100.00	70	100.00
Chi-square=1.600 P = 0.4490						

In our study of 70 patients, on post-operative day 7, 61(87.14%) patients showed spotty or scattered epithelialisation, out of which 26(74.29%) from group A & 35(100%) from group B, totally 9(12.86%) patients were infected or showed no epithelialisation, out of which all were from group A and none from group B. None of the patients from both groups show complete epithelialisation. 'p' value is significant in this group.

On post-operative day 21, none of the cases from both the groups shows infection or no epithelialisation, among 70 cases, 60(85.71%) showed complete epithelialisation, out of which 25(71.43%) from group A & 35(85.71%) from group B, totally 10(14.29%) patients showed spotty or scattered epithelialisation only from group A and none from group B.

On 3rd month, except one case in group A showing spotty or scattered epithelium all cases showed complete epithelialisation(>75%).

In our study among 70 patients, on postoperative day 7-rate of epithelialisation is faster among group B(collagen) compared to group A(paraffin gauze), none of them showing complete epithelialisation. On postoperative day 21-most of the cases showed complete epithelialisation in group B compared to group A with some scanty epithelialisation. On 3rd postoperative month both groups didn't have any patients with infection or no epithelialisation, most of them showed complete epithelialisation except for one patient in group A.

Table 5: Comparison of Group A and Group B with Rate of epithelisation at different time points

Rate of epithelisation	Group A	%	Group B	%	Total	%
Post OP Day 7						
Complete	0	0.00	0	0.00	0	0.00
Spotty or scattered	26	74.29	35	100.00	61	87.14
Infected or No	9	25.71	0	0.00	9	12.86
Chi-squarewith Yates's correction =8.1600P = 0.0040*						
Post OP Day 21						
Complete	25	71.43	35	100.00	60	85.71
Spotty or scattered	10	28.57	0	0.00	10	14.29
Infected or No	0	0.00	0	0.00	0	0.00
Chi-square= 11.6670P = 0.0010*						
3 months						
Complete	34	97.14	35	100.00	69	98.57
Spotty or scattered	1	2.86	0	0.00	1	1.43
Infected or No	0	0.00	0	0.00	0	0.00
Chi-squarewith Yates's correction =0.000P = 1.000						
Total	35	100.00	35	100.00	70	100.00
B/W Day 7 vs Day 21	Z=5.0862, p=0.0001*		Z=5.1594, p=0.0001*			
B/W Day 7 vs 3 months	Z=5.0862, p=0.0001*		Z=5.1594, p=0.0001*			

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B/W Day 21 vs 3 months	Z=-2.6656, p=0.0077*	Z=-0.0001, p=1.0000		

*p<0.05, Z→ Wilcoxon matched pairs test.

DISCUSSION

46 out of 70 patients (65.7%) didn't have any co-morbidities. 15 patients (21.43%) had Hypertension and 9 patients (12.86%) had both diabetes and hypertension. Diabetes and Hypertension was the most common co-morbidity present in the study population.

AGE AND DONOR SITE WOUND DRESSING

The study population had patients ranging from 18 years to 65 years. The mean age was 44.06 years. There was no statistically significant correlation between age and the donor sitewound assessment, and the p value was 0.9047.

PRESENCE OF CO MORBIDITIES AND THE DONOR SITE WOUND DRESSING

The study participants without any co morbid conditions (without diabetes or hypertension) had similar results that of patients with co-morbidities i.e. collagen dressing shows better results than paraffin gauze dressing.

Diabetes and Hypertension was the most common co morbidity present in the study population, though, non-diabetics had a better result than diabetics, but relationship was not statistically significant. patients with diabetes and hypertension has good outcome in group B compared to group A with early Rate of epithelialisation, less pain, less pruritus and less need of analgesia with statistically significant relationship.

RATE OF EPITHELIALISATION[5-8]

Horch *et al*. study of Comparison between collagen dressing and polyurethane showed that collagen was superior in reducing the discomfort and increasing healing.

Narayanathu *et al.* study of comparison between collagen dressing and paraffin gauze showed minimal effect on the rate of epithelialisation.

Syed Mahmood Ayaz *et al.*study also shows that collagen is better than paraffin gauze dressing in relation to early wound healing and patient comfort.

In our study of comparison between collagen dressing and paraffin gauze dressing showed that collagen was superior in promoting early epithelialisation and increased healing.

CONCLUSION

- The mean age of the participants in the study is 44.06 years, with the highest incidence of cases between the age groups 48-57 years.
- Among the study population, 81.43% were male and 18.57% were females.
- The Rate of epithelialisation is faster in collagen dressing without infection.

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