Long-term follow-up of patients undergoing autologous noncultured melanocyte-keratinocyte transplantation for vitiligo and other leukodermas

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Background: Persistence of pigmentation after a melanocyte-keratinocyte transplantation procedure (MKTP) is an important consideration for efficacy.

Objective: We sought to determine long-term repigmentation of MKTP in vitiligo and other leukodermas.

Methods: A retrospective review of electronic medical records was conducted for all MKTPs performed at Henry Ford Hospital between January 2009 and April 2014. Repigmentation was assessed by a 5-point grading scale (poor to excellent) and Vitiligo Area Scoring Index (VASI).

Results: One hundred patients had MKTP performed at 236 anatomically-based lesions (ABLs); 63 patients with 157 ABLs had long-term data available (12-72 months; median, 24 months). Segmental vitiligo, nonsegmental vitiligo, and physical leukoderma demonstrated improvement in VASI scores: −75.6 ± 24.6%, −59.2 ± 36.6%, and −32.4 ± 33.5%, respectively. In vitiligo, at 24, 48, and 72 months after MKTP, 53%, 64%, and 53% of ABLs, respectively, maintained >75% repigmentation. Skin phototype, age, and anatomic location of ABLs had no significant effect on the outcome of treatment.

Limitations: Limitations of the study include the retrospective design with uncontrolled, postoperative adjuvant treatments and inconsistent compliance to scheduled follow-up evaluations.

Conclusions: MKTP provides satisfactory long-term repigmentation in the majority of appropriately selected patients with leukoderma. MKTP can maintain repigmentation for at least 72 months. (J Am Acad Dermatol 2017;77:318-27.)

Key words: autologous transplantation; epidermal suspension; keratinocyte; leukoderma; long term; melanocyte; VASI; vitiligo.

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Vitiligo is an acquired depigmenting condition that significantly impacts one's quality of life through its effects on mental health and social exclusion.[1,2] Fifty-seven percent of patients report that vitiligo moderately or severely affects their quality of life.[3] Other forms of leukoderma also induce similar psychosocial effects.[4] Although there are good treatment options for vitiligo and leukoderma, each has limitations; further research is needed to improve available therapeutic modalities.

The noncultured, autologous melanocyte-keratinocyte transplantation procedure (MKTP) is one such therapy that has emerged in recent years as an effective, well-tolerated treatment of leukoderma in adults and children of all skin phototypes (SPTs).[5-8] This cellular grafting technique offers unique advantages over other surgical interventions: it allows for treatment of 10 times the donor site's surface area without requiring a tissue culture facility, and the procedure can be completed in 1 visit. Most publications on this procedure reported short-term (<6 months) studies, small cohorts, nonconsecutive patients, a nonvalidated scoring system, or a combination of the above-mentioned items.[7-13] The focus of our study was to report long-term (12-72 months) follow-up of treated patients.

This study was a retrospective chart review to evaluate long-term repigmentation of vitiligo and other leukodermas after MKTP and to identify predictive factors for repigmentation. Because persistence of repigmentation is an important determinant of treatment utility, a sub-analysis on the retention of repigmentation beyond 6 months after surgery was also performed.

CAPSULE SUMMARY

- Melanocyte-keratinocyte transplantation provides significant repigmentation by 6 months after surgery, but publications on quantification of long-term outcome data are limited.
- Segmental and nonsegmental vitiligo demonstrated better improvement in VASI scores (−75.6 ± 24.6%, −59.2 ± 36.6%) compared with physical leukoderma (−32.4 ± 33.5%) at median time 24 months.
- Vitiligo repigmentation can persist for at least 72 months. Age, skin phototype, and anatomic location had no effect on repigmentation.

METHODS

Patient selection

A Henry Ford Hospital Institutional Review Board–approved (IRB No. 8391), retrospective review of electronic medical records was performed for all patients who underwent MKTP at our facility between January 2009 and April 2014. All patients for whom clinical information was available for at least 12 months after the procedure were included in the study.

Inclusion criteria for MKTP were stable vitiligo (focal/segmental vitiligo [SV] or nonsegmental vitiligo [NSV] without fingertip involvement) or physical leukoderma (mechanical, chemical, and thermal causes), piebaldism, or halo nevi. Stable vitiligo was defined as no history of new or enlarging lesions for at least 6 months. No washout period was required for patients receiving topical or systemic medication, but phototherapy was withheld during the week before surgery. Pregnant patients and those with a history of keloid formation or koebnerization were excluded.

MKTP technique

MKTP was performed according to the protocol described in Huggins et al.[8] Denudation of the recipient sites was achieved with the use of a high-speed dermabrader; however, in 5 patients with large surface areas or difficult sites for dermabrasion (ie, lips, penis, and scrotum), the recipient sites were denuded with 1 pass of fractional CO_2 laser (10,600 nm; Ultrapulse Encore, Lumenis Ltd, Santa Clara, CA) set to a pulse energy of 200 mJ, power of 60 Watts, and spot density of 4. Preoperative antibiotics were not prescribed unless indicated by standard surgical guidelines.[14] Approximately 3 weeks after surgery, resumption of prior therapy was permitted; however, specific instructions on the resumption of prior therapy or the initiation of new treatments were not routinely given.

Follow-up

As part of their postoperative care, patients were verbally instructed to either e-mail photographs (taken at a similar angle and distance to baseline photographs), clinical concerns, and adverse events or to return for an in-person evaluation at 1, 3, 6, 9, and 12 months and yearly thereafter. Because of inconsistent patient follow-up, retrieval of long-term follow-up was further made through 3 attempts with telephone and e-mail communications during this study's chart review.

Evaluation

Baseline and current postoperative photographs were analyzed for long-term (≥12 months) repigmentation. A sub-analysis of those with short-term