

A Comparative Study of Platelet Rich Plasma Dressing with Normal Saline Dressing in Chronic Diabetic Foot Ulcer

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Abstract: Background: Diabetic foot ulcer (DFU) is one of the most serious complications of diabetes mellitus and is associated with delayed wound healing, prolonged hospital stay, infection, and increased risk of lower limb amputation. Platelet Rich Plasma (PRP), an autologous concentration of platelets rich in growth factors, has emerged as a promising adjunctive therapy for enhancing wound healing. Aim: To compare the efficacy of Platelet Rich Plasma dressing with Normal Saline dressing in chronic diabetic foot ulcers. Materials and Methods: This prospective randomized comparative study was conducted in the Department of General Surgery at Saraswathi Institute of Medical Sciences, Hapur. Fifty patients with chronic diabetic foot ulcers were included and randomly divided into two groups of 25 each. Group A received PRP dressing and Group B received normal saline dressing. PRP was prepared by double centrifugation technique and applied topically over the ulcer. Patients were followed weekly for assessment of wound healing for up to 12 weeks. Outcome parameters included wound contraction, duration of healing, hospital stay, and healing status. Results: Patients treated with PRP dressing demonstrated faster wound healing, greater reduction in ulcer size, earlier appearance of healthy granulation tissue, and higher rates of complete healing compared with the normal saline dressing group. Hospital stay was comparatively shorter in the PRP group. Conclusion: PRP dressing is a safe, effective, and economical treatment modality that significantly accelerates healing in chronic diabetic foot ulcers when compared with conventional normal saline dressing.

Keywords: Diabetic foot ulcer, Platelet Rich Plasma, PRP dressing, Normal saline dressing, Chronic ulcer, Wound healing.

1. Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia due to defects in insulin secretion, insulin action, or both. Diabetic foot ulcer (DFU) is among the most common and serious complications of diabetes mellitus and represents a major cause of morbidity, prolonged hospitalization, and lower limb amputation.

The development of diabetic foot ulcers is multifactorial and involves peripheral neuropathy, peripheral arterial disease, impaired immunity, repeated trauma, and delayed wound healing. Chronic hyperglycemia impairs leukocyte function, collagen synthesis, angiogenesis, and tissue regeneration, thereby delaying ulcer healing.

Conventional management of diabetic foot ulcers includes glycemic control, debridement, infection management, pressure offloading, and regular wound dressing. Normal saline dressing is commonly used because of its simplicity and low cost, but healing is often prolonged.

Platelet Rich Plasma (PRP) has recently gained attention as an adjunctive therapy in wound management. PRP is an autologous concentration of platelets containing multiple growth factors such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF). These growth factors enhance angiogenesis, fibroblast proliferation, collagen deposition, and epithelialization, thereby accelerating wound healing.

This study was undertaken to compare the efficacy of PRP dressing with conventional normal saline dressing in chronic diabetic foot ulcers.

2. Aim and Objectives

Aim

To compare the efficacy of Platelet Rich Plasma dressing with Normal Saline dressing in chronic diabetic foot ulcers.

Objectives

- 1) To study the efficacy of Platelet Rich Plasma in healing chronic diabetic foot ulcers.
- 2) To study the efficacy of Normal Saline dressing in healing chronic diabetic foot ulcers.
- 3) To compare wound healing rate, duration of healing, hospital stay, and healing outcome between PRP dressing and Normal Saline dressing.

3. Materials and Methods

Study Design

Prospective randomized comparative study.

Study Setting

Department of General Surgery, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh.

Study Duration [Insert Study Duration]

Sample Size

A total of 50 patients with chronic diabetic foot ulcers were included in the study.

Grouping

- **Group A:** PRP dressing group (25 patients)
- **Group B:** Normal saline dressing group (25 patients)

Inclusion Criteria

- Patients with chronic diabetic foot ulcers.
- Age above 18 years.
- Patients willing to participate and provide informed consent.

Exclusion Criteria

- Patients with malignancy.
- Patients with severe peripheral vascular disease.
- Patients with osteomyelitis.
- Patients with bleeding disorders.
- Patients unwilling to participate.

Procedure

Detailed history, clinical examination, and wound assessment were performed for all patients. Baseline investigations were conducted.

PRP was prepared using the double centrifugation method from autologous blood. After proper wound debridement and aseptic precautions, PRP was applied over the ulcer and covered with sterile dressing.

In the control group, wounds were dressed with normal saline dressing after debridement. Patients were followed weekly for assessment of:

- Wound contraction
- Granulation tissue formation
- Ulcer size reduction
- Time required for healing
- Hospital stay
- Complications

4. Results

A total of 50 patients were included in the study, with 25 patients in each group.

Demographic Profile

Most patients belonged to the middle-aged and elderly population. Male predominance was observed in both groups.

