

Brief Report

Keratinocyte-Melanocyte graft technique followed by PUVA therapy for stable vitiligo

Dilip Kachhawa, Gyaneshwar Kalla

Department of Dermatology, Venereology and Leprosy, Dr. S. N. Medical College, Jodhpur (Rajasthan), India

Address for correspondence: Dilip Kachhawa, III/1, Inside main gate, Mathura Das Mathur Hospital, Jodhpur (Rajasthan)- 342 003, India.
E-mail: drdilipkachhawa@hotmail.com

ABSTRACT

Background: Various surgical procedures for correcting stable vitiligo exist but these have their own limitations. Autologous, non-cultured, non-trypsinized, melanocyte plus keratinocyte grafting is a new and simple method of vitiligo surgery. **Objective:** The study aimed to evaluate efficacy of a new grafting technique in vitiligo patches. **Methods:** Eighteen vitiligo patches underwent this procedure. The upper layer of epidermis was removed by superficial dermabrasion using a dermabrader micromotor until the epidermis appeared wet and shiny. Then, antibiotic ointment was applied and dermabrasion was continued up to the whitish area of the upper dermis. The paste-like material (ointment with entangled epidermal particles) was collected and spread over the dermabraded recipient site. **Results:** Pigmentation usually started at 4–6 weeks. Complete uniform pigmentation took 16–20 weeks. **Conclusion:** For smaller vitiligo patches this method gives cosmetically acceptable results. It is easy to perform and does not require specific laboratory setup.

Key Words: Melanocytes, Keratinocytes, Non-trypsinised autologous, Vitiligo surgery

INTRODUCTION

Vitiligo causes significant psychological impact and cosmetic disfigurement. Vitiligo patients resistant to medical therapy pose a therapeutic problem to physicians. There are various surgical procedures for correcting stable vitiligo (no expansion of existing lesions and no new lesions in the last six months). Thiersch graft, first used by Behl PN in vitiligo,^[1] minigrafts, epidermal grafts, punch grafts, suction blister grafts, melanocyte culture and transfer^[2] and autologous non-cultured melanocytes grafting are some of such surgical procedures.^[3] Autologous, non-cultured, non-trypsinized, melanocyte plus keratinocyte grafting is a simple method of melanocyte transfer. The concept of this technique was established when the author was dermabrading the acne scarred facial skin. During the procedure it was observed that tiny particles were hitting the face. On close inspection these were found to be skin particles formed by the action of fraise of dermabrader. Therefore, the thought of collecting these skin particles for use in vitiligo as grafting material was entertained, because of the prospect of presence of melanocytes in them.

METHODS

Vitiligo patients from our OPD were initially treated with oral and topical steroids and/or PUVA/PUVASOL and/or topical tacrolimus 0.1% ointment, etc. for 6 months to 3 years. Surface area involved by vitiligo (at the time of medical treatment) was 1–20% of total body area. Although a majority of patients had satisfactory repigmentation by medical treatment there were some refractory patches of cosmetic significance predominantly on the exposed parts of the body. These patches underwent the procedure under study.

Eighteen patches, from 12 different patients with stable vitiligo, of <6 inches in size were selected for the procedure. Patient characteristics were: age 18–35 years, duration of disease 2–14 years, and nine women and three men. Of the total eighteen skin lesions selected, ten were present over trunk, one on the leg, and seven over the face. Nine patients were suffering from vitiligo vulgaris and three from segmental vitiligo. Written informed consent was obtained from all the patients. Permission from ethical committee of Dr. S.N. Medical College was also obtained.

How to cite this article: Kachhawa D, Kalla G. Keratinocyte-Melanocyte graft technique followed by PUVA therapy for stable vitiligo. Indian J Dermatol Venereol Leprol 2008;74:622-4.

Received: October, 2007. **Accepted:** November, 2008. **Source of Support:** Nil. **Conflict of Interest:** None Declared.

The procedure was performed under local anesthesia (2% lidocaine) at 4000–5000 rpm of micromotor dermabrader.

Procedure at donor site

Lateral area of thigh was selected as donor area in all the cases. Donor area needed for collecting grafting material was approximately one-third of recipient area. Procedure at donor site is described in step 2.

1. Debulking of epidermis: By dermabrading at a slow rpm the superficial epidermal layers were removed by just rolling the fraise twice or thrice over the donor site. Stratum corneum and upper most layer of epidermis were removed and discarded.
2. An antibiotic ointment (2% mupirocin) was applied over the donor site. The ointment helps to entangle the epidermal particles which are separated during the process of epidermal dermabrasion. Dermabrasion was

continued till the area appeared whitish (i.e., upper dermis). At this juncture, dermabrasion was stopped and the epidermal material entangled in ointment was collected with help of spatula or graft spreader. A paste-like material was obtained. This paste-like ointment containing melanocytes and keratinocytes was spread over the recipient site.

