

Management of Vitiligo Patients With Surgical Interventions

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Vitiligo is an acquired depigmentation disorder of unknown etiology. Medical treatments are usually reasonably effective for nonstable vitiligo patches; however, for vitiligo patches that have been stable for a substantial period of time, surgical intervention should be considered. In this article, surgical interventions for vitiligo are reviewed, including split-thickness skin grafting, suction blister grafting, miniature punch grafting, and cultured melanocyte transplantation.

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Vitiligo is a common, asymptomatic, acquired depigmentation disorder that is caused by an unknown etiology. Lesions appear as sharply demarcated, depigmented macules and patches that are scattered symmetrically or unsymmetrically over the body. The presentation can be delineated based on the segmental or nonsegmental nature of the disease. According to the revised classification/nomenclature of vitiligo,¹ the disorder can be classified as nonsegmental, segmental, mixed, or unclassified. The pathogenesis of the vitiligo disease process is due to multiple modalities that contribute to melanocyte loss. Theories for melanocyte destruction include but are not limited to autoimmunity, biochemicals, epidermal cytokines, increased hydrogen peroxide and free radicals, and humoral and cellular immune alteration.^{2,3}

Despite its long history, the most frustrating aspect of the vitiligo disease process remains its treatment due to limited efficacy, frequent application

of topicals, and the need for high-potency steroids. Medical therapies usually are the first line of treatment and are most effective with few side effects for bilateral nonsegmental or evolving vitiligo.² Some of the primary therapies with the highest efficacies appear to be calcipotriene and psoralen plus UVA, psoralen plus UVA as monotherapy, excimer laser, narrowband UVB, oral steroids, 8-methoxypsoralen, tacrolimus, and topical steroids.⁴ The theory is that these treatments would be successful if the patient had active melanocytes in the external root sheath that would be able to repigment a patch of vitiligo.⁵ Hence, it would be more difficult to treat areas such as the dorsal aspect of the fingers and toes because they lack hair-bearing areas with melanocytes.⁶ The alternative approach to treating vitiligo patches would be surgical intervention techniques, as they provide melanocytic cells to a previously depigmented area.^{3,5} The focus of this article is to evaluate the efficacy and appropriate use of some of the surgical procedures that can be used in the treatment of vitiligo patients.

Candidate Selection

First, vitiligo patients for whom first-line treatment with medical therapies has failed are candidates for surgical techniques. The second vital component is to clinically confirm the diagnosis of vitiligo as opposed to other genetic, infectious, or autoimmune causes of pigment loss. Lastly, the vitiligo patch should be stable. A stable vitiligo patch does not continue to progress and is no longer responsive to topical medications that are meant to repigment for a discernible period of time.⁷

Classification of Disease Stage

To classify the stage of vitiligo prior to surgical intervention, Gauthier⁸ created a basic grading system: grade I, with partial depletion of epidermal

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melanocytes in a vitiligo patch that responds to repigmentation in a follicular pattern evenly such as on the face and neck; grade II, with complete depletion of epidermal melanocytes with a usual follicular pattern of repigmentation; and grade III, indicating complete depletion of follicular melanocytes with no hope of response to medical therapy. According to Rusfianti and Wirohadidjodjo,² the surgical techniques that have developed over the years for treatment of grade III vitiligo patients include split-thickness skin grafting, suction blister grafting, miniature punch grafting, and cultured melanocyte transplantation.

Surgical Techniques

Split-thickness skin grafting is an older procedure that entails the use of a harvesting graft site with no pigment loss and dermabrasion of the recipient area to allow interaction with the wound bed.⁹ With proper care and minimal movement or wrinkling of the graft site, patients can have repigmentation without skip areas.

Suction blister grafting is another tried and tested surgical intervention. Hasegawa et al¹⁰ conducted a study of 15 patients (13 males, 2 females; age range, 16–38 years) diagnosed with segmental vitiligo who were treated using the suction blister grafting technique with CO₂ laser resurfacing. Patients were recruited 1 month prior to initiating therapy and no other treatments were used during the month or in conjunction with the surgical intervention. Suction blisters were harvested from the left thigh and transferred in saline to the recipient site, which was abraded with 1 pass of the short-pulse CO₂ laser system. The recipient sites were then closed with 7-0 nylon sutures and covered tightly with tie-over dressings for at least 1 week. Within 6 months of the procedure, a treatment response of 100% was seen in 15 patients, making it an effective method for treatment-resistant vitiligo patients.¹⁰

Miniature punch grafting is another possible treatment option for resistant cases of vitiligo. Mapar et al¹¹ conducted a study in 25 patients (21 women, 4 men; age range, 20–47 years) who had been diagnosed with stable vitiligo (ie, no progression in the last 2 years) and were treated with single hair follicle transplant versus miniature punch grafting. The theory behind the study was to use the melanocytic reservoir noted in the normal hair follicle to repigment the vitiligo patch. With follow-up of both methods of treatment, there was no statistical difference in treatment results.¹¹ A similar study was conducted by Malakar and Lahiri¹² in patients with lip leukoderma (a variant of vitiligo). One hundred eight patients (41 males, 67 females; age range,

14–62 years) who had been diagnosed with stable lip leukoderma (ie, stable vitiligo for at least 6 months) underwent treatment via autologous miniature punch grafting. Punch biopsies were performed in donor sites of the buttocks and upper thighs with 72% of patients noting complete repigmentation. Complications noted were herpes labialis–induced lip leukoderma, which ultimately led to rejection of the graft site.¹² Overall, however, miniature punch grafting is a viable surgical option in stable vitiligo patients.

Cultured melanocyte transplantation, or a non-cultured epidermal suspension, was first initiated in 1992.¹³ Silpa-Archa et al¹⁴ conducted an open, split-comparison study of 6 vitiligo patients (5 women, 1 man; age range, 20–65 years) with stable lesions. Fifty percent of patients received autologous pigmented skin cellular suspension, which was applied to vitiligo-affected skin that was treated with a fractionated CO₂ laser, and 50% received dermabrasion. Composite dressing was placed overlying the site with dressing removal in 1 week. The degree of repigmentation was based on a modified vitiligo area scoring index scale of poor (0%–25%), fair (26%–50%), good (51%–75%), very good (76%–90%), or excellent (91%–100%). Overall repigmentation was very good to excellent in all 6 patients.¹⁴ Potentially, this method can far improve the surgical treatment options for future vitiligo patients.

Final Thoughts

Overall, when evaluating surgical interventions for the treatment of vitiligo, careful consideration of the patient's disease progression, failed therapies, outcome expectations, and repigmentation is warranted prior to initiating any procedure. For appropriate candidates, a range of surgical methodologies has proven to be effective in treatment of stable vitiligo patients.

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