

Direct Transplant of Melanocytes from Normal Donor Area into Vitiliginous Recipient Area by Intralesional Injection of Melanocytes Using Spade Like Needle Technique

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Abstract

Background: Vitiligo is a common autoimmune inflammatory skin disease, where there are different surgical techniques for treatment of stable patches of vitiligo. **Objective:** To find non-costly, minimally invasive, simple technique by direct melanocytes transplant by spade needle technique in treatment of vitiligo. **Patients and Methods:** This interventional, therapeutic, comparative study was done in Department of Dermatology, Baghdad Teaching Hospital, Baghdad, Iraq from April 2014-March 2015. Twenty patients with localized, generalized and segmental vitiligo were included. Full history and examination for each patient was done with 4 (20%) males and 16 (80%) females and their ages ranged from 9 - 40 (23.15 ± 11.44) years. Forty one patches in 20 patients treated by spade grafting technique and the donor and recipient sites were demarcated and anesthesia done by xylocaine 2% with adrenalin 1:100,000. Transplantation was started by using disposable needle gauge 18 (the sharp end of needle was cut by a scissor to make it a spade like) with medical syringe 5 ml supplied with normal saline. The micro-pieces were taken from donor site and transplanted directly, easily and rapidly into dermis of recipient site and followed by pushing normal saline and the procedure was repeated to cover all recipient sites with 5 mm distance between injection points. The surface area of the lesions was calculated and the reduction rate was estimated every month till the end of the 4th month period of the treatment. **Results:** Including 41 patches in 20 patients with the surface area of the patches ranged from 1.5 - 90 cm² ($13.78 \pm$

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17.57) cm². The mean \pm SD of surface area of lesions was decreased from 13.78 \pm 17.57 cm² at baseline visit to 13.61 \pm 17.48 cm² at the second visit (after 2 weeks) which was statistically significant (p value \leq 0.001). The mean surface area continued to be reduced till reaching 12.20 \pm 15.68 cm² at the third visit and 12.01 \pm 15.55 cm² at the fourth visit. All were statistically significant when compared to baseline visit. There was reduction in surface area 1.1% at two weeks, 9.93%, and 12.5% at the 2nd, 4th months respectively. **Conclusions:** Intradermal injection of melanocytes in patients with vitiligo by spade like needle was very quick and simple non-costly technique, and gave 12.5% reduction which could be repeated at different times until satisfactory re-pigmentation of vitiligenous skin is achieved.

Keywords

Direct Transplant of Melanocytes, Intralesional Injection of Melanocytes, Spade Like Needle, Vitiligo

1. Introduction

Vitiligo is an autoimmune inflammatory disease that could be very progressive or run a slow course, or some time could be very stable localized area like segmental vitiligo. And in general, there are 2 types of patients with vitiligo in regarding to medical therapy either patients have rapid response to treatment so called rapid responder, while other group with very poor response to treatment so called poor responder [1].

In patients with localized stable patches vitiligo and those with stable but poorly response to treatment like segmental vitiligo, there is the main indication for surgical therapy [2].

These surgical treatment options for vitiligo offer the potential for rapid and more desirable amounts of repigmentation [3]. The different modalities of surgical techniques include: tattooing, organ-cultured fetal skin allografting, epidermal culture grafting, melanocyte culture grafting, autologous noncultured melanocyte-keratinocyte cell transplantation, epidermal grafting by the suction blister technique, thin Thiersch split skin grafting, or miniature punch grafting [4]. And more recently *Sharquie et al.* invented a new simple technique by direct transplant of melanocytes using micrografting pieces from normal donor area into vitiligenous recipient area with 68% repigmentation rate in the first 4 months. In this technique, partial splitting skin was harvested and divided into micro-pieces that transplanted directly into vitiligenous skin by using needling puncture [1]. While the aim of this work is to use very easily simple non-costly, minimally invasive technique by dermabrading normal donor area, and then to be injected inside the dermis of vitiligenous skin using spade like needle.

2. Patient and Methods

Twenty patients with vitiligo were enrolled in this case interventional, therapeutic, comparative study, 4 males, 16 females and their ages ranged from 9 - 40 years with a mean of 24.45, SD \pm 10.43 years. All clinical types of vitiligo including the generalized, localized and segmental were treated. The number of vitiligo patches varied between patients, so the total number of treated patches was 41 (**Table 1**).

