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CASE REPORT

Early Adjunctive Use of Injectable Platelet-Rich Fibrin for Hypertrophic Scar Modulation at a Full-Thickness Skin Graft Donor Site

Sriram V S[1], Amelia Lalthatluangi[2], Ravi Kumar Chittoria[3]

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ABSTRACT

Hypertrophic scarring is a common complication of wound healing, causing aesthetic disfigurement and functional impairment. Injectable platelet-rich fibrin (i-PRF) provides sustained growth factor release that enhances tissue regeneration and healing. We report a 38-year-old woman who underwent full-thickness skin graft harvest from the right groin. At suture removal, the donor-site scar showed early hypertrophic change [Vancouver Scar Scale (VSS)[5]], prompting intradermal i-PRF injection. i-PRF was prepared from 10 mL of venous blood by low-speed centrifugation (700 rpm, 3 minutes) without anticoagulants; 1.5 mL was injected along the scar by multipuncture technique. The postoperative course was uneventful, with no adverse effects attributable to i-PRF. Scar vascularity, pliability, and height progressively improved, and VSS fell from 5 to 3, with satisfactory cosmetic outcome. Although limited by its single-patient design, this report suggests i-PRF as a safe, cost-effective adjunct for early hypertrophic scar modulation. Controlled studies are warranted.

KEYWORDS

• PRF (injectable platelet-rich fibrin) • Hypertrophic scar • Scar modulation • Regenerative medicine

AUTHOR'S AFFILIATION:

[1]Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India.

[2]Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India.

[3] Professor and Associate Dean (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, JIPMER, Pondicherry, India.

CORRESPONDING AUTHOR:

Ravi Kumar Chittoria, Professor and Associate Dean (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, JIPMER, Pondicherry, India.

E-mail: drchittoria@yahoo.com

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INTRODUCTION

Hypertrophic scars result from excessive fibroblast activity and abnormal collagen deposition during wound healing. They may lead to aesthetic deformity, pruritus, pain, and functional impairment. Despite numerous preventive strategies including silicone therapy, pressure therapy, corticosteroid injections, and laser treatment, prevention of hypertrophic scarring remains challenging.

Recent advances in regenerative medicine have focused on autologous platelet concentrates as biological modulators of wound healing. Injectable platelet-rich fibrin (i-PRF) is produced using a low-speed centrifugation concept that preserves platelets, leukocytes, and fibrinogen within a liquid matrix.[1] Unlike platelet-rich plasma, i-PRF does not require anticoagulants and permits a slower, sustained release of growth factors including platelet-derived growth factor, transforming growth factor-β, epidermal growth factor, and insulin-like growth factor. Experimental studies have demonstrated enhanced fibroblast migration, collagen synthesis, angiogenesis, and tissue regeneration.[2] These properties suggest a potential role not only in wound healing but also in prevention of pathological scar formation through modulation of the remodeling phase of healing. This report describes the early adjunctive use of i-PRF for modulation of hypertrophic scar formation identified during surgical wound healing.

CASE REPORT

A 38-year-old woman underwent full-thickness skin graft harvest from the right groin. The donor-site wound measured approximately 6 × 2 cm and was closed primarily using interrupted polypropylene sutures (Figure 1).



Figure 1: Clinical photograph of scar showing early hypertrophic changes

Given the early hypertrophic changes noted in the donor-site scar, autologous i-PRF therapy was planned as an early modulatory intervention.

Preparation of i-PRF: i-PRF was prepared from 10 mL of venous blood by low-speed centrifugation (700 rpm, 3 minutes) without anticoagulant, yielding approximately 1–2 mL of the upper plasma layer, which was used within 10 minutes of preparation (Figure 2; Figure 3).

