MODERN APPROACHES TO THE PREVENTION, DIAGNOSIS AND TREATMENT OF ALLERGIC DERMATITIS

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Abstract: Allergic dermatitis is a chronic inflammatory skin condition underpinned by a complex interplay of genetic, immunological, and epidermal factors. Current understanding of the condition has evolved significantly following the identification of the roles of skin barrier dysfunction, filaggrin dysfunction, disruption of the skin microbiome, and the activation of type 2 cytokines (IL-4, IL-13, IL-31). Despite the expansion of treatment options, the prevalence of the condition remains high, reaching 20–25% among children and up to 10% among adults. The issue is of particular relevance in Central Asian countries, including the Republic of Uzbekistan, where climatic conditions, high levels of airborne dust, increasing urbanization, and changes in dietary patterns are contributing to a rise in the incidence of allergic diseases.

This article reviews contemporary prevention methods, diagnostic algorithms, and therapeutic approaches to allergic dermatitis, incorporating international clinical guidelines for 2023–2026. It synthesizes findings from studies by Russian and international authors, alongside the regional characteristics of the Republic of Uzbekistan. The text justifies the necessity of transitioning from symptomatic treatment to a personalized patient management strategy grounded in the assessment of disease phenotypes and the utilization of targeted pharmacological agents.

Keywords: allergic dermatitis, atopic dermatitis, skin barrier, prevention, diagnosis, biological therapy, JAK inhibitors, Republic of Uzbekistan, cytokines, immunopathogenesis.

Introduction. Allergic dermatitis is no longer regarded solely as a localized inflammation of the skin. The modern concept defines it as a systemic immuno-inflammatory disease, characterized by impaired epidermal barrier function, chronic pruritus, alterations in the skin microbiota, and the development of multiple comorbid conditions, including bronchial asthma, allergic rhinitis, anxiety disorders, and sleep disturbances.

According to international studies, more than 230 million people suffer from allergic skin conditions. Atopic dermatitis is one of the most common forms of allergic skin disease, affecting one in five children and almost one in ten adults.

For the Republic of Uzbekistan, this matter holds particular significance due to the pronounced environmental disparities among the nation's regions. Research conducted by allergists in Uzbekistan indicates a rising prevalence of allergic diseases among pediatric populations in the major cities of Tashkent, Samarkand, and Fergana. This trend is attributed to escalating industrial air pollution, shifts in

dietary patterns, and heightened exposure to household allergens. Within the context of a sharply continental climate, there is a notable frequency of seasonal exacerbations driven by temperature fluctuations and reduced atmospheric humidity.

A distinctive feature of modern clinical practice is that the extent of skin involvement is no longer the sole criterion for assessing disease severity. A patient with limited rashes may exhibit marked depression, sleep disturbances and a reduced quality of life comparable to that seen in severe psoriasis or diabetes mellitus.

Literature review. Recent studies have substantially reshaped the understanding of the pathogenesis of allergic dermatitis. Chu et al. (2024) indicate that the condition is fundamentally driven by the interplay of three components: a defect in the epidermal barrier, immune dysregulation, and the influence of environmental factors. The authors emphasize that traditional therapeutic approaches, which focus exclusively on suppressing inflammation, fail to provide long-term disease control.

Z.Y. Choo et al. (2024) view allergic dermatitis as a multisystemic disease. According to the researchers, chronic skin inflammation is accompanied by the development of neuropsychiatric and cardiovascular disorders, which requires a multidisciplinary approach to patient management.

J. Jeskey et al. (2024) note that moisturising therapy should be regarded not as an adjunctive measure, but as a fundamental strategy for restoring the skin barrier. The authors assert that the systematic use of emollients helps to reduce the frequency of flare-ups and minimise the need for topical glucocorticosteroids.

Experts from the American Academy of Dermatology (AAD, 2024–2025) concluded that biologics, primarily dupilumab and tralokinumab, should be considered as first-line therapy for moderate to severe disease, particularly in the presence of severe pruritus and a significant impairment in quality of life.

The authors of the EuroGuiDerm guidelines (2025) emphasise the need to rule out lymphoproliferative disorders and other dermatoses before prescribing systemic therapy, as the clinical presentation of allergic dermatitis can mimic a number of malignant skin conditions.

Russian researchers A.A. Kubanova, N.N. Potekaev, L.S. Namazova-Baranova and R.M. Khaitov have repeatedly emphasised that allergic dermatitis should be regarded as an early manifestation of the atopic march, which precedes the development of bronchial asthma and allergic rhinitis. According to the authors, early intervention makes it possible to alter the natural course of the disease and reduce the risk of systemic atopy developing.