Inclusion criteria

Segmental and localized areas of vitiligo were included. In patient with generalized vitiligo some localized areas were selected and treated either because were cosmetically unacceptable areas or as the patient requested. Activity of the disease was recorded for each patient to fix the duration of stability of the disease (**Table 1**).

Exclusion criteria

These are including systemic diseases like: diabetes mellitus, hematological diseases like bleeding tendencies, or drug that prevent clotting, and immune compromised patients. All patients stopped their vitiligo treatment at least two months before intervention.

From each patient, formal consent was taken before starting therapy after full explanation about the nature of the disease, course, and the procedure of treatment, follow up, prognosis and the need for pre and post treatment photographs. Also, the ethical approval was performed by the Scientific Committee of the Scientific Council of Dermatology and Venereology—Iraqi Board for Medical Specializations. All patients were photographed by

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

No. of pt.	Age	Sex	Type of Vitiligo	No. of patches	Stability of the disease in months	Donor Site
1	15	Male	Generalized	3	3	Thigh
2	9	Female	Generalized	1	3	Thigh
3	35	Female	Generalized	2	5	Thigh
4	35	Male	Segmental	1	12	Arm
5	26	Female	Segmental	3	9	Chest
6	21	Female	Generalized	1	6	Thigh
7	40	Female	Generalized	2	12	Thigh
8	16	Male	Segmental	1	2	Thigh
9	35	Female	Localized	1	4	Back
10	18	Female	Generalized	2	3	Thigh
11	16	Female	Generalized	5	7	Thigh
12	16	Female	Generalized	2	Unstable	Thigh
13	8	Female	Generalized	1	4	Thigh
14	35	Female	Generalized	4	24	Leg
15	40	Female	Generalized	3	Unstable	Thigh
16	21	Female	Localized	1	12	Thigh
17	32	Female	Generalized	2	12	Thigh
18	16	Female	Segmental	3	36	Back
19	35	Female	Generalized	2	Unstable	Thigh
20	20	Female	Generalized	1	Unstable	Thigh

Samsung Galaxy S4 combines 13 megapixel camera.

Technique of transplant

When patient lying in semi supine position in good illuminated room. The photo was taken to vitiliginous recipient area and also for donor site. The donor and recipient sites were demarcated and anesthesia by xylocaine 2% with adrenalin 1:100,000 was given. The idea of putting adrenalin is to stop bleeding during grafting and to make grafting more easily. Dermabrasion of normal donor areas was performed from different hidden in the body by using of ordinary surgical scalpel.

Transplantation was started by using disposable gauge 18 needle; its sharp end was cut by a scissor to make it a spade like (**Figure 1**) with medical syringe 5 ml supplied with normal saline.

The micro-pieces were taken from donor site by spade needle and transplanted directly, easily and rapidly into the dermis of recipient sites by needle puncture and followed by pushing normal saline and the procedure was repeated to cover all recipient sites with 5 mm distance between puncture points.

Follow up and evaluation of response in recipient area

Patients were evaluated every 2 weeks for the 1st month and then monthly for 3 months. Then patients were advised to have natural sunlight exposure every day for at least 15 minutes. After the next 2 weeks assessment of the start of pigment was carried out at the grafting areas. At 2 months the surface area of the new pigmentation was measured and compared with the surface area of the recipient patch before grafting then the rate of pigmentation was calculated by using transparent with square paper, and also to record any side effects.

Follow up and evaluation of donor area

After 2 weeks dressing was removed and then follow up was carried out for 2 weeks for the first month and then monthly for the next 3 months to watch for any Koebner's phenomenon and complications.

3. Results

Results included 41 patches in 20 patients with the surface area of the patches ranged between 1.5 - 90 cm² with a mean \pm SD of 13.78 \pm 17.57 cm².

Mean surface reduction

The mean \pm SD of surface area of lesions was decreased from $13.78 \pm 17.57 \text{ cm}^2$ at baseline visit to $13.61 \pm 17.48 \text{ cm}^2$ at second visit (after two weeks) which was statistically significant ($p \text{ value} \leq 0.001$). The mean surface area continued to be reduced till reaching 12.20 ± 15.68 at third visit and 12.01 ± 15.55 at fourth visit. All were statistically significant when compared to baseline visit (**Table 2**).

