

The Observational Study of Relation Between Different Factors in Split Skin Grafting in Rural Hospital



Medical Science

KEYWORDS : Split grafting, Ulcer, Haemoglobin, serum protein, Hospital Stay

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ABSTRACT

Introduction: The split-thickness skin grafting (STSG) is the most common performed procedures to close defects unable to be closed with the simple approximation of the wound edges. The Present study is designed in such a fashion to find the factors which are responsible for acceptance and rejection of skin graftin rural setup.

Objective: To evaluate the relation between different preoperative, intra-operative and post operative factors in Split skin grafting Procedure. Methods: Specialdesigned performa was used to collect data for split skin grafting patients. The data were expressed in number and percentage.

Results: The present study evaluates the 200 patients of Split skin grafting and assesses the factors which are responsible for graft acceptance . For Male patients, the values of Hb% were not statistically associated with graft acceptance ($p > 0.5$). Among female patients graft acceptance was least [i.e. 5(45.5%)] for the group of patients with Hb < 8 gm%. In a patient with serum protein ≤ 4 gm% graft was partially accepted. In group of patients in whom grafts stabilisation was done with stapler percentage of patients in whom graft was accepted was least i.e. in 13(62%) patients. The graft acceptance was maximum in group of patients who were immobilized up to post operative day 2 i.e. 29(93.5%). The only patient in whom graft was rejected was in group in which soackage was present on post operative day 7 which had swab positive for pseudomonas. In patients having hospital stay of 1-2 wks, 2-3 wks and 3-4 wks the graft was accepted in 11(78.6%), 37(92.5%) and 37(86%) patients respectively.

Conclusion: The present study concluded that the haemoglobin level and mode of anesthesia was not associated with graft acceptance while serum protein was associated with graft acceptance.

INTRODUCTION:

Ulcer is characterized by progressive destruction of surface epithelium and healing by formation of granulation tissue at base.¹ Lower limb ulcers are important clinical conditions which are often difficult to treat. Ulcers represent wide spectrum of etiology and pathology. Severity and morbidity associated with it leads to significant loss of work. Lower-extremity ulceration is a debilitating phenomenon not only affecting the patient directly but having a great impact on the economy, since a significant amount of resources are spent every year to treat, prevent, or decelerate the progression of the disease. Studies carried out earlier found that chronic leg ulceration affects about 1% of the population at some point in their lives.²

The split-thickness skin grafting (STSG) is the most common performed procedures to close defects unable to be closed with the simple approximation of the wound edges. The healing of a STSG donor site involves re-epithelialization from the epithelial appendages that are embedded in the dermis and subcutaneous fat. Skin grafts are used to heal a gap in the skin. When a wound heals first time without any delay it is known as primary healing, but when it is left to heal by itself this is known as secondary healing. A skin graft is one way of achieving primary healing or closing a wound which has failed to heal by secondary healing.

Ulceration is more common in aging population. The main causes are trauma, infections, and diabetes and lower limb venous and arterial diseases. The prevalence of lower-extremity ulceration is 0.18 to 2%, and in patients over 65 years of age, it is up to 5%³. The Present study is designed in such a fashion to find the factors which are responsible for acceptance and rejection

of skin graft. This study also deals with effect of intra operative techniques and post operative management in getting good graft acceptance. Hence ultimately this study can help us to gain better quality of skin grafting and minimize complications associated with it.

OBJECTIVE:

To assess the relation between different factors in Split skin grafting Procedure

MATERIAL AND METHODS:

Necessary approval from the Institutional Ethics Committee was obtained before initiating the study.

Study site

The Study conducted at the department of Surgery, Swami Ramanand Teerth G.M.C Ambajogai.

Study design

Prospective Observational study

Sample size: 200 Sample

Study Methods

Data regarding the name, age, sex, education, occupation address, chief complaint, treatment history before admission for present complaint, history regarding the mode of onset of disease, past medical and surgical history, personal history was collected from patient and accompanying relatives.

Split skin grafting:-

It was done for ulcer having large size (in most of the cases with ul-

cer area more than 5 cm²), Grafting used in our study was delayed primary grafting, which was done on ulcer which initially derided thoroughly and waited till healthy granulation tissue appeared.

This study included ulcers with different etiologies.

Statistical Analysis:

Data was analyzed using percentage, chi square test, Fisher exact test and ANOVA with the help of OPEN EPI version 2.3 and EPI INFO 7.0 statistical software.

