Original Article

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Role of Autologous Platelet Rich Plasma in Tangential Excision and Skin Grafting in Pediatric Scald Burns

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Abstract

Autologous plasma rich plasma (APRP) is an increasingly popular adjunct in surgical, medical and aesthetic interventions. Their beneficial effects lie in their ability to deliver a high concentrate of growth factors.In our study APRP was utilised in a child with scald burns to evaluate the efficacy and mechanism of action of APRP in successful take of a split skin graft.

Keyword: Autologous plasma, Rich plasma, Scaldburns, Grafting

Introduction

Autologous Platelet Rich Plasma is a blood product rich inplatelets, growth factors and chemokines. Since 1990s role of PRP is being discussed as an agent in tissue repair.[1] Now a days it is widely studied for its role in wound healing.[2] Split skin thickness grafts (STSG) are resurfacing procedures in plastic surgery and itmainly depends on wound bed preparation. Skin graft take involves plasma imbibition, inosculation and neovascularization. A susscessful take of graft depends on wound bed vascular status, micro environment and adequate hemostasis. APRP being rich in platelets augments healing process by platelet plug formation, conversion of fibrinogen to fibrin which in turn helps in adhesion of graft and provides a stable fixation. The growth factors from APRP promote angiogenesis and collagen deposition augmenting take of graft. Here in this study, we are evaluating the effect of APRP in successful take of a STSG in a child with scald burns.

Materials and methods

This study was conducted in tertiary care centre in department of plastic surgery after getting the department ethical committee approval. Informed consent was obtained for examination and clinical photography. One year old child presented with accidental scald burns over right upper limb and trunk (Fig. 1). Child was treated with tangential excision (Fig. 2) and split thickness skin graft.

Wound bed for the graft was prepared by injecting APRP into the wound (Fig. 3). The split skin graft was taken from right thigh of child and grafted into the scald burn (Fig. 4).

Autologous platelet rich plasma (APRP) obtained by standard double centrifugation protocol using 10cc of the patient's blood. Blood was separated into 3 layers namely Platelet poor plasma (PPP) at top, PRP in middle and RBC at bottom. RBC and PPP are discarded sequentially. PRP obtained was added with thrombin. The obtained APRP was injected into scald burns after tangential excision (Fig.

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Fig. 1: Child with scald burns

Fig. 2: Tangential excision being done

Fig. 3: Autologous Platelet Rich Plasma being injected into wound

Fig. 4: Split thickness skin graft being applied

Results

After 14 days of tangential excision and skin grafting with APRP, there was good take of graft without any local adverse effects (Fig. 5)

Discussion

Autologous platelet rich plasma (APRP) as the name implies refers to the plasma derived from the patient's own blood with a platelet count higher than the platelet count in the peripheral blood of the patient. Historically having been used to treat thrombocytopenia, the use in other specialties became widespread with its use in sports medicine to treat musculoskeletal injuries[3]. Its use in wound management results from the observation that wounds have a pro inflammatory environment that impairs healing. In addition, wounds have a high protease activity that impairs functioning of growth factors. APRP used in a chronic wound serves as a source of growth factors and hence has mitogenic, angiogenic and chemotactic properties. APRP has also been shown to stimulate human dermal fibroblast proliferation and thus increasing the deposition of TYPE I collagen, the above mechanism being proposed to its use in scar management. Application of activated APRP also provides 5 to 10 times the normal concentration of growth factors that include PDGF, VEGF, TGF-β locally also accelerating wound healing. Addition of calcium salts also helps in activation of platelets.Skin graft take involves plasma imbibition, inosculation and neovascularization. A susscessful take of graft depends on wound bed vascular status, micro environment and adequate hemostasis. APRP being rich in platelets augments healing process by platelet plug formation, conversion of fibrinogen to fibrin which in turn helps in adhesion of graft and provides a stable fixation. The growth factors from APRP promote angiogenesis and collagen deposition augmenting take of graft.

Conclusion

Autologous platelet rich plasma is an effective measure in enhancing graft takeand is a good choice for wound bed preparation in skin grafting provided the patient has a good functional status and surface area to be treated is small.

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