Research Article

Evaluation of the Inflammatory infiltrate in active vitiligo lesions

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Abstract

Background: Vitiligo is an autoimmune disease with episodes of activity and stability. Mononuclear cells infiltrate the vitiliginous skin with subsequent destruction of melanocytes are the hallmarks of vitiligo. **Aim**: to evaluate the mononuclear cell infiltrate in active vitiligo. **Patients and methods**: 30 active vitiligo patients were recruited, then perilesional, lesional and nonlesional skin were obtained and stained with hematoxylin and eosin. **Results:** The perilesional infiltrate was significantly higher in count than lesional and nonlesional ones. Also, the lesional infiltrate was significantly higher than nonlesional infiltrate. **Conclusion:** Perilesional skin of active vitiligo is by far the most representative area for the inflammatory infiltrate where active melanocytes destruction takes place.

Keywords: Vitiligo, Inflammatory infiltrate, mononuclear cell

Introduction

Vitiligo is a common, acquired disfiguring depigmentation disorder due to selective loss of functional melanocytes in the skin[1]. The exact pathogenesis of vitiligo remains unclear, however there is general agreement that a T-cell mediated melanocyte destruction is the final step in its pathogenesis regardless the initiating steps[2].

Vitiligo follows an unpredictable course with episodes of activity and stability which could be observed clinically via the morphology of the edge and the color of the biopsied vitiliginous lesion[3].

Patients and Methods

This prospective study was conducted on 30 patients of the attendants of Dermatology clinic, Minia University Hospital. All patients have active vitiligo. Activity was detected by asking the patient about the appearance of new vitiligo lesion(s) or expansion of existing lesions and confirmed clinically using the criteria of activity reported in Awad and Moftah[3]. Informed consents were obtained from all patients or their guardians (for those under 18 years of age). The study was approved by the local ethical committee of scientific research at Faculty of Medicine, Minia University.

All patients were subjected to complete history taking including age, duration, activity of the disease and family history of vitiligo.

Skin biopsies were obtained from each patient using punch probes (3mm) under local anesthesia from perilesional, lesional and nonlesional areas.

Each biopsy was processed for routine hematoxylin & eosin (H&E). The slides were examined and the number of mononuclear cells was counted and results were given in cells/mm^2. The evaluation repeated by three independent investigators and the median value for each case was recorded for further statistical evaluation.

Data were analyzed using Statistical package for the Social sciences (SPSS), version 24. Qualitative data were presented as frequency and percentage. Quantitative data were presented as the range and median. Data were not following a normal distribution, so non-parametric analytical tests were used. A P-value of 0.05 was chosen as the level of statistical significance.

Results

The current study was conducted on 30 NSV patients (16 males and 14). Their age ranged

from 11 to 65 years (median = 22.5). The duration of the disease ranged from 0.5 to 144 months (Median = 21). 3 patients (10%) were skin type III, 17 patients (56.67%) were skin type IV and 10 patients (33.33%) were skin type V. A positive family history of vitiligo was present in 5 patients (16.76 %). Activity of the disease ranged from 3 to 23 weeks (median = 7). 9 patients (30%) were +2, 5 patients (16.67%) were +3, and 16 patients (53.33%) were +4, as regarding VIDA score. VETI score ranged from 1.2 to 14 (median = 1.8).

H&E staining revealed mononuclear cell infiltrate in upper dermis of all biopsies (100%). Their number in perilesional skin ranged from 40 to 152 cell/mm^2 (median = 91), and from 37 to 137 cell/mm^2 (median = 69) in lesional skin. In the nonlesional skin, it ranged from 17 to 50 cell/mm^2 (median = 31). Comparing these three sites together showed a statistically highly significant difference ($p < 0.001$). Such difference was significantly higher in perilesional skin than in lesional and nonlesional skin ($p = 0.01$ and $p < 0.001$ respectively). Moreover, the infiltrate was significantly higher in lesional skin than nonlesional skin ($p < 0.001$).

Discussion

Skin infiltration by autoreactive, melanocyte-specific T-cells, followed by disappearance of melanocytes are hallmarks of vitiligo pathogenesis. Inflammatory infiltrates are found in lesional and perilesional skin, but mainly concentrated in perilesional skin of active lesions where melanocyte destruction takes place[4, 5]. This finding was previously reported in Awad and Moftah**,**[3] and encountered by ours in the routine H&E.

Although perilesional infiltrates are more abundant than lesional ones, they differ in the proportion of each T-cell subtype with a different CD4+/CD8+ T-cells ratio; perilesional infiltrates possess a lower CD4+/CD8+ T-cells ratio, while lesional ones possess a higher ratio[6]. All of these characters facilitate the mission of the infiltrate, which is to eliminate their targets (melanocytes) in perilesional skin. On the other hand, the infiltrate in lesional skin had eliminated melanocytes.

In conclusion, the perilesional skin of active vitiligo by far represent the most suitable areas to evaluate the mononuclear inflammatory infiltrate which is incriminated in vitiligo pathogenesis. Thus, intalesional corticosteroid in perilesional skin of active lesions may be a treatment option to stop the ongoing melanocytes destruction and expansion of the lesions.

Conflict of interest

None

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References

1. Alikhan A, Felsten LM, Daly M, Petronic-Rosic V. Vitiligo: a comprehensive overview Part I. Introduction, epidemiology, quality of life, diagnosis, differential diagnosis, associations, histopathology, etiology, and work-up. J Am Acad Dermatol. 2011;65.
2. Van den Boorn JG, Konijnenberg D, Dellemijn TA, van der Veen JP, Bos JD, Melief CJ, Vyth-Dreese FA, Luiten RM. Autoimmune destruction of skin melanocytes by perilesional T cells from vitiligo patients. J Invest Dermatol. 2009;129(9): 2220-32.
3. Awad S, Moftah N. Activity status in vitiligo lesions: diagnostic clues2014. p 55-61 p.
4. van den Wijngaard R, Wankowicz-Kalinska A, Le Poole C, Tigges B, Westerhof W, Das P. Local immune response in skin of generalized vitiligo patients. Destruction of melanocytes is associated with the prominent presence of CLA+ T cells at the perilesional site. Lab Invest. 2000;80(8):1299-309.
5. Le Poole IC, van den Wijngaard RM, Westerhof W, Das PK. Presence of T cells and macrophages in inflammatory vitiligo skin parallels melanocyte disappearance. Am J Pathol. 1996;148(4):1219-28.
6. Abdallah M, Lotfi R, Othman W, Galal R. Assessment of tissue FoxP3+, CD4+ and CD8+ T-cells in active and stable nonsegmental vitiligo. Int J Dermatol. 2014; 53(8):940