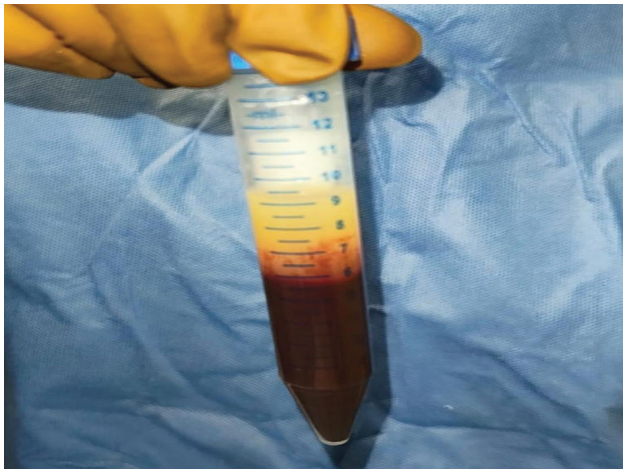


Figure 3: Injectable platelet-rich fibrin after centrifugation

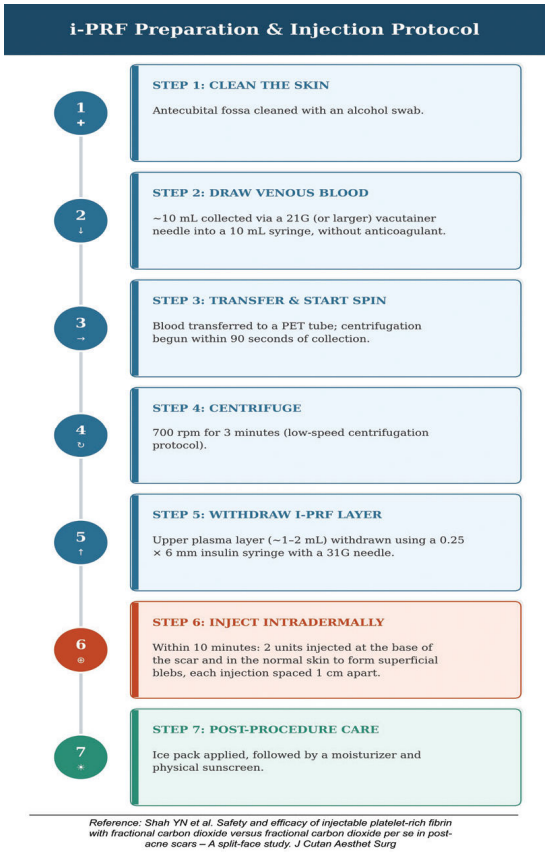


Figure 2: Schematic of the injectable platelet-rich fibrin (i-PRF) preparation and injection protocol

Administration: At the time of suture removal, approximately 1.5 mL of i-PRF was injected intradermally along the donor-site scar using a multipuncture technique, administered as a single treatment session with no repeat injections (Figure 2 & 4). Post-procedure care included an ice pack, a moisturizer, and physical sunscreen.



Figure 4: Intradermal administration of injectable platelet-rich fibrin

Follow-up: The patient was reviewed periodically. Scar assessment included evaluation of thickness, vascularity, pigmentation, pliability, symptoms, and serial photographic documentation. Scar severity was assessed using the Vancouver Scar Scale (VSS).

Wound healing progressed uneventfully. No wound dehiscence, infection, hematoma, or adverse effects related to i-PRF administration were observed. At 2 months, the scar demonstrated reduced erythema, minimal elevation above surrounding skin, and improved pliability. The VSS score improved from 5 at baseline to 3 during follow-up. Clinical photographs demonstrated progressive scar maturation and reduction in features suggestive of hypertrophic scar development (Figure 5).