RESULTS

Haemoglobin % and graft acceptance:

For male gender percentage of patients in whom graft was accepted was nearly same in various groups according to Hb %. For male gender groups Hb gm% was not statistically associated with graft acceptance. ($p>0.5$). Among female patients with Hb <8 gm% graft was accepted in least number of patients i.e. 5(45.5%). (Table 1)

Total serum protein and graft acceptance:

The above table shows the number of graft accepted in different groups of serum protein levels. In a patient with serum protein ≤ 4 gm% graft was partially accepted. Graft was accepted in group of patients with serum protein >6 gm% (91.5%) followed by group of patients with serum protein 4.1-5 gm% (86.2%) and group of patients with serum protein 5.1-6 gm% (82.5%).(Fig 1)

Technique of graft stabilisation and graft acceptance

In group of patients in whom grafts stabilisation was done with stapler percentage of patients in whom graft was accepted was least i.e. in 13(62%) patients. while patients in whom graft was not stabilised with suture or stapler percentage of patients in whom graft was accepted was 13(62%) and 62(90%) patients respectively. Rejection of graft was seen in 1(1%), 1(0.5%) and 1(2%) patients in group of patients in whom graft was stabilised with suture, stapler and in group with no stabilisation of graft respectively. (Table2)

Immobilisation and graft acceptance

For statistical purpose patients were grouped into group of early mobilization (<2 days) and group of late mobilization (>2 days). According to percentage of graft acceptance patients were grouped into group of >80% graft acceptance and group of <80% graft acceptance. In this study we found graft acceptance was maximum in group of patients who were immobilized up to post operative day 2 i.e. 29(93.5%). (Table 3)

Bacterail colonisation and graft acceptance

The above table shows the distribution of graft acceptance in different grafts with swab positive for different microbacteria. The only patient in whom graft was rejected was in group in which soakage was present on post operative day 7 which had swab positive for pseudomonas. While in group of patients with swab positive for staphalococci, psuedomonas, klebsiella and E-coli graft was accepted in 09(69.2%), 06(75%), 02(40%) and 03(100%) patients respectively. In group of patients with no soakage and swab with nil report the graft was accepted in 129(87.2%) and 21(91.3%) patients respectively. (Fig 2)

Relation between Graph acceptance & rejection and Hospital stay

The above table shows the graft acceptance in patients having different groups of hospital stay. In patients having hospital stay of 1-2 wks, 2-3 wks and 3-4 wks the graft was accepted in 11(78.6%), 37(92.5%) and 37(86%) patients respectively. While in patients having hospital stay of stay 4-5 wks, 5-6 wks and >6 wks the graft was accepted in 32(86.5%), 19(90.4%) and 34(75.6%) patients respectively. For statistical purpose when hospital stay was grouped in two groups < 4 wks and >4 wks, hospital stay

was found to be statistically associated with graft acceptance ($p<0.05$). (Fig 3)

DISCUSSION:

The Present study evaluates graft acceptance in patients in different groups of hemoglobin %. In male patients there is no much difference in % of patients having graft accepted which was proved statistically. But in female patient's only 45.5% patients had graft accepted who had hemoglobin less than 8 gm%. Female patients who had hemoglobin between 10.1 to 11 gm%, 75% graft's accepted. But in this there were only 8 patients of which 6 had graft accepted and 2 had partial acceptance. The study conducted by Pawan Agarwal et al, in their study of Evaluation of wound healing in the form of split thickness skin graft take was done in 35 normovolaemic anaemic patients (haemoglobin level of < 10 gm/ dl) and compared with control group (patients with haemoglobin level of 10 or > 10 gm/ dl). They concluded, it is not mandatory to keep hemoglobin level at or >10 g/dL or PCV value at or >30% for skin graft take, as mild to moderate anaemia per se does not cause any deleterious effect on wound healing; provided perfusion is maintained by adequate circulatory volume.

The Present study also showed the relation of serum protein level and graft acceptance. There was only one patient who had serum protein less than 4.1 gm% whose graft was partially accepted. Patients with serum protein more than 6 gm% had maximum percentage of patients whose grafts were accepted i.e.91.5%. Similar study has been evaluated by Agarwal et al⁴ in 2009 compared mean serum protein in the study group was 4.68 gm% with mean serum albumin and globulin was 2.5 gm% and 2.1 gm%. In the control group, mean serum protein was 6.1gm% with serum albumin and serum globulin level 3.6 gm% and 2.5 gm% respectively. Graft take was almost in equal proportion in study and control group.

