

Suction Blister Epidermal Grafting for Vitiligo Involving Angles of Lip: Experience of 112 Patients

Bikash R. Kar, Chinmoy Raj

Department of Dermatology, Venereology and Leprosy (DVL), Institute of Medical Sciences and SUM Hospital, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India

Abstract

Background: Lip vitiligo is usually resistant to medical modalities of treatment, and in all these cases, surgery offers a hope. Suction blister grafting (SBG) has been tried since long for lip vitiligo with high rate of success. There have been no long-term follow-up studies of patients with SBG at a difficult-to-treat site like angles of lip, which prompted us to conduct this study. **Aims and Objectives:** To assess the pigmentation rate and patient satisfaction of SBG on vitiligo involving angles of lip. **Materials and Methods:** This is a prospective study conducted on 112 patients with stable vitiligo involving angles of lip. SBG was carried out in all the patients using the standard procedure. Patients were advised to apply topical psoralen followed by sun exposure (PUVASOL) for 8–12 weeks after operation. The patients were followed up at 3, 6, 12, 18, and 24 months for assessment of pigmentation and overall satisfaction. **Results:** We found a pigmentation success rate of 83.7%, 84.9%, 85.7%, 78.3%, and 77.8% in the patients who were followed up at 3, 6, 12, 18, and 24 months, respectively. A total of 77.8% of patients who came for follow-up at the end of 24 months were very happy with the treatment. **Discussion:** Our data show clearance of vitiligo and persistence of pigmentation gained through SBG in 77.8% of cases at the end of 2 years as well as excellent patient satisfaction in the cohort of patients who followed up with us. **Conclusion:** SBG is an easy and cost-effective way of repigmentation of vitiligo involving angles of lip.

Keywords: Angle of lip, suction blister grafting, vitiligo

INTRODUCTION

Vitiligo is a cosmetically disfiguring condition that is commonly seen in Indian dermatological outpatient clinics. Prevalence calculated from the dermatological outpatient records ranges between 0.2% and 1.8% globally, with Mexico and India having the highest incidence of this condition.^[1] Vitiligo has a profound impact on self-image, self-esteem, and interpersonal relationships.^[2] In addition, the patient can experience stigmatization, embarrassment, and self-consciousness about vitiligo.^[3] Even marriage proposals of both the sexes are affected, and it poses a problem to the parents and society.^[4] Widespread prejudices, ignorance, taboos, lack of scientific appraisal, and confusion of vitiligo with leprosy, all make it a social embarrassment for the patient.^[5] Sites such as joints, acral areas, and lips are usually resistant to medical modalities of approach, and in all these cases, surgery offers a hope.

Pure mucosal vitiligo accounts for 2.3% of the total caseloads of vitiligo, and angles of lip contribute to 11.8% of the total pure mucosal vitiligo cases.^[6] Vitiligo of lips can cause great emotional distress. Medical therapies are often ineffective due to complete lack of pigment cell reservoir in the affected areas of lips. It is almost impossible to regain pigment with conservative methods. Melanocytes are stimulated during photochemotherapy in vitiligo. They migrate from hair follicle reservoir, spread centrifugally from the infundibulum to the basal cell layer, and recolonize the epidermis with functional pigment cells. This does not occur on the lips as there are no hair follicles, explaining why medical management often results in a slow or poor

Address for correspondence: Dr. Bikash Ranjan Kar,
Department of Skin and Venereal Disease (VD),
Institute of Medical Sciences & SUM Hospital, Kalinga Nagar,
Bhubaneswar, Odisha 751003, India.
E-mail: karbikash@yahoo.com

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response. Thus, transplantation of melanocytes and tattooing are the most logical procedures in these cases.^[7]

Vitiligo involving angles of lip is traditionally perceived as a site resistant to medical therapies. This site is different from other areas in being highly mobile, making it more difficult to hold the graft after placement.

Suction blister grafting (SBG) has been tried since long for lip vitiligo with high rate of success but literature is silent about SBG over the angles of lip. This study aims to assess the success rate of SBG performed on the angle of lip of patients with vitiligo.

MATERIALS AND METHODS

This was a prospective study conducted in patients who presented with angle of lip vitiligo to the dermatology outpatient department (OPD) of a tertiary care center of Eastern India from August 2010 to July 2013.

Institutional ethical committee approval was taken, and a written informed consent was obtained from each patient before recruitment.

