International Journal of General Medicine
and Pharmacy (IJGMP)
ISSN(P): 2319-3999; ISSN(E): 2319-4006
Vol. 4, Issue 1, Jan 2015, 37-46

International Academy of Science,
Engineering and Technology
Connecting Researchers; Nurturing Innovations

EFFICIENCY OF SUCTION BLISTER EPIDERMAL GRAFTING IN THE SURGICAL MANAGEMENT OF STABLE VITILIGO AT VARIOUS SITES OF THE BODY

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ABSTRACT

A Vitiligo affects approximately 1-2% of the general population. The management of this condition has undergone a sea of change over the last two or three decades. Suction blister epidermal grafting is a simple modality of treatment of patients with resistant and stable vitiligo. The objective of the study vitiligo at various sites of the body. Thirty patients with stable vitiligo at various sites of the body were selected for the study. Suction blister grafting was done after raising the blisters using syringes. Patients were followed up every 2 weeks for the first 2 months and then at monthly intervals for six months. Results were evaluated at the end of six months. At the end of six months the operated areas were analyzed for the extent of repigmentation, color match and complications. Excellent response (>75% repigmentation) was seen in 12 (40%) patients, good response (51-75% repigmentation) in 10 (33%), fair response (25-50% repigmentation) in 4 (13%) and poor response (<25% repigmentation) in 2 (7%) patients. No repigmentation was seen in 2 (7%) patients, one was related to errors in surgical techniques. The color match was excellent in 11 (39%) patients, good in 10 (36%), and poor in 7 (25%) patients. The main complication observed both at the donor and recipient areas was hyperpigmentation. Suction blister grafting is an easy, inexpensive and effective alternative to treat stable vitiligo with good success rates.

KEYWORDS: Vitiligo, Skin Grafting, Vitiligo Surgery, Suction Blister Grafting

INTRODUCTION

Vitiligo is one of the oldest diseases of mankind. It is a common depigmenting disorder characterized clinically by milky white patches and histologically by an absence of functional melanocytes in the affected area. It affects 1-2% people of all races regardless of sex and age. Vitiligo commonly begins in childhood or young adulthood, with a peak onset at 10 to 30 years, but it can develop at any age. Despite modern advances in medical science and in the social attitude of people, vitiligo continues to embarrass the victim, resulting in considerable mental agony. The condition does not produce a physical handicap and it is asymptomatic but may be psychologically devastating. Although the disease does not have any systemic complications, it is of great cosmetic concern, particularly in darker skinned individuals, as in Indians, where it creates psychosocial problems due to the stigma attached to it.

In vitiligo, there is a partial or total destruction of melanocytes; initially only of the epidermis and later even of the hair follicle, which acts as a reservoir for providing melanocytes during repigmentation. Hence, in patients with vitiligo, to achieve repigmentation, the existing melanocytes need to be activated or melanocytes from the normal pigmented skin need to be transplanted and this can be done by the various medical and surgical therapies respectively. While medical therapies such as topical and systemic corticosteroids, topical immunomodulators, topical or systemic phototherapy are the primary treatment, these are not always successful and repigmentation is often incomplete. Some patients are refractory to medical line of treatment. The surgical methods are recommended for such lesions that are stable MPG), split thickness

skin grafts (STSG, non-cultured epidermal cell suspension procedure, epidermal and melanocyte cultures. Suction blister grafting is a simple procedure in the treatment of vitiligo that doesn't require much equipment and surgical expertise. This procedure has shown encouraging results in vitiligo. Hence there is a need to offer the patient an option of suction blister epidermal grafting which seems to be attractive. The main objective is to evaluate the efficacy of suction blister epidermal grafting in the management of localized, stable vitiligo at various sites of the body.

METHODOLOGY

This was a prospective study involving 30 patients who presented with stable vitiligo at various sites of the body to dermatology department of Victoria Hospital and Boring and Lady Curzon Hospital attached to Bangalore Medical College and Research Institute, Bangalore during November 2009 to May 2011. Ethical clearance was obtained before starting the study from Ethical Clearance Committee of Bangalore Medical College and Research Institute.

This study evaluates the efficacy and complications of suction blister epidermal grafting in the management of stable vitiligo. Thirty cases of stable vitiligo of focal, segmental and generalized types constituted the study population. Stablility was defined as appearance of no new lesions, no progression of existing lesions and absence of koebnerization in the past one year. The patients were selected randomly according to the inclusion and exclusion criteria.

