

ASSESSMENT OF CLINICAL AND IMMUNOLOGICAL FEATURES OF VARIOUS FORMS OF ALLERGIC CONJUNCTIVITIS IN CHILDREN

Tukhtaeva Matlab Ashurovna 1,

Nuraliyev Nekkadam Abdullayevich 2

Bukhara State Medical Institute named after Abu Ali ibn Sino1

Vice-rector of Urgench University of Technology RANCH2

Abstract

Allergic conjunctivitis is one of the most common allergic pathologies of the visual organ in children and is a serious medical and social problem due to its high prevalence, tendency to recurrent course and negative impact on the quality of life of the child. Despite the achievements of modern ophthalmology and allergology, the issues of early diagnosis, objective assessment of the activity of the inflammatory process, immunological mechanisms of disease development and control of the effectiveness of therapy remain insufficiently studied.

Keywords: Allergic conjunctivitis, children, immunological parameters, IgE, IL-6, IL-10, treatment, quality of life.

Introduction

Allergic diseases remain one of the most pressing problems of modern medicine. According to the World Health Organization (WHO), over the past decades, there has been a steady increase in the prevalence of allergic diseases worldwide, especially among children, due to the combined effects of genetic, environmental and social factors. Allergic pathology occupies one of the leading places among chronic diseases of childhood, significantly affecting the physical development, quality of life and social adaptation of the child[1,4,6].

Allergic conjunctivitis is one of the most common diseases of the anterior part of the eye of an allergic nature. According to international epidemiological studies, symptoms of allergic conjunctivitis occur in 15-30% of the population at various periods of life, and the incidence of the disease continues to increase among children. The clinical picture is characterized by itching, hyperemia, lacrimation, conjunctival edema, photophobia, and decreased visual comfort. In the chronic course, the disease is accompanied by structural changes in the surface of the eye, a violation of the protective properties of the tear film and a decrease in the quality of life of patients..[2,3,5].

The aim of this study is to evaluate the clinical and immunological features of various forms of allergic conjunctivitis in children by determining the parameters of humoral immunity.



Materials and research methods. The study included 90 sick children with various forms of allergic conjunctivitis registered at the Bukhara branch of the Republican Specialized Scientific and Practical Medical Center for Eye Microsurgery in the period 2023-2025.

The following standard ophthalmological diagnostic methods were used in all sick children: patient complaints were collected in order to identify subjective signs such as hyperemia, itching and burning, foreign body sensation in the eyes, lacrimation, blepharospasm, photosensitivity, the presence and nature of secretions; anamnesis was collected in order to determine the duration of the disease, the treatment performed and the results obtained; To determine the presence of signs of dry eye syndrome, a survey was conducted using the OSDI adaptive and valid questionnaire (Ocular Surface Disease Index)

The results of the study. Among the examined children, the age group of 6-11 years was the most common, which was $56.67 \pm 5.22\%$ ($n=51$), followed by 12-14 years ($26.67 \pm 4.66\%$, $n=24$), 3-5 years ($10.0 \pm 1.05\%$, $n=9$), 15-17 years ($6.67 \pm 2.63\%$, $n=6$). Also, 70 ($77.78 \pm 4.38\%$) of the sick children were children living in rural areas, and 20 ($22.22 \pm 4.38\%$) were their peers living in the city. Of the examined children, 13 ($14.44 \pm 3.71\%$) were pupils of children's institutions with an organized children's group, 77 ($85.56 \pm 3.71\%$) were children of primary, middle and senior school age.

Along with general data on children, clinical and ophthalmological data were studied. When examining the complaints of sick children, the condition indicated in Table 1 was revealed.

Table 1 Frequency of complaints from children diagnosed with allergic conjunctivitis

Symptoms	Results	
	abs	Relative (%) number
Redness	90	100,0
Itching	90	100,0
The tumor	74	$82,22 \pm 4,03$
Lacrimation	86	$95,56 \pm 2,17$
Photophobia	87	$96,67 \pm 1,89$

The children clearly showed 5 symptoms related to this pathology, which confirmed the diagnosis from a clinical and ophthalmological point of view. The study of the status of the eyeball showed that there were no differences between acute allergic conjunctivitis (AAC) and chronic allergic conjunctivitis (CAC) in visual acuity (without correction), which indicates that there is no negative effect of the pathology studied on the visual acuity of sick children.