The Present study showed the effect of graft stabilization technique on graft acceptance %. In group of patients in whom grafts stabilisation was done with stapler, percentage of patients in whom graft was accepted was least i.e. in 13(62%) patients. while patients in whom graft was not stabilised with suture or stapler, percentage of patients in whom graft was accepted was 13(62%) and 62(90%) patients respectively. We observed that patients in who grafts were stabilized with stapler or suture had sloughing or necrosis of graft edges. Even at the time of removal of these materials the graft edges found to be not adhered to the graft bed hence graft acceptance % of grafts of these patients decreased. The study by Coupland⁵ RM et al retrospectively studied reviews of 45 skin flap operations and found that 20.60,0 of sutured flaps are complicated by partial necrosis or slow healing. These complications occurred in 62.5% of stapled flaps.

The Present study also evaluated the effect of period of immobilization on graft acceptance. We found highest percentage of patients whose graft was accepted was mobilized on post operative day 2 i.e.93.5%. While patients who were mobilized on post operative day 3, 4, 5 and 6 had comparable % of patients i.e. 80, 83.9, 80, and 85.65% respectively in who graft was accepted. Total 3 patients in whom grafts were rejected were immobilized i.e. 1 patient till day 1 and 2 patient's till day 5. According to Luczak B, et al⁶ there is an increasing trend towards early mobilization post-split skin grafting of the lower limb. A retrospective review of 48 cases of lower limb split skin grafts performed by the plastic surgery department at Royal Perth Hospital was undertaken. Patients were stratified into early and late mobilization groups. They found No difference in outcome with early mobilization, but an increased rate of deconditioning with increased length of stay was present with late mobilization. Traditionally surgeons prefer to immobilize the postoperative grafted patients but Southwell-Keely J et al⁷ (mobilization) found no dif-

ference in the healing of split skin grafts to pretibial lacerations in patients managed with early mobilization compared to patients managed with postoperative bed rest. There is insufficient data in the published surgical literature to assess whether or not permitting early mobilization spared the patient from reduced post-operative mobility. Early mobilization was not associated with an increased incidence of haematoma, bleeding complications, infection, or delayed donor site healing when compared with bed rest. Deep vein thrombosis, pulmonary embolism, and chest infection were not noted to have occurred more frequently in either treatment group.

The Present study assessed the deals with bacterial colonization and graft acceptance. We studied post operative swab of graft with soakage on post operative day 5. The only patient in whom graft was rejected was in group in which soakage was present on post operative day 7 had swab positive for pseudomonas. While in group of patients with swab positive for staphylococci, psuedomonas, klebsiella and E-coli graft was accepted in 09(69.2%), 06(75%), 02(40%) and 03(100%) patients respectively. Høgsberg T et al⁸ conducted retrospective study of consecutive patients who underwent meshed split-thickness skin grafting for chronic venous leg ulcers. The analysis revealed that only 33.3% of ulcers with P. aeruginosa, isolated at least once from 12 weeks prior, to or during surgery, were healed (98% or more) by week 12 follow-up, while 73.1% of ulcers without P. aeruginosa were so by the same time. This study supports hypothesis that P. aeruginosa in chronic venous leg ulcers, despite treatment, has considerable impact on partial take or rejection of split thickness skin grafts. GILLILAND El et al⁹ in their analysis of the immediate preoperative swab results suggested that it is S. aureus and Pseudomonas.

We also evaluated the effect of hospital stay over graft acceptance. The grafts accepted in patients having hospital stay 1-2 wk, 2-3 wk and 3-4 wk were 11(78.6%), 37(92.5%) and 37(86%) respectively. While grafts accepted in patients having hospital stay 4-5 wk, 5-6 wk and >6 wk were 32(86.5%), 19(90.4%) and 34(75.6%) respectively. The three patients in whom grafts were rejected all had hospital stay > 4 wks i.e. 1 month. For statistical purpose when hospital stay was grouped in two groups < 4 wks and >4 wks, hospital stay was found statistically associated with graft acceptance (p<0.05. Hospital stay may not be directly related to graft acceptance but due to other confounding factors.

CONCLUSION:

The hemoglobin level was not associated with graft acceptance until significant derangement in peripheral circulation was seen. The level of serum protein was not associated with graft acceptance when serum protein grouped in two groups <4 gm% and >4 gm%. Bacterial colonization was affecting the graft acceptance and graft rejection was more with pseudomonas. Many factors like amount of colonization, type of bacteria and virulence of organism may be associated with graft acceptance which needs to be individually evaluated.