Percent Reduction

There was reduction in surface area 1.1% at two weeks, 9.93%, and 12.5% at the 2nd, 4th months respectively (**Figure 2**).

Pattern of repigmentation

The pattern of repigmentation was halo pigmentation in all patients who response.

Side effects

Donor site Koebner's phenomena was seen in 4 patients from 20 (20%), this was noticed at third visit (two months after grafting), atrophic linear scarring in 2 patients 10%, and post inflammatory hyperpigmentation in 4 patients (20%). These side effects were disappeared at fourth months of follow up. while in treated patches there was no side effect during period of follow up.

4. Discussion

When medical therapy of vitiligo has failed, surgical treatment is indicated and the main target of surgery is stable localized and segmental vitiligo [5]. The aim of all these procedures is to implant melanocytes from the normal skin into vitiliginous areas [6]. There many surgical procedures but most these methods are time consuming, costly and need sophisticated lab and personnel. Sharquie *et al.* invented new simple techniques for direct melanocytes transplant. The first one so called direct transplant of melanocytes from normal donor area in to vitiliginous skin by dermabrasion technique which gave 36.78% repigmentation rate after 6 months of operation [7]. The second technique, direct melanocytes transplant by micrografting needling technique and this gave



Figure 1. Spade like needle.

Table 2. The mean differences patch size before and after needling using spade like needle.

Variable	Categories	Number of patches	Mean \pm SD	Z	p value
Patch size (cm^2)	Before needling	41	13.78 ± 17.57	-2.226	<0.001**
	2 weeks after needling	41	13.61 ± 17.48		
Patch size (cm^2)	Before needling	41	13.78 ± 17.57	-4.034	<0.001**
	2 months after needling	41	12.20 ± 15.68		
Patch size (cm^2)	Before needling	41	13.78 ± 17.57	-4.03	<0.001**
	4 months after needling	41	12.01 ± 15.55		

*p value ≤ 0.05 was significant; **p value ≤ 0.05 was significant; Wilcoxon Signed Ranks Test.

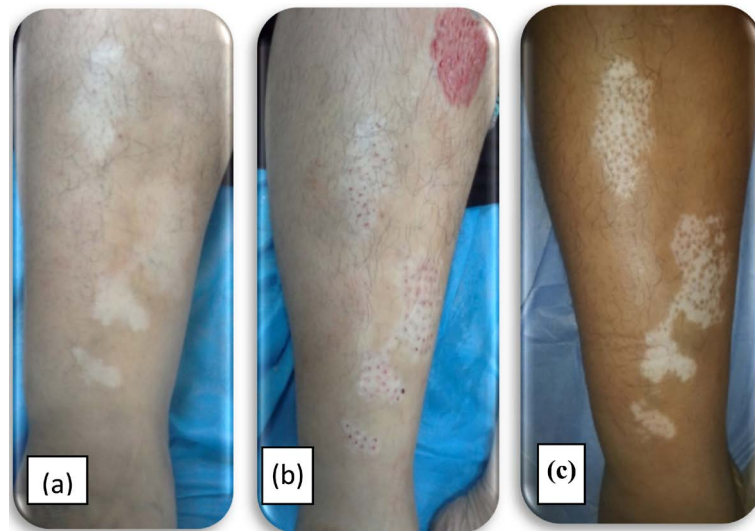


Figure 2. Showing 35 years old female with generalized vitiligo treated by spade micro grafting technique. (a), (b) at the 1st visit and (c) at 4 months.

61.36% repigmentation rate at four months. These two techniques were quick and non-costly and gave a very high success rate within short time, when compared with cultured and non-cultured melanocytes transplant techniques [8]-[11].

The aim of present work is to find much quicker, simple and the least costly than others techniques, by taking debraded normal donor skin using a spade like needle to be injected into dermis of the vitiligenous site.

The results of present work showed that the repigmentation rate was 12.5% at 4 months. And this rate of pigmentation is high within short time but much lower than previous Sharquie *et al.* techniques. Accordingly because this technique very easy simple, it could be repeated every month until will full repigmentation of vitiligenous skin was reached.

5. Conclusion

Intralesional injection of melanocytes by spade like needle was very quick and simple technique, and gave 12.5% reduction rate which could be repeated every month until achieving satisfactory repigmentation of vitiligenous skin.

Disclosure

This study was an independent study and not funded by any drug companies.

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