Intraocular pressure in AAC children was significantly ($P < 0.05$) lower than in CAC - 11.93 ± 0.19 mm/Hg versus 13.13 ± 0.16 mm/Hg in OD and 12.04 ± 0.20 mm/Hg versus 13.42 ± 0.18 mm/Hg in OS, respectively. This is due to the different effects of allergic conjunctivitis on intraocular pressure.

The effect of AAC and CAC on other parts of the eye has practically not been established, in particular, according to the results of the permeability of the tear ducts, the symmetry of the eyeball, the purity of the vitreous body, the preservation of the molecular reflex and other special ophthalmological studies, no differences were found between the nosological units. A significant difference was observed only in the frequency of swelling and redness of the eyelids.

The concentration of IgA in CAC and AAC significantly exceeded these parameters of healthy individuals by 1.91 times. The IgA level in CAC significantly exceeded the indicators of healthy children by 1.32 times, whereas in AAC there was a clear upward trend. It was found that the level of IgA in the blood serum in AAC was significantly 1.45 times higher than in CAC (Table 2). This is due to the high intensity of the development of the allergic process during the acute exacerbation of the disease, as a result of which the activity of the immune system increases, the synthesis of IgA increases.

Table 2. Characteristics of immunoglobulin parameters in the blood serum of children diagnosed with acute and chronic allergic conjunctivitis

IgG	Healthy children, n=20.	acute allergic conjunctivitis, n = 45.	chronic allergic conjunctivitis, n=45;
IgA (0,9-2,5) г/л	1,37±0,16;	2,61±0,12* ↑	1,80±0,09* ↑ ^
IgM (0,3-2,2) г/л	1,28±0,08	2,78±0,14* ↑	1,67±0,19* ↑ ^
IgG (9,0-20,0) г/л	12,45±0,76;	14,90±0,52*.	20,03±0,65* ↑ ^
IgE (70-216) ЕД/мл	96,0±1,06	260,10±5,47* ↑	224,11±3,12* ↑ ^

Note:* - a sign of a significant difference from the indicators of healthy children; ↑ - the direction of changes; ^ - a sign of a significant difference from the parameters of the SPC; AAC - acute allergic conjunctivitis; CAC - chronic allergic conjunctivitis.

IgM was significantly more frequently detected in CAC and AAC by 2.17 times ($P<0.001$), and in CAC by 1.30 times ($P<0.05$). With the same trend and direction of IgM changes, the intensity of changes was most pronounced in AAC. Quantitative changes in IgG in blood serum were different. With AAC in children, this indicator significantly exceeded the indicator of healthy people by 1.20 times, and with CAC it was significantly higher not only in healthy people by 1.61 times, but also in children with AAC by 1.34 times. This imbalance was related to their functions, their role in the pathological condition, and their specific value in pathogenesis. This opposite situation is also explained by the late synthesis of this immunoglobulin, its long-term persistence and its role in chronic pathology.

It is noteworthy that in CAC, the concentrations of IgA and IgM were significantly lower compared to CAC kg, while IgG, on the contrary, were statistically significantly ($P<0.05$) higher (Fig. 1, a; b). This imbalance was associated with its functions, its role in various pathological conditions, and their specific value in pathogenesis. This opposite situation is also explained by the late synthesis of this immunoglobulin, its long-term persistence and its function in chronic pathology.

Figure 1 shows that the indicators of immunoglobulins in the biological fluid of sick children significantly exceed those of healthy children, and significant differences in different directions are observed between nosological units ($P<0.05$ - $P<0.001$). This fact shows their role in the pathogenesis of the disease and their diagnostic value.

