Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of role of PRP in management of diabetic foot ulcers- A clinical study

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ABSTRACT:
Background: Diabetic foot ulcers (DFUs) are a serious complication of diabetes that results in significant morbidity and mortality. The present study assessed the role of PRP in management of DFUs. **Materials & Methods:** The present study was conducted on 45 patients of diabetic foot ulcers. Wound size as per maximum length and breadth and area were recorded and three PRP dressings were given on day 0, second after first week, and third after 3rd week. On 2nd week, and 4th, 5th, 6th and 8th weeks only saline dressings were applied at weekly intervals. On every dressing patient's wound was measured in maximum length and maximum breadth by using a scale and area was calculated. Assessment of the DFUs was done as per University of Texas classification of DFU. **Results:** There were 25 males and 20 females in present study. There were 25 patients in grade IIA, 10 in I A, 6 in II B and 4 in II A. The difference was significant (P< 0.05). There was significant difference in wound dimension recorded at day 0, after 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks and 8 weeks (P< 0.05). **Conclusion:** Authors found that autologous PRP is a safe, inexpensive method in treating diabetic foot ulcer.
Key words: Diabetic foot ulcer. PRP, Wound.

Received: 24/07/2020 **Modified:** 12/08/2020 **Accepted:** 18/08/2020

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This article may be cited as: Srivastava MK, Singh N. Assessment of role of PRP in management of diabetic foot ulcers- A clinical study. J Adv Med Dent Scie Res 2020;8(9):221-224.

INTRODUCTION

Diabetic foot ulcers (DFUs) are a serious complication of diabetes that results in significant morbidity and mortality.[1] Ulceration occurs as a result of trauma in the presence of neuropathy and/or peripheral vascular disease with infection as a secondary phenomenon following disruption of the protective epidermis. The disease often leads to the development of serious health threatening complications. Of all diabetic complications, diabetic foot syndrome (DFS) is one of the most devastating.[2]

Mortality rates associated with development of a DFU are estimated to be 5% in the first 12 months, and 5-year morality rates have been estimated at 42%.[3] The standard practices in DFU management include surgical debridement, dressings to facilitate a moist wound environment and exudate control, wound off-loading, vascular assessment, and infection and glycemic control. These practices are best coordinated by a multidisciplinary diabetic foot wound clinic. Even with this comprehensive approach, there is there is still room for improvement in DFU outcomes.[4]

Conventional therapies such as dressings, surgical debridement and even skin grafting cannot provide satisfactory healing since these treatments are not able to provide necessary growth factors that can modulate the healing process. Autologous platelet-rich plasma (PRP) is an inexpensive method used in treating non-healing ulcers as it provides growth factors which enhance healing. The use of platelet-rich plasma (PRP) to enhance wound healing has increased dramatically over the last decade.[5] The present study assessed the role of PRP in management of DFUs.

MATERIALS & METHODS

The present study was conducted on 45 patients of diabetic foot ulcers. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained from ethical committee.

Demographic profile of patients was recorded. Wound size as per maximum length and breadth and area were recorded and three PRP dressings were given on day 0, second after first week, and third after 3rd week. On 2nd week, and 4th, 5th, 6th and 8th weeks only saline dressings were applied at weekly intervals. On every dressing patient's wound was measured in maximum length and maximum breadth by using a scale and area was calculated. Assessment of the DFUs was done as per University of Texas classification of DFU. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 45		
Gender	**Males**	**Females**
Number	25	20

Table I shows that there were 25 males and 20 females in present study.

Table II Texas Grading in patients

Texas Grading	Number	P value
I A	10	0.01
I B	25	
II A	4	
II B	6	
Total	45	

Table II, graph I shows that there were 25 patients in grade IIA, 10 in I A, 6 in II B and 4 in II A. The difference was significant (P< 0.05).

