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COMPARATIVE STUDY BETWEEN PLATELET RICH FIBRIN (PRF) AND NORMAL SALINE DRESSINGS FOR THE TREATMENT OF CHRONIC NON-HEALING ULCERS OF LOWER LIMB

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ABSTRACT

BACKGROUND

As a chronic disease, venous leg ulcers can be treated in a number of ways. One of the more recent techniques is platelet-rich fibrin (PRF), which improves wound healing by containing fibroblast growth factor (GF), vascular endothelial GF, and platelet-derived GF. The potential of platelet-rich fibrin to promote healing in patients with lower extremity ulcers that do not heal over time was evaluated.

AIM

To determine the efficacy of PRF for management in chronic non healing ulcers of lower limb.

MATERIALS AND METHODS

Preliminary data were obtained from this prospective comparative study.25 cases were treated with PRF and 25 controls were treated with saline dressings. Age groups taken into consideration from 18 to 60 years. Initial ulcer size was less than 9 cm in longest dimension. Each PRF was placed and secondary dressing done and removed after 1 week.

RESULTS

Patients were followed Percentage reduction in the wound size is 84.55% in patients treated with PRF and 14.26% in patients with saline dressings weekly for 6 weeks.

CONCLUSION

PRF shows significant result for healing of chronic ulcers.

INTRODUCTION

Venous ulcers can be treated in a number of ways, such as using compression stockings, proper wound care, and even surgical procedures. The course of treatment is typically

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challenging and has a high recurrence rate. An important factor in the healing of these ulcers is dressings. It is well known that using saline moist occlusive dressings accelerates wound healing. Because platelet concentrates contain transforming growth factor (GF) F, platelet-derived GF, vascular-endothelial GF, platelet-derived epidermal GF, insulin-like GF-I, and basic fibroblast GF, they have been utilized extensively in regenerative medicine to enhance wound healing. Therefore, we carried this research to determine whether autologous platelet rich fibrin (PRF) or saline dressing is more effective for treating chronic venous leg ulcers.[1]

AIM

To determine the efficacy of PRF for management in chronic non-healing ulcers of lower limb.

MATERIALS AND METHODS

Study design : A prospective comparative study between PRF and normal saline dressings for treating chronic non-healing ulcers in lower limb

Study subjects: All the patients admitted in GGH,KKD under the department of general surgery with chronic non healing ulcers lower limb

Sample size- 25cases in study group (group A) and 25 were allocated for control group (group B)

Duration of study- Oct 2021 to march 2023

INCLUSION CRITERIA

1. Patients of age 18-60
2. Hb% above 10gm%
3. Random blood sugar <240 mg/dL
4. Wound size < 9cm in longest dimension

EXCLUSION CRITERIA

1) Hypoproteinemia <6gm/dL
2) Osteomyelitis
3) Edge biopsy with carcinomatous changes
4) Malnutrition

PROCEDURE

Random allocation of patients into Group A and Group B

Group A:Wounds were debrided → PRF is applied on wounds → Secondary dressing placed. The dressing is removed after 7 days and the process is repeated

Group B:Wounds were debrided and normal saline dressing was applied and the dressing was changed every alternate day

Surface area of the wound is measured every week in both groups.

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PRF PREPARATION

10ml of peripheral blood sample is collected in a centrifuge tube.The tubes are centrifuged for 15 minutes at 3000rpm.Supernatant: Acellular plasma Middle: PRF gel Bottom: RBC.Separate PRF gel from the tube.Apply on the wound and cover for 7 days. Repeat the process for 6 weeks [(2)].

STATYSTICAL ANALYSIS:

The reduction of surface area of wound is statistically significant, confirmed with Unpaired T-test; $t(48) = -6.24$, $p < .001$

Point-Biserial correlation test – correlation of time taken for the wound to completely heal and diabetes is not significant, $r = -.013$, $p = .95$

Point-Biserial correlation test – correlation of time taken for the wound to completely heal and hypertension is not significant, $r = -.003$, $p = .87$

Pearson-correlation coefficient for correlation of the duration of ulcer before intervention and ulcer healing time is positive but the relationship between the variables is weak, $r = .47$

RESULTS

Table 1:Gender distribution of study subjects

Gender	Number of subjects	Percentage
Female	20	40%
Male	30	60%
Total	50	100

Table 2

Parameter	Group A(study)	Group B(Control)
Initail surface area of wound	25.53+/- 12.92	26.91+/- 14.08
Surface area of wound after 6 weeks	3.94+/- 4.08	23.07+/- 14.40
Percentage reduction of wound size 6 weeks later	84.54%	14.27%

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Patient in study group at week 0

Patient in study group at week 6

DISCUSSION

- PRF was initially developed in the dental world as an inexpensive and user-friendly surgical adjuvant to improve healing and promote tissue regeneration, particularly in oral surgery and implant dentistry
- The use of platelet-rich fibrin (PRF) is emphasized for complex wounds as an alternative, simple, inexpensive, time-saving process that does not require hospitalization
- It has a healing potential over that of bare soft tissue, including bone, tendon, and ligaments
- Platelet concentrates have been widely used in regenerative medicine to promote wound healing as they contain various growth factors(1).
- Somani A et al [(1).,] conducted a randomized control trail to compare the efficacy of autologous PRF versus saline dressings in chronic venous leg ulcers. After 4 weeks of treatment, the mean reduction in the area of the ulcer size in PRF group was 85.51%, and the mean reduction in the area of the ulcer size in Saline group was 42.74% which was statistically significant with a $P < 0.001$ and $t = 4.11$
- Pinto et a [(3).], of the 44 non-healing ulcers treated with PRF, 29 ulcers (17 venous leg ulcers, 10 diabetic ulcers and 2 complex wounds) showed full closure in 3 months, and the remaining ulcers showed significant improvement in the size of ulcer
- Growth factors released include VEGF, PDGF, TGF-β, EGF, IGF-I, HGF [(4)]
    - Cytokines such as IL-1, IL-6, IL-4, and IL-10
    - Chemotactic molecules such as chemokine ligand-5 (CCL-5) and eotaxin(7).
- *in vitro,* PRF causes a strong stimulation of proliferation of fibroblasts, prekeratinocytes, preadipocytes, osteoblasts, and mesenchymal stem cells and also a stimulation of differentiation of bone cells

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- The TGF-β, PDGF, VEGF, eotaxin, and CCL-5 released by the leukocytes promote local vascularization and tissue repairing, mainly due to the control of the inflammatory process by anti-inflammatory cytokines IL-4, IL-6, and IL-10 also having an antimicrobial potential [5]
- Ozer K et al [6]., 3 acute wounds and 14 chronic wounds showed complete healing with PRF over a varied duration of time

CONCLUSION

Platelet rich fibrin a safe, easy, inexpensive , painless and can be performed as an outpatient procedure. We would conclude that the use of PRF dressings as an adjuvant therapy in treating chronic ulcer shows great potential to heal ulcers and can successfully be used as a routine procedure in the management and potential alternative that can be used to treat non-healing ulcers of varied etiology.

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