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MODERN METHODS OF TREATMENT OF VITILIGO

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Abstract

Vitiligo is a chronic autoimmune skin disorder characterized by the loss of melanocytes, leading to depigmented patches on the skin. Although the disease is not life-threatening, it significantly affects patients' quality of life due to its psychological and social impact. Over recent decades, considerable progress has been made in understanding the pathogenesis of vitiligo, which has contributed to the development of modern and more effective treatment strategies. This article reviews contemporary methods for the management of vitiligo, including topical therapies, phototherapy, systemic immunomodulatory treatments, surgical approaches, and emerging targeted therapies such as Janus kinase (JAK) inhibitors. The advantages, limitations, and clinical effectiveness of these methods are discussed. A comprehensive and individualized treatment approach is essential to achieve optimal repigmentation and improve patient outcomes.

Keywords

Vitiligo, depigmentation, phototherapy, topical treatment, immunomodulatory therapy, JAK inhibitors, melanocyte regeneration.

Introduction

Vitiligo is a chronic acquired skin disorder characterized by the progressive loss of functional melanocytes, resulting in well-demarcated depigmented macules and patches. The global prevalence of vitiligo is estimated to be approximately 0.5–2% of the population, affecting individuals of all ages, genders, and ethnic backgrounds. Although vitiligo is not associated with physical morbidity or mortality, its visible nature often leads to significant psychological distress, reduced self-esteem, and impaired quality of life.

The exact etiology of vitiligo remains complex and multifactorial. Current evidence suggests that autoimmune mechanisms play a central role in melanocyte destruction, with genetic predisposition, oxidative stress, neural factors, and environmental triggers contributing to disease onset and progression. Advances in molecular biology and immunology have improved the understanding of these pathogenic pathways, paving the way for the development of targeted and mechanism-based therapeutic approaches.

Traditional treatment options for vitiligo have included topical corticosteroids, calcineurin inhibitors, and various forms of phototherapy, particularly narrowband ultraviolet B (NB-UVB). While these modalities remain widely used, their efficacy is variable and often dependent on disease duration, lesion location, and patient adherence. In recent years, novel treatment strategies such as systemic immunomodulators, surgical melanocyte transplantation techniques, and targeted therapies including Janus kinase (JAK) inhibitors have emerged, offering new hope for improved repigmentation outcomes.

This article aims to provide an overview of modern methods used in the treatment of vitiligo, focusing on their mechanisms of action, clinical effectiveness, and current limitations. Emphasis is placed on the importance of individualized treatment plans and the integration of emerging therapies into clinical practice to optimize patient management.

This article is based on a comprehensive review of current scientific literature focusing on modern methods used in the treatment of vitiligo. Relevant publications were identified through systematic searches of major medical and scientific databases, including PubMed, Scopus, Web

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of Science, and Google Scholar. Peer-reviewed original research articles, clinical trials, systematic reviews, and meta-analyses published primarily within the last 10–15 years were considered to ensure the inclusion of up-to-date and clinically relevant information.

The search strategy employed a combination of keywords and medical subject headings (MeSH), such as vitiligo, treatment, phototherapy, topical therapy, immunomodulatory treatment, JAK inhibitors, and melanocyte transplantation. Articles not published in English, case reports with limited clinical relevance, and studies lacking sufficient methodological quality were excluded from the analysis.

Selected studies were critically evaluated to assess their study design, sample size, treatment protocols, outcome measures, and reported efficacy and safety profiles. The reviewed treatment modalities were categorized into topical therapies, phototherapy, systemic treatments, surgical interventions, and emerging targeted therapies. Comparative analysis was conducted to highlight the advantages, limitations, and clinical applicability of each therapeutic approach.

This methodological approach allows for an integrated and evidence-based overview of modern vitiligo treatment strategies, supporting the identification of optimal and individualized management options for patients.

Topical Therapies

Topical treatment remains the first-line therapeutic approach for patients with localized and early-stage vitiligo. The most commonly used agents include topical corticosteroids and topical calcineurin inhibitors. Corticosteroids exert their effect by suppressing local immune responses and reducing inflammation, thereby preventing further melanocyte destruction. They are particularly effective in non-segmental vitiligo affecting the face and trunk. However, long-term use may be associated with adverse effects such as skin atrophy, telangiectasia, and striae.

Topical calcineurin inhibitors, such as tacrolimus and pimecrolimus, are increasingly preferred for sensitive areas including the face, neck, and intertriginous regions. These agents inhibit T-cell activation without causing skin atrophy, making them suitable for prolonged use. Clinical studies have demonstrated comparable efficacy to corticosteroids, especially when combined with phototherapy.

Phototherapy

Phototherapy is considered one of the most effective treatment modalities for generalized vitiligo. Narrowband ultraviolet B (NB-UVB) therapy is currently regarded as the gold standard due to its favorable safety and efficacy profile. NB-UVB promotes repigmentation by stimulating melanocyte proliferation, migration from hair follicles, and melanogenesis, while also modulating immune responses in the skin.