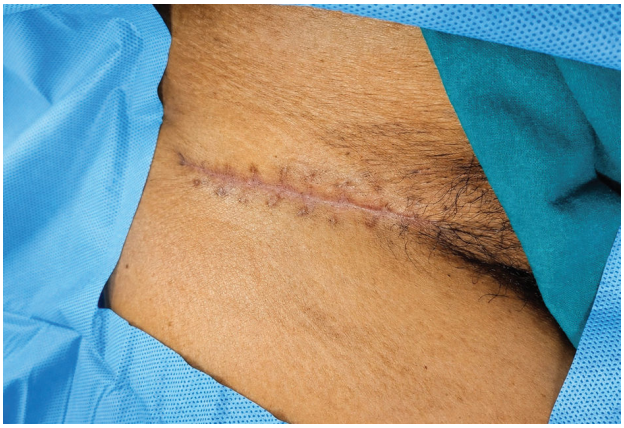


Figure 5: Clinical photograph of scar at 2-month follow-up

DISCUSSION

Prevention and early control of hypertrophic scarring remain important objectives in reconstructive and aesthetic surgery, particularly when abnormal features are identified before a scar has fully matured. Excessive inflammation, prolonged fibroblast activation, and dysregulated collagen deposition contribute to pathological scar formation.

i-PRF belongs to the family of leukocyte- and platelet-rich fibrin concentrates within the broader classification of autologous platelet concentrates,[3] and may favorably influence these processes through sustained delivery of growth factors, cytokines, platelets, and leukocytes. Unlike platelet-rich plasma, which releases growth factors rapidly after activation, i-PRF provides a fibrin matrix that allows gradual and prolonged release of bioactive mediators. Experimental studies have demonstrated enhanced fibroblast migration, increased collagen synthesis, and improved angiogenesis, thereby supporting tissue regeneration and scar remodeling.

Clinical studies evaluating i-PRF in dermatology have reported favorable results. In combination with microneedling, i-PRF improved acne scar scores and patient-reported quality of life compared with microneedling alone.[2] Fluid PRF has also shown efficacy comparable to platelet-rich plasma in atrophic acne scars,[4] and similar benefit has been reported when i-PRF is combined with fractional carbon dioxide laser resurfacing for post-acne scarring;[6] regenerative applications of i-PRF extend beyond dermatology into periodontal and oral tissue regeneration as well.[5] Although these studies primarily addressed atrophic rather than hypertrophic scars, the underlying regenerative mechanisms suggest a plausible role for i-PRF in modulating pathological scar formation more broadly.

In the present case, i-PRF was administered at the earliest clinical signs of hypertrophic change—an elevated, vascular scar identified at the time of suture removal—rather than before any change had occurred. This represents early therapeutic modulation rather than primary prevention, and the two should not be conflated when interpreting the outcome. The subsequent improvement in VSS score may be attributable to enhanced wound healing, improved angiogenesis, and

modulation of collagen remodeling, but the absence of a comparator scar and the short follow-up period preclude any definitive conclusion regarding efficacy.

Standard preventive and early-intervention strategies for hypertrophic scarring—silicone gel sheeting, pressure therapy, and intralesional corticosteroid injection—are well established but each carries drawbacks: silicone and pressure therapy require prolonged patient adherence, and corticosteroid injection carries risks of dermal atrophy, telangiectasia, and pigmentary change. i-PRF, prepared from a small volume of the patient's own blood without additives, may offer a comparably accessible option, although it has not been directly compared with these modalities in a controlled setting.

This report has several limitations. It describes a single patient and a single i-PRF injection session, without a control or comparator scar. Follow-up was limited to two months, which is insufficient to confirm durable prevention of hypertrophic progression, and VSS scoring was performed by the treating team rather than a blinded assessor. These factors limit the strength of any causal inference between i-PRF administration and the observed scar improvement.

Injectable platelet-rich fibrin appears to be a promising autologous adjunct for early modulation of hypertrophic scar formation. Its ease of preparation, favorable safety profile, and regenerative potential make it an attractive option in reconstructive and aesthetic surgery, though its role relative to established preventive modalities remains to be defined. Controlled clinical studies with longer follow-up are warranted.

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