

ORIGINAL RESEARCH

Assessment of efficiency of PRP and conventional dressing in the management of diabetic foot ulcers

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ABSTRACT

Background: A diabetic foot ulcer is an open sore or wound that occurs on the feet of individuals with diabetes. The present study was conducted to assess the efficiency of the management of diabetic foot ulcers with PRP and conventional dressing. **Materials & Methods:** 54 patients with diabetic foot ulcers of both genders were divided into 2 groups of 27 each. Group I received homologous platelet dressings, and group II patients received conventional moist wound dressings. Parameters such as skin grafting, necrotic tissue, duration of hospital stay, number of wound debridement, and wound dressing etc. were compared. **Results:** There were 17 males and 10 females in group I and 18 males and 9 females in group II. The mean duration of hospital stay was 16.2 days in group I and 39.1 days in group II. The mean wound debridement days was 3.8 in group I and 18.2 in group II. The mean wound dressing days was 7.2 in group I and 42.5 in group II. The skin grafting was required in 5 in group I and 13 patients in group II. The difference was significant ($P < 0.05$). **Conclusion:** Platelet dressing patients were found to be superior to those treated with conventional wound dressing in terms of split skin grafting, duration of hospital stay, number of wound debridement, and duration of wound debridement.

Key words: diabetic foot ulcer, skin grafting, wound debridement

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INTRODUCTION

A diabetic foot ulcer is an open sore or wound that occurs on the feet of individuals with diabetes. These ulcers often develop as a result of complications related to diabetes, such as peripheral neuropathy (nerve damage) and poor circulation.¹ Diabetes can lead to reduced sensation in the feet, making it difficult for individuals to notice injuries or pressure points that can develop into ulcers. Diabetes can cause nerve damage, particularly in the extremities.² Peripheral neuropathy can lead to a loss of sensation in the feet, making it difficult for individuals to detect injuries or irritation. Diabetes can also affect blood vessels, leading to reduced blood flow to the extremities. Poor circulation impairs the body's ability to heal and fight off infections.³ In their lifetime, 15% of people with diabetes get diabetic foot ulcers. Nearly 80% of individuals in that group simultaneously suffer from peripheral neuropathy and limb ischemia. When combined, they slow down the healing process of diabetic foot ulcers and increase the risk of complications like sepsis, osteomyelitis, and cellulitis.⁴

Platelet-rich plasma (PRP) therapy is a medical treatment that involves using a concentration of a patient's own platelets to promote healing.⁵ PRP is derived from the patient's own blood and contains a high concentration of platelets, growth factors, and other bioactive proteins. Platelets play a crucial role in the body's natural healing process. When applied to a wound, PRP is thought to stimulate tissue repair and regeneration.⁶ The present study was conducted to assess the efficiency of the management of diabetic foot ulcers with PRP and conventional dressing.

MATERIALS & METHODS

The present study consisted of 54 patients with diabetic foot ulcers of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 27 each. Group I received homologous platelet dressings, and group II patients received conventional moist wound dressings. Parameters such as skin grafting, necrotic tissue, duration of hospital stay, number of wound debridement, and wound dressing etc. were compared.

Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	platelet dressings	conventional dressings
M:F	17:10	18:9

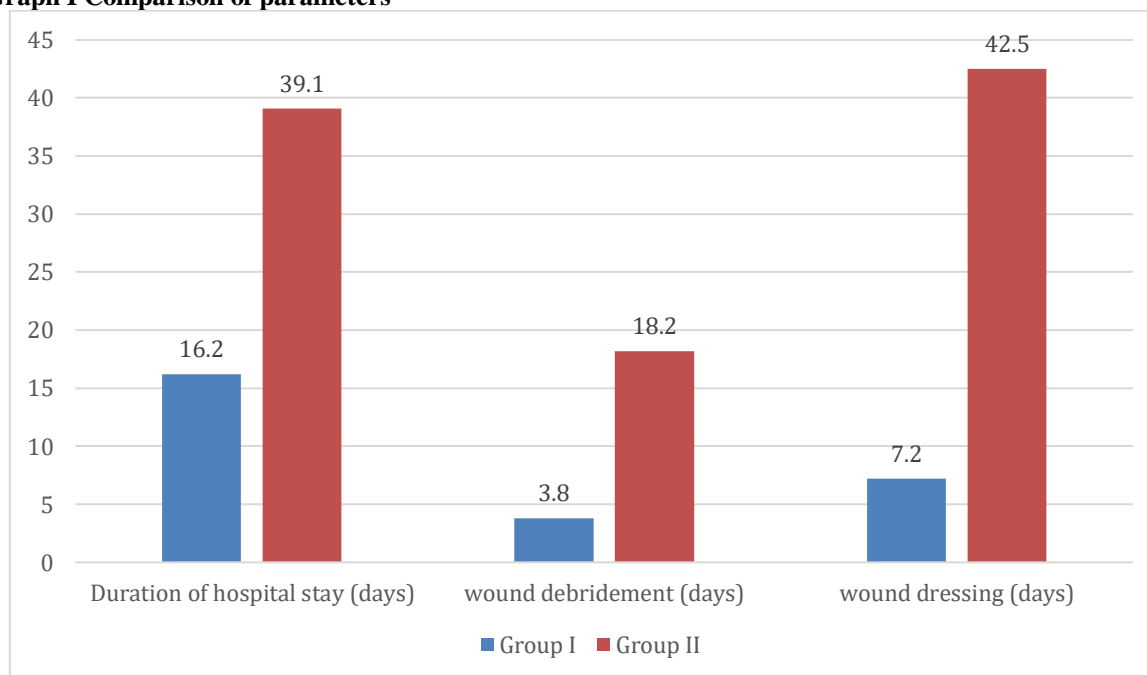
Table I shows that there were 17 males and 10 females in group I and 18 males and 9 females in group II.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
Duration of hospital stay (days)	16.2	39.1	0.03
wound debridement (days)	3.8	18.2	0.01
wound dressing (days)	7.2	42.5	0.001
Skin grafting (no.)	5	13	0.01

