Overview of Vitiligo Research

April 2014 – June 2014

Highlights

- *The first part of review series on vitiligo dedicated to disease pathogenesis and triggers recently published.*
- *Epidemiological study found no gender differences in vitiligo. Consanguinity in marriage increases incidence in vitiligo.*
- *Candidate biomarkers confirm the autoimmune nature of vitiligo progression.*
- *Several previous studies pointed to the superior efficiency of high-intensity narrow-band ultraviolet (NB-UVB) over conventional NB-UVB phototherapy.*
- *Anti-oxidant effect of NB-UVB in vitiligo patients unexpectedly found, witnessed by a decrease in initially elevated markers of oxidative stress.*
- *An Eastern medicine treatment, moxibution, reported with good clinical results accompanied by normalization of altered immunological parameters in vitiligo patients.*
- *Simple leaflet including psychoeducation, relaxation and attentional refocusing combined with guidance on forming specific "if-then" plans might be an effective tool to alleviate social anxiety in vitiligo patients.*

This is a review of research results in the vitiligo field which were indexed in the PubMed database (www.ncbi.nlm.nih.gov/pubmed) for the period from April 2014 till June 2014. Abstracts of papers were retrieved from the PubMed database using the search term "*vitiligo*" with a filter set up to retrieve records with *creation date* between April 01, 2014 and June 30, 2014. Retrieved records were manually checked for a relevance to and significance for the field of vitiligo research. Thirty six records were found to be relevant and of interest, and were included into this quarterly overview.

Reviews & comments

Tarle and co-authors PubMed published the first part of review series on vitiligo dedicated to disease pathogenesis and triggers. Tung & Le Poole PubMed, in their comments on the earlier published work of Anbar et al. emphasized the importance of introducing clear guidelines for vitiligo treatment to improve overall vitiligo treatment efficiency. Lotti & D'Erme PubMed published a review article emphasizing diversity of vitiligo pathogenesis and systemic nature of the disease. Nestor et al. PubMed published a review focused on the usage of *Polipodium leukotomas* in management of pigmentory disorders, including vitiligo.

Disease management and clinical features

Sharaf assessed understanding of vitiligo among Saudi school children. PubMed In conclusion, the author found prevailing misconceptions on the reasons for and essence of vitiligo which delays the seeking of medical advice for this condition, which is critical in the period early after onset. These findings highlight the need for proper education on the nature and management of vitiligo.

Epidemiology

Agrawal et al.[PubMed] studied vitiligo profiles in the Kumaun region of India and found that acrofacial type is the prevailing one, with the most commonly observed age of vitiligo onset being the first decade of life.

Patil et al.[PubMed] reported the results of a cross-sectional analysis aiming to reveal gender differences in vitiligo among Indian patients. In general, no difference has been found, with males significantly more likely to report family history of the disease.

Alenizi[PubMed] expectedly found that consanguinity in marriage increases incidence in vitiligo, which is well in line with the fact that genetic factors contribute to vitiligo susceptibility.

Comorbidities

In a study of autoimmune thyroiditis patients Ponto et al.[PubMed] observed increased (compared to general population) frequency of vitiligo (4.4%) among patients which further confirms the association of vitiligo with thyroid disorders of an autoimmune nature.

Quality of life (QoL)

Gupta et al.[PubMed] assessed newly a developed instrument VIS-22 for QoL measurement of vitiligo patients and compared it to the existing DLQI and Skindex-16 tools. Authors concluded that the assayed instrument is valid and comparable to DLQI and Skindex-16 while addressing specific needs of vitiligo patients.

Vitiligo triggers

Korean researchers investigated the conditions which, in patient opinion, served as triggers for vitiligo on a cohort of 489 vitiligo patients.[PubMed] Results showed that the most frequent triggers of vitiligo were trauma and burn, sunlight and stress followed by household chemicals and hair dyes, thus potentially offering a way of controlling vitiligo onset through avoiding these precipitating factors.

