Dermatology Practical & Conceptual

Validating a Novel Technique of Dermatoscopic Imaging or Sequential Comparison of Target Lesions in Vitiligo

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Introduction

Sequential dermatoscopy can be a handy tool to assess disease activity in vitiligo and hence guide management practices [1]. However, the small size of the contact plate of hand held dermatoscopes prevents the adequate capturing of images of larger patches in entirety. "Wide area digital dermoscopy" (WADD) and Video-WADD, are certain modifications used to acquire images of lentigo maligna and congenital melanocytic nevus [2,3]. This study aimed at devising a new method to acquire and store dermatoscopic images of vitiligo patches in entirety, which would facilitate easy sequential comparison.

Case Presentation

This prospective observational study was conducted at the outpatient department of a tertiary care center in India. Thirty patients of active vitiligo (defined as occurrence of new lesions or expansion of pre-existing lesions in the previous 6 weeks) were recruited. Two target lesions were identified in each patient and dermatoscopic assessment was performed at baseline and after 16 weeks of medical treatment resulting in 60 pairs of pre and post treatment photographs. The detailed methodology of patient recruitment and follow-up has previously been published [4].

The reference points in the target lesion were marked according the markings on a clock, using different colored pens, akin to the technique used in Mohs micrographic surgery (Figure 1) [5]. Dermatoscopic images were acquired from each quadrant, while maintaining an overlap of 10% between images. Both lesional and perilesional skin were included as marginal lesions are crucial in determining disease activity and repigmentation. Images were then merged to obtain a consolidated image using Adobe Photoshop software (Adobe Inc., version CS3).