Graph I Texas Grading in patients

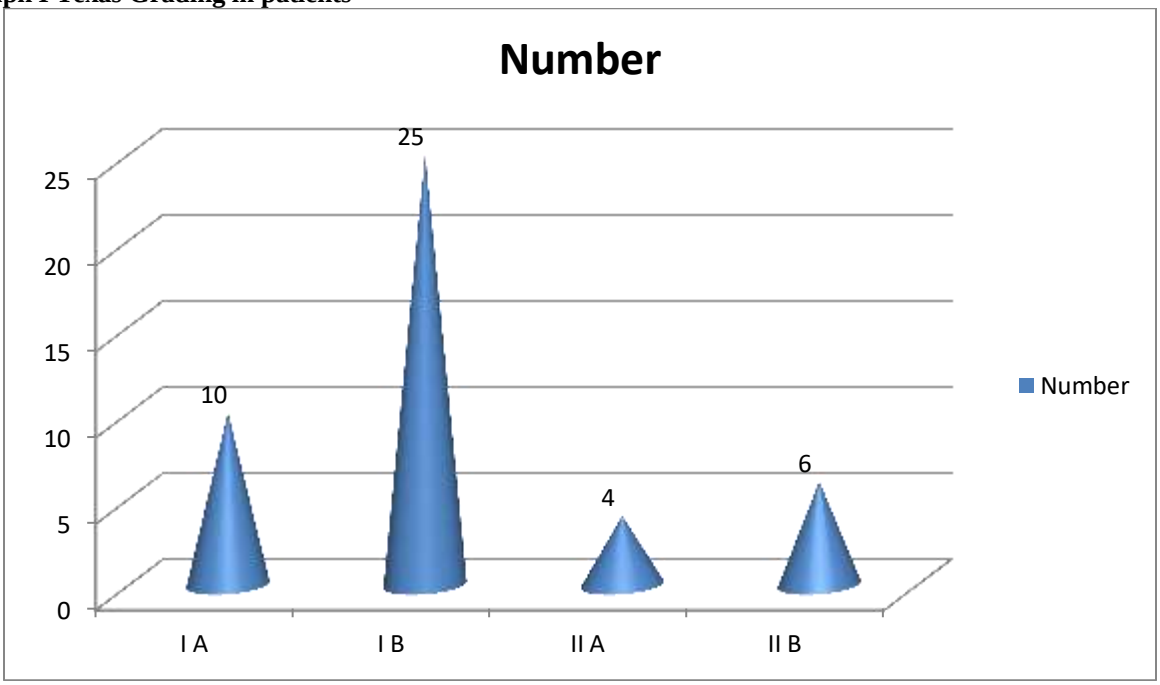
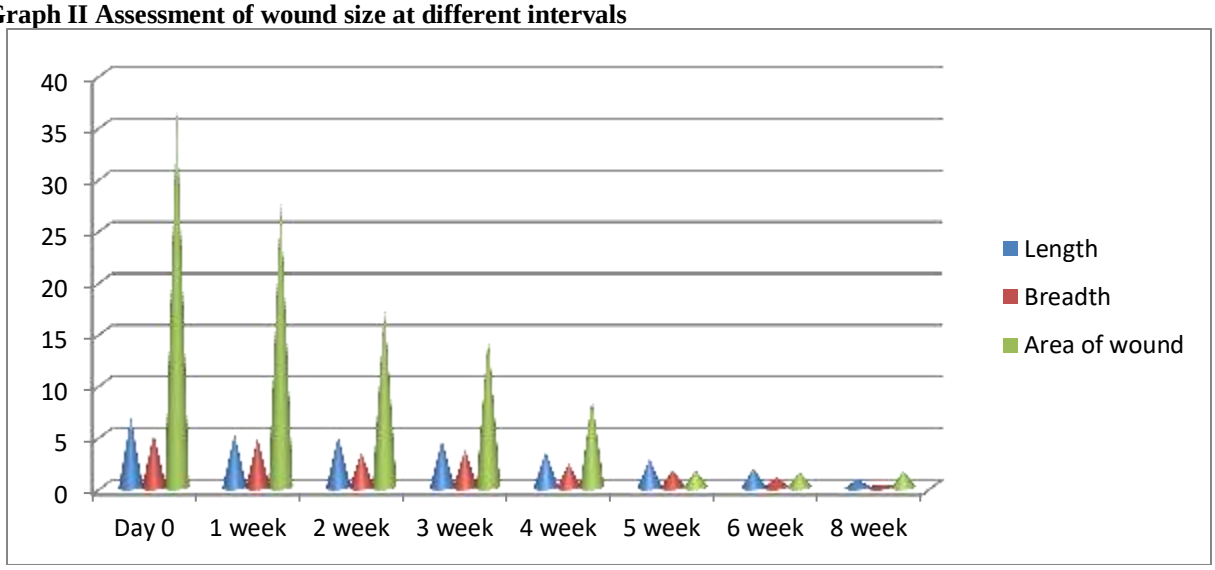


