

Direct Melanocytes Transplant from Normal Donor Area into Vitiliginous Recipient Area by Dermabrasion Technique*

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ABSTRACT

Background: Vitiligo is an autoimmune pigmentary disorder, that affects all age group that is treated by many medical treatments but some of them might need surgical therapy. **Objective:** To evaluate the dermabrasion technique in the treatment of vitiligo by direct transfer of melanocytes from the dermabraded normal donor area to the vitiliginous recipient area. **Patients and Methods:** This is a case interventional study was done in Department of Dermatology/Baghdad Teaching Hospital from February 2011-March 2012. Nine Patients with vitiligo were enrolled in this study with different clinical types of vitiligo including 5 segmental, 2 generalized and 2 localized. The donor and recipient areas were anesthetized at the same time with xylocain alone. Dermabrasion of recipient area was done first by manual abrader and left for few minutes until the oozing was stopped. Then the donor area was similarly dermabraded and the dermabraded tissue including the epidermis and superficial epidermis was immediately transferred into the recipient area and dressing was applied. Removal of the dressing was done after 10 - 14 days from the operative time. Follow up was done every 2 weeks in the first month then monthly for six months to record the result of implantation and repigmentation. **Results:** The re-pigmentation started one month after the operation as small macules and this increased gradually over time: the mean rate of re-pigmentation was 13% at 2 months, 27.8% at 4 months and 36.78% at 6 months. In addition, sun light exposure was applied to enhance re-pigmentation. The pigmentation was diffuse and not follicular in shape. **Conclusion:** Direct transfer of melanocytes from normal donor area into vitiliginous recipient area by dermabrasion technique was easy, rapid and non-costly and gave 36.78% mean rate of pigmentation at 6 months follow up and without complications.

Keywords: Vitiligo; Melanocytes Transplant; Dermabrasion; Direct Transfer

1. Introduction

Vitiligo is a common autoimmune inflammatory disease where there is absence, deficiency or dysfunction of melanocytes [1-4]. There are many standard therapies for vitiligo like PUVA [5], PUVA Sole [6], Narrow Band UVB [7], 5% Tincture iodine solution [6,8] and lactic acid [9,10]. The response of therapy depends on severity of disease, location of the illness and time factor. Some cases of vitiligo like segmental or localized vitiligo that do not respond to medical types, surgical therapy is indicated.

There are many surgical grafting procedures used in vitiligo but the commonly practiced nowadays are auto-

logous melanocytes transplants that have been used to treat vitiligo patches by using tissue graft, like punch mini-graft [11-15], suction blister epidermal grafting [13], and split thickness grafting [15-17] and cellular grafting like transplantation of autologous epidermal cell suspension [18-23] (non-cultured melanocytes grafting and transplantation of cultured autologous melanocytes). The old technique using minigrafting is usually associated with many problems like poor spread of the grafted melanocytes to the surrounding area, cobble stoning and needs punching grafts. While the other techniques are expensive, need sophisticated laboratories and personals [11-17].

The aim of present work is to look for rapid, time sparing surgical procedure of melanocytes grafting by so called direct melanocytes transplant by dermabrasion technique

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from dermabraded normal donor area into dermabraded vitiliginous recipient area.

2. Patients and Methods

Nine patients with vitiligo were included in this case interventional study, 3 males and 6 females, their ages range from 8 - 38 years with a mean \pm SD of 20.22 ± 10.29 years. All clinical types of vitiligo including some areas of generalized, localized and segmental were treated. The number of vitiligo patches varied between patients and the total number of treated patches were 15 (Table 1).

2.1. Inclusion Criteria

Localized vitiligo, localized vitiliginous areas from generalized vitiligo and segmental vitiligo were included. Activity of the disease was recorded for each patient to fix the duration of stability of the disease and the patients were divided into two groups stable vitiligo when there was no activity of the disease for more than 6 months before grafting and the second group when the stability of the vitiligo was ranged from 2 - 6 months only before grafting (Table 1).

2.2. Exclusion Criteria

Systemic diseases like hematological problems or drugs that prevent clotting, immune-compromised patient, diabetes mellitus and other debilitating diseases were excluded. Also all patients with active vitiligo at the time of grafting were excluded.

All therapies for vitiligo were stopped at least one month prior to the operation.

The nature and target of this study were explained for each patient. Formal consent was taken from each patient before starting the operation, after full explanation about the nature of the disease, course, the procedure of treatment, follow up, prognosis and the need for pre and post treatment photographs. Also, the ethical approval was

given by the scientific committee of the Scientific Council of Dermatology & Venereology-Iraqi Board for Medical Specializations.