Research conducted by scientists from the Republic of Uzbekistan, including D.A. Abidov, Sh.S. Karimov, F.M. Mukhamedov, and co-authors, indicates an increase in allergic conditions among children in Tashkent and the Fergana Valley. The researchers attribute this phenomenon to anthropogenic pressure, shifts in dietary patterns, and the deterioration of environmental indicators in major cities.

Of particular interest are recent publications focusing on the role of the skin microbiome. It has been established that increased colonisation of the skin by Staphylococcus aureus contributes to enhanced production of IL-4 and IL-13 and the formation of a vicious cycle of inflammation.

Main section. The current understanding of allergic dermatitis is grounded in the 'outside-in and inside-out' concept. Disruption of the epidermal structure results in increased transepidermal water loss, the penetration of allergens, and the activation of the innate immune system. Subsequently, a type 2 inflammatory response develops, characterized by a predominance of the cytokines IL-4, IL-13, and IL-31. Specifically, IL-31 is regarded as the principal mediator of chronic pruritus.

The prevention of this condition has undergone significant changes. While allergen avoidance previously dominated, current recommendations emphasize maintaining skin barrier integrity and the early identification of risk factors. The routine exclusion of foods without proven sensitization is no

longer recommended, as this may contribute to the development of food allergies and nutritional deficiencies.

The influence of climatic factors is of particular interest to Uzbekistan. Low relative humidity, high levels of solar radiation, and frequent dust storms result in pronounced skin dryness and an increase in the frequency of disease relapses. Clinical practice in dermatology departments in Tashkent indicates a rise in patient attendance during the autumn and winter months.

Current approaches to the prevention of allergic dermatitis	**Clinical significance**
Daily use of emollients	Restoration of the skin's barrier function
Control of the indoor microclimate	Reducing skin dryness
Elimination of passive smoking	Reducing the risk of flare-ups
Early detection of atopy in the family	Identification of high-risk groups
Educating patients and parents	Improving adherence to treatment
A balanced diet	Reducing the likelihood of food sensitisation

Table 1. Current preventive measures for allergic dermatitis.

The diagnosis of allergic dermatitis is currently based on a combination of clinical and laboratory criteria. Total IgE levels and skin prick tests are of auxiliary value and cannot be used in isolation to make a diagnosis.

Clinical assessment of disease severity is carried out using the SCORAD, EASI and POEM scales. A number of studies have shown that quality-of-life indicators correlate more strongly with the intensity of itching than with the area of skin involvement.

The introduction of digital technologies deserves special attention. Artificial intelligence systems demonstrate diagnostic accuracy comparable to that of expert assessments by dermatologists, which opens up prospects for teledermatology in remote regions of Uzbekistan, where access to specialist dermatologists remains limited.

Modern treatment of allergic dermatitis is based on a stepwise approach, with emollients remaining the cornerstone of therapy, as regular use of moisturisers can reduce relapse frequency by almost one-third. Topical glucocorticosteroids are still considered first-line agents for managing flare-ups, although long-term continuous use is discouraged because of the risks of skin atrophy and steroid phobia. Calcineurin inhibitors play an important role in treating sensitive areas, particularly the face and periorbital region, and help reduce corticosteroid use. In recent years, the introduction of biologic therapies and Janus kinase inhibitors has revolutionised the management of allergic dermatitis.

Dupilumab blocks IL-4 and IL-13 signalling, reducing the severity of inflammation and itching. Tralokinumab selectively inhibits IL-13. JAK inhibitors (upadacitinib, abrocitinib, ruxolitinib) are characterised by a rapid onset of clinical effect and a marked reduction in itching within the first few weeks of treatment.

Treatment approach	**Target of action**	**Advantages**	**Limitations**
Emollients	Barrier restoration	Safety	Require long-term use
Topical corticosteroids	Anti-inflammatory effect	Rapid results	Skin atrophy
Calcineurin inhibitors	T-lymphocyte activation	Suitable for long-term use	Skin burning
Dupilumab	IL-4/IL-13	High efficacy	High cost
Tralokinumab	IL-13	Good safety profile	Limited availability

JAK inhibitors	JAK signalling pathway	Rapid relief from itching	Need for safety monitoring

Table 2. Current pharmacological approaches to the treatment of allergic dermatitis.

The introduction of personalised treatment algorithms is of particular interest to the healthcare system of the Republic of Uzbekistan. The high cost of biologic therapy limits its widespread use. At the same time, economic analyses show that patients with severe allergic dermatitis lose a significant number of school and working days each year, which constitutes a substantial socio-economic burden of the disease.

