Dermatoscopy in Vitiligo: Diagnosis of the Stages

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Abstract

The aim of the Study is to identify the main dermatoscopic patterns of vitiligo and to establish their relationship with the activity of the process.

Materials and Methods: The study involved 63 patients with an established diagnosis of vitiligo. There were 34 patients with a progressive course, 11 with a stable and 18 in the repigmentation stage. All patients underwent dermatoscopy using a Delta 20T dermatoscope. Statistical processing of research materials was carried out using the SPSS Statistics software package.

Results. In the study, it was found that the most significant changes are manifested in the perifollicular region. So, progressive vitiligo is characterized by perifollicular pigmentation (91.2%), an altered pigment network (97.1%), a blurred spot border (94.1%), as well as specific structures - star-shaped formations and "comet tail". A stable vitiligo process is characterized by perifollicular depigmentation (81.8%), a sharp spot border (72.7%). For the stage of repigmentation, marginal hyperpigmentation (100%), perifollicular depigmentation (72.2%), blurred spot border (77.8%), "pigmentation islands" (77.8%).

Conclusion. For the first time, diagnostic dermatoscopic patterns of vitiligo have been developed, and their value has been shown. Dermatoscopy is a promising auxiliary non-invasive tool for diagnosing vitiligo and determining the stage of the disease.

Key words: *dermatoscopy, diagnostics, stability, vitiligo*

Introduction

Vitiligo is an acquired autoimmune disease, whose typical features are sharply demarcated spots resulting from the progressive loss of epidermal melanocytes[1-2]. Vitiligo is a topical problem because this medical condition is common among many ethnic groups and regions, it has major implications for the patients' psycho-social status, and there are no reliable treatment methods for it. It is the typical external symptoms that allow for establishing the correct clinical diagnosis in most cases. Though understanding the process activity is critical for making a decision on the subsequent treatment approach, this indicator cannot always be properly determined. The methods of unbiased and affordable vitiligo diagnosis are not available now. Confocal microscopy is an expensive diagnosis method[3]; tissue biopsy is not always an acceptable procedure for patients, so the diagnosis is based on visual assessment and auxiliary devices that are widely available to skin specialists, such as Wood's lamp. Dermatoscopy of skin disorders is becoming a more common method in dermatology now. For instance, dermatoscopic patterns can be observed in many general dermatoses[4-6]. This method is widely used to diagnose melanocyte-based skin lesions, such as melanoma[7-8]. There are also some publications on dermatoscopic features of parasitic and viral dermatoses[9-12], psoriasis[13-14], lichen planus[15-17], Kaposi sarcoma[18], rosacea and seborrhea dermatitis[19-20]. The knowledge of particular dermatoscopic pattern features of these dermatoses may become a critical additional argument during differential diagnosis of these dermatoses in case of doubt. Foreign literary sources contain occasional publications on

vitiligo dermatoscopyonly[21], but no clear-cut emphases or dermatological patterns or terms in describing vitiligo. Therefore our study was designed to determine the key dermatoscopic patterns that can be useful in diagnosing vitiligo and in assessing the process activity.

Materials and Methods

The study was carried out in the V.A. Rakhmanov Department of Skin and Sexually Transmitted Diseases of N.V. Sklifosovsky Clinical Medicine Institute. The study enrolled 63 patients diagnosed with vitiligo who had been under observation in the Department from October 2018 to December 2019. Vitiligo was diagnosed based on conventional examinations and clinical signs well described in literary sources.

The patients with both stable and unstable (progressive) vitiligo course were enrolled. The disease course was regarded as stable if the patient did not report any new spots and the enlargement of the existing ones in the last 6 months. Stable course with repigmentation (that is normally used during treatment) is accompanied with the shrinking of available foci and pigmentation in the center of the focal spots. Vitiligo progression means the enlargement of the existing depigmentation foci and emergence of new ones during the last 6 months.

