SENSITIZATION TO STAPHYLOCOCCAL ENTEROTOXINS AS A MARKER OF THE SEVERITY OF ALLERGIC RHINITIS

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Abstract: Allergic rhinitis (AR) remains one of the most common allergic diseases, but the mechanisms that determine its severity remain poorly understood. In recent years, there has been growing interest in the role of the nasal mucosal microbiome, in particular *Staphylococcus aureus* (*S. aureus*) colonization and sensitization to its enterotoxins (SE), in the formation of different rhinitis phenotypes.
Objective. The aim of the study was to assess the frequency of *S. aureus* carriage and sensitization to its enterotoxins in patients with AR and non-allergic rhinitis (NAR), to determine differences between groups in immunological parameters, and to identify potential predictors of severe AR.
Materials and methods. A retrospective analysis of medical records of 109 patients with chronic recurrent rhinitis who visited the allergy clinic during 2020-2025 was conducted. All patients underwent a comprehensive examination including skin prick tests, measurement of specific IgE (sIgE) to inhalant allergens by the ImmunoCAP method, bacteriological culture from the nose, determination of specific IgE to SE (SEA, SEB, SEC, TSST), total IgE, serum immunoglobulins A, M, G and salivary secretory IgA (sIgA). Patients were divided into four groups: AR+SE (n = 22), AR-SE (n = 34), NAR+SE (n = 16) and NAR-SE (n = 37).
Results. S. aureus carriage was detected in 64.2 % of the examined patients (69.6 % of those with AR and 56.6 % with NAR). Sensitization to SE was observed in 34.9 % of cases: in 39.3 % of patients with AR and 30.2 % with NAR. The AR+SE group demonstrated significantly higher levels of total IgE compared to the AR-SE group (median 202 vs. 89.9 kU/L, $p<0.05$), more frequent polysensitization to inhalant allergens (≥5 allergens: 27.3 % vs. 5.0 %) and multiple sensitization to SE (68.2 % had IgE to 2 or more types of SE). In the NAR+SE group, monosensitization to SE prevailed (62.5 %). Serum levels of immunoglobulins A, M, G levels did not differ significantly between the groups. However, a decrease in sIgA was found in patients with NAR+SE compared to NAR-SE (274.9 vs. 347.2 mg/L, $p<0.05$), while in patients with AR this difference was not significant. High sIgA levels (≥600 mg/L) were more frequently found in patients without SE sensitization, especially in the AR-SE group (32.0 % vs. 18.8 % in AR+SE).
Conclusions. S. aureus carriage is not always accompanied by the development of sensitization to its enterotoxins. Sensitization to SE in AR is associated with a more severe course of the disease, manifested by higher levels of total IgE, more frequent polysensitization to aeroallergens, and persistent symptoms. Local immune deficiency, in particular a decrease in salivary sIgA, may be an important factor in the development of SE sensitization in NAR. Sensitization to SE may be considered as an additional marker of the severity of AR and the risk of disease progression.

Key words: allergic rhinitis, non-allergic rhinitis, *Staphylococcus aureus*, staphylococcal enterotoxins, secretory IgA, polysensitization.