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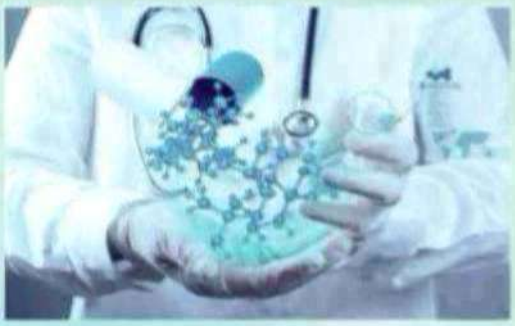

AVICENNA-MED.UZ

ISSN 2181-712X.
EiSSN 2181-2187

8 (94) 2026

ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE

Илмий-рефератив, маънавий-маърифий журнал
Научно-реферативный,
духовно-просветительский журнал

УЧРЕДИТЕЛИ:

БУХАРСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ ИНСТИТУТ
ООО «ТИББИЁТДА ЯНГИ КУН»

Национальный медицинский исследовательский центр хирургии имени А.В. Вишневского является генеральным научно-практическим консультантом редакции

Журнал был включен в список журнальных изданий, рецензируемых Высшей Аттестационной Комиссией Республики Узбекистан (Протокол № 201/03 от 30.12.2013 г.)

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8 (94)

2026

Август

Received: 20.07.2026, Accepted: 06.08.2026, Published: 10.08.2026

УДК 616.31-002.15:616.523:616-056.3-053.2

ALLERGIYA KASALLIKLARI BO‘LGAN BOLALARDA QAYTALANUVCHI GERPETIK STOMATITNING KLINIK VA IMMUNOLOGIK XUSUSIYATLARI

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✓ ***Rezyume***

Maqolada allergik kasalliklar (atopik dermatit, allergik rinit, bronxial astma) bilan og‘rigan bolalarda qaytalanuvchi gerpetik stomatitning (QHS) kechishi, klinik ko‘rinishlari hamda immunologik ko‘rsatkichlari tahlil qilingan. Tadqiqot davomida bunday bolalarda gerpetik infeksiyaning qaytalanish tezligi yuqori ekani, og‘iz bo‘shlig‘i shilliq qavatidagi jarohatlarning bitishi uzoqroq davom etishi aniqlandi. Immunologik tekshirishlar natijasida mahalliy va tizimli immunitet ko‘rsatkichlarida sezilarli o‘zgarishlar — T-limfotsitlar subpopulatsiyasi dispersiyasi, sIgA va IFN-γ darajasining pasayishi hamda IgE miqdorining oshishi kuzatildi. Olingan natijalar allergik fon mavjud bo‘lganda gerpetik stomatitni davolashda standart virusga qarshi terapiya bilan birga immunomodullovchi va antiallergik muolajalarni majburiy qo‘llash zarurligini ko‘rsatadi.

Kalit so‘zlar: qaytalanuvchi gerpetik stomatit, bolalar, allergik kasalliklar, atopik dermatit, immunologik ko‘rsatkichlar, sIgA, interferon, immunokorreksiya.

CLINICAL AND IMMUNOLOGICAL FEATURES OF RECURRENT HERPETIC STOMATITIS IN CHILDREN WITH ALLERGIC DISEASES

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✓ ***Resume***

This article analyzes the clinical features and immunological indicators of recurrent herpetic stomatitis (RHS) in children with underlying allergic diseases (atopic dermatitis, allergic rhinitis, bronchial asthma). The study revealed that children with an allergic background exhibit a higher recurrence rate of HSV infection and prolonged healing of oral mucosal lesions. Immunological evaluation demonstrated significant disturbances in both local and systemic immunity, characterized by T-lymphocyte subpopulation imbalance, reduced levels of sIgA and IFN-γ, alongside elevated IgE levels. These findings emphasize the clinical necessity of combining antiviral therapy with immunomodulatory and antiallergic agents in the comprehensive management of RHS in allergic pediatric patients.

Keywords: recurrent herpetic stomatitis, children, allergic diseases, atopic dermatitis, immunological features, sIgA, interferon, immunocorrection.

