Original Research

Efficiency of PRP and conventional dressing in patients with diabetic foot ulcers

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ABSTRACT

Background: An open wound or sore that develops on a diabetic's foot is known as a diabetic foot ulcer. Diabetes-related problems such peripheral neuropathy (damage to the nerves) and poor circulation frequently lead to the development of these ulcers. The present study was conducted to assess the efficiency of the management of diabetic foot ulcers with PRP and conventional dressing.

Materials & Methods:70 patients with diabetic foot ulcersof both genderswere divided into 2 groups of 35 each. Group I received homologousplatelet dressings, and group II patients receivedconventional moist wound dressings. A comparison was made between parameters such skin grafting, necrotic tissue, length of hospital stay, number of wound debridements, and wound dressing, among others.

Results: There were 17 males and 18 females in group I and 19 males and 16 females in group II. The mean duration of hospital stay was 18.2 days in group I and 35.1 days in group II. The mean wound debridement days was 3.9 in group I and 17.5 in group II. The mean wound dressing days was 7.5 in group I and 41.2 in group II. The skin grafting was required in 7 patients in group I and 12 patients in group II. The difference was significant ($P< 0.05$).

Conclusion: In terms of split skin grafting, length of hospital stay, number of wound debridements, and length of wound debridement, patients treated with platelet dressings outperformed those treated with traditional wound dressings.

Keywords:diabetic foot, skin grafting, wound

Introduction

An open wound or sore that develops on a diabetic's foot is known as a diabetic foot ulcer. Diabetes-related problems such peripheral neuropathy (damage to the nerves) and poor circulation frequently lead to the development of these ulcers.[1] Diabetes can cause decreased foot sensitivity, which makes it harder for people to detect wounds or pressure points that could turn into ulcers. Nerve damage, especially in the extremities, can result from diabetes.[2] People with peripheral neuropathy may experience a loss of feeling in their feet, which makes it challenging to identify wounds or irritation. Blood artery damage from diabetes can also result in decreased blood flow to the extremities. The body's capacity to fight off infections and mend is hampered by poor circulation.[3] 15% of diabetics will get diabetic foot ulcers throughout their lifetime. In that group, limb ischemia and peripheral neuropathy coexist in about 80% of cases.[4] Together, they raise the risk of complications like sepsis, osteomyelitis, and cellulitis and slow down the healing of diabetic foot ulcers.[5] A medical procedure called platelet-rich plasma (PRP) therapy uses a patient's own platelets in concentration to aid in the healing process. Platelets, growth factors, and other bioactive proteins are abundant in PRP, which is made from the patient's own blood. The body's natural healing mechanism depends heavily on platelets. PRP is believed to promote tissue regeneration and repair when administered to wounds.[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 70 patients with diabetic foot ulcersof 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 35 each. Group I received homologousplatelet dressings, and group II patients receivedconventional moist wound dressings. A comparison was made between parameters such skin grafting, necrotic tissue, length of hospital stay, number of wound debridements, and wound dressing, among others. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Result

Table: I . Distribution of patients

Groups	Group I	Group II
Method	Platelet dressings	Conventional dressings
M:F	17:18	19:16

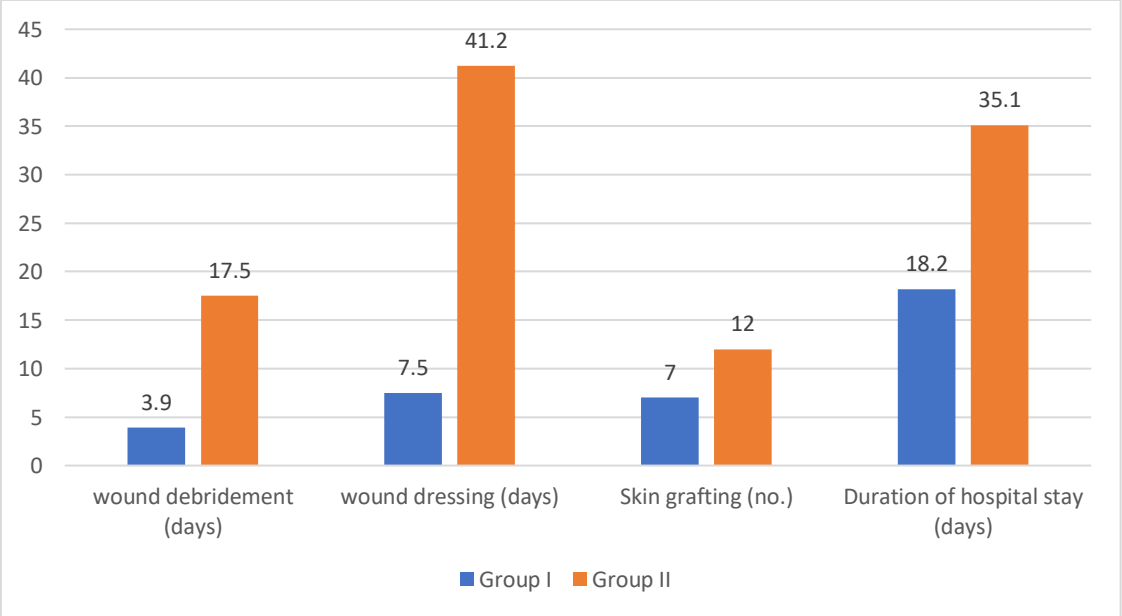
Table I shows that there were 17 males and 18 females in group I and 19 males and 16 females in group II.