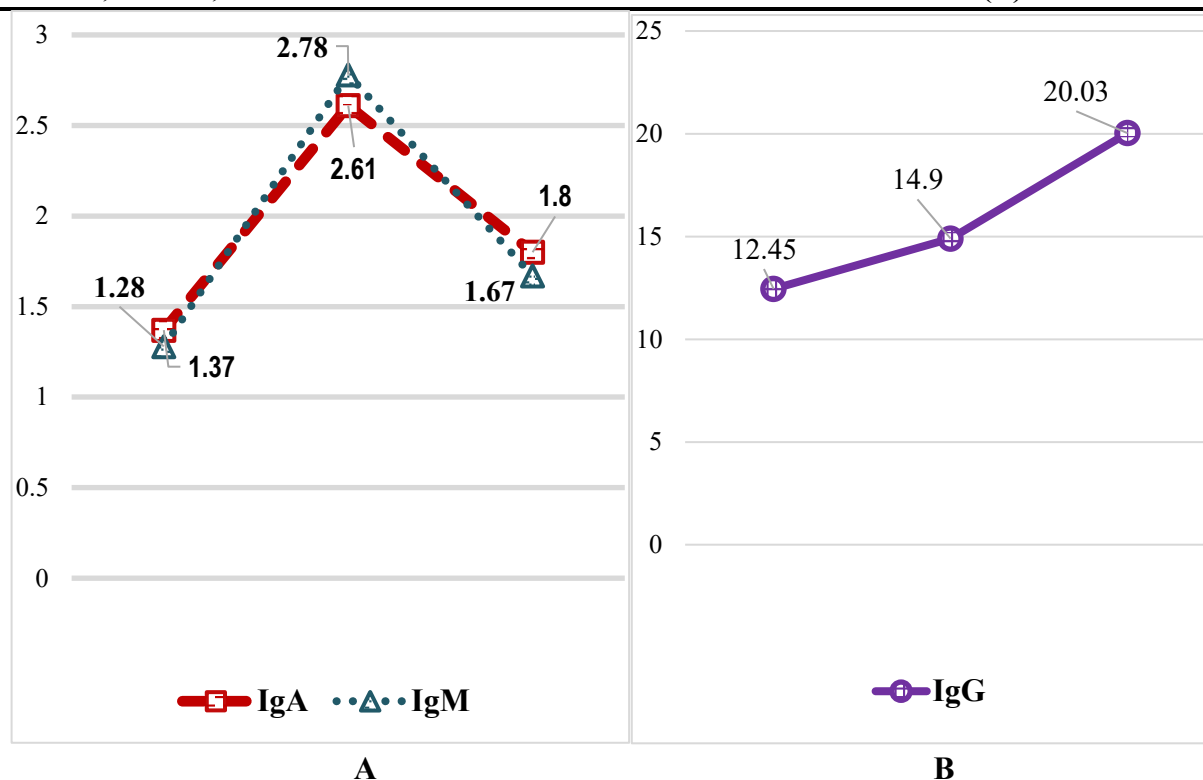


Figure 1. Quantitative indicators of serum immunoglobulins in acute and chronic allergic conjunctivitis, g/l

Along with other immunoglobulins, various changes were also observed in the quantitative indicators of IgE, so in healthy children the concentration of IgE was 96.0 ± 1.06 IU/ml, with UAC this indicator significantly increased by 2.71 times (to 260.10 ± 5.47 IU/ml) ($P < 0.001$), with CAC the intensity of changes was 2.33 times lower - 224.11 ± 3.12 IU/ml ($P < 0.001$) (Fig. 2).