КЛИНИКО-ИММУНОЛОГИЧЕСКИЕ ОСОБЕННОСТИ РЕЦИДИВИРУЮЩЕГО ГЕРПЕТИЧЕСКОГО СТОМАТИТА У ДЕТЕЙ С АЛЛЕРГИЧЕСКИМИ ЗАБОЛЕВАНИЯМИ

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✓ ***Резюме***

В статье проанализированы клинические проявления и иммунологические показатели рецидивирующего герпетического стоматита (РГС) у детей, страдающих аллергическими заболеваниями (атопический дерматит, аллергический ринит, бронхиальная астма). В ходе исследования установлено, что у детей с аллергической патологией отмечается более высокая частота рецидивов герпетической инфекции и затяжное заживление элементов поражения слизистой оболочки полости рта. Иммунологический анализ выявил существенные нарушения местного и системного иммунитета: дисбаланс субпопуляций Т-лимфоцитов, снижение уровней sIgA и IFN-γ, а также повышение уровня IgE. Полученные данные обосновывают необходимость включения иммуномодулирующей и антиаллергической терапии в комплексную схему лечения РГС на фоне аллергической патологии.

Ключевые слова: рецидивирующий герпетический стоматит, дети, аллергические заболевания, атопический дерматит, иммунологические показатели, sIgA, интерферон, иммунокоррекция.

Relevance

Recurrent herpetic stomatitis (RHS) remains one of the most widespread and complex problems in modern pediatric dentistry, pediatrics, and clinical immunology. According to epidemiological data, the Herpes Simplex Virus type 1 (HSV-1) infects up to 80-90% of the pediatric population, with a significant proportion developing chronic, recurrent intraoral manifestations. The management of RHS becomes particularly challenging in children with co-occurring allergic pathologies, such as atopic dermatitis, allergic rhinitis, and bronchial asthma—conditions whose global prevalence in the pediatric cohort has been steadily increasing over recent decades [1,2,3].

The interplay between herpesvirus infection and allergic diseases creates a complex pathogenetic "vicious cycle." The underlying allergic inflammation induces persistent systemic immune dysregulation, characterized by a Th2-skewed immune response, reduced synthesis of type I and II interferons (IFN-α, IFN-γ), decreased secretory IgA (sIgA) levels, and impaired epidermal/mucosal barrier integrity. Consequently, this compromised local mucosal defense lowers the threshold for HSV reactivation, leading to higher recurrence frequencies, prolonged erosion healing times, severe pain syndromes, and a pronounced risk of secondary bacterial superinfections [4,5,6].

Conversely, chronic and recurrent herpesvirus infection serves as a persistent antigenic stimulus that further aggravates allergic inflammation, triggering disease exacerbations and resistance to standard antiallergic therapies. Standard antiviral regimens focused solely on virus suppression frequently prove inadequate for achieving long-term clinical remission in this immunocompromised patient group [7,8,9].

Despite numerous studies on pediatric herpesvirus infections, the dynamic relationship between mucosal barrier breakdown, localized immune parameters, and systemic allergic sensitization in children with RHS remains insufficiently systematized. Therefore, a comprehensive, multi-factorial investigation into the clinical features and immunological mechanisms of RHS against an allergic background is highly relevant for establishing early diagnostic markers and designing targeted, immunomodulatory therapeutic protocols [10,11,12].

Aim of the study: to evaluate the specific clinical features and immunological status (local and systemic immunity parameters) in children with recurrent herpetic stomatitis occurring on the background of allergic diseases, and to rationalize an optimized comprehensive treatment protocol based on the identified disorders.

Materials and methods

Study Population and Sample Size

The study was conducted in the Bukhara Region and involved a total of 240 children aged 1 to 7 years. Based on their clinical status, the participants were stratified into three groups:

Group 1 (Main Group): Children with recurrent herpetic stomatitis (RHS) occurring on the background of allergic diseases.

Group 2 (Comparison Group): Children with RHS without co-occurring allergic pathology.

Group 3 (Control Group): Practically healthy children of the corresponding age group without a history of RHS or chronic allergic diseases.

Clinical and Dental Examination Methods

A comprehensive clinical examination was performed to evaluate intraoral manifestations, disease severity, and oral health status:

Lesion Area & Pain Assessment: The mucosal lesion surface area was measured, and pain intensity was evaluated using the Numeric Rating Scale (NRS).