Inclusion criteria

All consenting patients above 18 years of age with stable^[8] vitiligo involving angles of lip were included.

Exclusion criteria

Patients with keloidal tendency, active infections, diabetes mellitus, pregnancy or lactation, bleeding diathesis, and

patients on immunosuppressive drugs and anticoagulants were excluded.

Procedure

SBG was carried out using the procedure as described by Gupta and Goel,^[9] where suction syringe was attached to the pulling syringe using a three-way connector [Figure 1A]. The suction syringes used were of 10mL, and the syringe used for creating vacuum was of 50 mL [Figure 1B]. The three-way connector was used to control the negative pressure. After an average time of 1.5–2h, the blisters were formed [Figure 1C], and they were then removed using a curved scissor to a glass slide with the dermal side facing up. The grafts were placed in normal saline till the recipient area was prepared. Manual dermabrasion using Manekshaw's dermabraders was carried out on the angles of the lip after infiltration with 2% lidocaine. The grafts were placed on the dermabraded site, and surgical glue was applied to the periphery of the grafts. The patients were asked to minimize lip movements and only liquid diet was advised for 3 days using a straw. After 3–4 days, the grafts tend to fall off on their own when normal food intake was resumed in all cases. All the patients were asked to receive topical psoralen followed by sun exposure (PUVASOL) after applying methoxsalen (0.75% w/v diluted with water in the ratio of 1:20) on the treated areas followed by sun exposure of 5 min, starting 7 days after grafting was carried out for 12 weeks. They were asked to follow-up at 3, 6, 12, 18, and 24 months to assess the outcome of the procedure.



Figure 1: (A) Suction apparatus, (B) suction apparatus *in situ*, and (C) unilocular blister formation

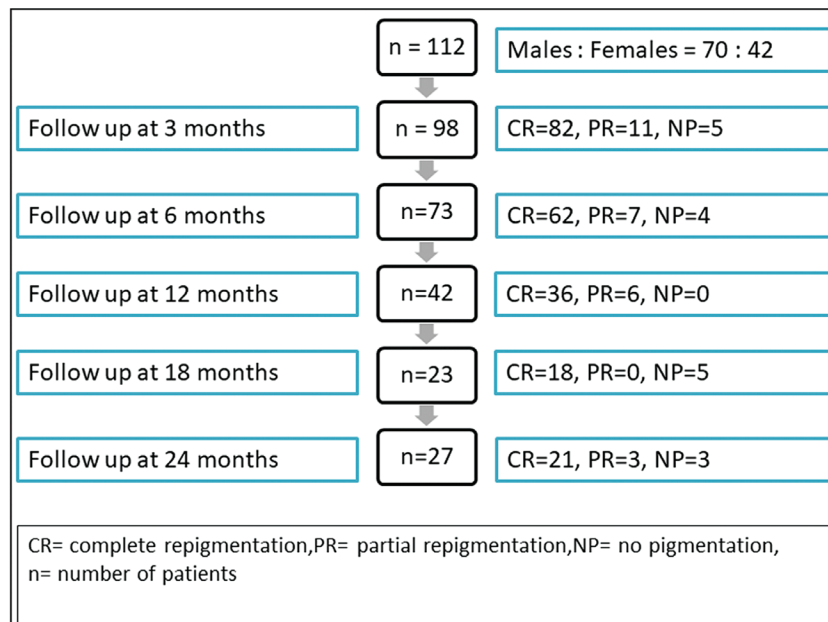


Figure 2: Flow of patients

At subsequent follow-ups, an independent observer graded the outcome of procedure as complete, partial, or no pigmentation. Patient satisfaction was graded as excellent, moderately satisfied, and not satisfied.

All the calculations were carried out using Microsoft Excel (version: Microsoft office professional plus 2010 for Windows, Washington, USA).

The flow of patients is given in Figure 2.

RESULTS

A total of 112 patients were included in this study, of which 70 were men and 42 were women. The mean age was 27 ± 6.1 years. The mean duration of disease was 5 ± 1.25 years. The mean duration of stability was 2.46 ± 1.17 years. Thirty-one patients had personal history of vitiligo vulgaris and 30 patients had a family history of vitiligo. Eighty patients had exclusive angle of lip vitiligo, 6 had segmental vitiligo, and 26 had non-segmental vitiligo [Table 1].