All patients underwent dermatoscopic assessment of a single vitiligo spot using the Delta 20T dermatoscope at 20-fold magnification in polarized mode, and photos were shot on Iphone 11.

The selection of dermatoscopic patterns included into the assessment process was based on the publications and own experience. Dermatoscopic structures included into the dermatoscopic assessment included: perifollicular changes, altered pigment network, borderline marginal hyperpigmentation, the spot boundary, the pigmentation islets inside the spot, availability of specific features, such as appearance of starlike formations, appearance of the comet's tail.

All patients were divided into 3 groups (stable course, stable course with repigmentation against the treatment background, unstable or progressive course), depending on the combination of medical history and clinical research.

Statistical processing of the study materials was carried out using the SPSS Statistics software. To compare the symptom emergency rate in patients, Pearson's chi square criterion is used in three stages with calculation of the precise significance by Monte Carlo method and using z-criterion with Bonferroni's adjustment to compare the proportions by columns (i.e. by stages).

Results and Discussion

In our study, 63 patients were randomized into 3 groups:

1. Progressive vitiligo (n=34),

2. Stable vitiligo (n=11),

3. Stable vitiligo with repigmentation (n=18).

Even though several dermatological structures were found in each category(Fig.1), some of them were observed in one of the treatment arms either exclusively or frequently. In this study, we did not adjust any particular dermatoscopic patterns for the patient's age, gender, disease duration, lesion site or concomitant diseases.

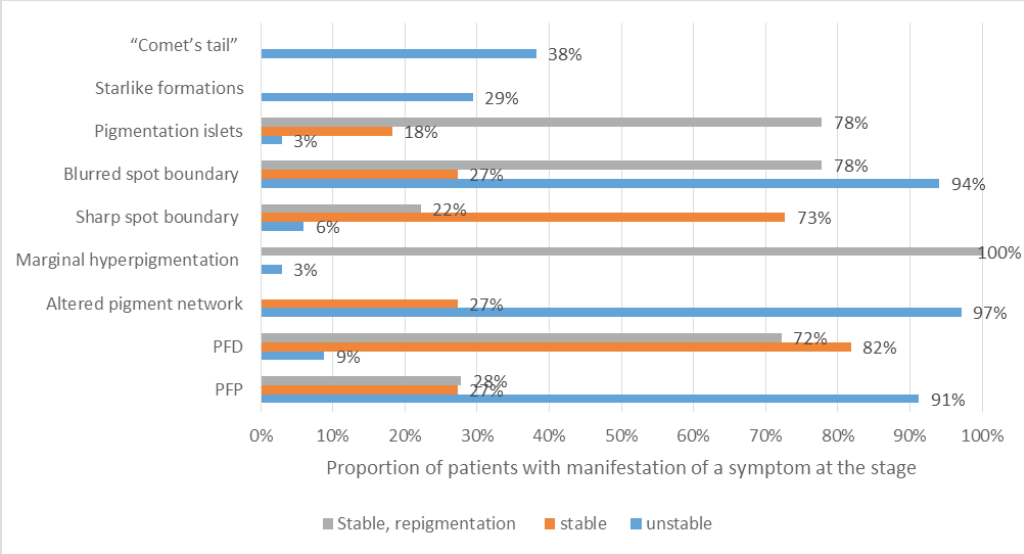

Figure 1. Frequency of the appearance of dermatoscopic patterns at different stages of vitiligo

The most significant changes in case of vitiligo are observed in the perifollicular region. The perifollicular changes included perifollicular pigmentation (PFP) and perifollicular depigmentation (PFD).