Table: II. Comparison of parameters

Parameters	Group I	Group II	P value
wound debridement (days)	3.9	17.5	0.02
wounddressing (days)	7.5	41.2	0.01
Skin grafting (no.)	7	12	0.04
Duration ofhospital stay (days)	18.2	35.1	

Table II, graph I shows that the mean duration of hospital stay was 18.2days in group I and 35.1days in group II. The mean wound debridement days was 3.9 in group I and 17.5 in group II. The mean wound dressing days was 7.5 in group I and 41.2 in group II. The skin grafting was required in 7patients in group I and 12 patients in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters



Discussion

PRP showed two important roles in the healing of wounds. In order to prevent pathogens from entering the wound bed, the gel fibrin first forms a barrier. Secondly, the platelet growth factors facilitated wound healing by balancing the levels of matrix metalloproteinases (MMP) and MMP inhibitors.[7] PRP contains at least seven growth factors, including fibroblast growth factor, insulin-like growth factor, transforming growth factor-beta, vascular endothelial growth factor (VEGF), platelet-derived growth factor, keratinocyte growth factor, and epidermal growth factor.[8] Many growth factors are essential to the healing process of wounds.To speed up the healing process, platelet-rich plasma (PRP), for instance, promotes the expression of GI cycle regulators and type I collagen while also promoting the formation of type I collagen in dermal fibroblasts.[9] PRP's growth factors have the ability to speed tissue regeneration and encourage angiogenesis, or the creation of new blood vessels, which could help diabetic foot ulcers heal. PRP may help control inflammation linked to chronic wounds because of its potential anti-inflammatory properties.[10]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 18 females in group I and 19 males and 16 females in group II.Eighty diabetic wounds were included in the Crovetti research.[11] The patients were split into two groups: group B received PRP treatment (N=40, 50%) while group A received regular, conventional dressing (N=40, 50%). Twelve weeks was the average follow-up time. 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. The estimated time of wound healing was 12 weeks for 82.5% of patients in group A and 97.5% of patients in group B. At the fourth week, the PRP group (group B) had a greater healing rate than group A, which had a healing rate of 0.89±0.13 versus 0.49±0.11 cm2/week.

We found that the mean duration of hospital stay was 18.2days in group I and 35.1days in group II. The mean wound debridement days was 3.9 in group I and 17.5 in group II. The mean wound dressing days was 7.5 in group I and 41.2 in group II. The skin grafting was required in 7 patients in group I and 12 patients in group II. Twenty cases of diabetic foot ulcers were examined by Tripathy et al.[12] Two PRP dressings were administered on day 0 and the second day after the first week, and the maximum length, breadth, and area of each ulcer were noted for each patient. Using a scale, the size was measured in maximum length and maximum width, and the area was computed. Ten of the twenty cases were male, and ten were female. There were two males and one female in the 30–50 age group, three males and five females in the 50–70 age group, and five males and four females in the >70 age group. A reduction of 80% was seen in 5 females and 6 males.

Mohammadi et al[13]evaluated the effectiveness of using autologous platelet-rich plasma (PRP) gel for treatment of diabetic foot ulcer (DFU) during the first 4 weeks of the treatment. Out of 100 patients, 70 (70%) were enrolled in the trial. After the primary care actions such as wound debridement, the area of each wound was calculated and recorded. The PRP therapy (2mL/cm^2 of ulcers) was performed weekly until the healing time for each patient. The mean (SD) of DFU duration was 19.71 weeks (4.94) for units sampling. The ratio of subjects who withdrew from the study was calculated to be 2 (2.8%). Average area of 71 ulcers in the mentioned number of cases was calculated to be 6.11cm^2. Also, the mean, median (SD) of healing time was 8.7, 8 weeks except for 2 mentioned cases. According to one sample T-test, wound area (cm^2), on average, significantly decreased to 51.9% through the first four weeks of therapy. Furthermore, significant correlation (0.22) was not found between area of ulcers and healing duration. According to the results, PRP could be considered as a candidate treatment for non-healing DFUs as it may prevent future complications such as amputation or death in this pathological phenomenon.

The shortcoming of the study is the small sample size.

Conclusion

Authors found that in terms of split skin grafting, length of hospital stay, number of wound debridements, and length of wound debridement, patients treated with platelet dressings outperformed those treated with traditional wound dressings.

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