Of 98 patients, 82 had complete repigmentation at 3 months. On the first visit, the treated site was a little hyperpigmented as compared to the normal surrounding skin. Of 73 patients who came for a follow-up visit at the end of 6 months, 62 had complete repigmentation. The pigment gained was completely in match with the surrounding lip color. Forty-two patients were available for follow-up at 1 year, of whom, 36 had retained the pigment gained with SBG whereas 6 had partial loss of pigment and their lesions were looking off-white. Twenty-three patients could come for follow-up at the end of 18 months, of whom, 5 had loss of pigmentation, which was complete, giving a depigmented appearance. Of 27 cases followed up at 24 months, 21 had complete

repigmentation, 3 had partial loss of pigment, and 3 had total depigmentation [Figures 3 and 4]. In all the cases with complete loss of pigment, a regrafting was offered.

Of the 98 patients who came for follow-up at 3 months, 82 were extremely satisfied with the treatment, 11 were moderately satisfied, and 5 were not satisfied. Of the 73 patients who came for a follow-up visit at the end of 6 months, 62 were completely satisfied. Of 42 patients, 36 were extremely satisfied with the treatment at the end of 1 year whereas 6 were moderately satisfied. Of 23 patients who came for follow-up at the end of 18 months, 4 were not satisfied and 1 was moderately satisfied even though he had partial loss of pigment. Of 27 patients who came for follow-up at the end of 2 years, 21 were extremely satisfied, 3 were moderately satisfied, and 3 were not satisfied with the treatment [Figure 5].

Approximately 88.2%, 88.5%, 93.1%, 87.5%, and 89.5% of the patients with exclusive lip vitiligo retained the pigment after SBG at follow-up at 3, 6, 12, 18, and 24 months, respectively [Table 2].

We did not observe any significant difference in the treatment outcome across gender, age of the patients, and in patients having a personal history or family history of vitiligo and those without. Outcome of treatment was better in patients with duration of vitiligo less than 5 years, and this was statistically significant at 12 months ($P = 0.0001$) and 18 months ($P = 0.0001$) of follow-up [Table 3].

DISCUSSION

Great advances have been made in surgical options for vitiligo treatment in the recent years. It is essential to take into consideration size and area affected, age of patient,

patient's attitude, requirement and expectations, facility available, expertise of surgeon, and cost before opting for surgery.^[10] Surgical modalities are broadly classified into grafting (including tissue and cellular grafts) and non-grafting techniques (including micropigmentation, excision/closure, dermabrasion, phototherapy, and lasers).

Although cellular grafts can be used to treat larger areas with excellent cosmetic outcome and minimal side effect profile, they have the disadvantages of requiring technical expertise and being time-consuming and costly.^[11,12]

Tissue grafts, such as mini punch grafting (MPG), split-thickness grafting, and hair follicle grafting, carry dermis and subcutaneous fat in addition to epidermis. The differentiation, pigmentation, and development of epidermal cells are regulated by the dermis of donor site. Punch grafting is the easiest method but has the least

cosmetic acceptance.^[13] Split-thickness grafting is quicker and yields large grafts, but it needs surgical skill as graft may be thicker and may result in milia formation. In both the methods, epidermis and dermis are grafted so the graft retains characteristic of the donor site; hence, the pigmentation leading to cosmetic mismatch may occur.^[14]

Micropigmentation or tattooing involves introducing various combinations of inert, artificial pigments into the mid-dermis level of the lesion.^[15] It is indicated in special sites such as angle of lips where graft retention is poor and in situations that need urgent pigment correction such as upcoming major life events. It is particularly useful in Asians and Africans.^[16] The drawback of the procedure is deeper migration of the pigment giving the treated site a washed-off appearance and formation of pigment-induced foreign body granuloma.^[17] Francis *et al.*^[18] concluded that micropigmentation is a safe, effective, and cosmetically acceptable option for vitiligo of lateral lower lip as it is a relatively easy procedure with immediate and fairly long-lasting results.