All patients were photographed by a digital camera as a baseline and then every two weeks, in the same place with fixed illumination and distance by using a digital camera (Canon: power shoot G12, HS system, 10.0 mega pixels, high-sensitivity, HD movie).

2.3. Technique of Transplant

Xylocain as local anesthesia was used to anesthetize both the vitiliginous recipient area and the normal donor skin at the same time. Sterilized manual dermabrader of different sizes: 6 mm, 10 mm, 16 mm (Aisco Company, Germany) (Figure 1) was used to do superficial dermabrasion of the recipient area, and then was covered with normal saline soaked gauze to stop bleeding. Similar dermabrasion was done for the donor area to remove the epidermis and papillary dermis and directly transferred into the recipient area (Figure 2).

After finishing the transplantation, hypo-allergic semi-occlusion plaster (Betafix, Betasam, Turkey) was put as dressing on the recipient and donor areas. Systemic antibiotics were given for ten days.

Dressing was removed 10 - 14 days after the operation. The patient was advised to expose the recipient area to sun light for at least 15 minutes a day for everyday without using any topical therapy. Follow up was done every two weeks for the first month and monthly for 6 months to report the rate of re-pigmentation in the recipient area. Also follow up was done for donor area similar to recipient area watching any complications like koebners phenomenon, scar and keloid formation.

3. Results

After about 2 weeks from the time of operation only redness were noticed. Then the repigmentation at the

Table 1. The types of vitiligo, stability of the disease, and the site of donor areas.

No. of patients	Age in years	Sex	Type of vitiligo	No. of patches	Stability of the disease	Site of donor area
1	18	♂	Segmental	2	18 months	Rt side of abdomen
2	8	♀	Localized	1	2 months	Lt side of the chest
3	16	♀	Segmental	2	2 years	Rt side of abdomen
4	22	♀	Generalized	4	7 months	Rt thigh
5	35	♀	Generalized	1	13 years	Med side of Lt leg
6	9	♀	Localized	3	2 years	Back of Rt leg
7	38	♂	Segmental	1	4 months	Rt arm
8	19	♀	Segmental	1	12 months	Lt side of the chest
9	17	♀	Segmental	1	2 months	Rt arm



Figure 1. Showing the manual dermabraders of different sizes.



Figure 2. Melanocytes transfer by dermabrasion technique showing dermabraded donor area.

grafted area was started one month after the time of operation. The pigmentation was macular and sometimes follicular type (**Figure 3**). At 2 months follow up the rate of pigmentation was increased and surface area was reduced, and the reduction ranged from 3% - 30% with a mean 13%, while at 4 months follow up, the rate of pigmentation was ranged from 7% - 60% with a mean 27.8%. The pigmentation increased gradually to become at 6 month follow up a range from 15% - 70% with a mean 36.33% (**Table 2**). The pigmentation in six months follow up was diffuse uniform, figurate in shape but not follicular (**Figure 4**).

Regarding the activity of the disease, also the rate of pigmentation was much less and less rapid in a patient with stable vitiligo for 2 - 6 months compared to stable vitiligo more than 6 months.

In 2 cases while the pigmentation was going on very well in the grafted area there was new vitiliginous areas appeared elsewhere.

Also in 2 patients who had white hairs in the grafted donor area like beard or abdomen, these white hairs changed into pigmented hair at the grafted area.



Figure 3. (a) Vitiligo patch on the right leg of 22 years old female patient preoperative; (b) The same patient at time of dermabrasion; (c) The same patient showing repigmentation after 1 month; (d) The same patient showing 80% repigmentation after 6 months of operation.

In 2 patients the repigmentation and depigmentation process was going on at same time in the same patch.

Regarding the donor area repigmentation was noticed after few weeks. No complications were noticed apart from 6 patients who had hyperpigmentation that went to normal over time.

4. Discussion

Although vitiligo is a common autoimmune pigmentary disorder, still there are many patient do not respond to standard medical therapies especially patient with segmental vitiligo. There are many new satisfactory surgical grafting procedures that have been used for treating vitiligo which is resistant to medical therapies, each one has its merits and disadvantages like culturing and non culturing technique melanocytes transplantation of autologous epidermal cell suspension [18-23], These procedures although effective to induce repigmentation in vitiliginous area but it is time consuming, needs sophisticated laboratories and personnel and they are expensive operations [11-23].

The present work is a new technique, easy to perform; non-expensive procedure that could be carried out in outpatients bases taking very short time. By this new procedure we did a direct transfer of melanocytes from normal donor area into vitiliginous recipient area. The pigmentation appeared at one month and gradually increased over time: the mean rate of repigmentation after two months was 13% while was 27.8% after four months

Table 2. The number of patches, the site and rate of pigmentation of the recipient areas after dermabrasion.

