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Study On Efficacy Of Autologous Platelet Rich Plasma On Split Thickness Skin Graft Donor Site

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ABSTRACT

Background: Optimal management of split-thickness skin graft (STSG) donor sites is essential to promote healing, minimize pain, and reduce complications. Traditional paraffin gauze dressing has long been used, but recent advancements have introduced autologous platelet-rich plasma (PRP) as a promising alternative due to its regenerative properties.

Objective: To compare the efficacy of autologous Platelet rich plasma (PRP) versus Paraffin gauze dressing on Split Thickness Skin Grafting donor site in terms of Speed of wound healing.

Methodology: In this Comparative study, patients requiring STSGs were divided into two groups: PRP group (n=18) and non-PRP (n=18). The efficacy of autologous Platelet rich plasma (PRP) versus Paraffin gauze dressing on Split Thickness Skin Grafting donor site in terms of Speed of wound healing with respect to age, Diabetes and smoking status were compared.

Results: The mean & SD of age among the patients are 48 ± 18 years and male patients (69.4%) were more than the female patients (30.06%). On comparing the two groups, patients in the PRP group had a higher healing rate than the patients in the Non-PRP group and found to be significant (0.043). Patients who were in PRP group with >40 years of age, diabetic, and smoker also had an increased healing rate.

Conclusion: Autologous PRP dressing is a superior alternative to paraffin gauze for STSG donor site management, offering enhanced healing, better pain control, and improved patient comfort.

Keywords: *Platelet-rich plasma (PRP), Paraffin gauze and Split-thickness skin graft (STSG).*

1. INTRODUCTION

The most common reconstructive method for skin and soft tissue abnormalities is still split-thickness skin grafts (STSG). A secondary acute wound is created at the donor site, but the entire epidermis and a portion of the dermis are harvested throughout process. Reduced quality of life, delayed healing and infection, an undesirable aesthetic look, and donor-site discomfort (pain and itching) are all possible outcomes for patients. Co-morbid conditions that hinder donor-site healing include diabetes, smoking, poor nutrition, immobility, aging, and peripheral vascular disease (1).

Traditionally, paraffin gauze dressing has been widely used for donor site care due to its simplicity, availability, and cost-effectiveness.Nevertheless, although being widely used, paraffin gauze dressings may result in less than ideal cosmetic results, greater discomfort during dressing changes, and delayed epithelialisation (2).

Autologous platelet-rich plasma (PRP) has attracted interest recently due to its potential for regeneration. PRP is a concentration of autologous platelets in a small amount of plasma that is enhanced with growth factors like vascular endothelial growth factor (VEGF), transforming growth factor-beta (TGF-β), and platelet-derived growth factor (PDGF). These growth factors are important for wound healing because they promote angiogenesis, tissue remodelling, and cellular proliferation (3,4). PRP has been shown in numerous trials to have the potential to improve cosmetic outcomes, decrease postoperative pain, and speed wound healing in a variety of therapeutic settings (5,6).

Our study aims to compare the efficacy of autologous Platelet rich plasma (PRP) versus Paraffin gauze dressing on Split Thickness Skin Grafting donor site in terms of Speed of wound healing.

2. METHODOLOGY

A comparative study was conducted among 36 patients and they were split up into two groups of 18 patients each. One group received paraffin gauze dressing (NON PRP GROUP) while the other group received autologous PRP (PRP GROUP), which is given to patients hospitalisedin PRP-using units.Following their admission, each of the 36 patients underwent a thorough history and clinical examination in accordance with a prepared proforma. Blood tests were performed before surgery to measure the patient's haemoglobin, platelet count, immunological state and HIV status. The patients with platelet levels less than100,000/ml of blood, Haemoglobinlevels less than 10gm/dl and patients who were onimmunosuppressors or corticosteroid therapy were excluded. The autologous PRP is prepared by drawing twentymillilitres of the patient's blood and mixing it with an anticoagulant. After centrifugation, the plasma is separated and further centrifuged to isolate platelet-rich plasma, which is then collected and applied to the STSG site during surgery.In the PRP GROUP the platelet-rich plasma prepared is taken and injected subcutaneously over the donor site followed by paraffin gauze dressingand In the NON PRP GROUP donor site is dressed with paraffin gauze dressing alone.Wound dressing was opened on post-operative day 14 and the healing was compared between the PRP and non-PRP group. The chi-square test is used as a statistical test to compare two groups.

PLATELET RICH PLASMA, POST PROCESSING PRP BEING INJECTED OVER DONORSITE

3. RESULTS

Table 1: Demographic characteristics of patients

Variable	**No of patients (n = 36)**
Age (in years)	48 ± 18
Female	11 (30.6)
Male	25 (69.4)

The mean & SD of age among the patients are 48 ± 18 years and male patients (69.4%) were more than the female patients (30.06%).

