

Punch Minigrafting for Stable Vitiligo: Our Experience at the Jordanian Royal Medical Services

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ABSTRACT

Objective: To evaluate punch mini grafting as one of the existing surgical methods used to treat stable vitiligo in patients with vitiligo involving small areas of skin.

Methods: This study was conducted at two of the Jordanian Royal Medical Services Hospitals over a two year period from June 2009 to June 2011. Twenty nine patients with stable vitiligo of three to 10 year duration (mean 6 years), and a duration of disease stability from one to six years (mean 3 years), were treated by implanting small sized autologus full thickness skin grafts into the vitiligenous areas. The grafts were harvested from normally pigmented skin. Patients were followed up monthly for twelve months. In each follow up they were evaluated for the amount of repigmentation of the treated area and for the presence of any complications. The overall response of the treated lesions was clinically assessed by two different dermatologists at six months postoperatively and based on the degree of pigmentation it was defined as: poor (repigmentation <30%), fair (31-50%), good (51-75%) and excellent (>75%). A simple statistical analysis of frequencies, means and percentages was used to describe the study variables.

Results: A total of 89.6% of patients showed good to excellent repigmentation by six months. Complications were encountered in 10 patients (34.5%) and included cobblestoning in two patients (6.9%), graft displacement in six patients (20.7%) and minor infections in two patients (6.9%). No graft depigmentation or relapse of vitiligo in the treated areas was noted. No koebnerization or scarring was noted in the donor areas.

Conclusion: Minigrafts seem to be a good treatment option for patients with stable vitiligo. Patient selection and attention to details in the technique can improve the outcome.

Key words: Minigrafting, Vitiligo.

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Introduction

Vitiligo is a common depigmentary cutaneous disorder occurring in one to two percent of the world population with no race or age predilection.^(1,2) Vitiligo is characterized by absence of normal color of the skin. It results from melanin pigment loss due to the underlying destruction of the melanocyte; the pigment

producing cell in the skin. The cause of melanocyte destruction is still not known.⁽³⁾ However there are several theories that have been postulated to explain the pathogenesis of vitiligo, such as autoimmunity,⁽⁴⁾ self-destructing mechanisms,⁽⁵⁾ neurals,⁽⁶⁾ biochemicals,⁽⁷⁾ an imbalance of epidermal cytokines⁽⁸⁾ and genetic factors.⁽⁹⁾ Clinically vitiligo has two main

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classifications: unilateral (segmental, asymmetric) and bilateral (nonsegmental, symmetric).⁽¹⁰⁾

Although vitiligo is not a life-threatening disease, however, it may cause a major social and emotional distress.⁽¹¹⁾ currently, several therapeutic options of repigmentation of vitiligo are available. Yet, they commonly show unsatisfying outcomes.⁽¹²⁾ The most widely used treatments are phototherapy (Ultraviolet light A and B) and steroids (local and systemic).⁽¹³⁾ It has been reported that phototherapy and topical steroids treatments result in limited success rates.⁽¹⁴⁾ Therefore a number of methods to transplant melanocytes has been developed to obtain a complete and permanent repigmentation.⁽¹⁵⁾ The first successful autograft repigmentation in humans was reported by Norman Orentreich in 1972.⁽¹⁶⁾ In 1978, Falabella, reported a novel method of minigrafting to achieve repigmentation in leucoderma.⁽¹⁷⁾ Punches of a 1.5 mm diameter were used by Falabella to perform minigrafting for segmental vitiligo in 1983.⁽¹⁸⁾ Falabella reported success with minigrafting in chemical leucoderma, post-dermabrasion leucoderma, and focal and segmental vitiligo.⁽¹⁹⁻²¹⁾

This study was performed at the Jordanian Royal Medical Services hospitals to evaluate punch minigrafting (PMG) as one of the existing surgical methods used to treat stable vitiligo.

Methods

Patients:

This study was conducted at the Jordanian Royal Medical Services in King Hussein Medical Center and Prince Rashid Ben Al-Hassan Hospital in the period from June 2009 to June 2011.

