10. Wu S.-J. i dr. Modeling GA-derived optimization analysis for canal-based irrigation water allocation under variations in runoff-related and irrigation-related factors // Agricultural Water Management. 2023. T. 290. S. 108588.

CONTEMPORARY DIAGNOSTIC CONSEPTS IN VITILIGO: CLINICAL EVALUATION, BIOMARKER IDENTIFICATION AND ADVANCED IMAGING TECHNOLOGIES

Klebleeva G.D.
Head of Department Dermatovenerology and cosmetology SamSMU, Samarkand, Republic of Uzbekistan PhD, docent
Khamidova M.A.
1-course Master's Resident of Department Dermatovenerology and cosmetology SamSMU Samarkand State Medical University, Samarkand, Republic of Uzbekistan
khamidovamanzurakhon@gmail.com

Annotation: Vitiligo is a multifactorial depigmenting skin disorder characterized by the progressive disappearance of melanocytes resulting in sharply defined hypopigmented or depigmented lesions. Increasing knowledge about autoimmune mechanisms, oxidative stress pathways, and genetic susceptibility has significantly transformed diagnostic approaches during the last decade. Modern dermatological practice emphasizes early detection of disease activity and differentiation from similar pigmentary abnormalities through non-invasive imaging techniques, laboratory biomarker evaluation, and digital analytical systems. This review discusses current diagnostic principles, clinical manifestations, prognostic determinants, and emerging technological solutions used for accurate evaluation of vitiligo.

Keywords: Vitiligo, melanocyte dysfunction, depigmentation disorders, dermoscopy, ultraviolet examination, confocal microscopy, autoimmune biomarkers, dermatologic imaging, disease progression.

СОВРЕМЕННЫЕ ДИАГНОСТИЧЕСКИЕ КОНЦЕПЦИИ ВИТИЛИГО: КЛИНИЧЕСКАЯ ОЦЕНКА, ИДЕНТИФИКАЦИЯ БИОМАРКЕРОВ И ПЕРЕДОВЫЕ ТЕХНОЛОГИИ ВИЗУАЛИЗАЦИИ

Клеблеева Г.Д.
Заведующая кафедрой дерматовенерологии и косметологии СамГМУ, г. Самарканд, Республика Узбекистан, PhD, доцент
Хамидова М.А.
Магистрант 1 курса кафедры дерматовенерологии и косметологии СамГМУ Самаркандский государственный медицинский университет, г. Самарканд, Республика Узбекистан
khamidovamanzurakhon@gmail.com

Аннотация: Витилиго — многофакторное депигментирующее заболевание кожи, характеризующееся прогрессирующим исчезновением меланоцитов, что приводит к появлению чётко очерченных гипопигментированных или депигментированных очагов. Углубление знаний об аутоиммунных механизмах, путях оксидативного стресса и генетической предрасположенности существенно изменило диагностические подходы за последнее десятилетие. Современная дерматологическая практика акцентирует внимание на раннем выявлении активности заболевания и его дифференциации с другими пигментными нарушениями с использованием неинвазивных методов визуализации, лабораторной оценки биомаркеров и цифровых аналитических систем. В обзоре рассматриваются современные принципы диагностики, клинические проявления,

прогностические факторы и новые технологические решения для точной оценки витилиго.

Ключевые слова: витилиго, дисфункция меланоцитов, депигментирующие заболевания, дерматоскопия, ультрафиолетовое исследование, конфокальная микроскопия, аутоиммунные биомаркеры, дерматологическая визуализация, прогрессирование заболевания.

VITILIGONING ZAMONAVIY DIAGNOSTIK KONSEPSIYALARI: KLINIK BAHOLASH, BIOMARKERLARNI ANIQLASH VA ILG‘OR VIZUALIZATSIYA TEXNOLOGIYALARI

Klebleeva G.D.
SamDTU (SamSMU) dermatovenerologiya va kosmetologiya kafedrasi mudiri, Samarqand, O‘zbekiston Respublikasi, PhD, dotsent
Khamidova M.A.
SamDTU dermatovenerologiya va kosmetologiya kafedrasi 1-bosqich magistranti Samarqand davlat tibbiyot universiteti, khamidovamanzurakhon@gmail.com

Annotatsiya: Vitiligo — bu ko‘p omilli depigmentatsion teri kasalligi bo‘lib, melanotsitlarning asta-sekin yo‘qolishi bilan tavsiflanadi va natijada aniq chegaralangan gipopigmentatsiyalangan yoki depigmentatsiyalangan o‘choqlar paydo bo‘ladi. So‘nggi o‘n yillikda autoimmun mexanizmlar, oksidativ stress yo‘llari va genetik moyillik haqidagi bilimlarning kengayishi diagnostika yondashuvlarini sezilarli darajada o‘zgartirdi. Zamonaviy dermatologiya amaliyoti kasallik faolligini erta aniqlash hamda uni boshqa pigmentatsiya buzilishlaridan farqlashga qaratilgan bo‘lib, bunda noinvaziv vizualizatsiya usullari, laborator biomarkerlar tahlili va raqamli analitik tizimlardan foydalaniladi. Mazkur sharhda vitiligoni aniq baholash uchun zamonaviy diagnostika tamoyillari, klinik belgilar, prognoz omillari va yangi texnologik yechimlar yoritilgan.

