Perspective

Melanocyte-keratinocyte transplantation procedure: A few insights

Sanjeev V. Mulekar[1,2]

Vitiligo is a chronic disease of little-understood pathogenesis. Appearance of hypo- or depigmented patches anywhere on the body is enough to send a shiver down the spine of an affected person and his/her family due to stigma and social compulsions, especially in South and Middle-East Asia. My initial results in patients treated with non-cultured melanocyte-keratinocyte transplantation procedure encouraged me to focus on this treatment for vitiligo.[1-3] We have treated about 1000 patients every year since 2003–2015 at National Center for Vitiligo, Riyadh, Saudi Arabia. Medical treatment included topical creams (steroids and calcineurin inhibitors), narrowband ultraviolet-B phototherapy and excimer laser depending upon duration, extent of disease and anatomic locations of vitiligo lesions. In addition, we used palliative measures such as camouflage. However, our center is known for its surgical expertise. Most patients were treated with melanocyte-keratinocyte transplantation procedure though we have used split thickness skin grafting on a few occasions, especially for very small lesions located on areas such as the wrists and forearms that can be easily immobilised, and after failures with melanocyte-keratinocyte transplantation procedure.[4-10] It has been reported that split thickness skin grafting has the highest success rate and we tend to agree with this statement though more comparative studies are required to confirm this proposition.[11] We did not use epidermal grafting or punch grafting because both are time-consuming, can treat only small areas in one session and are frequently associated with adverse reactions.[11] On the contrary, melanocyte-keratinocyte transplantation procedure is a day care procedure which can be completed in 1–2 h and unlike cultured melanocyte-keratinocyte transplantation, it does not require a special laboratory thus reducing expenses. Considering cost, difficulty level of technique, training, results and adverse events, melanocyte-keratinocyte transplantation procedure lies between tissue grafting methods and cultured melanocyte-keratinocyte transplantation procedure. It combines the advantages of culture technique while eliminating the disadvantages of tissue grafting methods. Therefore, it is likely to be a widely used surgical method in the future.

Here are some insights based on our experience of the last 20 years for all those who are actively engaged in surgical management of vitiligo.

STABILITY

A most important selection criterion for melanocyte-keratinocyte transplantation procedure is clinical stability which is assessed by appearance of no new lesions, negative Koebner's phenomenon and unchanged existing lesions. There is an element of unpredictability in repigmentation due to lack of a laboratory test to determine stability and the unpredictable natural course of vitiligo. It is possible to give complete/almost complete repigmentation in about 50% of generalized and 80% of segmental vitiligo patients.[1,2] Our aim is to give prolonged disease-free period to vitiligo vulgaris patients. Though different stability periods are recommended

[1]National Center for Vitiligo and Psoriasis, Riyadh, Saudi Arabia, [2]Mulekar Clinic, Mumbai, Maharashtra, India

Address for correspondence: Dr. Sanjeev V. Mulekar, Mulekar Clinic, No. 142, 1st Floor, Laxmi Plaza, Laxmi Industrial Estate, New Link Road, Andheri West, Mumbai - 400 053, Maharashtra, India.
E-mail: mulekar@gmail.com

Access this article online	
Quick Response Code:	Website: www.ijdvl.com
	DOI: 10.4103/0378-6323.172904

How to cite this article: Mulekar SV. Melanocyte-keratinocyte transplantation procedure: A few insights. Indian J Dermatol Venereol Leprol 2016;82:13-5.

Received: March, 2015. **Accepted:** November, 2015.

by different authors, 1-year clinical stability seems to be adequate.[12]

PHENOTYPES OF VITILIGO

The term acral vitiligo includes patches distributed from elbow and knee to fingers and toes and does not recognize finger/toe tip involvement as a separate entity.[13] We have observed that finger/toe tips do not improve with melanocyte-keratinocyte transplantation procedure in spite of clinical stability.[14,15] A small number of patients may improve, but they relapse quickly. We have also observed that vitiligo located on central parts of the body is also relatively resistant to melanocyte-keratinocyte transplantation procedure when associated with tip involvement.

AREA TO BE TREATED IN ONE SESSION

It is possible to treat very large areas, up to 500 cm^2 in one operative session with cellular grafting methods. We have treated a few patients with large affected areas in a single session but whenever the treated area has repigmented excellently, there has been loss of pigmentation after a while. On the other hand, when treating larger areas over multiple sessions there has been excellent repigmentation in the initial sessions leaving small areas without result but repeat melanocyte-keratinocyte transplantation failed to produce any pigmentation on these areas and eventually the large patch shows loss of pigmentation.

One of the causes of reactivation of vitiligo is physical trauma. Treating large areas will lead to extensive trauma due to epidermal ablation. It is not yet clear if the trauma of dermabrasion is harmful (may reactivate disease) or beneficial (due to release of anti-inflammatory cytokines). Relationship of repigmentation to affected area and area treated in one session requires to be ascertained.

ANESTHESIA

Published reports either do not mention the type of anesthesia used for epidermal ablation or recommend topical anesthesia (5% EMLA cream) for this purpose.[16,17] In our experience, topical anesthesia is inadequate for pain relief during and after dermabrasion or laser ablation resulting in severe patient discomfort which leads to reluctance to undergo a repeat procedure, if required. We use 23% lidocaine cream/gel compounded in a pharmacy, under occlusion for about 30 min. This is effective for the face and neck but needs to be supplemented with 1–2% lidocaine injection at other sites. For a large area or multiple small areas, we consider either intravenous anesthesia or sedation supplemented with local anesthesia.[8] It is important to remember that the upper limit of lidocaine injection without adrenaline is 5 mg/kg. Relationship of pain during the procedure with outcome is yet to be ascertained.