Inclusion Criteria

- Male and female patients in the age group of 15-60 years.
- Patients with localized stable vitiligo of focal, segmental or generalized types.
- Patients whose lesions are stable and not responding to adequate medical line of treatment.

Exclusion Criteria

- Patients with active vitiligo
- Patients with history of Koebner's phenomenon
- Serious systemic disease
- History of any form of treatment for vitiligo in the past 3 months

Written informed consent was taken from all patients for their participation in the study. Details about the patient such as name, age, sex, address, contact number, marital status and occupation were noted. A detailed history about the disease such as site of onset, duration, progression, stability of the disease and history off medication was taken. Any past history of systemic disease, endocrinologic disturbance, bleeding tendency or herpes labialis were recorded. Selected patients were thoroughly examined for the number of lesions, size, site and type of vitiligo. Old scars and BCG scars were examined to exclude keloiodal tendency.

All the patients were investigated with complete hemogram, urine analysis, blood sugar, liver and renal function tests, bleeding time, chest roentgenogram and ECG to rule out any systemic disease. Lignocaine sensitivity was tested and tetanus toxoid injection was given the day before the surgery. Photographs were taken before the procedure and then periodically to compare the pigmentation and color match.

SUCTION BLISTER EPIDERMAL GRAFTING (SBEG) PROCEDURE

nstruments used for the procedure were disposable syringes (10, 20 and 50ml), 3-way connectors, a dermabrader (manual or motor driven), iris scissors, jeweler's forceps and sterile glass slides. Anterolateral aspect of the thigh was used as donor area because of the hidden nature. After surgical cleansing, 2% lignocaine was injected as a field block as the procedure was painful. Blisters were raised using disposable syringes of 10, 20 or 50ml depending on the size of the recipient vitiligenous area. A 3-way tap was attached to the needle end of the syringe and suction was given using a 50 ml syringe. Pressure was measured by a manometer (vacuum gauge) or by the amount of aspirated air as described by Gupta et al. And maintained at -300 to -400 mmHg depending on the age of the patient. Once the blisters were formed completely, the roofs were gently cut using iris scissors and everted on a glass slide or gloved index finger.

The recipient area was cleaned and anesthetized using 2% lignocaine infiltration. The aea was dermabraded using motorized or manual dermabrader until punctuate bleeding points appeared. The graft was hen placed such that the dermial side of the graft was in contact with dermabraded area and spread fully over the raw area using jeweler's forceps. The donor site was cleaned and bandaged using nonadherent dressing. The recipient site was dressed with a double layer of a nonadherent dressing, followed by two layers of gauze pieces and a further pressure dressing with Dynaplast.

Antibiotics and anti-inflammatory drugs were given for 7 days and if required the part was immobilized. The dressing over the donor site was removed after 24 hours and cleaned an dagain dressed. The dressing over the recipient site was left on for 7 days. Both the donor and recipient site dressings were removed on the 8th day and oral PUVASOL therapy started.

The patients were followed up regularly for a period of 6 months, at an interval of e every 2 weeks for the first 2 months and then at monthly intervals. The results were assessed at the end of 6 months for the extent of repigmentation, color match and complications.

RESULTS

The study included 30 patients of stable vitiligo at various sites of the body treated with suction blister epidermal grafting. The age of these patients ranged from 15 to 48 years with a mean of 28.3 years. Among the 30 patients, 17 (57%) were males and 13 (43%) were females .Among the study groups, focal vitiligo was present in 16 (53%) patients, segmental vitiligo in 1 (3%), vitiligo vulgaris in 8 (27%) and lip-tip vitiligo in 5 (17%) patients. In our study focal vitiligo was the commonest type with 16 (53%) and segmental vitiligo was the least common type with 1 (3%) patient. The duration of vitiligo in the study patients ranged from 1.5 to 15 years with a mean duration of 5.1 years. The duration of vitiligo in most of the patients (73%) presented was 2-5 years. Only one patient 93%) had a duration of <2 years and 3 (10%) had >10 years duration. The stability of vitiligo lesions varied from 1 to 15 years, with a mean duration of 3.5 years.

POST-OPEARTIVE EVALUATION

Of the 30 patients who underwent the procedure, the graft peeled off in most of the patients upon removal of the dressing on 8th day. Only in 5 patients the grafts remained adhered to the recipient area. In these patients too they peeled off in 3-4 weeks and none were taken up. The outcome of the procedure was assessed at the end of 6 months for the following parameters- extent of repigmentation, color match and complications at the donor and recipient areas.