A total number of 443 patients with vitiligo were evaluated for the possibility of treatment with punch minigrafting. The following criteria were adopted for considering surgical therapy :^(22, 23)

1. Stable vitiligo defined as static lesions of segmental vitiligo, vitiligo vulgaris, and acrofacial vitiligo without a history of new lesions or an extension of old lesions for the last six months or more.
2. No response to various medical treatments.

Patients with any of the following criteria have been excluded :⁽²²⁻²⁴⁾

1. Extensive vitiligo involving more than 5% body surface.
2. Progressive vitiligo (recent appearance of new lesions or enlarging of existing lesion)
3. Presence of koebnerization (appearance of vitiligo lesion at sites of trauma).
4. Patients with a history of keloidal tendency.
5. Presence of serious concomitant diseases.
6. Children less than 14 years of age were excluded.
7. Pregnant female and lactating mothers.

A total number of 29 patients met the inclusion criteria and underwent punch minigrafting. A detailed clinical history and examination of all patients was recorded including age, sex, site of the lesions, number of the lesions, duration of the disease and duration of stability of the disease. The stability of the disease was assessed by the history. The baseline photographs of all the lesions were taken before the grafting. Patients were advised to expose the grafted area to sunlight 15-20 minutes daily.

All patients were followed up monthly for 12 months. In each follow up they were evaluated for the amount of repigmentation around the grafts and for the presence of any complications. The overall repigmentation defined as a percentage of the vitiligo area acquiring the color of the normal surrounding skin, was assessed at six months postoperatively by two dermatologists clinically and was defined as: poor (< 30% repigmentation), fair (31-50%), good (51-75%) and excellent (>75%).

A simple statistical analysis of frequencies, means and percentages was used to describe the study variables.

Technique :⁽²²⁾

We adopted the technique of punch minigrafting as described by Falabella with few modifications.⁽²²⁾

Punch minigrafting is a three step procedure including:

1. Preparation of recipient site:

The area is anesthetized by local infiltration of 1% xylocaine. Using a punch with a diameter of two millimeters small perforations were

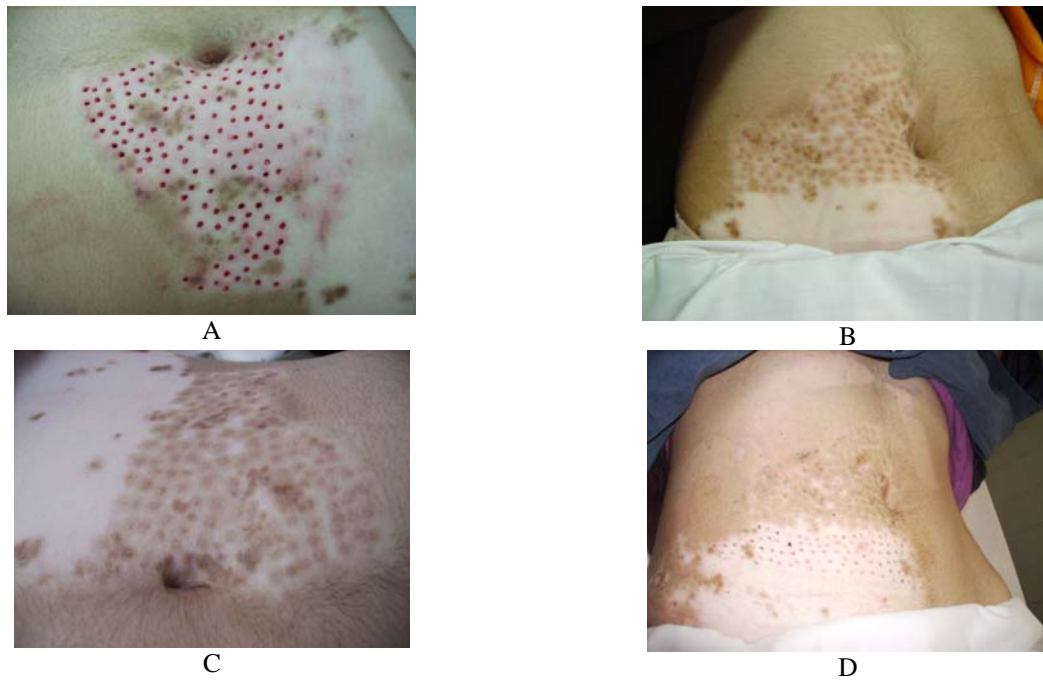


Fig. 1 Punch minigrafting for segmental vitiligo. The procedure performed on multiple stages. Holes are done in the first stage (A). Six and eight weeks post operative, note the pigmentation around the grafts (B and C). Four months later, a second stage shows the new grafts in the area adjacent to the previous one, note the excellent repigmentation in the area of the first stage (D).