Kalit so‘zlar: vitiligo; melanotsit disfunktsiyasi, depigmentatsiya kasalliklari, dermatoskopiya, ultrabinafsha tekshiruv, konfokal mikroskopiya, autoimmun biomarkerlar, dermatologik vizualizatsiya, kasallik rivojlanishi.

Introduction. Vitiligo is recognized as an acquired pigmentary disorder involving selective melanocyte destruction within the epidermis. The condition affects individuals of all ethnic backgrounds and age groups and may develop gradually or rapidly depending on immune activity. Although the disease is medically benign, visible skin involvement frequently leads to psychological distress and reduced quality of life. Recent dermatological investigations demonstrate that vitiligo development involves immune-mediated cytotoxicity directed toward melanocytes combined with oxidative cellular damage. Epidemiological observations discussed within dermatology programs supported by the World Health Organization underline the importance of timely diagnosis in chronic dermatologic disorders because delayed identification may increase psychosocial complications. Historically, diagnosis depended primarily on clinical inspection. However, overlapping features with other hypopigmentary dermatoses often complicate evaluation. Consequently, contemporary dermatology integrates imaging modalities, laboratory screening, and computational analysis into diagnostic protocols.

Clinical Characteristics. Vitiligo lesions appear as depigmented macules caused by complete melanin loss.Typical Morphological Findings: Clearly demarcated white patches. Absence of scaling or epidermal infiltration. Progressive enlargement or fusion of lesions. Hair depigmentation within affected areas. Distribution Patterns: Non-segmental vitiligo usually demonstrates symmetrical localization affecting the face, extremities, and areas exposed to mechanical friction. Segmental vitiligo commonly develops unilaterally along dermatomal lines and stabilizes earlier. Frequently Involved Sites: Periorificial facial zones. Hands and dorsal fingers. Elbows and knees.Genital and mucosal regions. The Koebner phenomenon remains an important clinical indicator suggesting disease activity following trauma or irritation.

Diagnostic Criteria. Accurate diagnosis begins with detailed patient history, including onset timing, progression rate, family autoimmune disorders, and triggering environmental factors.Typical vitiligo lesions demonstrate total pigment loss with sharply defined borders and absence of inflammation. Ultraviolet Examination Assessment under ultraviolet illumination using the Wood's lamp enhances diagnostic precision. Key observations include: Bright bluish-white fluorescence. Identification of early or subclinical lesions. Clear differentiation from post-inflammatory hypopigmentation. This technique remains widely accessible and cost-effective. Dermoscopic Examination Dermoscopy allows magnified evaluation of pigment distribution. Characteristic signs include: Reduced pigment network. Irregular lesion borders. Satellite depigmented macules. Perifollicular pigmentation indicating repigmentation potential. Dermoscopy also assists clinicians in evaluating treatment response. Reflectance Confocal Microscopy. Reflectance confocal microscopy enables visualization of epidermal cellular architecture without tissue removal. Diagnostic findings include: Absence of melanocytes within basal epidermis. Reduced melanin reflectance. Presence of inflammatory cells in active lesions. This technique improves diagnostic accuracy in cosmetically sensitive areas. Optical Imaging Technologies. Optical coherence tomography provides cross-sectional assessment of epidermal integrity and melanin distribution. Although still developing, it offers potential for monitoring treatment-induced repigmentation. Histopathology. Skin biopsy remains necessary in atypical presentations. Microscopic findings include: Melanocyte depletion. Interface alteration. Mild lymphocytic infiltration during active disease. Immunohistochemical staining confirms melanocyte absence. Laboratory Investigations. Vitiligo frequently associates with autoimmune endocrine disorders. Recommended laboratory screening: Thyroid function assessment.

Autoantibody testing. Vitamin D level evaluation. Recent studies demonstrate increased chemokine activity, especially CXCL10, correlating with disease progression. Artificial Intelligence in Diagnosis

Digital dermatology platforms increasingly employ artificial intelligence algorithms capable of lesion recognition and quantitative monitoring. Advantages include: Objective disease severity measurement. Remote patient monitoring. Standardized photographic analysis. AI technologies are expected to expand teledermatology accessibility.

Prognostic Factors. Disease progression varies significantly. Favorable Prognostic Indicators: Early treatment initiation. Facial or truncal localization. Residual follicular pigmentation. Unfavorable Indicators: Acral involvement. Leukotrichia. Long disease duration. Associated autoimmune disorders. Psychological stress and oxidative imbalance may also influence relapse risk.

