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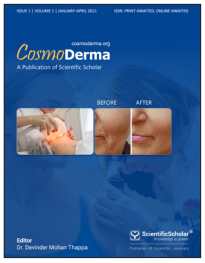

Original Article

The contribution of platelet-rich plasma in the management of leg ulcers

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ABSTRACT

Objectives: The objectives of the study are to evaluate the efficacy and safety of perilesional platelet-rich plasma (PRP) injections combined with PRP-impregnated dressings in accelerating healing and reducing pain in chronic leg ulcers compared with standard care.

Materials and Methods: This single-center, double-blind, randomized controlled trial enrolled 60 adults (17–68 years) with non-healing leg ulcers of 1–7 months' duration. Participants were randomized (1:1) into two groups: (1) PRP group (n = 30), receiving monthly perilesional PRP injections (5 mL) for 3 months plus twice-weekly PRP-soaked dressings until closure, and (2) Control group (n = 30), receiving twice-weekly standard sterile dressings. The primary outcomes were the healing rate (complete epithelialization at 12 months) and the mean healing time. The secondary outcome was pain reduction, assessed with the Visual Analog Scale (VAS). Data were analyzed using the Chi-square test, t-test, or Mann–Whitney U test, with $P < 0.05$ considered significant.

Results: All 60 patients completed the study. Healing was achieved in 79% of the PRP group compared to 52% of the controls (P = 0.02). Mean healing time was significantly shorter with PRP (7.0 ± 1.2 months) than with standard dressings (12.9 ± 1.5 months; $P < 0.001$). Pain scores decreased more substantially in the PRP group (Δ – 6.0, final VAS 2.0 ± 0.6) compared with controls (Δ – 4.0, final VAS 4.0 ± 0.9; $P < 0.001$). No serious adverse events occurred; minor transient injection-site discomfort was reported in four patients.

Conclusion: Adjunctive PRP therapy significantly accelerates ulcer closure and enhances pain relief compared with conventional dressings, achieving a 79% healing rate within 7 months and a mean VAS reduction of 6 points. PRP represents a safe and cost-efficient alternative for chronic leg ulcer management. Larger multicenter trials are warranted to validate these findings and optimize treatment protocols.

Keywords: Cutaneous wound healing, Leg ulcers, Pain assessment, Visual Analog Scale, Platelet-rich plasma, Tissue regeneration

INTRODUCTION

Chronic leg ulcers affect up to 1% of older adults and impose considerable pain, infection risk, and healthcare costs. Conventional therapies – compression, debridement, and dressings – often yield slow or incomplete healing. Platelet-rich plasma (PRP) is an autologous concentrate rich in growth factors (platelet-derived growth factor, transforming growth factor-beta, vascular endothelial growth factor) that stimulate angiogenesis, cell proliferation, and collagen synthesis.[1] Its regenerative potential has been explored in dermatology, rheumatology, and ophthalmology.[2] We hypothesized that combining perilesional PRP injections with PRP-impregnated dressings would accelerate ulcer healing and alleviate pain compared to standard care.

MATERIALS AND METHODS

Study design and population

This single-center, double-blind, prospective randomized trial enrolled 60 adults (17–68 years) with non-healing leg ulcers (duration 1–7 months) between October 2021 and October 2023. Exclusion criteria: Active infection, coagulopathy, malignancy, or immunosuppression. Ethical approval for my study was obtained from the relevant committee, and all patients were informed about the study procedure, from whom we subsequently obtained informed consent.

Randomization and intervention

Participants were randomized (1:1) through a computer-generated sequence into:

- PRP group ($n = 30$): 20 mL autologous blood centrifuged at 1,500 g for 10 min to yield PRP. Monthly perilesional injections (total 5 mL) for 3 months, plus twice-weekly PRP-soaked dressings until closure
- Control group ($n = 30$): Twice-weekly standard sterile dressings.

Outcomes

- Primary: Healing rate (complete epithelialization by 12 months) and mean healing time (months).
- Secondary: Pain reduction through Visual Analog Scale (VAS; 0–10).

Ulcer area was measured monthly by planimetric tracing. Comorbidities (diabetes and hypertension) and ulcer etiology were recorded.

Statistical analysis

Categorical data: Chi-square or Fisher's exact test. Continuous variables: Student's *t*-test (normal distribution) or Mann–Whitney U test. Significance set at $P < 0.05$. Analyses were conducted with the Statistical Package for the Social Sciences version 25.