Extent of Repigmentation

The Extent of Repigmentation was Assessed As

- >75% repigmentation – excellent response
- 51-75% repigmentation- good response
- 25-50% repigmentation – fair response
- <25% repigmentation- poor response

Of the 30 patients, excellent response was seen in 12 (40%), good response in 10 (33%), fair response in 4 (13%) and poor response in 2 (7%) patients. No repigmentation was seen in 2 (7%) patients. One was due to error in judging the epidermal and dermal side after taking out the graft and the other was due to displacement of the dressing along with the graft in lip vitiligo presented in Table(3) .

Color Match

The color of the re pigmented area was compared with the adjacent normally pigmented area and was scored as excellent, good and poor depending on the need of camouflage to make up the pigmentation deficiency.

- Poor color match – gross hypo or hyper pigmentation of the grafted area, difficult to cover up with ordinary makeup
- Good – mild to moderate hypo or hyper pigmentation of the grafted area amenable to camouflage
- Excellent – no hypo or hyper pigmentation, matching with the surrounding skin requiring no camouflage

Of the 28 patients who showed repigmentation, excellent color match was seen in 11 (39%), good response in 10 (36%) and poor in 7 (25%) patients. Many patients who showed excellent or good color match, initially developed hyper pigmentation that gradually faded by 4-5 months to match the surrounding skin Tab(6) .

Effect of Age, Sex, Type and Site of Vitiligo and Duration of Stability on Repigmentation and Color Match

Effect of Age

Patients between the age of 15-30 years showed a better repigmentation than patients of >30 years of age. Of the 21 patients between 15-30 years of age, 17 (81%) showed repigmentation of >50% (good or excellent repigmentation) as compared to only 5 (55%) out of 9 patients of >30 years of age. There was no effect of age on color match. 16 (76%) of the 21 patients between the age of 15-30 years showed excellent or good color match and 7 (77%) out of 9 patients of >30 years Table (1).

Effect of Sex

Both male and female patients showed no difference in the extent of repigmentation and color match. Thirteen (76%) out of 17 male patients and 9 (70%) out of 13 female patients showed >50% repigmentation. Nine (70%) out of 13 male patients and 12 (80%) out of 15 female patients showed good or excellent color match. The present study, localized vitiligo (focal and segmental) showed better response as compared to generalized (vitiligo vulgaris and lip-tip vitiligo) type. Of the 17 patients with localized lesions, 15 (88%) showed >50 repigmentation as compared to 7 (53%) out of 13 patients with generalized vitiligo. There was no effect of type of vitiligo on color match.

Site of Lesions

Table (2) and Table (4) depicted that, the site of vitiligo lesions showed to be no effect on the outcome of suction blister grafting. Various body sites exhibited equally good results with respect to both extent of repigmentation and color match. Patients with a stability of >2 years showed a better repigmentation as compared to <2 years .Ninty percent out of 21 patients with a stability of >2 years showed good or excellent response as compared to 3 (33%) out of 9 patients with a stability of <2 years duration. The majority of the patients the repigmentation started by 6-8 weeks, the earliest response was by 4 weeks, seen in 3 patients. In most of the patients the repigmentation was complete by 5 months and there was no further increase in repigmentation after 5 months.

Complication at the Donor Area

Table (13)-No major complications were seen in this procedure. Twenty two patients showed no side effects at the donor area. The most common complication observed at the donor area was hyper pigmentation, which was seen in 8 (27%) patients. No infection, scarring or koebneization was observed in any of the patients

Complications at the Recipient Area

Table (14) -Hyper pigmentation was the most common complication observed at the recipient area, which was seen in 7 (23%) patients. Two patients (7%) developed infection, one (3%) of whom developed scarring.

Table 1: Age Distribution

Age Group (Years)	No. of Cases	Percentage
10-20	6	20%
21-30	15	50%
31-40	6	20%
>40	3	10%
Total	**30**	**100**

Table 2: Sex Distribution

Gender	No. of Cases	Percentage
Male	17	57%
Female	13	43%
Total	**30**	**100**

Table 3: Type of Vitiligo

Vitiligo Type	No. of Patients	Percentage
Focal	16	53%
Segmental	1	3%
Vitiligo vulgaris	8	27%
Lip-tip	5	17%
Total	**30**	**100**

Table 4: Duration of the Disease

Duration of Lesions (Years)	No. of Cases	Percentage
<2	1	3%
2-5	22	73%
5-10	4	14%
>10	3	10%
Total	**30**	**100**