Table 1 Shows: Hemoglobin % and graft acceptatnce

	HB (gm %)	NO OF PATIENTS IN DIFFERENT GROUP OF GRAFT ACCEPTANCE %			
		REJECTED (0-20 %)	PARTIALLY AC-CEPTED (21-80%)	ACCEPT-ED (>80%)	TOTAL
Males	<8	00	02(14.3%)	12(85.7%)	14(100%)
	8.1-9	01(1.8%)	08(13.6%)	49(84.4%)	58(100%)
	9.1-10	01(2.6%)	04(10.5%)	33(86.9%)	38(100%)
	10.1-11	00	03(20%)	12(80%)	15(100%)
	>11.1	00	01(14.3%)	06(85.7%)	07(100%)

	HB (gm %)	NO OF PATIENTS IN DIFFERENT GROUP OF GRAFT ACCEPTANCE %			
		REJECTED (0-20 %)	PARTIALLY AC-CEPTED (21-80%)	ACCEPT-ED (>80%)	TOTAL
Females	<8	00	06(54.5%)	05(45.5%)	11(100%)
	8.1-9	01(4.75%)	01(4.75%)	19(90.5%)	21(100%)
	9.1-10	00	00	25(100%)	25(100%)
	10.1-11	00	02(25%)	06(75%)	08(100%)
	>11.1	00	00	03(100%)	03(100%)

Fig 1 Shows: Total serum protein and graft acceptance

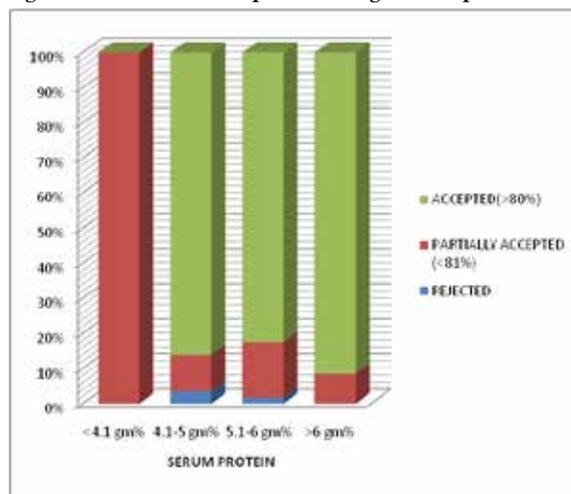


Table 2 shows: Technique of graft stabilisation and graft acceptatnce

Stabilisation of graft	No of patients in different group of graft acceptance %			
	Rejected (0-20 %)	Partially accepted (21-80%)	Accepted (>80%)	Total
Suture	01(1%)	14(13%)	95 (86%)	110(100%)
Stapler	01(05%)	7(33%)	13(62%)	21(100%)
No stabilisation	01(02%)	6(8%)	62(90%)	69(100%)

Table 3 Shows: Immobilisation and graft acceptatnce

Days of immobilisation	No of patients in different group of graft acceptance %			
	Rejected (0-20 %)	Partially accepted (21-80%)	Accepted (>80%)	Total
1	01(1.5%)	07(11%)	56(87.5%)	64(100%)
2	00	02(6.5%)	29(93.5%)	31(100%)
3	00	05(20%)	20(80%)	25(100%)
4	00	05(13.1%)	26(83.9%)	31(100%)
5	02(6.7%)	04(13.3%)	24(80%)	30(100%)
6	00	02(14.35)	12(85.65%)	14(100%)
7	00	02(40%)	03(60%)	5(100%)

Fig 2 Shows: Bacterail colonisation and graft acceptance

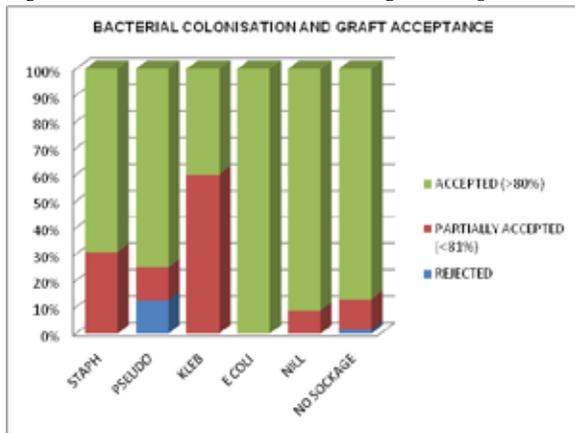


Fig 3 Shows: Relation between Graph acceptance and Hospital stay



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