PROGNOSIS

As mentioned earlier, acral areas such as palms, soles and finger/toe tips are difficult to repigment with melanocyte-keratinocyte transplantation. Lesions in non-acral areas in patients with finger-toe involvement have a poor prognosis. Large affected area exceeding 1000 cm^2 and multiple smaller lesions distributed on different anatomic locations also have a poor prognosis.

RETENTION OF PIGMENTATION

We have observed that appearance of new lesions on previously uninvolved skin is more common than loss of pigment on treated and repigmented vitiligo lesions. We have also observed that very few patients progress to develop universal vitiligo indicating that large numbers of melanocytes are not destroyed in ordinary vitiligo. Does this indicate that there are two melanocyte populations, one immune and one susceptible to autoimmune damage? Is number or immunological status of cells important? Is there any method to determine this susceptibility?

There are many unanswered questions and many more will arise as new research unfolds. It is necessary to understand that melanocyte-keratinocyte transplantation is one of the methods of treating vitiligo and is not a miracle cure. Both patients and newly trained dermatologists should have realistic expectations from the procedure. That said, getting rid of the blemish of segmental vitiligo on the face with melanocyte-keratinocyte transplantation is nothing short of a miracle.

REFERENCES

1. Mulekar SV. Melanocyte-keratinocyte cell transplantation for stable vitiligo. Int J Dermatol 2003;42:132-6.

2. Mulekar SV. Long-term follow-up study of segmental and focal vitiligo treated by autologous, noncultured melanocyte-keratinocyte cell transplantation. Arch Dermatol 2004;140:1211-5.
3. Mulekar SV. Long-term follow-up study of 142 patients with vitiligo vulgaris treated by autologous, non-cultured melanocyte-keratinocyte cell transplantation. Int J Dermatol 2005;44:841-5.
4. Mulekar SV, Al Issa A, Al Eisa A, Asaad M. Genital vitiligo treated by autologous, noncultured melanocyte-keratinocyte cell transplantation. Dermatol Surg 2005;31:1737-9.
5. Mulekar SV, Asaad M, Ghwish B, Al Issa A, Al Eisa A. Koebner phenomenon in vitiligo: Not always an indication of surgical failure. Arch Dermatol 2007;143:801-2.
6. Mulekar SV, Ghwish B, Al Issa A, Al Eisa A. Treatment of vitiligo lesions by ReCell vs. conventional melanocyte-keratinocyte transplantation: A pilot study. Br J Dermatol 2008;158:45-9.
7. Mulekar SV, Al Issa A, Al Eisa A. Treatment of vitiligo on difficult-to-treat sites using autologous noncultured cellular grafting. Dermatol Surg 2009;35:66-71.
8. Mulekar SV, Al Eisa A, Delvi MB, Al Issa A, Al Saeed AH. Childhood vitiligo: A long-term study of localized vitiligo treated by noncultured cellular grafting. Pediatr Dermatol 2010;27:132-6.
9. Mulekar SV, Isedeh P. Surgical interventions for vitiligo: An evidence-based review. Br J Dermatol 2013;169 Suppl 3:57-66.
10. Isedeh P, Al Issa A, Lim HW, Mulekar SS, Mulekar SV. Uncommon responses of segmental vitiligo to melanocyte-keratinocyte transplantation procedure. J Cutan Med Surg 2015;19:177-81.
11. Njoo MD, Westerhof W, Bos JD, Bossuyt PM. A systematic review of autologous transplantation methods in vitiligo. Arch Dermatol 1998;134:1543-9.
12. Parsad D, Gupta S; IADVL Dermatosurgery Task Force. Standard guidelines of care for vitiligo surgery. Indian J Dermatol Venereol Leprol 2008;74:S37-45.
13. Ezzedine K, Lim HW, Suzuki T, Katayama I, Hamzavi I, Lan CC, *et al.* Revised classification/nomenclature of vitiligo and related issues: The Vitiligo Global Issues Consensus Conference. Pigment Cell Melanoma Res 2012;25:E1-13.
14. Alsubait N, Mulekar S, Al Issa A. Failure of non-cultured melanocyte-keratinocyte transplantation in periungual vitiligo: A case report. J Dermatol Dermatol Surg 2015;19:123-5.
15. Guerra L, Capurro S, Melchi F, Primavera G, Bondanza S, Cancedda R, *et al.* Treatment of "stable" vitiligo by Timedsurgery and transplantation of cultured epidermal autografts. Arch Dermatol 2000;136:1380-9.
16. Chen YF, Yang PY, Hu DN, Kuo FS, Hung CS, Hung CM. Treatment of vitiligo by transplantation of cultured pure melanocyte suspension: Analysis of 120 cases. J Am Acad Dermatol 2004;51:68-74.
17. Guerra L, Primavera G, Raskovic D, Pellegrini G, Golisano O, Bondanza S, *et al.* Erbium: YAG laser and cultured epidermis in the surgical therapy of stable vitiligo. Arch Dermatol 2003;139:1303-10.