Supporting previous reports, a case of vitiligo induction by imiquimod was observed.[PubMed]

Case reports

Gandopadhyay et al.[PubMed] reported a case of squamous cell carcinoma residing in photo-covered area in a vitiligo patient. This is an exceptional case as previous studies of large vitiligo patient cohorts showed at least the same rate of skin cancer as in the general population.

Understanding mechanisms of vitiligo pathogenesis

Eby et al.[PubMed] reported observations made in a model of vitiligo which is based on SCF transgenic mice with interfollicular melanocytes, supporting opinion on less abundant regulatory T-cells in the skin of mice prone to develop vitiligo. This further supports the role of regulatory T-cell dysfunction in vitiligo. In addition, the author's results suggest an important role of SCF, one of the key melanogenic growth factors, in repigmentation process in vitiligo.

Mehaney et al.[PubMed] assayed total anti-oxidant status in Egyptian vitiligo patients, with the findings that it is lowered in vitiligo patients compared to healthy controls. However, no association (although study cohorts were small) was found with *CAT* and *COMT* gene polymorphisms suggesting that other factors lead to altered anti-oxidant capacity in vitiligo patients.

Benzekri and co-authors[PubMed] addressed the question of conditions underlying melanocyte loss in vitiligo. Their findings suggest that there are heterogeneous histological pattern of melanocyte loss which include inflammatory and non-inflammatory types (as well as a combination of the above) thus further confirming the heterogeneous nature of vitiligo mechanisms of pathogenesis.

Mansuri et al.[PubMed] explored microRNA expression in lesional versus healthy skin and found several differentially regulated species which are known to target transcripts, the genes and their expression products of which have been reported to be associated with vitiligo, and which are linked to oxidative stress and immune system. These findings combined with previous data of Shi et al.[PubMed] highlight possible role of microRNA expression changes in vitiligo pathogenesis.

Recently, evidence on the involvement of interferone-γ in vitiligo pathogenesis has been uncovered. The study of Wang and co-authors[PubMed] showed that interferone-γ induces senescence in melanocytes and, importantly, enhances their immunecompetence thus potentially promoting autoimmune reaction leading to melanocyte destruction in vitiligo.

Genetic studies

Alzolibani et al.[PubMed] examined a link between genetic variations in the *CYP2C9* gene and vitiligo on a small cohort of Saudi patients, with results suggesting existence of such an association.

Lu et al.[PubMed] conducted a meta-analysis of the impact of catalase gene polymorphism on vitiligo susceptibility. Authors concluded that 389 C/T variation in the *CAT* gene might be associated with vitiligo in western Europeans although GWAS results have failed to confirm this association in Caucasians to date.

Candidate biomarkers

Pietrzak and co-authors[PubMed] addressed a question of metabolic abnormalities in childhood vitiligo with the findings that HDL-cholesterol was significantly lower, whereas the concentration of LDL-cholesterol was significantly higher in patients with vitiligo compared to healthy controls, and the value of the LDL/HDL ratio was significantly higher in vitiligo patients. Results of the study suggest that lipid disturbances in vitiligo may result from disturbed metabolic processes and/or from oxidative stress.

Marie at al.,[PubMed,] based on previous findings indicating involvement of NRRP1 inflammasome component in vitiligo which were initially based on results genetic study, revealed that immunostaining for NLRP1 as well as for product of inflammasome processing, interleukin-1β, in perilesional skin can serve as markers of progressive disease. These findings further confirm the autoimmune nature of vitiligo progression and offer a new marker for disease activity.

Mechanisms of treatments

Seleit el.[PubMed] questioned whether a melanocyte reservoir is retained in depigmented hairs in vitiligous lesions, which is one of the pre-requisites for repigmentation. In agreement with results of a previous study,[PubMed] melanocyte lineage cells were found even in depigmented hairs, although in lower quantities, thus prompting future research to elaborate ways to activate them in order to repigment the surrounding skin as a therapeutic intervention.