Table 5: Duration of Stability of Lesions

Stability of Lesions (Years)	No. of Patients	Percentage
1-2	9	30%
2-5	17	57%
5-10	3	10%
>10	1	3%
Total	**30**	**100**

Table 6: Extent of Repigmentation

Repigmentation	No. of Cases	Percentage
Excellent	12	40%
Good	10	337%
Fair	4	13%
Poor	2	7%
No repigmentation	2	7%
Total	**30**	**100**

Table 7: Extent of Repigmentation in Relation to Age

Age Group (Years)	Excellent	Good	Fair	Poor	Total
10-20	4	2	-	-	6
21-30	4	7	2	2	15
31-40	3	1	-	2	6
>40	1	-	2	-	3
Total	**12**	**10**	**4**	**4**	**30**

Table 8: Extent of Repigmentation in Relation to Sex

Gender	Excellent	Good	Fair	Poor	Total
Male	7	6	1	3	17
Female	5	4	3	1	13
Total	**12**	**10**	**4**	**4**	**30**

Table 9: Extent of Repigmentation in Relation to Type of Vitiligo

Type of vitiligo	Excellent	Good	Fair	Poor	Total
Focal	8	6	-	2	16
Segmental	-	1	-	-	1
Vitiligo vulgaris	3	2	2	1	8
Lip-tip	1	1	2	1	5
Total	**12**	**10**	**4**	**4**	**30**

Table 10: Extent of Repigmentation in Relation to Site of Vitiligo

Site	Excellent	Good	Fair	Poor	Total
Face	7	7	1	3	18
Trunk	1	1	0	1	3
Upper limb	0	0	1	0	1
Lower limb	4	2	2	0	8
Total	**12**	**10**	**4**	**4**	**30**

Table 11: Extent of Repigmentation in Relation to Duration of Stability

Stability (Yrs)	Excellent	Good	Fair	Poor	Total
1-2	1	2	2	4	9
2-5	8	7	2	-	17
5-10	3	-	-	-	3
>10	-	1	-	-	1
Total	**12**	**10**	**4**	**4**	**30**

Table 12: Color Match of the Repigmented Lesions

Color Match	No. of Cases	Percentage
Excellent	11	39%
Good	10	36%
Poor	7	25%
Total	**28**	**100**

Table 13: Complications at the Donor Area

Complications	No. of Patients	Percentage
None	22	73%
Koebnerization	-	-
Hyperpigmentation	8	27%
Infection	-	-
Scarring	-	-
Total	**30**	**100**

Table 14: Complications at the Recipient Area

Complications	No. of Patients	Percentage
None	20	67%
Hyperpigmentation	7	23%
Infection	2	7%
Scarring	1	3%
Total	**30**	**100**

DISCUSSIONS

Vitiligo is an acquired depigmentation disorder characterized by white macules on the skin. It is cosmetically embarrassing since it can be easily noticed by others. Although this condition is yet a disease of unknown etiology, therapy and prognosis have improved remarkably during the past 50 years, after unravelling most of the histological, ultra-structural, biochemical, immunological and molecular events occurring within and around the pigment cell. Surgical attempts to treat vitiligo that appeared initially as an exclusive medical condition began in the past century around the 1960s and different approaches with many refinements have been successfully reported since then. During the past three decades, several surgical procedures have been developed, modified and standardized to treat stable recalcitrant vitiligo. These surgical techniques are based on the principle of restoring melanocytes in the recipient vitiligenous areas, obtained from pigmented donor skin. Among the various surgical therapies, suction blister grafting is an easy, safe, inexpensive and effective procedure with good success rate.The present study was done to evaluate the efficacy and complications of suction blister epidermal grafting in the management of stable vitiligo at various sites of the body. Thirty cases of stable vitiligo of focal, segmental and generalized types constituted the study population. The age of the patients ranged from 15 to 48 years with a mean of 28.3 years. Among the 30 patients, 17 (57%) were males and 13 (43%) were females. Focal

vitiligo was the commonest type with 16 (53%) and segmental vitiligo was the least common type with 1 (3%) patient. The duration of the disease ranged from 1.5 to 15 years with a mean duration of 5.1 years and stability of vitiligo lesions varied from 1 to 15 years, with a mean duration of 3.5 years.