Perifollicular pigmentation (PFP) (Fig.2A) means the emergence of dotty pigment around the hair follicle on depigmented skin. Perifollicular pigmentation in patients at the unstable stage was observed at a significantly higher rate (91.2%, or 31 persons) as compared with patients at the stable and stable, repigmentation stages (27.3%, or 3 persons, and 27.8%, or 5 persons, respectively). Significant differences in PFP emergence (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

Perifollicular depigmentation (PFD) (Fig.2B) is the lack of the pigment section near a hair follicle. Perifollicular pigmentationin patients at the unstable stage was observed at a significantly lower rate (8.8%, or 3 persons) as compared with patients at the stable and stable, repigmentation stages (81.8%, or 9 persons, and 72.2%, or 13 persons, respectively). Significant differences in PFD emergence (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

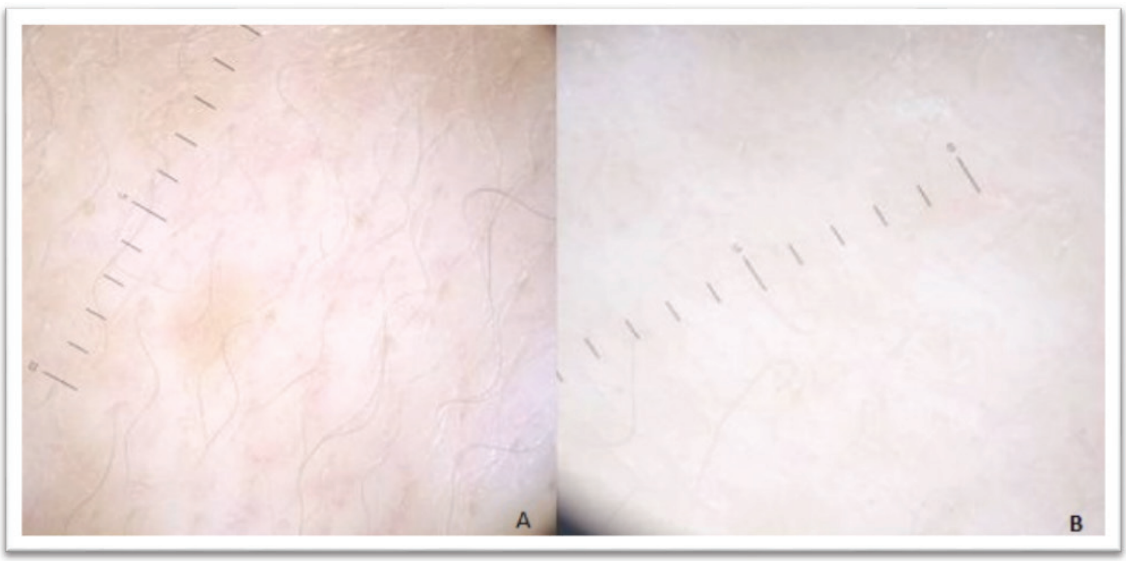

Figure 2. Perifollicular changes. A- periffolicular pigmentation; B- periffolicular depigmentation

Altered pigment network (Fig.3) means partial disappearance or total absence of the network-like pigment pattern. The altered pigment network in patients at the unstable stage is observed at a significantly higher rate (97.1%, or 33 persons) as compared with patients at the stable and stable, repigmentation stages (27.3%, or 3 persons, and 0%, or 0 persons, respectively). Significant differences in the altered pigment network emergence (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

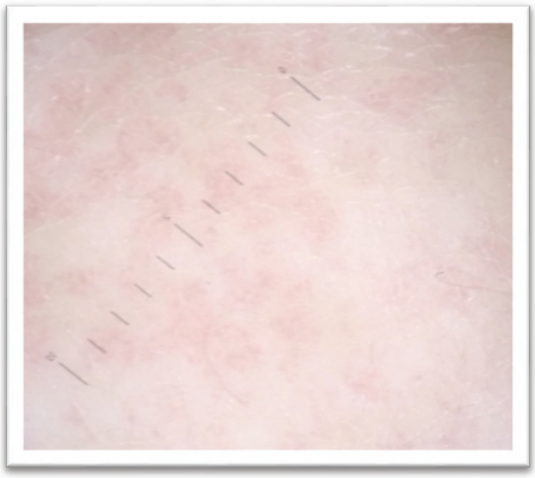

Figure 3. Altered pigment network

Marginal hyperpigmentation (Fig.4A) is more intense, dark pigmentation around a depigmented spot. Its incidence in patients at the stable, repigmentation stagewas observed at a significantly higher rate (100%, or 18 persons) as compared with patients at the unstable and stable stages (2.9%, or 1 persons, and 0%, or 0 persons, respectively). Significant differences in the marginal hyperpigmentation emergence (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