Conclusion. Diagnostic strategies for vitiligo have undergone significant transformation due to technological progress and improved understanding of disease pathogenesis. Integration of clinical examination with dermoscopic analysis, ultraviolet assessment, biomarker investigation, and artificial intelligence allows earlier detection and more accurate monitoring of disease activity. Future advances are expected to focus on predictive molecular markers and personalized diagnostic algorithms that support targeted therapeutic interventions

References

1. Taieb A., Picardo M. (2009). Vitiligo. New England Journal of Medicine, 360(2), 160–169.
2. Ezzedine K., Eleftheriadou V., Whitton M., van Geel N. (2015). Vitiligo. The Lancet, 386(9988),
3. Bergqvist C., Ezzedine K. (2020). Vitiligo: A Review. Dermatology, 236(6), 571–592.
4. Rashighi M., Harris J. (2017). Interferon gamma pathway in vitiligo. Journal of Investigative Dermatology, 137(10), 2077–2084.
5. Rodrigues M., Pandya A. (2017). Advances in Vitiligo Research. Dermatologic Clinics, 35(2), 151–161.
6. Speeckaert R., Dugardin J., Lambert J. (2017). Biomarkers in Vitiligo. Experimental Dermatology, 26(9), 782–790.
7. van Geel N., Mollet I. (2018). Confocal microscopy in pigmentary disorders. Journal of the European Academy of Dermatology and Venereology, 32(9), 1429–1436.
8. Frisoli M., Essien K., Harris J. (2020). Vitiligo: Mechanisms of Pathogenesis. Annual Review of

Immunology, 38, 621–648.

9. Dell'Anna M. L., Ottaviani M. (2019). Oxidative stress in vitiligo. Pigment Cell & Melanoma Research, 32(2), 206–215.

10. Hamzavi I., Jain H. (2004). Vitiligo Area Scoring Index (VASI). Journal of the American Academy of Dermatology, 50(5), 824–830.

11. Silverberg J. I. (2015). Association between vitiligo and autoimmune diseases. British Journal of Dermatology, 172(2), 405–412.

12. Whitton M. et al. (2016). Interventions for Vitiligo. Cochrane Database of Systematic Reviews.

13. Krüger C., Schallreuter K. (2012). Pathogenesis of Vitiligo. International Journal of Dermatology, 51(6), 656–667.

14. Passeron T., Ortonne J.P. (2012). Vitiligo and Melanocyte Biology. Pigment Cell & Melanoma Research, 25(6), 667–675.

15. World Health Organization. Skin Diseases and Global Burden Reports. Available at:

16. National Center for Biotechnology Information (NCBI). PubMed Database — Vitiligo Research Articles.

17. American Academy of Dermatology. Vitiligo Clinical Guidelines.

18. European Academy of Dermatology and Venereology Clinical Recommendations for Pigmentary Disorders.

19. National Institutes of Health. Autoimmune Skin Disorders Research Reports.

TERINING ZAMBURUG'LI KASALLIKLARINING KLINIK JIHATLARI ZAMONAVIY USULLAR VA KELAJAK ISTIQBOLLARI

Klebleyeva G.D. [1], Rustamova M.S. [2]

1- SamDTU dermatovenerologiya va kosmetologiya kafedrasi mudiri, Samarqand, O'zbekiston Respublikasi, PhD, dotsent

2- Samarkand Davlat Tibbiyot Universiteti Dermatovenerologiya va kosmetologiya kafedrasi 1-bosqich magistranti

madinabonusirojiddinovna1999@gmail.com

Annotatsiya: Ushbu maqolada terining zamburug'li kasalliklari (dermatomikozlar) ning etiologiyasi, epidemiologiyasi, klinik ko'rinishlari, diagnostika usullari va davolash samaradorligi ilmiy asosda yoritildi. Tadqiqot natijalariga ko'ra, dermatofitlar orasida *Trichophyton rubrum* yetakchi o'rinni egallashi aniqlandi. Klinik shakllar ichida *tinea pedis* va *onikomikoz* ko'proq uchrashi qayd etildi. Kombinatsiyalangan (mahalliy va tizimli) antimikotik terapiya faqat mahalliy davolashga nisbatan yuqori samaradorlik ko'rsatdi. Natijalar terining zamburug'li kasalliklarida erta tashxis, laborator tasdiq va kompleks yondashuv muhim ahamiyatga ega ekanligini tasdiqlaydi.

Kalit so'zlar: Nanotexnologiya va biopolimerlar, sun'iy intellekt algoritmlari , dermatomikoz, dermatofit, onikomikoz, tinea pedis, trichophyton rubrum, Candida albicans, mikroskopik tekshiruv, antimikotik terapiya, laborator diagnostika, epidemiologiya.

КЛИНИЧЕСКИЕ АСПЕКТЫ ГРИБКОВЫХ ЗАБОЛЕВАНИЙ КОЖИ, СОВРЕМЕННЫЕ МЕТОДЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ

Klebleyeva G.D.[1], Rustamova M.S.[2]

[1]Заведующая кафедрой дерматовенерологии и косметологии Самаркандского государственного медицинского университета, Самарканд, Республика Узбекистан, PhD, доцент

[2]Самаркандский государственный медицинский университет, кафедра дерматовенерологии и косметологии, магистрант 1 курса