Of the 30 patients, excellent response was seen in 12 (40%), good response in 10 (33%) patients i.e. 22 (73%) patients showed >50% repigmentation. No repigmentation was seen in 2 (7%) patients. One was due to error in judging the epidermal and dermal side after taking out the graft and the other was due to displacement of the dressing along with the graft in lip vitiligo. The color match was excellent in 11 (39%) patients. In many of the patients, there was initial hyperpigmentation which faded slowly by 4-6 months to match the surrounding skin. Gupta and Kumar performed SBEG in 143 patients. But follow-up was available in 117 patients and analysed results in these patients. The overall success rate was 64% in all patients and a meta-analysis of the literature, published in the same article, has shown an overall success rate of 87% in all patients.[90]

In a large study involving 1100 patients, Li et al. observed complete repigmentation in 227 patients (20.6%) and excellent repigmentation in 568 (51.6%), a success rate of 72.3%.[91] In most of the patients the process of repigmentation started by 6 to 8 weeks, with a mean of 7.1 weeks. The earliest was by 4 weeks seen in 3 patients. In majority of the patients the repigmentation was complete by 4 to 5 months.

Twenty one (81%) patients between the age of 15 to 30 years showed >50% repigmentation as compared to 5 (55%) patients of >30 years of age. This shows that earlier the age, better the response, as was observed by Gupta and Kumar who noted success rates of 82% and 58% respectively in patients aged <20 years and >or=20.

Localized vitiligo (focal and segmental) showed better response as compared to generalized (vitiligo vulgaris and lip-tip vitiligo) type. Of the 17 patients with localized lesions, 15 (88%) showed >50% repigmentation as compared to 7 (53%) out of 13 patients with generalized vitiligo. Gupta and Kumar also reported success rates for generalized and segmental/focal disease as 53% and 91 respectively.

In the present study, sex of the patient and site of vitiligo lesions had no significant impact on the outcome as was also observed by Gupta and Kumar.

Nineteen (90%) out of 21 patients with a stability of >2 years showed good or excellent response as compared to 3 (33%) out of 9 patients with a stability of <2 years duration. The importance of stability was also shown by a study conducted by Khundkar et al. who performed SBEG in 25 patients of stable and 5 patients of unstable vitiligo. They observed excellent repigmentation in 16 and good response in 9 patients of stable vitiligo and fair response in 3 and poor response in 2 patients of unstable vitiligo. [89]

No serious complications were observed in the present study. The most common complication observed both at the donor and recipient area was hyperpigmentation see in 8 (23%) and 7 (23%) patients respectively. Two patients (7%) with lesion on the leg and foot developed infection as they could not keep the dressing dry. Babu et al. also reported hyperpigmentation as the main complication both at the donor and recipient area's.[81]

Kiistla Mustkallio first raised suction blisters in 1964. Epidermal grafting with suction blisters was successfully used for the first time in 1971 by Falabeella for repigmentation of leukoderma secondary to burns. Since then various authors have published effective use of suction blister grafting in the tratement of vitiligo at various sites of the body. The procedure itself has undergone a sea of change to make it simple and easy to perform. The simplest method is raising

blisters using disposable syringes, which was adapted in the present study. The unique advantage of the procedure is that it is a "scarless" surgery. Both the donor and recipient sites heal without the slightest scarring, so that the same donor area can be used for repeated sessions. The main limitation of the procedure is that it is difficult to treat large areas and is time consuming. The blister induction time (time required for the formation of complete blisters) in the present study ranged from 45 minutes to 3.5 hours, with an average of 2.01 hours. The blister induction time can be reduced by injecting the donor area with intradermal saline, exposure to Wood's lamp before giving suction and intrablister injection of saline after incomplete formation of blisters in the present study intradermal injection of saline, intradermal injection of local anesthetic, local anesthetic mixed with saline and intrablister injection of saline into the small incompletely formed blisters to enlarge and make a single large blister have been tried. By these methods the blister induction time could be reduced from 1.5-3 hours to 45-90 minutes. After complete formation of the blisters, next difficult part is transferring the graft to the recipient site as the graft is ultrathin. Common practice is to take the graft onto a sterile glass slide which is then transferred to the recipient area. This may be difficult as the graft would not adhere to the glass slide. This can be made easy by taking the graft on the gloved index finger or rolling the graft over a sterile syringe and then spreading on the recipient area or taking on the sterile wrapper of paraffin dressing and then placing over the recipient area. These were tried in the present study and found

CONCLUSIONS

The study is helps to clinician to rule out vetiligo patients early and further study would be extended to treat large areas with greater accuracy.

ACKNOWLEDGEMENTS

The author acknowledges the Dean cum Director and Professor and Head, Department of Dermatology and Venerology, BMCRI, Bangalore.

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