Table II, graph I shows that the mean duration of hospital stay was 16.2 days in group I and 39.1 days in group II. The mean wound debridement days was 3.8 in group I and 18.2 in group II. The mean wound dressing days was 7.2 in group I and 42.5 in group II. The skin grafting was required in 5 in group I and 13 patients in group II. The difference was significant ($P < 0.05$).

Graph I Comparison of parameters



DISCUSSION

PRP demonstrated two crucial functions in wound healing. First, the gel fibrin creates a barrier that stops microorganisms from entering the wound bed.⁷ Second, the platelet growth factors balanced the levels of matrix metalloproteinases (MMP) and MMP inhibitors and promoted wound healing.⁸ Epidermal growth factor, platelet-derived growth factor, transforming growth factor-beta, vascular endothelial growth factor (VEGF), fibroblast growth factor, insulin-like growth factor, and keratinocyte growth factor are among the minimum seven growth factors found in PRP. Numerous growth factors play crucial roles in the process of wound healing.⁹ For example, platelet-rich plasma (PRP) boosts the development of type I collagen in dermal fibroblasts and increases the

expression of GI cycle regulators and type I collagen to speed up the healing process.¹⁰ The growth factors in PRP may promote angiogenesis (formation of new blood vessels) and accelerate tissue regeneration, potentially aiding in the healing of diabetic foot ulcers. PRP may have anti-inflammatory effects, which could be beneficial in managing inflammation associated with chronic wounds.¹¹ The present study was conducted to assess the efficiency of the management of diabetic foot ulcers with PRP and conventional dressing.

We found that there were 17 males and 10 females in group I and 18 males and 9 females in group II. Dhanasekaran U et al¹² included 40 patients who were divided into two groups: group I comprising 20 patients who received homologous platelet

concentrate and group II comprising 20 patients received conventional wound dressing. 7 patients had been operated for split skin grafting, 7 patients had 0-10% of the area covered with necrotic tissue, the mean duration of hospital stay was 18 days, mean duration of wound debridement was 3 days and the mean number of wound dressing was 6. In conventional wound dressing group, 15 patients had operated for split skin grafting, 4 patients had 0-10% of the area covered with necrotic tissue, mean duration of hospital stay was 39 days, mean duration of wound debridement was 18 days and mean number of wound dressing was 48.

We found that the mean duration of hospital stay was 16.2 days in group I and 39.1 days in group II. The mean wound debridement days was 3.8 in group I and 18.2 in group II. The mean wound dressing days was 7.2 in group I and 42.5 in group II. The skin grafting was required in 5 in group I and 13 patients in group II. Tripathy et al¹³ studied 20 cases of diabetic foot ulcers. In all patients, ulcer size as per maximum length and breadth and area were recorded and two PRP dressings were given on day 0 and second after first week. The size was measured in maximum length and maximum breadth by using a scale and area was calculated. Out of 20 patients, males were 10 and females were 10. Age group 30-50 years had 2 males and 1 female, 50-70 years had 3 males and 5 females and >70 years had 5 males and 4 females. There was 80% reduction in 6 males and 5 females. The difference was significant ($P < 0.05$). Crovetti et al¹⁴ study included 80 diabetic wounds. Patients were divided into two groups: group A received conventional ordinary dressing (N=40, 50%) and group B received PRP dressing (N=40, 50%). The mean follow-up period was 12 weeks. The estimated time of wound healing was 12 weeks for 82.5% of the patients in group A and 97.5% of the patients in group B; the PRP group was found to be more effective with fewer complications, less infection, exudates, pain, and failed healing: 17.5, 12.5, 32.5, and 2.5% versus 27.5, 42.5, 62.5, and 17.5% in group B, respectively. The highest healing rate was observed for both groups at the fourth week, but it was better for the PRP group (group B): 0.89 ± 0.13 versus 0.49 ± 0.11 cm²/week in group A.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that platelet dressing patients were found to be superior to those treated with conventional wound dressing in terms of split skin grafting, duration of hospital stay, number of wound debridement, and duration of wound debridement.

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