No. of patients	No. of patches	Recipient area site	% of pigmentation at 2 months	% of pigmentation at 4 months	% of pigmentation at 6 months
1	1	Lt cheek	10	15	30
2	1	Upper chest/Lt side	30	50	50
3	2	Abdomen near the umbilicus	5	10	10
		Abdomen near the umbilicus	5	20	20
4	4	Rt foot/dorsal aspect	10	50	60
		Rt foot/dorsal aspect	5	30	40
		Rt foot/dorsal aspect	5	30	35
		Ant aspect of lower leg	10	60	70
5	1	Med malulase of Lt foot	2	15	25
		Lat Side of Rt foot	10	15	20
6	3	Ant aspect of Rt ankle	10	15	20
		Med side of Rt foot	30	15	30
7	1	Forehead	30	40	60
8	1	Rt side of pelvis	30	45	60
9	1	Lt cheek & Lt side of the nose	3	7	15
Total no. = 15			Mean 13	Mean 27.8	Mean 36.3

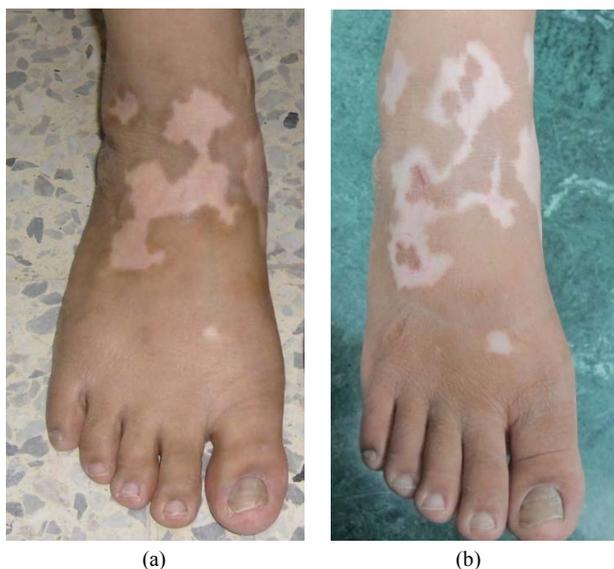


Figure 4. (a) 22 years old female patient with vitiligo patches on her right foot; (b) The same patient showing figurate repigmentation 6 months following dermabrasion.

and 36.78% after six months.

All the successful surgical procedures for treatment of vitiligo like split skin graft [15-17], suction blister epidermal grafting [13], cultured and non-cultured melanocytes [18-23] have transported the normal melanocytes from normal skin into dermabraded vitiliginous recipient

areas. The present study was comparable to these surgical procedures where melanocytes in the dermabraded tissues were transferred from normal donor skin into dermabraded recipient area.

The present work showed also that transplant of melanocytes from normal donor area into non-hairy recipient area like dorsum of foot induced successful repigmentation (**Figure 4**). Also, all re-pigmentation in our patients was diffuse uniform but not follicular and this goes parallel with way of spread of the dermabraded tissue from donor skin into recipient area. Also in two our patients, the white hairs in recipient areas changed into pigmented hair after melanocytes transplant. These observations are in favor that residual hair follicles melanocytes are not the source of re-pigmentation.

In addition, there are some controversies regarding the dermabrasion of the vitiliginous skin was enough to induce repigmentation as there are some studies showed that dermabrasion had failed to induce re-pigmentation [24-27].

Hence, we can conclude that residual melanocytes in the hair follicles in vitiligo skin might play little role in the process of re-pigmentation in the dermabraded vitiliginous skin.

When the present study compared with non-cultured melanocytes-keratinocytes transplant; Muleker *et al.* [18-21] reported 56% excellent re-pigmentation within 1 - 6

years. While El-Zawahry *et al.* [22] noticed excellent re-pigmentation in 32% of cases after 6 - 17 months follow up. While in the present work we had mean of 36.78% rate of re-pigmentation at 6 months.

To enhance the rate of re-pigmentation we strongly recommend increasing the amount of melanocytes in the debraded tissue that transferred from donor into recipient area.

In some cases also melanocytes transfer by dermabrasion could be repeated until we have complete re-pigmentation.

In conclusion, direct melanocytes transplant from normal donor into vitiliginous recipient area by dermabrasion technique is a new approach easy to perform, non-costly and take short time. The re-pigmentation was 36.78% at six months without any complications.

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