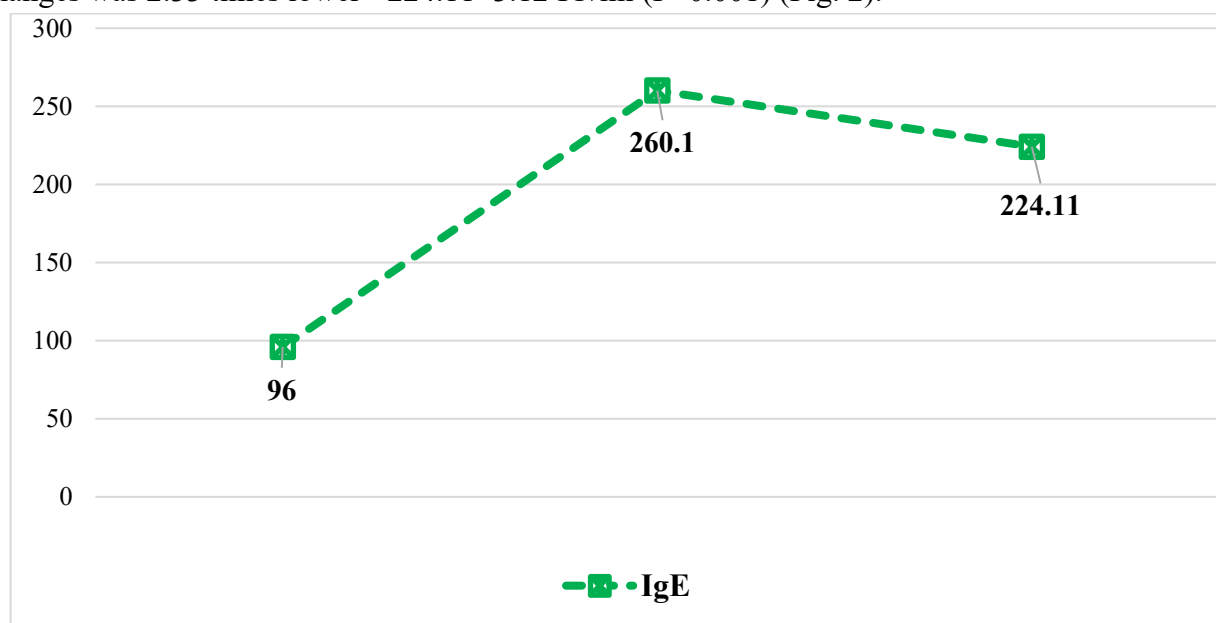


Figure 2. The level of determination of IgE concentration in blood serum in acute and chronic allergic conjunctivitis, IU/ml

The degree of quantitative changes in these immunoglobulins was more pronounced when studying their parameters in healthy children (Table 3). Intergroup differences and the degree of differences in relation to healthy individuals differed in the trend, direction, and intensity of changes.

Table 3. The ratio of immunoglobulins in children with AAC and CAC to those in healthy children is several times

IgG	AAC, n = 45.	CAC, n=45;	The ratio of AAC to CAC
IgA	1,91*.	1,31*.	1,45*.
IgM	2,17*.	1,30* ↑.	1,66* ↑.
IgG	1,20*.	1,61* ↑	1,34* ↓;
IgE	2,71*.	2,33* ↑.	1,16*.

Note: * is a sign of a significant difference compared to the indicators of healthy children; ↑, ↓ are the directions of changes..

It has been established that it is necessary to take into account the high role of these parameters in the transition of the allergic process from acute to chronic. The dynamics of changes are recognized as biomarkers reflecting the transition of the allergic process from acute to chronic, the course of the disease in the dynamics of treatment and the effectiveness of treatment.

The results obtained in the study to determine the concentration of IL-6 showed that in healthy children their concentration was significantly lower than in children with AAC and CAC. The increase in this cytokine was statistically significantly higher in healthy children with AAC by 9.21 times ($P<0.001$), and in CAC by 5.18 times ($P<0.001$) compared with this parameter (Table 4). This indicates the high diagnostic value of IL-6 in acute and chronic pathologies..

Conclusion

The concentration of the pro-inflammatory cytokine IL-6 in the blood serum of children with AAC and CAC was increased by 9.21 and 5.18 times compared with this parameter in healthy children, the level of IL-6 in AAC was 1.78 times higher than in CAC. A similar trend and orientation was observed for IL-8, but the intensity of the changes was low. Inflammatory cytokines were detected more often in acute allergic processes than in chronic ones, which made it possible to assess the degree of development of acute and chronic processes in allergic conjunctivitis.

References

1. Berger W. E., Granet D. B., Kabat A. G. Diagnosis and management of allergic conjunctivitis in pediatric patients //Allergy & Asthma Proceedings. – 2017. – T. 38. – №. 1.
2. Fauquert J. L. Diagnosing and managing allergic conjunctivitis in childhood: the allergist's perspective //Pediatric Allergy and Immunology. – 2019. – T. 30. – №. 4. – C. 405-414.
3. Fauquert J. L. et al. Conjunctival allergen provocation test: guidelines for daily practice //Allergy. – 2017. – T. 72. – №. 1. – C. 43-54.
4. Leonardi A. et al. Diagnostic tools in ocular allergy //Allergy. – 2017. – T. 72. – №. 10. – C. 1485-1498.



5. Kate A. et al. Allergen testing: a review of the indications, procedures, and limitations in ocular allergy //Clinical Reviews in Allergy & Immunology. – 2024. – T. 67. – №. 1. – C. 1-20.
6. Palmares J. et al. Allergic conjunctivitis: a national cross-sectional study of clinical characteristics and quality of life //European journal of ophthalmology. – 2010. – T. 20. – №. 2. – C. 257-264.

