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LET'S HEAR FROM A COLLEAGUE

The role of skin punch grafting with plasma-rich plasma injection on stable segmental vitiligo

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ABSTRACT

Vitiligo is a non-communicable, chronic skin condition that has psychosocial effects for the patient. The case of an otherwise healthy skin phototype IV Filipino male with a two-year history of stable vitiligo is presented here. Three sessions of skin punch grafting and platelet-rich plasma injection under local anesthetic were done on the patient three months apart, resulting in excellent cosmetic results and patient satisfaction.

KEYWORDS plasma-rich plasma, vitiligo, skin punch grafting

INTRODUCTION

Vitiligo is an acquired pigmentary disorder resulting in depigmentation in different areas of the skin. A variety of causes contribute to its etiology. This includes an inherent genetic predisposition, environmental factors, and oxidative stress. There are various genetic protein malfunctions that cause abnormal melanocyte metabolism resulting in depigmentation. The various proteins involved are tyrosinase, TRP1 (tryptophan1), XBP1 (Xbox Binding Protein1), CCR6 (CCMotif Chemokine Receptor 6), NLRP1 (NLR Family Pyrin Domain Containing 1), IL-2RA(Interleukin 2RA), PTPN22 (Protein Tyrosine Phosphatases Family) N22 and FOXP3 (Forkhead Box Protein 3).[1]

Research shows that vitiligo has psychosocial effects, especially on the skin of color. In a study from India, the daily life quality index score showed that 47% of affected vitiligo patients experience a moderate to significant impact of the disease on their lives.[2] While in Thailand, where patients have skin color close to that of Filipinos, a study showed that patients with new lesions are 4.12 times likely to be depressed compared to those without lesions.[3] Thus, it is essential to offer methods that can hasten the treatment of this condition.

THE PROCEDURE

SKIN PUNCH GRAFTING AND PLATELET-RICH PLASMA INJECTION

Narrow-band ultraviolet B and excimer laser are well-established treatment options for vitiligo. In the case of our patient, he underwent more than 50 sessions of excimer laser and thrice-weekly narrow-band ultraviolet B treatment for 2 years. The treatment result from these two methods plateaued.

Grafting skin from non-affected areas allow melanocytes to be transferred onto the vitiliginous areas. These melanocytes must be kept viable by suspending in 0.9% sodium chloride solution isotonic with human plasma. Melanocyte differentiation is enhanced by the injection of platelet-rich plasma on the affected area.

Platelet-rich plasma is an increased concentration of autologous platelets suspended in a small amount of plasma. The production of platelet-rich plasma starts with harvesting 30-50 mL of venous blood on the same day as the procedure. Then, alpha granules are stabilized to prevent premature secretion by adding anticoagulants before centrifugation.[4,5] At the Cellular Therapeutics Laboratory, pure platelet-rich plasma, a leucocyte-poor platelet-rich plasma with a low-density fibrin network after activation, is obtained and brought to the procedure site using a cold chain. For the face, 3 milliliters of pure platelet-rich plasma is used per procedure.

With the secretion of platelet's alpha granules, platelet-rich plasma increases the release of growth factors, adhesion molecules, and chemokines, which promote cell growth and differentiation of melanocytes in the local environment of the vitiliginous skin. The major growth factors secreted by the alpha granules are platelet-derived growth factor (PDGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), fibroblast growth factor (FGF), connective tissue growth factor (CTGF) and insulin-like growth factor-1 (IGF-1). In addition, platelets may release numerous anti-inflammatory cytokines, such as

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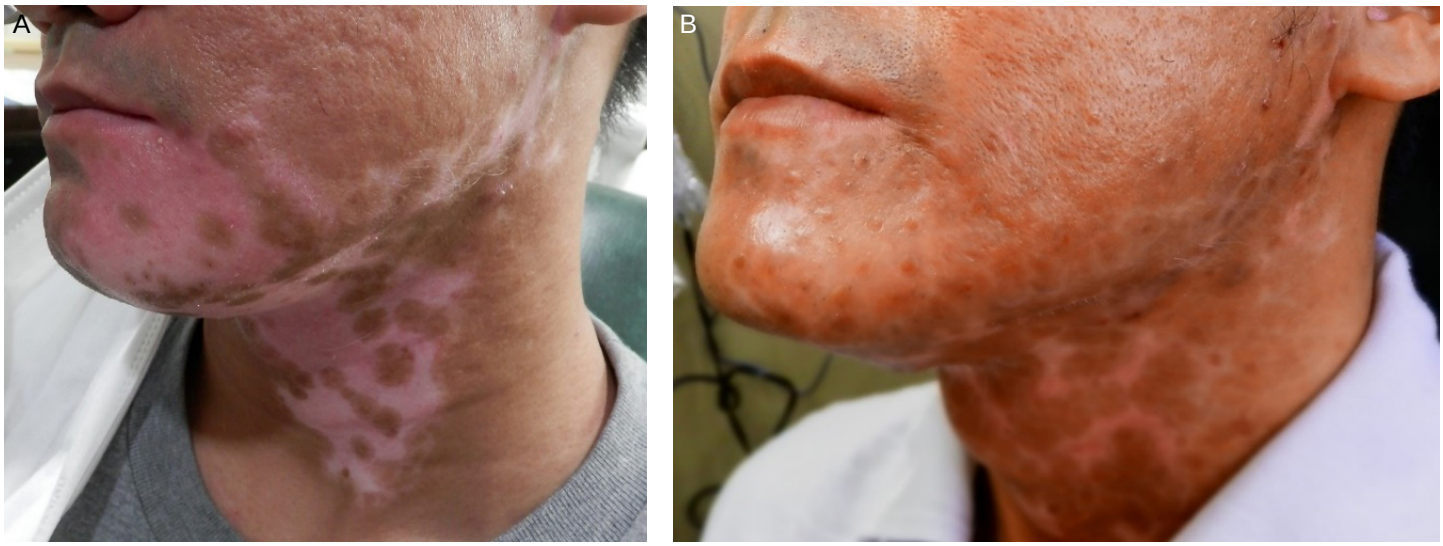