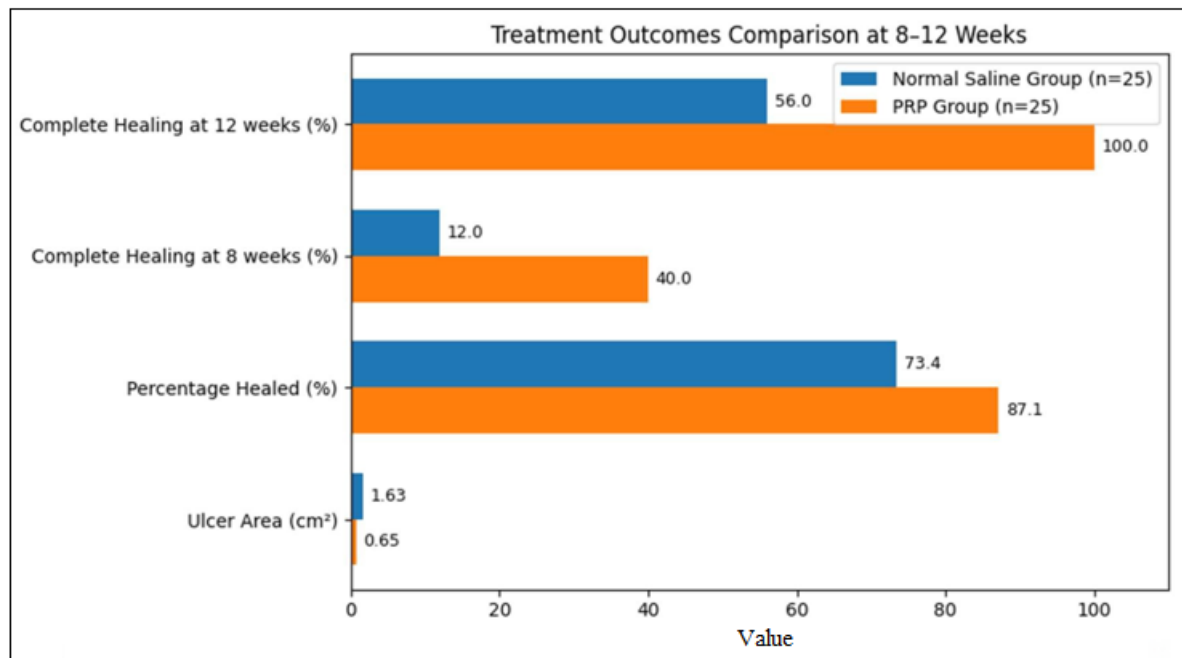
Characteristic	PRP Group (n = 25)	Normal Saline Group (n = 25)	Overall (n = 50)	p-value*
Gender, n (%)				0.765
Male	20 (80.0%)	21 (84.0%)	41 (82.0%)	
Female	5 (20.0%)	4 (16.0%)	9 (18.0%)	
BMI (kg/m ²), Mean ± SD	30.4 ± 3.3	30.0 ± 3.3	30.2 ± 3.3	0.612
Obesity Class, n (%)				0.68G
Class I (30.0–34.9)	13 (52.0%)	12 (48.0%)	25 (50.0%)	
Class II (35.0–39.9)	3 (12.0%)	2 (8.0%)	5 (10.0%)	

Wound Healing

Patients treated with PRP dressing showed:

- Faster reduction in ulcer size
- Better granulation tissue formation
- Higher wound contraction rates
- Earlier healing compared to normal saline dressing

Outcome Measure	PRP Group (n=25)	Normal Saline Group (n=25)	P-value*
Ulcer Area (cm ²) Mean ± SD	0.65 ± 0.45	1.63 ± 0.66	<0.001
Percentage Healed (%) Mean ± SD	87.1 ± 4.8	73.4 ± 3.2	<0.001
Complete Healing at 8 weeks	10 (40.0%)	3 (12.0%)	0.032
Complete Healing at 12 weeks	25 (100.0%)	14 (56.0%)	<0.001†



Hospital Stay

The average duration of hospital stay was lower in the PRP group compared with the normal saline group.

Healing Outcome

Complete healing rates were higher in patients treated with PRP dressing.

Complications

No major adverse effects were observed with PRP therapy.

5. Discussion

Diabetic foot ulcer is a challenging clinical condition due to impaired wound healing and increased susceptibility to infection. Delayed healing contributes significantly to morbidity and increases the risk of amputation.

Platelet Rich Plasma contains multiple biologically active growth factors that stimulate tissue repair and regeneration. PRP promotes angiogenesis, fibroblast proliferation, collagen synthesis, and epithelialization.

The findings of the present study demonstrated superior healing outcomes in the PRP group compared with conventional normal saline dressing. Patients receiving PRP dressing exhibited faster wound contraction, earlier granulation tissue formation, reduced healing time, and shorter hospital stay.

The improved healing observed with PRP can be attributed to the high concentration of growth factors released from activated platelets at the wound site.

The results of this study are consistent with previous studies that reported enhanced wound healing with PRP therapy in chronic diabetic foot ulcers.

PRP dressing is relatively economical, easy to prepare, autologous in nature, and associated with minimal adverse effects, making it an effective adjunctive modality in

chronic wound management.

6. Conclusion

Platelet Rich Plasma dressing is a safe, simple, and effective treatment modality for chronic diabetic foot ulcers. Compared with conventional normal saline dressing, PRP significantly accelerates wound healing, improves granulation tissue formation, reduces ulcer size more rapidly, and shortens hospital stay.

PRP therapy can therefore be considered an effective adjunctive treatment option in the management of chronic diabetic foot ulcers.

7. Limitations

- 1) Small sample size.
- 2) Single-center study.
- 3) Short follow-up duration.
- 4) Long-term recurrence rates were not evaluated.

Ethical Clearance

The study was conducted after approval by the Institutional Ethics Committee of Saraswathi Institute of Medical Sciences, Hapur. Written informed consent was obtained from all participants.

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