performed. The perforations are made to the depth of 0.5–1 mm and with a distance of 3–4mm between them. The skin inside the perforation is pulled out with a forceps, cut with scissors and discarded. The recipient area is then covered with gauzes soaked in normal saline.

2. Harvesting the minigrafts:

The minigrafts were taken from the gluteal region in 21 patients, outer thigh in seven and posterior neck in one patient. Perforations done with a 2mm punch similar to the size for that used in recipient area. Perforations separated at a distance of about 1 mm from one another. Minigrafts pulled out gently with fine-tipped forceps, cut with scissors and placed in normal saline. The donor site is covered with an antibiotic cream and a non adherent dressing for one week. The holes are left to heal by second intention.

3. Implanting the minigrafts:

The minigrafts were inserted into the perforations in the recipient area with the dermal portion of the graft in direct contact with the dermis of the recipient perforations. Moderate pressure is applied to the surgical area with dry gauze. The recipient area is covered with gauze and surgical tape; special

care to make sure that the dressing keeps the grafts immobile in their recipient sites for two weeks.

Results

A total number of 29 patients underwent punch minigrafting. Male to female ratio was 1:1.4 and 48.2% of patients were in the age group of 21–30 years. The majority (93.1%) of patients had focal or segmental vitiligo and 86.2% had less than five lesions. The most frequent involved site was the abdomen (37.9%), however the lowest was the hands (6.9%). Patients' clinical data are summarized in Table I. Duration of the vitiligo ranged from three to 10 years (mean 6 years) and the duration of the stability of the disease ranged from one to six years (mean 3 years).

Most of the patients (89.6%) showed good to excellent repigmentation by six months as presented in Table II. Figure 1 shows the result in one of our patients. Complications were encountered in 34.5% (n=29) of patients as shown in Table III and included cobblestoning in 6.9% of patients, which showed improvement over several months. Graft displacement was noted early at the time of removing of the dressing in 20.7% of patients. The number of displaced grafts was between two and five.

Table I: Patients' clinical data

Gender distribution	
Male	12
Female	17
Age distribution	
14-20 (year)	3
21-30 (year)	14
31-40 (year)	7
41-50 (year)	5
Distribution according to clinical type of vitiligo	
Focal/Segmental	27
Acral	2
Distribution according to number of lesions	
1- 2 lesions	13
3- 5 lesions	12
> 5 lesions	4
Site of lesions	
Face	6
Neck	7
Abdomen	11
Back	4
Hands	2

Table II: The overall response of the treated lesions as assessed at six months postoperatively

Repigmentation	Number of patients (%)
Poor (< 30% repigmentation)	1 (3.4)
Fair (31–50%)	2 (6.9)
Good (51–75%)	9 (31.0)
Excellent (>75%)	17 (58.6)

Table III: Reported complications over 12 months follow up post grafting

Complications	Recipient Area	Donor Area
	Number of patients (% n=29)	Number of patients (n=29)
Infection	1 (3.4%)	1 (3.4%)
Cobblestoning	2 (6.9%)	-
Koebnerization	-	0
Graft Displacement	6 (20.7%)	-
Graft Depigmentation / Relapse of vitiligo in the treated areas	0	-
Scarring	-	0

Infections occurred in 6.9% of patients and were mild and responded very well to topical and oral antibiotic. No graft depigmentation or relapse of vitiligo in the treated areas was noted. No koebnerization or scarring was noted in the donor area.