Several previous studies pointed to the superior efficiency of high-intensity narrow-band ultraviolet (NB-UVB) over conventional NB-UVB phototherapy. Dong et al.[PubMed] investigated a possible mechanism underlying this phenomenon and found that high-intensity NB-UVB might better stimulate maturation of hair follicle melanocyte precursors.

Karsli et al.[PubMed] unexpectedly found anti-oxidant effect of NB-UVB in vitiligo patients witnessed by a decrease in initially elevated markers of oxidative stress in vitiligo patients compared to healthy controls.

Methodological advancements

Tour et al.[PubMed] attempted to determine patient-reported treatment outcome measures as patient satisfaction is acknowledged as a major measure of treatment success owing to the specific features of vitiligo mostly affecting patient quality of life. In the results of this pilot study, matching between normal and affected skin, the noticeability of vitiligo and the reduction vitiligo patches were identified as important indicators of treatment success.

Novel treatment modalities

Yu & Ai[PubMed] investigated the efficiency of moxibution, an Eastern medicine treatment, in vitiligo treatment and reported good clinical results accompanied by normalization of altered immunological parameters in vitiligo patients.

Depigmentation is an option for expanded vitiligo treatment aiming to remove remaining melanocytes. However approved treatments occasionally result in incomplete or reversible depigmentation. Webb et al.[PubMed] suggest that combination of depigmentation-inducing agents with immune adjuvant therapies to induce T-cell response and promote melanocyte destruction would improve overall treatment efficiency.

Huo and co-authors[PubMed] investigated whether orally taken galangin can be an efficient treatment for vitiligo using the mouse model of hydroquinone-induced vitiligo, and found an increased number of melanine-containing hair follicles accompanied by decreased blood malondialdehyde (the later was constitutively reported to be increased in vitiligo patients). These results prompt the further investigation of galangin as a potential treatment for vitiligo.

Patel et al.[PubMed] reported improved formulation of clobetasol propionate (microemulsion) which has better penetration through skin barrier and showed superior therapeutic effect over conventional formulation in terms of faster repigmentation and better efficiency in the treatment of vitiligo patients as topical agent.

Clinical studies and trials

Aziz Jalaki and co-workers[PubMed] investigated efficiency of pigmented hair follicle transplantation in segmental vitiligo on ten segmental vitiligo patient and observed signs of perifollicular repigmentation around the transplanted area within 2 weeks, with 2-9 mm perifollicular repigmentation in all patients at the 6 month follow-up. This observation highlights hair follicle transplantation as a treatment option for difficult-to-treat segmental vitiligo.

Al-Shobaili[PubMed] reported experience of 308 nm excimer laser usage for vitiligo treatment on 105 lesions in 48 patients, with – accordingly to previous reports – good efficiency. The most responsive lesions were located on the face, and average number of sessions to achieve repigmentation was 16.8. This report further confirms 308 nm excimer laser phototherapy as an efficient option for treating vitiligo.

In the study Helou and co-authors,[PubMed] the effect of fractional laser (10600 nm) was investigated on the repigmentation of refractory non-segmental vitiligo lesions in combination with sun exposure. The study results showed that ablative treatment significantly improved repigmentation thus further confirming positive effect of adjuvant to other interventions ablative treatment of vitiligo lesions.

Retrospective study of Yoshida et al.[PubMed] on 231 patients confirmed that phototherapy, either alone or in combination with topical intervention, is superior over topical monotherapy. In addition, results of the study again confirmed that younger patients are more likely to benefit from the treatment.

Chandrashekar et al.[PubMed] reported positive experience of using motorized power punch in 10 patients to treat stable non-segmental vitiligo offering time saving for the procedure and increased ease.

Padilla-Espana and co-authors[PubMed] reported that corrective make-up can be useful for vitiligo treatment in adolescents based on QoL assessment of four patients, re-confirming that camouflage is an appropriate and effective option for vitiligo patients.

Reviewed and prepared by:

Dr. Igor Korobko, DSci.
Chief Scientific Director, Vitiligo Research Foundation

info@vrfoundation.org
www.VRFoundation.org
1-855-966-3555
1, Penn Plaza #6205
New York, NY 10119 USA

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