SBG involves use of creating negative pressure by applying suction on the donor area, which causes a physiological split at the level of dermoepidermal junction. This results in very thin epidermal grafts, which are then transferred to the recipient site and fixed. The grafts, being purely epidermal, adopt the characteristics of the recipient area producing excellent color match and cosmetic outcome.^[19] It is most suitable for facial vitiligo and areolar involvement. The major drawbacks are that it is a time-consuming process and only small areas can be treated.^[20]

Table 1: Patient profile

Patient characteristics (n = 112)	
Male/female	1.67:1
Mean age (years)	27 ± 6.1 (range: 18–42)
Mean duration of disease (years)	5 ± 1.25 (range: 2–9)
Mean duration of disease stability (years)	2.46 ± 1.17 (range: 1–7)
History of vitiligo	
Personal history	31
Family history	30
Type of vitiligo	
Exclusive angle of lip	80
Nonsegmental	26
Segmental	6



Figure 3: Left column: before treatment; right column: after treatment

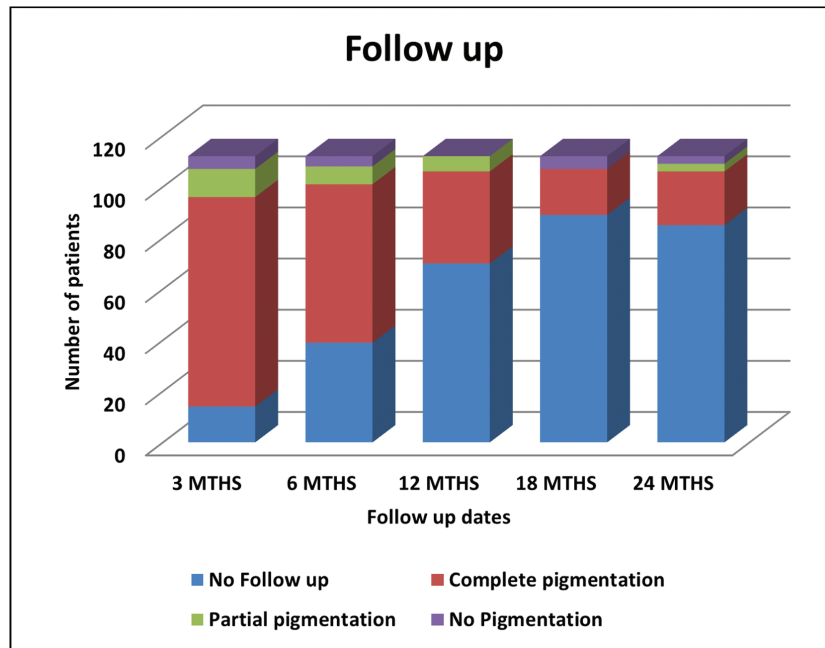


Figure 4: Graph of follow-up data

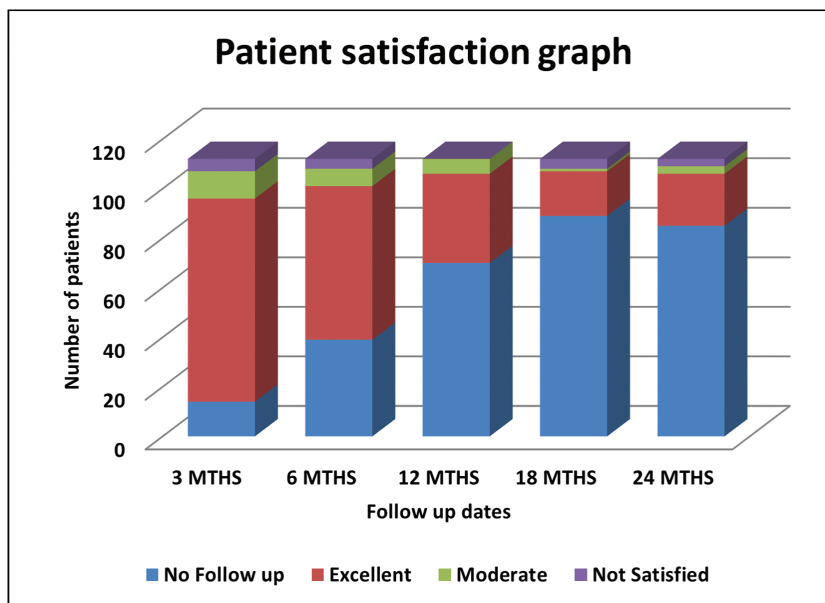


Figure 5: Graph of patient satisfaction

Table 2: Repigmentation in patients with exclusive lip vitiligo

Follow-up (months)	CP	PP	NP	Total no. of patients
3	88.2	8.8	2.9	68
6	88.5	9.6	1.9	52
12	93.1	6.9	0	29
18	87.5	0	12.5	16
24	89.5	5.3	5.3	19

CP = complete pigmentation, PP = partial pigmentation, NP = no pigmentation

The mean age in our study was 27 ± 6.1 years. In a study by Gupta and Kumar,^[21] 117 patients with a mean age of 27.07 ± 10.32 years (10–59 years) were recruited. They further divided the patients into two groups of age <20 years and >20 years, and they treated them with SBG. They concluded that patients in the younger age group responded better to therapy. However, in our study, we did not observe any difference across the age groups.