Table III Assessment of wound size at different intervals

Parameters	Day 0	1 week	2 week	3 week	4 week	5 week	6 week	8 week	P value
Length	6.8	5.2	5.01	4.6	3.5	2.8	1.9	0.8	0.01
Breadth	5.2	4.8	3.4	3.7	2.3	1.7	1.01	0.29	0.001
Area of wound	36.4	27.6	17.4	14.6	8.6	1.7	1.5	1.6	0.012

Table III, graph II shows that there was significant difference in wound dimension recorded at day 0, after 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks and 8 weeks (P< 0.05).

Graph II Assessment of wound size at different intervals



DISCUSSION

Treatment of DFUs accounts for approximately one-third the total cost of diabetic care, which was estimated to be U.S $176 billion in direct healthcare expenditures in 2012. Despite these high healthcare costs, about 20% of patients have unhealed DFUs at 1 year.[6] Even after wound resolution, subsequent DFUs are common, with a recurrence rate of roughly 40% of patients within 1 year.[7] Although there are well-established principles to managing DFUs, treatment of DFUs is often challenging. A broad spectrum of novel interventions is being studied to improve wound healing.[8] The present study assessed the role of PRP in management of DFUs. In this study we found that there were 25 males and 20 females. There were 25 patients in grade IIA, 10 in I A, 6 in II B and 4 in II A as recorded by Texas grading. Abdelaziz et al[9] investigate the added benefits of combining the intra-lesional injection of PRP with topical PG application. Fifty patients who had DFUs (grade 1; Texas classification) were randomized into two equal groups; (A and B). In Group A, local PRP injection and topical (PG) were used. Groups B were dressed by (PG) alone. The procedure was repeated every 2 weeks till complete healing or the end of 10 weeks treatment course. Complete healing was achieved in 24 patients (96%) of group A, and in 22 patients in group B (88%). Ulcers lesser than 7 cm^2 had significantly shorter healing time in group A (16 ± 2.6 days), versus (27 ± 3.4 days) in group B, P value was 0.016. Group A required 45 PRP sessions for healing, while group B required 54 sessions. Combination of PRP injection and topical (PG) application fastens the rate of healing of DFUs and minimizes the number of applications.

We found that there was significant difference in wound dimension recorded at day 0, after 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks and 8 weeks (P< 0.05). Akingboye et al[10] conducted a prospective randomized controlled study on 60 diabetic patients having non-healing feet ulcers. Patients were randomly allocated by using a computer generated random number table into two groups according to the dressing method performed. Group A: Conventional ordinary dressing (N=30 (50%)), Group B: PRP dressing (N=30 (50%)). Follow-up period was for 3-monthes. Most of ulcers were healed within the estimated time for this study (12 weeks) and There were satisfactory results (less complications) in PRP group (B); infection, exudates and pain which were observed in 5 cases (16%), 3 cases (10%), 10 cases (33.3%) respectively as compared to group (A); 8 cases (26.6%), 12 cases

(40%), 18 cases (60%) respectively. Also the rate of healing was good in group (B) with p-value <0.05.

Almost every cell type in skin is involved in the production of GFs and several cells release many different types of GFs during the wound healing process. Through degranulation of the alpha granules in platelets, PRP can secrete various GFs, including PDGF, VEGF, FGF, hepatocyte growth factor (HGF), and TGF beta, which have been documented to initiate wound healing process.[11] Platelet-rich plasma is a new inductive therapy which is being increasingly used for the treatment of the complications of bone healing, such as infection and nonunion. The activator for platelet-rich plasma is a mixture of thrombin and calcium chloride which produces a platelet-rich gel.[12]

The limitation of the study is small sample size.

CONCLUSION

Authors found that autologous PRP is a safe, inexpensive method in treating diabetic foot ulcer.

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