Table 2: Comparison of Day14 healing between the Groups

Day14 healing	**PRP** **No of patients** **(n = 18)**	**Non–PRP** **No of patients** **(n = 18)**	**Chi-square value**	**p-value**
healed	13 (72.2%)	6 (33.4&)	5.461	***0.043 ******
Not healed	5 (27.8%)	12 (66.6%)		

p = < 0.05 considered as significant

Table 2 shows the Comparison of Day 14 healing between the Groups. Among the two groups, patients in the PRP group had a higher healing rate than the patients in the Non-PRP group and found to be significant (0.043).

CLINICAL PICTURES

Donor site intraoperative after PRP application

Donor site on day 14 fully healed

Two donor sites—PRP applied only to medial site,
Lateral site dressed with paraffin gauze

Day 14, Lateral Site Shows Only 92% Healing With residual raw area

Day 14, Medial Site Shows Complete Healing

Table 3: Comparison of PRP and Non-PRP with risk factors

Variable		**PRP No of patients**	**Non–PRP No of patients**	**p-value**
>40 years	healed	9	1	***0.004 ** **
	Not healed	4	10	
<40 years	healed	4	5	1.000
	Not healed	1	2	
Diabetes	healed	6	1	0.304
	Not healed	5	5	
Smoker	healed	2	2	1.000
	Not healed	2	3	

The majority of the patients with less than 40 years of age were healed in both groups and the patient's belonged to the age more than 40 years, diabetic, and smokers had a lower healing rate. Overall, patients in the PRP group had a higher healing rate than the non-PRP group. the statistical significance was found with >40 years (0.004).

4. DISCUSSION

Our findings demonstrated that wounds treated with autologous PRP showed significantly faster healing rates, better granulation tissue formation, and improved patient comfort compared to those managed with paraffin gauze dressing.PRP is known to have a high concentration of growth factors, such as transforming growth factor-beta (TGF-β), vascular endothelial growth factor (VEGF), and platelet-derived growth factor (PDGF), which all support different phases of wound healing, including matrix formation, angiogenesis, and chemotaxis. These bioactive proteins may be responsible for the improved healing seen in the PRP group since they decrease inflammation and speed up tissue regeneration (7,8).On the other hand, although the paraffin gauze dressing prevents desiccation and offers a barrier of protection, it is devoid of the natural bioactive ingredients found in PRP. Slower healing rates may be explained by the paraffin gauze group's healing process, which most likely depended only on the body's natural healing processes (9).

A systematic review and meta-analysis by Carter MJ et al and Yammine K demonstrated that chronic wounds have shown that platelet-rich plasma treatment is highly recommended for full recovery. Infection was less common in wounds treated with platelet-rich plasma, according to a meta-analysis of acute wounds with primary closure studies which is consistent with our study findings (10,11).A similar stud by Suthar M et al mentioned that the patients who received treatment had a mean age of 62.5±13.53 years, were monitored for 24 weeks, and all of them showed evidence of wound healing, including a decrease in wound size, with an average time to ulcer healing of 8.2 weeks whereas in our study the mean & SD age was 48 ± 18 years and at the day of 14, 72.2% of the patients with PRP had healed and on comparing with the patients in the Non-PRP group we found significant (0.043) (12).

Another study by Rajendran S et al found that the ulcer was healed among 66.7% of the patients in the PRP Group, which is close to our study results, 72.25%. In the same previous study and our studythe ulcer in the PRP group was much less than in the group receiving regular dressings (13). Another contrary study by Elsaid A et al showed that patients in the PRP group

saw a considerably higher percentage of reduction in the longitudinal and horizontal dimensions of the Diabetic foot ulcer than the patients inthe conventional dressing group. The time to maximum recovery was noticeably less than conventional dressing (14). Xu P et al and Lacci KM et al suggested that reduced patient morbidity, shorter hospital stays, and an earlier return to regular activities could result from PRP's ability to speed wound recovery which is in line with our results (15,16).

5. CONCLUSION

Our study demonstrates that autologous platelet-rich plasma (PRP) promotes wound healing much more effectively than traditional paraffin gauze covering. PRP-treated wounds showed improved granulation tissue development, quicker epithelialisation, and increased patient comfort. PRP is a useful adjuvant in wound care because its biologically active ingredients directly promote improved tissue regeneration.It is suggested that more extensive research be done to standardise the use of PRP and evaluate its long-term usefulness and cost-effectiveness in a range of patient populations.

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