



A COMPARATIVE STUDY BETWEEN ROLE OF PLATELET RICH PLASMA AND NORMAL DRESSING IN WOUND HEALING

Dr. Atul Vyas

Professor And Head, Department of Surgery, Index Medical College Hospital & Research Centre, Indore M.P

Dr. Nisha Gupta*

Junior Resident, Department of Surgery, Index Medical College Hospital & Research Centre, Indore M.P. *Corresponding Author

Dr Sarsij Singh Parihar

Junior Resident, Department of Surgery, Index Medical College Hospital & Research Centre, Indore M.P

ABSTRACT

BACKGROUND: Non healing ulcers are major health problem in developing countries, are often difficult to heal because they lack necessary growth factors to maintain the healing process, and are frequently complicated by superinfection. PRP as a concentrate of platelets enhances wound healing by either the barrier effect to prevent bacterial invasion into the wound or the growth factors stimulate the wound healing.

METHODS: Autologous PRP is prepared from whole blood, by process of differential centrifugation. In differential centrifugation, acceleration force is adjusted to sediment certain cellular constituents based on specific gravity. Patients with non- healing ulcers of different etiologies who met inclusion criteria were divided into two groups. Group A were treated with PRP injection and Group B were treated with normal dressing.

RESULT: All patients of non- healing ulcer within age group 30-70 years were treated with PRP and normal dressing and they were followed up for a period of 8 weeks. All patients treated with PRP showed signs of wound healing with reduction in wound size and depth. Rate of wound healing was measured as (Initial wound area-Final wound area/Time period of 8 weeks). Hospital stay was less in patients treated with PRP as compared to patients treated with normal dressing.

CONCLUSION: This case series has demonstrated the potential safety and efficacy of autologous platelet rich plasma in treatment of wounds as compared to the wounds treated with normal dressing. The estimated time of wound healing was 8 weeks for 97.5% of patients in group A & 82.5% for the patients in group B.

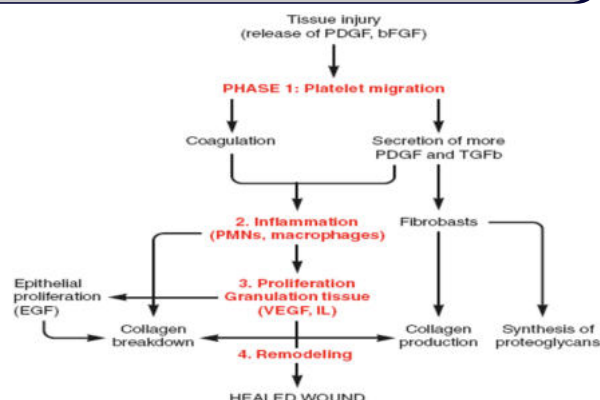
KEYWORDS : Platelet Rich Plasma, Chronic Wounds, Growth factors, Wound Healing.

INTRODUCTION

Nonhealing ulcers are a major health problem with high cost in terms of human and material resources. Application of autologous PRP has been a major breakthrough for the treatment of nonhealing ulcers, as it is an easy and cost-effective method, it enhances wound healing by either the barrier effect to prevent bacterial invasion into the wounds or the growth factors stimulate wound healing.

Platelet rich plasma (PRP) is a derivative of whole blood that contains a supra-physiological concentration of platelets. Platelets stores growth factors in their alpha granules, which are released after activation. These growth factors are involved in phases of wound healing (inflammation, proliferation, remodelling) in many years, such as by promoting chemotaxis, cell adhesion, mitogenesis, proliferation, and angiogenesis. The most studied of these factors are platelet-derived growth factors (PDGF), fibroblast growth factors (FGF), transforming growth factor (TGF), Epidermal growth factor(EGF)

Vascular endothelial growth factor(VEGF), and insulin- like growth factor(IGF). The delivery of an abundance of these growth factors has shown positive effects on wound healing in vitro analyses. There are many different types of platelet - rich products with a broad nomenclature. There are not only different names for one similar product, but the products are actually often very different, with different preparation procedures and consequently different content, and they vary in fibrin composition and presence of leucocytes and/or erythrocytes.



AIMS AND OBJECTIVES:

Aims:

This study was aimed to explain the basic principles of platelet rich plasma in wound healing and to better understand the use and clinical outcomes of the therapy.

OBJECTIVES:

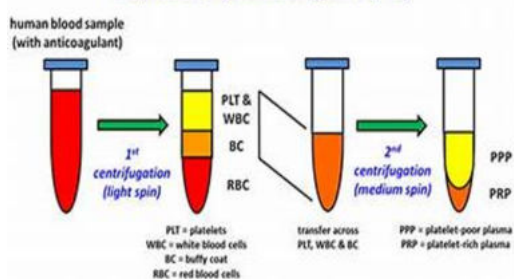
To compare improvement in the size and depth of wounds in patients those who were treated with PRP & those who were treated with normal dressing
To compare the hospital stay in patients those who were treated with PRP & those who were treated with normal dressing.

METHODS

A total of 50 study subjects who had chronic non healing ulcer (Diabetic ulcer, Traumatic ulcer, Bed sores) were selected from surgery OPD & Ward in index hospital from period of 8 months (August 2019 to March 2020). Wounds were debrided and made free from slough or necrotic tissues then pus was sent for culture and sensitivity and antibiotics were given accordingly.

The patients were divided into two treatment groups: (a) study group: (PRP group) – chronic wound was cleaned with normal saline, and

Preparation of platelet-rich plasma (PRP)



PRP solution was injected in and around the wound. PRP was evenly distributed over the wound. Dressings were done once a week and changed depending on the wound exudate. (b) Control group: the ulcers were first cleaned and then normal saline dressings were done. Dressings were changed on every alternate days.