Procedure at recipient site

This site [Figure 1] was prepared with the same method as for split thickness grafting (STG) in vitiligo surgery by doing dermabrasion up to upper dermis and the epidermal cell material was spread on this dermabraded recipient site as a thin film [Figure 2]. Dressing with antibiotic-soaked gauze was done and left for seven days. Routine care of recipient site as advised in STG was given to all patients. After seven days when the dressing was removed,



Figure 1: Large stable vitiligo patch before surgery



Figure 2: Photograph just after surgery showing graft material on lower half while no graft material on upper half



Figure 3: After 1 week of surgery photograph showing blackish grafted material on the lower half only



Figure 4: After 20 weeks of surgery photo showing only pigmentation in the areas where grafting was done no pigmentation is seen where only dermabrasion was done

a blackish graft was seen that fell off on its own in next 3–5 days [Figure 3]. Topical psoralen with sunlight (PUVASOL) was started after 14–21 days in the form of methoxsalen USP 0.75% W/v applied on the surgical area during night and repeat application in the morning to sunlight-exposed areas for 10 minutes (twice a week).

RESULTS

Repigmentation started after 4–6 weeks of the procedure only in areas that received the keratinocytes plus melanocytes graft material, there was no pigmentation at the sites where only dermabrasion was done. Complete uniform pigmentation took 16–20 weeks in the patches where keratinocytes plus melanocytes graft material was applied [Figure 4]. These patients were followed up to one year. In all these patients no immediate or delayed complications were noted. Also, there were no graft failures in the present experimental study.

The initially observed dilution of vitiliginous area as a sign of repigmentation slowly spread uniformly to cover depigmented recipient site in 16–20 weeks. It was neither marginal nor follicular instead starting all over the recipient site.

DISCUSSION

During initial seven days of dressing period (healing phase), melanocytes and keratinocytes present in the grafted material are entrapped in the healing tissue of recipient site. They multiply and repigment the depigmented area. Further pigmentation can be accelerated by PUVASOL. It is possible that growth factors and cytokines released during wound healing phase help in transplantation and multiplication of melanocytes.^[4]

Pigmentation at the treated areas gradually increased in size due to melanocyte proliferation and migration under the influence of cytokines secreted by surrounding keratinocytes. Hence, melanocytes taken from a small donor area could pigment a much larger recipient area. Moreover, split thickness grafting does not give the perfect matching with the surrounding skin. STG may also cause milia formation and irregular skin surface at both

donor as well as recipient sites. Furthermore, STG cannot be done at all the body sites while this new technique can be done on any site, irrespective of whether it is fixed or mobile.^[5]

This method is easier to perform and less time consuming than suction blister technique. Cultured autologous melanocyte technique^[2] and its modifications by Gauthier^[3] and Olson^[5] used by many dermatologists are excellent methods of producing enormous amount of melanocytes for transplanting large areas of vitiligo but need a well-trained skilled staff and laboratory setup is also expensive.

Although in this new technique the epidermal cells may not be as rich in melanocytes as the above mentioned techniques but we tried theoretically to improve the ratio of melanocytes to that of keratinocytes by debulking of epidermis. This new technique (Jodhpur technique) tried in small-sized vitiligo patches also gives cosmetically acceptable results as given by others and it does not require expensive sophisticated laboratory setup and no special training, and less expertise skill is required.

The advantages are uniform and cosmetically acceptable pigmentation, easy to perform, less expensive, no laboratory setup is required, no scarring at donor site, no milia formation, early healing of donor site, and no cobbling. The disadvantages are mainly delayed pigmentation and need of special instruments like dermabrader. We recommend more controlled trials with other techniques of vitiligo surgery at different centers so that usefulness of this method can be established.

REFERENCES

1. Behl PN. Treatment of vitiligo with homologous thin Thiersch's graft. *Curr Med Pract* 1964;8:218-22.
2. Lerner AB, Halaban R, Klavs SN. Transplantation of human melanocytes. *J Invest Dermatol* 1987;89:215-9.
3. Gauthier Y, Surleve-Bazeille JE. Autologous grafting with non-cultured Melanocytes: A simplified method for treatment of depigmented lesion. *J Am Acad Dermatol* 1992;26:191-4.
4. Mulekar SV. Melanocyte-Keratinocyte cell transplantation for treatment of stable vitiligo. *Int J Dermatol* 2003;42:132-6.
5. Olson MJ, Juhlin L. Epidermal sheet grafts for repigments of vitiligo and piebaldism with review of surgical techniques. *Acta Dermatol Venereol* 1997;77:463-6.