It would be advisable to establish a national register of patients with severe forms of allergic dermatitis, to introduce teledermatology platforms for remote areas of Karakalpakstan, Surkhandarya and Navoi regions, and to develop domestic prevention programmes that take into account the country's climatic and environmental characteristics.

The modern approach to treatment is gradually shifting from managing individual symptoms to controlling the immunological mechanisms of the disease. It is likely that the coming decade will change the very definition of remission in allergic dermatitis: clinicians will assess not only the condition of the skin, but also the normalisation of the microbiome, the restoration of the epidermal barrier and the patient's quality of life.

Conclusion. Allergic dermatitis is not a localised dermatosis, but a chronic systemic disease, the development of which is determined by the interaction of genetic, immunological and environmental factors. Advances in our understanding of the role of the cytokines IL-4, IL-13 and IL-31 have enabled a shift from symptomatic therapy to pathogenetically based treatment.

Prevention of the disease should be based on early restoration of the skin barrier, control of environmental factors and improving patients' health literacy. Diagnosis requires a comprehensive approach utilising clinical scales, quality-of-life assessments and modern digital technologies.

The most promising area is the introduction of personalised therapy using biologics and JAK inhibitors. For the Republic of Uzbekistan, the priority tasks remain the establishment of national patient registries, the expansion of teledermatology capabilities, and the development of regionally adapted prevention programmes that take into account the country's climatic and environmental characteristics. The future of allergic dermatitis treatment is likely to be determined not so much by the ability to eliminate rashes as by the possibility of preventing the development of systemic atopy and restoring a full quality of life to the patient.

References

1. Chu D.K., Schneider L., Asiniwasis R.N., Boguniewicz M., De Benedetto A. et al. Atopic dermatitis (eczema) guidelines: 2023 American Academy of Allergy, Asthma and Immunology/American College of Allergy, Asthma and Immunology Joint Task Force on Practice Parameters GRADE- and Institute of Medicine-based recommendations // Annals of Allergy, Asthma & Immunology. 2024. Vol. 132, No. 3. P. 274–312.
2. Choo Z.Y., Mehlis S.L., Joyce J.C. Updates in atopic dermatitis for the primary care physician // Disease-a-Month. 2024. Vol. 70, No. 4. Article 101687.
3. Jeskey J., Hodge J., Medina J. et al. Atopic dermatitis: A review of diagnosis and treatment // Cureus. 2024. Vol. 16, No. 11. Article e73852.
4. Davis D.M.R., Drucker A.M., Alikhan A. et al. Executive summary: Guidelines of care for the management of atopic dermatitis in adults with phototherapy and systemic therapies // Journal of the American Academy of Dermatology. 2024. Vol. 90, No. 2. P. 342–345.
5. Saeki H., Ohya Y., Arakawa H. et al. English version of clinical practice guidelines for the management of atopic dermatitis 2024 // Journal of Dermatology. 2025. Vol. 52, No. 2. P. e70–e142.

6. Werfel T., Heratizadeh A., Aberer W. et al. S3 Guideline Atopic dermatitis: Part 1 – General aspects, topical and non-drug therapies, special patient groups. // Journal of the German Dermatological Society. 2024. Vol. 22, No. 1. P. 137–153.
7. Werfel T., Heratizadeh A., Aberer W. et al. S3 Guideline Atopic dermatitis: Part 2 – Systemic treatment. // Journal of the German Dermatological Society. 2024. Vol. 22, No. 2. P. 302–347.
8. Khaitov R.M., Ilyina N.I. Allergology and Immunology: National Guidelines. 2nd ed. Moscow: GEOTAR-Media, 2022. 1112 p.
9. Namazova-Baranova L.S., Baranov A.A. Allergic Diseases in Children. Moscow: Pediatr, 2021. 512 p.
10. Potekaev N.N. (Ed.). Dermatology and Venereology: National Guidelines. Moscow: GEOTAR-Media, 2020. 1024 p.
11. Kubanova A.A. (Ed.). Clinical Dermatology and Venereology. Moscow: GEOTAR-Media, 2021. 400 p.
12. Liu Y., Jain A., Eng C. et al. A deep learning system for the differential diagnosis of skin diseases // Nature Medicine. 2020. Vol. 26, No. 6. P. 900–908.
13. Guttman-Yassky E., Renert-Yuval Y., Brunner P.M. Atopic dermatitis // The Lancet. 2025. Vol. 405, No. 10478. P. 583–596.