Pigmentation islets (Fig.4B) are homogeneous pigmentation of the healthy skin color as roundish lesions inside a depigmented spot. Their incidence inside the spot in patients at the stable, repigmentation stagewas observed at a significantly higher rate (77.8%, or 14 persons) as compared with patients at the unstable and stable stages (2.9%, or 1 persons, and 18.2%, or 2 persons, respectively).Significant differences in the emergence of pigmentation islets inside the spot (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

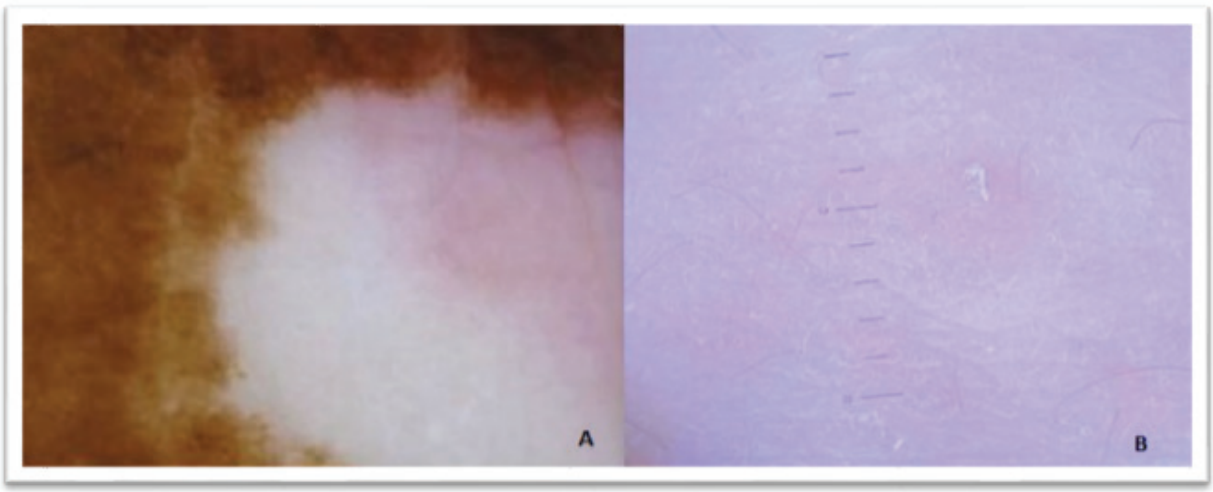

Figure 4. Dermatoscopic patterns: 4A- Marginal hyperpigmentation; 4B- Pigmentation islets.

Sharp spot boundary (Fig.5A) is a clear transition from the depigmented area to the normal skin color. The incidence of sharp spot boundary in patients at the stable stage was observed at a significantly higher rate (72.7%, or 8 persons) as compared with patients at the unstable and stable, repigmentation stages (5.9%, or 2 persons, and 22.2%, or 4 persons, respectively). Significant differences in sharp spot boundary emergence (p=0.001) were found at stages by Pearson's chi square criterion

and by the significance calculation by Monte Carl method.

Blurred spot boundary (Fig.5B) means a smooth transition from the healthy skin to the depigmented skin as the pigment intensity decrease. The incidence of blurred spot boundary in patients at the stable stagewas observed at a significantly lower rate (27.3%, or 3 persons) as compared with patients at the unstable and stable, repigmentation stages (94.1%, or 32 persons, and 77.8%, or 14 persons, respectively).Significant differences in blurred spot boundary emergence (p=0.001) were found at stages by Pearson's chi square criterion and by the significance calculation by Monte Carl method.

