



Autologous Platelet Rich Plasma Assisted Full Thickness Skin Grafting: A Case Report

Ravi Kumar Chittoria*, Padmalakshmi Bharathi Mohan, Abhinav Aggarwal, Saurabh Gupta, Chirra Likhitha Reddy, Shijina K and Imran Pathan

Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Education and Research (JIPMER), India

Abstract

Skin grafting is an age old procedure which has been used for wound coverage. Skin grafting may be of various types like partial thickness or full thickness based on the thickness of the dermis that has been harvested along with the epidermis. Various techniques have been used to improve the take of the graft. In this article we would like to report a case of Post burn contracture released and raw area covered with FTSG, whose take was enhanced with the help of autologous platelet rich plasma.

Keywords: Platelet; Full thickness grafting; APRP

Introduction

Autologous platelet rich plasma as the name suggests is concentration of the patient's own platelets in a small amount of plasma. It is enriched by growth factors and it acts as a fibrin sealant and has various properties. It's important application is in skin grafting where it aids as a fibrin sealant and also aids in the take of the graft by enriching it with growth factors and promoting angiogenesis. Skin grafting is the gold standard for the treatment of a raw area. Skin grafting can be partial thickness or full thickness grafts, and are utilized depending on the necessities. The take of the graft are affected by various factors, including wound bed nutrition, mobility of the graft. In order to increase the take of the Full thickness grafts, suturing edge to edge with the wound bed to ensure immobility and nourishment from the wound edges, and additional immobilization with bolster sutures have been described. In this case report we would like to describe the utilization of autologous platelet rich plasma as an adjunct to enhance the take of the full thickness graft, in a case of Post burn contracture of finger release and cover of raw area with full thickness graft.

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*Correspondence:

Ravi Kumar Chittoria, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Education and Research (JIPMER), Puducherry, India, Tel: +91-9442285670;

E-mail: drchittoria@yahoo.com

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Materials and Methods

This study was conducted in the Department of Plastic Surgery, in a tertiary care hospital in Pondicherry.

The patient was a 19 year old girl, with history of thermal flame burns to her right hand at 3 years of age, following which she had developed post burn contractures.

On examination she had Flexion contractures of right index, middle, ring and little finger at the level of proximal to distal interphalangeal joint. Staged reconstruction was planned. After releasing the contractures, the raw area was enriched with Autologous Platelet rich plasma. Steps of Autologous platelet rich plasma preparation were as follows. 10 ml of the patient's heparinised venous blood was taken and was centrifuged at 3000 rpm for 10 min. The upper layer off of the three layers was taken and recentrifuged at 4000 rpm for 10 min. After this step, the content had been separated into two layers. The bottom layer of the plasma was rich in platelets and was aspirated using 18 g needle and was used to mix with the wound and to inject into the wound bed. Other adjunctive methods like Low level laser therapy was also used to aid in graft take. The Full thickness skin graft, harvested from the groin was then fixed and bolsters applied. Immobilization of the hand was done in the form of external splinting. Post procedure, first look of the graft was done on 5th postoperative day and sequential dressings were done. Graft take was 100% in all the fingers (Figure 1-3).

Discussion

Grafts are tissues that are transferred without their blood supply, which therefore have to revascularize once they are in a new site [1]. Skin graft can be partial or full thickness depending on the thickness of the dermis harvested along with it. An indication of partial thickness and full



Figure 1: Post contracture release raw area bed enriched with APRP prior to Full Thickness skin graft fixation.



Figure 2: Fixed Full thickness skin graft.

thickness skin graft varies. Full-thickness skin grafts are indicated for small avascular areas less than 1 cm or for larger areas with good blood supply as the metabolic demands of the additional adnexal structures of FTSG increase the likelihood of necrosis [2]. Full thickness skin grafts, unlike partial thickness grafts takes less readily than the split skin graft, and before it can be used successfully, conditions have to be optimal. Various factors aid in the take of full thickness skin graft, including accurate fitting to the defect, edge to edge approximation with the wound bed, and thorough defatting of the under surface of the graft, proper immobilization. In spite of all these methods, sometimes the take of Full thickness grafts are not satisfactory. Hence the use of Autologous Platelet rich plasma has been described. Normal platelet counts in blood range from approximately 1,50,000 to 4,50,000/cum³, whereas Platelet Rich Plasma (PRP) contains platelet concentration above baseline compared to same quantity of whole blood [3]. Autologous platelet rich plasma acts by various methods. It mimics the final step of coagulation cascade and thereby provides immediate adequate hemostasis. It also brings instant adhesion to the graft bed, thereby preventing any collection under the graft [4,5]. Autologous platelet rich plasma also contains various growth factors like insulin-like growth factor 1 (IGF-1), transforming growth factor (TGF), platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), epidermal growth factor (EGF), and vascular endothelial growth factor (VEGF) which aid in graft nourishment and thereby improving the take of the graft [6,7]. APRP has been described for various uses like, adjunct to early tangential excision in burns [8], in holistic approach for non-healing wounds [9], in Fournier's gangrene for wound bed preparation [10], a major advantage of using of autologous platelet rich plasma is that it is taken



Figure 3: Post Full thickness skin graft take.

from the patient itself, and thereby it avoids any change of allergic reaction. It is also cost effective, and by improving the take of FTSG, it decreases hospital stay for the patient, and thereby decreasing the patient morbidity.

Conclusion

Autologous PRP has large potential and practical benefits which improved the outcome of graft take on wounds. It is found to be highly beneficial in many aspects both to the patient and surgeon. A large multicentric randomized control trial is required to validate the same.

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