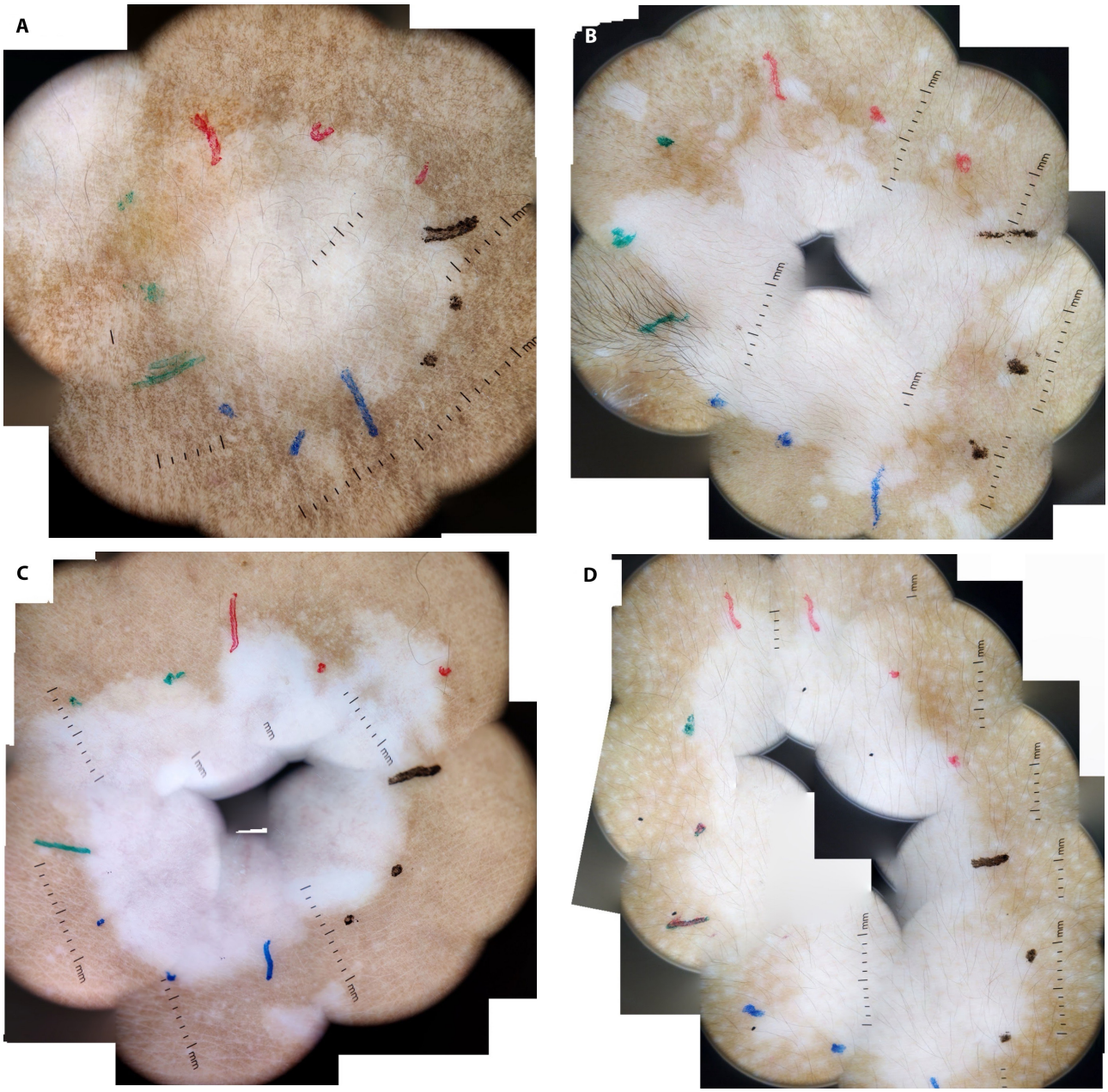

Figure 1. (A) Pre-treatment merged dermoscopic image of a patch of vitiligo with no blurring/distortion or missing part (Grade 4) (red-colored mark denotes 12 o'clock mark or cephalic direction, blue-colored mark denotes 6 o'clock or caudal, green and black marks signify 9 and 3 o'clock or left and right respectively). (B) Merged dermatoscopic image of another patch of vitiligo with blurring but slight (<5%) distortion and missing part <5% limited to central area (Grade 3) (C) Merged dermatoscopic image of another patch of vitiligo with blurring and distortion more than 5% but less than 10% and missing part <10% limited to central area (Grade 2) (D) Merged dermatoscopic image of another patch of vitiligo with no distortion but blurring and missing more than 10% (Grade 1).

The merged images were evaluated by 3 independent investigators at the end of the study (VK, AB, and AD) and graded on a Likert scale (Table S1). Consensus was said to be reached for each image if two or more investigators scored equal grades. Additionally, each investigator also scored the pair of pre- and post-treatment consolidated image of each patient. Cohn Kappa analysis was performed for two observers and Fleiss Kappa assessment was done for more than two observers, with level of agreement more than 0.6 considered as significant.

Amongst 120 consolidated images, consensus was not reached for one image, hence 119 images and 59 pairs were considered for analysis (Table 1). Level of agreement between the three experts for consolidated mage analyses were acceptable (Cohn and Fleiss kappa value > 0.6).

Conclusions

The proposed technique has various advantages like ease of sequential comparison of dermatoscopic images post-treatment, more rapid assessment and reduced digital space usage in acquisition and storage of dermatoscopic images. Inter observer agreement was significant in majority

Table 1. Image quality analysis by three independent dermatoscopy experts (N = 120).

Consolidated Image Analysis (N = 120)[a]					
Image Quality	**Expert 1**	**Expert 2**	**Expert 3**	**Consensus**	**Fleiss kappa**
Grade 1	12	6	9	7 (5.9%)	0.679
Grade 2	12	11	9	11 (9.2%)	
Grade 3	19	20	19	17 (14.3%)	
Grade 4	77	83	83	84 (70.6%)	
Total	120	120	120	119	
Paired image analysis (N = 60)					
Grade 1	11	6	7	7 (11.9%)	0.770
Grade 2	07	6	7	6 (10.1%)	
Grade 3	14	15	12	12 (20.3%)	
Grade 4	28	33	34	34 (57.6%)	
Total	60	60	60	59	

[a]One image in consolidated image analysis and one pair in paired image analysis excluded due to lack of consensus amongst three experts.

of instances overall, denoting the reliability and reproducibility of this method in follow up of vitiligo.

However, this method currently has its limitations as well like difficulty in merging images larger than 6 cm, deterioration of quality due to variation in the orientation of the dermatoscope with respect to the anatomical position of the body and unprecedented technological limitations, which warranted manual merging of certain images.

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