Excimer laser and excimer lamp therapies, which emit monochromatic UVB light (308 nm), are used for localized and resistant lesions. These targeted approaches allow higher doses of UV radiation to be delivered directly to affected areas while sparing surrounding healthy skin. Phototherapy is often administered in combination with topical agents to enhance repigmentation outcomes.

Systemic Therapies

Systemic treatments are typically reserved for patients with rapidly progressive or extensive vitiligo. Oral corticosteroids, administered as low-dose continuous therapy or oral mini-pulse regimens, are used to stabilize disease activity by suppressing autoimmune processes. While effective in halting disease progression, long-term systemic steroid use is limited by potential adverse effects, including metabolic and cardiovascular complications.

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Other systemic immunomodulatory agents, such as methotrexate and azathioprine, have been investigated in selected cases, although their use remains limited and requires careful patient monitoring.

Surgical Treatment Options

Surgical interventions are considered for patients with stable vitiligo that has not responded to medical therapy for at least 6–12 months. These methods aim to restore pigmentation by transplanting functional melanocytes into depigmented areas. Common techniques include split-thickness skin grafting, suction blister epidermal grafting, and non-cultured melanocyte–keratinocyte cell suspension transplantation.

Among these, non-cultured cell suspension transplantation has gained popularity due to its ability to treat larger areas with minimal donor skin and favorable cosmetic outcomes. Surgical treatments generally provide good repigmentation results; however, they require specialized expertise and are not suitable for patients with active disease.

Emerging and Targeted Therapies

Recent advances in the understanding of vitiligo pathogenesis have led to the development of targeted therapies. Janus kinase (JAK) inhibitors represent a promising new class of drugs that interfere with cytokine-mediated immune signaling involved in melanocyte destruction. Topical and oral JAK inhibitors, such as ruxolitinib, have demonstrated encouraging results in clinical trials, particularly when combined with phototherapy.

Other emerging approaches include antioxidant therapy, regenerative medicine strategies, and stem cell-based treatments, which aim to counteract oxidative stress and promote melanocyte regeneration. Although these therapies show potential, further large-scale clinical studies are required to establish their long-term safety and efficacy.

Combination and Individualized Treatment Approaches

Given the heterogeneous nature of vitiligo, combination therapy is often necessary to achieve optimal clinical outcomes. Integrating topical agents with phototherapy or combining systemic treatments with targeted therapies can enhance repigmentation and disease stabilization. Individualized treatment plans based on disease type, extent, activity, patient age, and lesion location are essential for effective management.

Conclusion

Vitiligo is a complex chronic skin disorder that requires a comprehensive and multifaceted treatment approach. Significant advances in understanding the immunological and molecular mechanisms underlying the disease have led to the development of more effective and targeted therapeutic strategies. Modern treatment options, including topical agents, phototherapy, systemic immunomodulators, surgical interventions, and emerging targeted therapies such as Janus kinase (JAK) inhibitors, have expanded the possibilities for achieving disease stabilization and repigmentation.

Despite these advancements, no single treatment modality is universally effective for all patients. Therapeutic outcomes depend on multiple factors, including disease type, extent, duration, lesion location, and individual patient characteristics. Therefore, personalized treatment strategies and combination therapies play a crucial role in optimizing clinical outcomes and improving patients' quality of life.

Future research should focus on large-scale, long-term clinical trials to further evaluate the safety and efficacy of novel therapies, as well as to identify reliable biomarkers for predicting treatment response. Continued progress in targeted and regenerative treatment approaches holds promise for more effective and durable management of vitiligo in the coming years.

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REFERENCES

1. Alikhan A, Felsten LM, Daly M, Petronic-Rosic V. Vitiligo: a comprehensive overview part I. Epidemiology, pathogenesis, and clinical features. Journal of the American Academy of Dermatology. (review of vitiligo treatment strategies). Cited in vitiligo pathogenesis and therapy overview.
2. Ezzedine K, et al. JAK Inhibitors for the Treatment of Vitiligo: Current Evidence and Emerging Therapeutic Potential. [Review of JAK/STAT pathway–targeted vitiligo therapies].
3. Study on Baricitinib + NB-UVB Phototherapy for Vitiligo. Low-Dose Baricitinib Plus Narrow-Band Ultraviolet B for the Treatment of Progressive Non-Segmental Vitiligo: A Prospective Controlled Study. Demonstrates enhanced repigmentation with combination therapy.
4. Systematic Review: NB-UVB in Vitiligo Therapy. Treatment of Vitiligo with NB-UVB: A Systematic Review of Randomized Controlled Trials. Summarizes clinical effects and comparative efficacy with other UV therapies.
5. Meta-Analysis of Phototherapy Outcomes. Effect of narrow band ultraviolet B phototherapy as monotherapy or combination therapy for vitiligo: a meta-analysis — evaluates NB-UVB with topical treatments outcomes.
6. Efficacy and Safety of Traditional and Surgical Modalities in Segmental Vitiligo. Review article on segmental vitiligo treatments including surgical options. Provides evidence of surgery as a main option in resistant cases.
7. Vitiligo Disease: Causes, Diagnosis, and Modern Treatment Methods. International Journal of Medical Sciences Review — overview of diverse vitiligo therapies including pharmacological and procedural methods.