Dental Indices: Oral hygiene status, dental caries experience, and gingival inflammation were assessed using the primary/mixed dentition caries indices (dmf-t / DMF-T + dmf-t), the Simplified Oral Hygiene Index (OHI-S by Greene–Vermillion), and the Papillary-Marginal-Attachment (PMA) index.

Quality of Life Evaluation: Disease impact on oral health-related quality of life was evaluated using the Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire completed by parents/guardians.

Laboratory and Immunological Methods

Physical-chemical, biochemical, and immunological properties of non-stimulated oral fluid (saliva) were examined:

Physical-Chemical & Cellular Analysis: Evaluation of oral fluid viscosity, pH, total cellular elements, and cytological evidence of eosinophilic inflammation.

Factors of Local Non-Specific Resistance: Determination of secretory Immunoglobulin A (sIgA) and lysozyme activity in saliva.

Immunoglobulin Profile: Quantification of total IgA, IgM, IgG, and total IgE levels using enzyme-linked immunosorbent assay (ELISA).

Cytokine Profile & Inflammatory Markers: Quantification of Interleukin-6 (IL-6) and Interleukin-10 (IL-10) in oral fluid using ELISA.

Calculated Diagnostic Ratios: Calculation of integral dynamic ratios, specifically IL-6/sIgA and Leukocytes/sIgA, to evaluate local mucosal defense and inflammatory intensity.

Etiological Verification: Polymerase Chain Reaction (PCR) testing was utilized for molecular verification and detection of Herpes Simplex Virus Type 1 (HSV-1) DNA in oral mucosal scrapings/saliva.

Treatment Protocols and Preventive System

Patients underwent distinct management strategies to evaluate therapeutic efficacy:

Standard Therapy: Administration of conventional antiviral and topical symptomatic treatment.

Differentiated Treatment Algorithm: Implementation of an optimized protocol based on clinical severity, mucosal lesion area, NRS pain score, and local immune dynamics (Leukocytes, IL-6, sIgA). This protocol integrated:

Systemic antiviral therapy.

Systemic antihistamine therapy targeting the allergic component.

Topical reparative therapy based on Rosa damascena extract.

Laser photobiomodulation (low-level laser therapy) for analgesia, anti-inflammatory effect, and tissue regeneration.

Preventive System: Application of a personalized prophylaxis scheme tailored to relapse frequency, oral hygiene indices, and salivary immune markers (sIgA and IL-6).

Statistical Analysis

Data were statistically processed using descriptive and inferential methods. Intergroup differences were assessed using appropriate parametric (Student's t-test) or non-parametric criteria (Mann–Whitney U test, Kruskal–Wallis test) depending on normality distribution. Correlation analysis (Pearson or Spearman) was performed to evaluate relationships between immunological markers, clinical scores, and quality of life indicators. Statistical significance was established at $p < 0.05$.

Results and discussion

Strategic Approach to Preventive Follow-Up

Preventive management in pediatric patients with recurrent herpetic stomatitis (RHS) occurring against the background of allergic diseases cannot be considered a mere formal extension of acute topical therapy. Our findings demonstrate that recurrent intraoral manifestations in this specific cohort develop due to persistent mucosal immune dysfunction—characterized by secretory Immunoglobulin A (sIgA) deficiency, elevated proinflammatory cytokine activity, compromised oral hygiene status, and systemic allergic sensitization. Therefore, the preventive algorithm was structured based on individual risk stratification rather than a single clinical parameter.

Risk Stratification for RHS Recurrence

Patient allocation to specific risk categories was established by combining clinical recurrence frequency, previous exacerbation severity, oral hygiene levels, periodontal inflammation, allergic disease background, and key salivary biomarkers (sIgA and IL-6):

Low-Risk Category: Characterized by 1–2 mild exacerbations per year, satisfactory oral hygiene (OHI-S), mild periodontal involvement (PMA index), and relative maintenance of mucosal barrier integrity.

Moderate-Risk Category: Defined by 3–4 moderate episodes annually, moderate dental hygiene impairment, intermediate inflammation scores, and transitional salivary biomarker values (sIgA and IL-6).

High-Risk Category: Composed of patients with frequent recurrences (5 or more episodes/year or multiple relapses within 3 months), severe clinical presentations, high PMA scores, unsatisfactory OHI-S, significantly depleted sIgA, and elevated IL-6 concentrations.