The male-to-female ratio in our study was 1.67:1. Maleki *et al.*^[22] reported that complete repigmentation was observed

Table 3: Repigmentation in relation to personal history, family history of vitiligo, and disease duration

	3 months	6 months	12 months	18 months	24 months
Personal history (<i>P</i> value)	0.3	0.6	0.7	0.8	0.7
Family history (<i>P</i> value)	0.4	0.8	0.9	0.8	0.6
Duration <5 vs. >5 (<i>P</i> value)	0.3	0.07	0.0001	0.0001	0.5

more in male patients than in female patients treated with SBG, though it was not statistically significant; however, they had a very small sample size of only 10 patients. We observed a similar outcome in our study.

Babu *et al.*^[23] compared MPG with SBG for stable lip vitiligo in which they found that MPG was better than SBG as far as quality of pigment match was considered. MPG has its own set of adverse effects such as cobblestoning, variegated appearance, and color mismatch; static graft, depigmentation of graft, perigraft halo, and graft rejection are complications at recipient site; and hypertrophic scars and depigmentation are complications at the donor site^[24] and difficulty in holding the graft at the angle of the lip. Gupta *et al.*^[19] compared both the methods in 86 stable patches of vitiligo in 50 patients and found superior results in the SBG group. They concluded that SBG gives rapid and superior cosmetically matching pigmentation with less adverse effects such as cobblestoning and delayed pigment spread and scarring of the donor site. Li *et al.*^[25] used suction blister epidermal grafting using a modified suction method in the treatment of stable vitiligo in 1100 patients and found the success rate to be around 73% in SBG at 6 months of follow-up. However, a longer follow-up was missing. Nanda *et al.*^[26] treated stable eyelid vitiligo using SBG and found it to be highly effective for a delicate site such as eyelid. Autologous melanocyte transfer via epidermal graft has been found to be safe and effective for the treatment of lip vitiligo, and it is cosmetically more acceptable and there is no abnormal keratinization associated with the procedure.^[12]

We treated 112 patients with angles of lip vitiligo using SBG and tried to follow them up for as long as 2 years and found a success rate of pigmentation of 83.7%, 84.9%, 85.7%, 78.3%, and 77.8% at 3, 6, 12, 18, and 24 months of follow-up, respectively. This comes close to the success rate described by other authors at other non-mucosal sites. The advantages of this procedure are that the procedure is a fairly simple OPD procedure with no risk of scarring, milia, cobblestoning, and so on, characteristically seen with punch or partial-thickness skin grafting techniques. Patients who lost the pigment during follow-up could also be offered regrafting as the procedure is non-scarring in nature.

A personal history or family history of vitiligo did not affect the final outcome of treatment at the end of 2 years. The duration of disease also did not affect the outcome, which was probably because we recruited patients

with stable vitiligo for more than 1 year. There was no significant difference in treatment outcome in patients having segmental vitiligo vs. nonsegmental vitiligo, which could be attributed to the small sample size of patients having segmental vitiligo and their dwindling numbers at subsequent follow-ups.

The drawback of our study is low compliance during follow-up. At every follow-up visit, the number of patients went down, and the success of pigmentation kept changing as we took only people following up as the denominator. One of the reasons could be many of the patients were job holders outside the state and they could come once in a while for follow-up, and the procedures were carried out mostly during vacation times.

CONCLUSION

SBG is an easy and cost-effective method of repigmentation of a difficult-to-treat site for vitiligo such as angle of lip. Quality of repigmentation matches nicely with the surrounding skin. Follow-up at 6 months has a high rate of complete repigmentation. Patients need to be followed up for a loss of pigmentation. Regrafting can be offered in cases where pigment is lost during follow-up after assessing the disease activity.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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