Discussion

Vitiligo is a common depigmentary cutaneous disease. In Jordan, where most people have dark skin, it has a great cosmetic concern and is a cause of social and psychological distress. Currently there are several medical therapies used to treat vitiligo including phototherapy,

topical and systemic steroids and topical immuno-modulators. These treatments may fail to achieve satisfactory results in some patients although varying degrees of repigmentation may be observed.⁽²⁴⁾ This is where surgical option is indicated. Several surgical techniques have been described to treat vitiligo including: Full thickness minigrafting, split thickness grafting, grafting epidermal blister, grafting cultured epidermal melanocytes, grafting non cultured epidermal suspension.^(22,25-27) However punch minigrafting is the simplest and easy to follow technique, inexpensive and can be performed as an outpatient clinic.⁽²²⁻²⁵⁾

Stability of the disease is an extremely important factor which determines the outcome of the surgery for any vitiliginous area. A number of studies showed that surgical treatments are satisfactory whenever they are implemented to patients with a stable type of vitiligo.^(13,28,29) Stability of the disease is determined by a number of factors⁽²²⁾ including: absence of disease progression, spontaneous repigmentation, absence of new koebnerization, and unilateral vitiligo per se is considered as a synonym of stable disease. The minigrafting test is a reliable tool to identify patients with stable vitiligo who may respond to melanocyte transplantation.^(28,30)

Unilateral (segmental) vitiligo has been shown as the most stable form,⁽³¹⁾ with 95% repigmentation following surgical interventions.⁽²⁸⁾ In stable bilateral vitiligo the rate of repigmentation was adequate in 50% of patients in some reports.⁽²⁸⁾ However, other reports showed that with proper patient selection, it is possible to obtain similar rates of repigmentation in vitiligo vulgaris as in localized vitiligo.⁽³¹⁾ In our study stability of the disease ranged from one to six years (mean three years) and this was a major factor contributed not only to good/excellent repigmentation in 89.6% of our patients but also to the fact that none of our patients showed depigmentation in the grafted area.

Boersma *et al.*⁽³¹⁾ reported depigmentation in 8.33% of the cases, and Malakar and Dhar⁽³²⁾ in 3.07% of the cases. Barman *et al.* reported graft depigmentation in 16.7%⁽²⁴⁾ of cases where two to seven grafts had shown depigmentation, it has been considered as a reasonable finding compared to the large number of grafts. Patients with active disease are more likely to show depigmentation of the transplanted grafts. That is why the exclusion criteria we adopted were designed to exclude patients who are likely to have an active disease, this included patients who were having extensive involvement of vitiligo (more than 5% body surface area) and patients who were having recent koebnerization (appearance of vitiligo lesion at sites of trauma).

Cobblestoning which is the appearance resulting from elevated grafts is an important complication of PMG. Savant reported

cobblestoning in 36.8 %, ⁽³³⁾ Rathi and Singh in 22 %, ⁽³⁴⁾ Singh and Bajajin 22 %, ⁽³⁵⁾ Malakar and Dhar ⁽³²⁾ in 33.18% of cases. The high incidence of cobblestoning in these series has been attributed to the use of large size punches (2.5 to 4mm) and to the fact that the depth of recipient punched area was less than the donor punch. The rate of cobblestoning in our study was low 6.9%. This is due to two facts: first, we used small sized (2mm) punches for all patients, and second, we matched the depth of the recipient site with the thickness of the graft redoing punching for the recipient hole if it was not deep enough for the graft. It is worth to mention that cobblestoning in two of our patients showed remarkable improvement over several months. Therefore we recommend not rushing in treatment of cobblestoning as it may improve with time.

Graft displacement of one to five grafts was noted in six patients. This is an expected finding in patients receiving 40 to 100 minigrafts. Infection of few grafts has been noted in one patient it was mild and responded well to topical and oral antibiotics.

In spite of recent recommendations which state that this procedure is not generally recommended due to poor results and high rates of complication,⁽³⁶⁾ we think that PMG is a good therapeutic option in properly selected patients who are having small areas of vitiligo (focal or segmental). In our experience PMG results in satisfactory repigmentation in the affected area and complications can be minimized by using small sized punches and making the right depth of the recipient sites.

Conclusion

We believe that punch minigrafting is a safe and simple technique for patients with stable vitiligo involving only small areas of skin up to 5% of surface area. We do not think that this method is appropriate for use in patients with large areas even if the disease was stable. Careful and proper selection of patients is of extreme importance to achieve satisfactory repigmentation and to minimize complications. Attention to the details of the technique is also an important factor to minimize complications.

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