- Group A received PRP dressing (N=25, 50%)
- Group B received conventional ordinary dressing (N=25, 50%)

The mean follow up period was 8 week Then comparative study between the wounds treated with PRP and normal dressing was done and clinical outcomes of therapy were studied.

INCLUSION CRITERIA:

- All males & females between 30 -70 years.
- Patients with diabetic ulcer, traumatic ulcer, bed sores/pressure sores.

EXCLUSION CRITERIA

- Patients above 70 years & below 30 years were excluded from the study.
- Patients those who were immunocompromised & Burn patients were excluded from the study.

RESULTS

Table 1: Distribution of cases

Etiology	Group A	Group B
Diabetic ulcer	7	8
Traumatic ulcer	13	11
Bed sore	5	6

In this study patients from three groups were categorised & results of PRP & Normal dressing were compared.

Table 2: Gender Distribution

Group	Male	Female
A	16	9
B	14	11

In our study maximum no. of patients in both groups were males as compared to females.

Table 3: Age Distribution

Group	Below 50yrs of age	Above 50yrs of age
A	17	8
B	14	11

Age of patient's varied from 30-70 years & maximum number of cases belongs to 30-50 years.

Table 4: Comparison of rate of healing

Rate of healing (cm ² /week)	Group A (Mean+/-SD)	Group B (Mean+/-SD)
Diabetic ulcer	144.87+/-34.16	111.30+/-44.90
Traumatic ulcer	165.1+/-64.82	111.71+/-25.65
Bedsore	163.83+/-44.94	120.56+/-35.32

Table 5: Comparison of rate of healing

Rate of healing (cm ² /week)	Group A (Mean+/-SD)	Group B (Mean+/-SD)
Diabetic ulcer	144.87+/-34.16	111.30+/-44.90
Traumatic ulcer	165.1+/-64.82	111.71+/-25.65
Bedsore	163.83+/-44.94	120.56+/-35.32

The rate of granulation tissue formation was assessed upto 8 weeks for healing of ulcers. Rate of wound healing in PRP dressing (Group A) was better than conventional normal dressing (Group B).

Table 6: Comparison of hospital stay

Hospital stay	Group A (Mean)	Group B (Mean)
Diabetic ulcer	38.7	47.67
Traumatic ulcer	37	45.5
Bed sore	37.87	46.11

In our study we found that hospital stay was less in patients those who were treated with PRP (Group A) than in the normal dressing (Group B)

The estimated time of wound healing was 8 weeks for 97.5% of patients in group A & 82.5% for the patients in group B. Regular

dressing and weekly measurement of wound size and depth was done for 8 weeks and rate of wound healing was measured (initial wound area-final wound area/time period of 8 weeks). The PRP group was found to be more effective with fewer complications, less infections, exudates, pain & failed healing. The highest healing rate was observed for both groups at fourth week, but it was better for the PRP group.



Follow-up:

The patients were advised to avoid pressure on the wound area. Elevation of the feet was recommended when sitting or lying down to decrease edema. The patients were seen once or twice weekly throughout the course of treatment and a clinical evaluation was performed once weekly. Patients with pressure sores were advised repeated posture change and were advised to use low air loss mattresses. Clinical laboratory tests were performed every 4 weeks for all treatment groups – that is, complete blood count, random blood sugar, and serum albumin.

The patients were evaluated for the rate of wound healing in about 8 weeks and this evaluation was carried out by taking photos and measuring the wound's dimensions (length and width) using a metric tape at the initial visit and then every week. Characteristics of the wound such as exudates, necrotic tissue, infection, and granulation tissue were documented. The primary outcome evaluated: was reduction in the size of the wound, which was determined from photos taken every week. The secondary outcome parameters were the presence of infection, exudates, and pain.

DISCUSSION

Chronic wounds/ulcers come with significant cost and morbidity for the patients and society as a whole. The main goal of any treatment modality is to obtain wound closure expeditiously. The conventional treatment includes adequate debridement, control of infection, revascularization of ischemic tissue, and avoidance of undue pressure on the wound. Skin grafting has shown some efficacy; however, they

are not capable of providing the necessary GFs to modulate the healing process and are expensive.

CONCLUSIONS

- The study concluded that PRP therapy in wounds showed partial or complete wound healing by stimulating and accelerating the wound healing process as compared to normal dressing especially when conventional therapy is not good enough and surgical treatment is not possible. There have been considerable advancements in the use of PRP in therapeutic process in recent years in tissue generation therapy. PRP is a powerful tool for treatment of chronic wounds, it enhances healing, reduces infection rates, & exudates.
- The percentage of improvement in size and depth of the ulcers after 8 weeks was 44–100%.
- We also noted that there was reduction in pain and discharge within 1 week owing to the anti-inflammatory property of PRP, which contains leukocytes.
- Moreover, no adverse effects were reported on the day of treatment and during the patient's follow-up period, deeming this as a safe and effective treatment method for chronic non healing ulcers. Furthermore, the overall quality of life of the treated patients improved tremendously after PRP therapy.

REFERENCES:

1. Willrich M, Pinzur M, McNeil D, Juknelis A, Lavery L. Health related quality of life, cognitive function, and depression in diabetic patients with foot ulcer or amputation. A preliminary study. *Foot Ankle Int* 2005; 26:128–134. Back to cited text no. 1
2. McAleer JP, Sharma SG, Kaplan EM, Persich GZ. Use of autologous platelet concentrate in a non-healing lower extremity wound. *Adv Skin Wound Care* 2007; 19: 354–363. Back to cited text no. 29
3. Gelf JM, Hoffstad OZ, Margolis DJ. Surrogate endpoints for the treatment of diabetic leg ulcers. *J Invest Dermatol* 2012; 119:1420–1425. Back to cited text no. 30.