Differentiated Preventive Protocols and Monitoring Algorithm

Therapeutic and prophylactic interventions were tailored according to the established risk profile:

Low-Risk Protocol: Focused on complete oral cavity sanitation, parental education on gentler oral hygiene regimes, elimination of local mechanical trauma, and early topical intervention upon the appearance of prodromal signs.

Moderate-Risk Protocol: Encompassed oral sanitation, hygiene correction, course-based local mucosal therapy, follow-up examinations every 3–4 months, and co-management with an allergist to stabilize mucosal defenses.

High-Risk Protocol: Required an expanded scheme featuring repeated cycles of topical mucosal therapy, immediate treatment initiation at prodromal onset, evaluation for low-level laser photobiomodulation, strict monitoring of {OHI-S} and {PMA} indices, and dynamic salivary {sIgA} and {IL-6} tracking.

The criterion for escalating preventive measures was defined as age 2 recurrences within a 3-month window, clinical deterioration, or persistent adverse immuno-biochemical markers.

Baseline Characteristics and Intergroup Comparability

Prior to evaluating therapeutic efficacy, the baseline demographic and clinical comparability of the study groups was strictly validated to rule out potential confounding variables. The gender distribution across the therapeutic subgroups and the comparison group showed high comparability with no statistically significant differences ($p > 0.05$).

A similar pattern of homogeneity was confirmed when analyzing baseline disease severity parameters between therapeutic subgroup OG-1 and subgroup OG-2:

Mean Age: The average age of patients was 4.12 \pm 0.31 years in subgroup OG-1 and 4.08 \pm 0.34 years in subgroup OG-2 ($p > 0.05$).

Baseline Clinical Parameters: Initial pain intensity measured on the Numeric Rating Scale (NRS), total lesion surface area, total number of intraoral aphthous elements, hygiene indices (OHI-S), periodontal inflammation scores (PMA), and overall quality of life baseline scores (ECOHIS) showed no statistically significant differences between the two main therapeutic subgroups (in all cases $p > 0.05$).

These data confirm the high initial homogeneity of the main therapeutic subgroups, providing a valid baseline for subsequent therapeutic outcome evaluation.

Disease Severity Gradient and Allergic Comorbidity

When contrasting the consolidated Main Group (children with RHS and allergic diseases) against the Comparison Group (children with RHS without allergic pathology), a clear disease severity gradient was observed:

Mild Form: Mild clinical presentations were significantly less frequent in the Main Group compared to the Comparison Group (23.1\% - 20.8\% versus 38.0\%; $p < 0.05$).

Severe Form: Severe disease manifestations were recorded at a significantly higher rate in the Main Group (28.8\% - 31.2\% versus 18.0\%; $p < 0.05$).

Moderate Form: The frequency of moderate severity forms showed no statistically significant variation between the groups.

Furthermore, a comprehensive baseline comparison with the Comparison Group demonstrated that children presenting with RHS against an allergic background experienced higher annual relapse frequencies, larger total lesion surface areas, a greater count of active erosive elements, and more severe pain intensity ($p < 0.05$ across the majority of clinical metrics).

Conclusion

These findings confirm that allergic comorbidity creates a significantly more severe morphological and clinical substrate during acute exacerbations of recurrent herpetic stomatitis.

Comparative Evaluation of Pain Regression Dynamics

One of the most objective and clinically informative criteria for assessing therapeutic response was the regression dynamics of the pain syndrome. Pain intensity was dynamically tracked using the Numeric Rating Scale (NRS) throughout all stages of intervention to evaluate the differential efficacy of standard therapy versus the complex optimized protocol.

Baseline Dynamics: Initial NRS pain scores were comparable across all active treatment cohorts prior to therapy initiation.

Treatment Response: Patients managed with the comprehensive protocol demonstrated a significantly faster decline in NRS pain scores within the first 48 to 72 hours of treatment compared to those on standard symptomatic regimens ($p < 0.05$).

Clinical Significance: The rapid reduction of oral mucosal pain facilitated early restoration of adequate oral fluid intake, improved compliance with oral hygiene measures, and contributed to a prompt recovery in the child's quality of life (ECOHIS).

This rapid resolution of pain highlights the synergistic action of low-level laser photobiomodulation and Rosa damascena-based topical repair in suppressing localized neuro-inflammatory distress.

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Entered 20.07.2026