RESULTS

A total of 60 patients (mean age, 42.3 ± 12.4 years; range, 17–68 years) completed the study. Comorbidities were balanced between groups (25% diabetes, 6.3% hypertension). Ulcer etiologies included venous [Figure 1] (56.3%), arterial (15.6%), and traumatic [Figure 2] or burn-related (28.1%).

- Healing rate: In the PRP group, 24 of 30 patients (79 %) achieved full epithelialization within 12 months, compared to 16 of 30 patients (52 %) [Figure 3] in the control arm ($\chi^2 = 5.12$; $P = 0.02$).

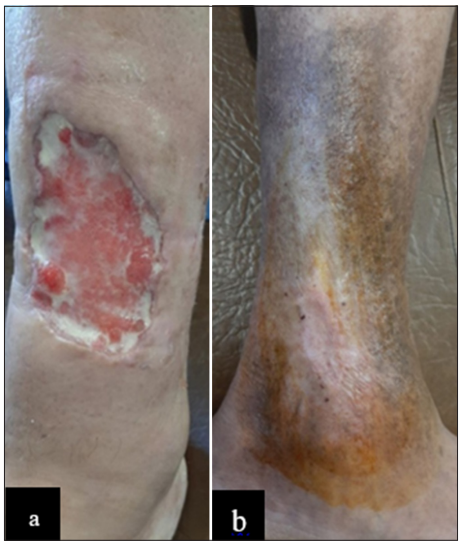

Figure 1: A 50-year-old patient with a venous leg ulcer. (a) Initial photograph. (b) Photograph after 6 platelet-rich plasma sessions.

Figure 2: A 23-year-old patient with a chronic post-traumatic ulcers. (a) Initial photograph. (b) Photograph after 5 platelet-rich plasma sessions.

Figure 3: A 69-year-old man with arterial ulcers who had undergone directed wound healing. (a) Initial photograph. (b) Photograph after 4 months of directed wound healing.

- Healing time: Mean time to complete closure was significantly shorter with PRP (7.0 ± 1.2 months) than

with standard dressings (12.9 ± 1.5 months), yielding a between-group difference of 5.9 months (t = 9.76; $P < 0.001$).

- Pain reduction: Baseline VAS pain scores were identical (8.0 ± 0.8). At 12 months, the PRP group reported a mean VAS of 2.0 ± 0.6 (Δ – 6.0), whereas controls scored 4.0 ± 0.9 (Δ – 4.0). The greater reduction in the PRP arm was highly significant (t = 10.23; $P < 0.001$).
- Safety: No serious adverse events or PRP-related complications occurred. Minor transient discomfort at injection sites was reported by four patients and resolved within 48 h.

DISCUSSION

Our findings demonstrate that adjunctive PRP therapy markedly improves both the speed and success of wound closure in chronic leg ulcers compared to conventional dressing alone. The 79 % healing rate and 7-month mean closure time in the PRP arm substantially exceed those seen with standard care, underscoring PRP's capacity to stimulate ulcer resolution. These results align with previous studies in diabetic foot and venous leg ulcer populations, where PRP enhanced angiogenesis, fibroblast proliferation, and collagen deposition.[3]

Importantly, the pronounced analgesic effect (mean VAS reduction of 6 points) suggests that PRP's anti-inflammatory cytokines and growth factors may also attenuate nociceptive signaling, thereby improving patient comfort and adherence to care. Faster healing coupled with superior pain control could reduce overall healthcare utilization by decreasing dressing changes, clinic visits, and complication rates such as secondary infections or chronicity.[4,5]

While our single-center design and moderate sample size limit generalizability, the robustness of our results – demonstrated by highly significant *P*-values across all endpoints – supports PRP's therapeutic role. Future multicenter trials should explore optimal dosing schedules, cost–cost-effectiveness analyses, and long-term recurrence rates. In addition, mechanistic studies investigating PRP's modulatory effects on inflammatory mediators and neural pain pathways would further elucidate its dual regenerative–analgesic properties.

CONCLUSION

Perilesional PRP injections combined with PRP-soaked dressings significantly accelerate healing and produce superior pain relief in chronic leg ulcers compared to standard care. With a 79% closure rate achieved in just 7 months and a mean VAS reduction of 6 points, PRP offers a safe, cost-efficient therapeutic alternative. These robust findings, backed by rigorous randomization and highly significant P-values, support the integration of PRP into routine ulcer management. Larger, multicenter studies are needed to refine dosing protocols and confirm the long-term durability of benefits.

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Ethical approval: The study was approved by the Institutional Review board at University Hospital Center Mohammed VI, number AC185NV/2025, Dated 26 November 2025.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent.

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