Figure 1. **A.** Chin before skin punch grafting and platelet rich plasma injection. **B.** Chin after two sessions of skin punch grafting and platelet rich plasma injection.

IL-1 receptor antagonist (IL-1ra), soluble tumor necrosis factor (TNF) receptor (sTNF-R), and interferon γ.[5]

During the consultation, it is essential to establish trust and rapport. Valuable insights obtained are medical history, including allergies, and intake of blood thinners. Once consent is secured, give preoperative instructions and prescribe sodium ascorbate 500 mg tablet daily, an oral antibiotic, and tranexamic acid 500 mg tablet on the morning before the procedure. In addition, during the COVID-19 pandemic, a COVID-19 RT-PCR test is required of the patient 48 hours prior to the procedure.

The following are the steps in skin punch grafting with platelet-rich plasma injection.

1. Harvest the blood and secure platelet-rich plasma in cold storage at 4 degrees Celsius.[7]
2. Mark the recipient sites.
3. Sterilize the area with 7.5% iodine scrub solution thrice and 10% iodine antiseptic solution 10% thrice.
4. Anesthetize the donor area using a local anesthetic composed of 1% lidocaine with epinephrine buffered with sodium bicarbonate.
5. Harvest the normal skin from the donor area on the abdomen using a 4-mm punch and soak the grafts in 0.9% sodium chloride solution.[6]
6. Remove the vitiliginous skin from the recipient site.
7. Insert the donor skin graft into the recipient site
8. Suture the grafts onto the recipient sites using a nylon 6-0 suture with P3 Needle. One may also use cyanoacrylate skin glue if it is available.
9. Inject the three vials of platelet-rich plasma using a gauge 30 needle.
10. Dress the donor and recipient sites using non-adhesive sterile dressing and 2% mupirocin ointment.

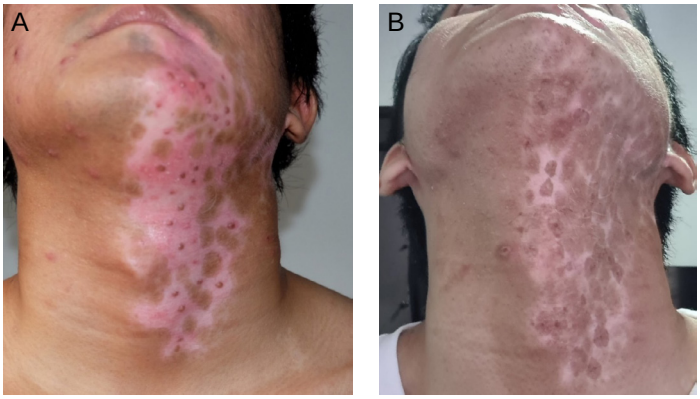

Figure 2. **A.** Neck two weeks after first session of skin punch grafting and platelet rich plasma injection. **B.** Neck three months after third session of skin punch grafting and platelet rich plasma.

Post-operative medication includes paracetamol 500 mg tablet thrice-daily for five days, tranexamic acid 500 mg tablet twice a day for three to five days, and an oral antibiotic of choice to reduce bacterial colonization on both the recipient and donor sites. Initial follow-up was done two days after the procedure for a change of dressing. Sutures were removed after seven days. The patient was instructed on daily wound care with

zinc oxide cream. Two weeks after each procedure, the patient was instructed to do narrow-band UVB treatment twice a week. Follow-up of the patient after three procedures done at three-month intervals show almost complete repigmentation (Figures 1 and 2).

CONCLUSION

Skin punch grafting and platelet-rich plasma injection, combined with narrow-band-ultraviolet B phototherapy, shows good results in providing a viable treatment option for stable patients in the outpatient dermatology clinic setting with minimal downtime.

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