IMMUNOLOGICAL AND GENETIC FEATURES OF THYROID-ASSOCIATED OPHTHALMOPATHY

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Introduction.

Thyroid-associated ophthalmopathy (TAO) is the most common extrathyroidal manifestation of Graves' disease. Its study is relevant due to high prevalence in the working-age population, challenges in early diagnosis caused by subclinical progression, and insufficient timely treatment, leading to disease advancement, severe eye complications, visual impairment, and reduced quality of life.

Objective.

To investigate the immunological and genetic characteristics influencing the activity and severity of thyroid-associated ophthalmopathy.

Materials and Methods.

The study included patients with Graves' disease: 132 patients with thyroid- associated ophthalmopathy (TAO) and 153 patients without signs of TAO. All patients underwent comprehensive ophthalmological, immunological, and genetic evaluations, which included the measurement of thyroid-stimulating hormone receptor antibodies (TSH-R antibodies) and cytokines IL-17 and IL-38 levels in serum, tear fluid, and orbital adipose tissue. An analysis of associations with genetic polymorphisms of IL-17 (rs9463772/IL17F) and IL-38 (rs3811058/IL1F10; rs7570267/IL1F10) was performed, and correlations between these biomarker levels and clinical activity score (CAS) as well as disease severity according to EUGOGO criteria were investigated.

Results.

Patients with active TAO showed significantly higher IL-17 levels in serum, tears, and orbital tissue (13.77 ± 5.65; 37.21 ± 8.84; 24.34 ± 6.87) compared to inactive TAO (3.93 ± 0.94; 20.52 ± 5.21; 16.81 ± 6.97; $p = 0.01$). IL-38 levels were significantly lower in active TAO (8.97 ± 6.31; 12.55 ± 6.32; 9.23 ± 6.78) versus inactive (17.45 ± 7.92; 24.13 ± 7.55; 20.18 ± 5.23; $p = 0.01$). IL-17 increased with disease severity, peaking in severe TAO (15.1 ± 7.2), exceeding IL-38 by more than 2.5 times. Correlation analysis showed moderate positive association of IL-17 with clinical activity ($r = 0.3$; $r = 0.14$) and a negative correlation for IL-38 ($r = –0.433$; $p = 0.030$). The rs7570267 IL38 polymorphism was linked to disease activity ($p = 0.002$) and severity ($p = 0.008$).

Conclusions.

Increased IL-17 and decreased IL-38 levels correlate with TAO activity and severity. Their association with rs7570267 polymorphism highlights the role of immune and genetic factors in TAO pathogenesis and potential diagnostic utility.