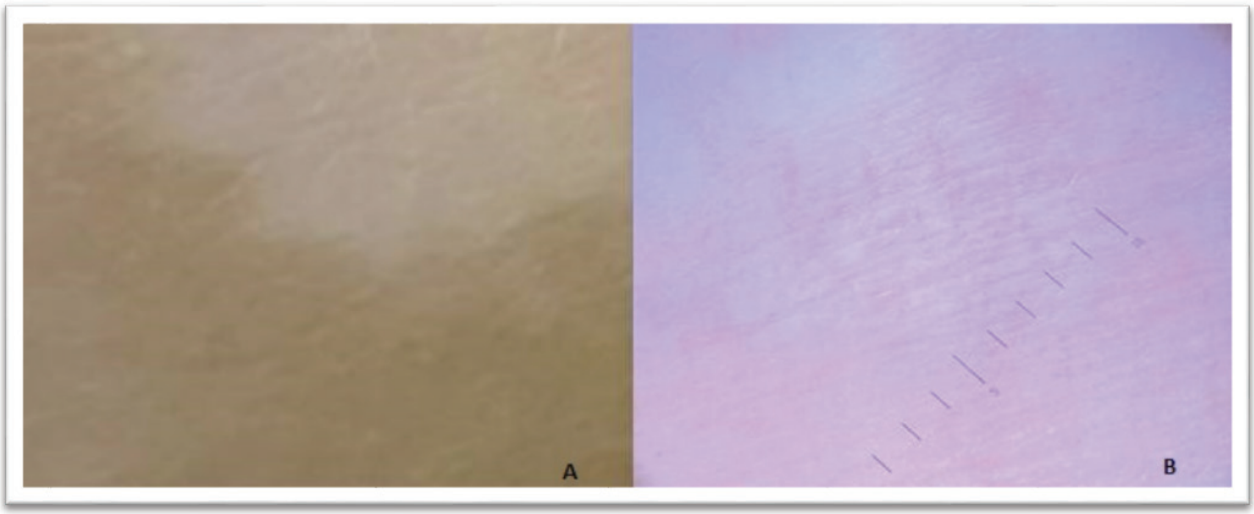

Figure 5. Spot border: 5A- Sharp spot boundary; 5B- Blurred spot boundary

The micro-Kebner phenomenon in vitiligo is the emergence of isomorphous depigmented strips along the injury lines, around the vitiligo spot, which demonstrates the appearance of the "comet's tail" andstarlike formations. Starlike formations (29.4% or 10 persons) and the comet's tail (38.2% or 13 persons) were only found at the unstable stage.

Thus, PFP, modified pigment network, blurred spot boundary and the specific structures, starlike formations and the comet's tail, are typical of the unstable disease course (vitiligo progression). Whereas PDF and sharp spot boundary are typical of the stable course of the disease. For the repigmentation state, the marginal hyperpigmentation, PFD, blurred boundary of the spot, "pigmentation islets".

Conclusion. Dermatoscopy is a promising auxiliary non-invasive tool for diagnosing vitiligo. It enables to assess the disease stages, which may influence the treatment approach selection in the future. The diagnostic dermatoscopic patterns were developed for the first time and demonstrated to be valuable. For instance, perifollicular pigmentation is typical of progressive vitiligo, and perifollicular depigmentation is rather a sign of stable vitiligo. Other dermatoscopic structures, such as modified pigment network, borderline hyperpigmentation and other auxiliary signs, will supplement the picture and enable a more precise diagnosis. Further research and development of the single, standardized dermatoscopic patterns as the diagnostic tests are warranted, which will relieve from the need for invasive histological examinations. Conflict of interests: the authors do not state any conflict of interests.

Ethical Clearance. The study protocol has been approved by The Ethics Committee of Sechenov University in Moscow, Russian Federation (approval number 01-19).

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Conflict of Interest – Nil.

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