Genetic Factors: Influence on the Development of Thyroid Diseases and Rheumatic Diseases

Abstract

The article discusses the presence of common genes in RA and thyroid disease.

Methods: Published studies that enrolled adult patients with rheumatoid arthritis (RA) and autoimmune thyroid pathology were identified by searches of Medline and Embase, and by manual searches of medical journals. Meta-analyses were performed to assess the association of SE presence, dose, and genotype with rheumatoid arthritis and autoimmune thyroid pathology.

Results: A total of studies 133 patients were included in the analysis. RA patients have increase in the frequency of the gene DR B1 (p < 0.05, OR = 3.2, 95% CI = 1.4-6.8), the gene B8 (p < 0.05, RR = 2.6; 95% CI = 1.8-4.3). In patients with autoimmune thyroid disease, most frequently found genes HLA-B8 (94% patients) HLA-DR3 (67%) and HLA-DR5 (72%).

Conclusion: According to the obtained results it is concluded that the presence of the HLA-B8 gene can cause of RA in patients with autoimmune thyroid pathology.

Introduction

Autoimmune diseases are diseases associated with dysfunction of the human immune system, which perceives its own tissues as foreign and damaging it. Such diseases are called systemic, because, as a rule, affects the whole system or even the entire body. The incidence of autoimmune rheumatic diseases and their prevalence is sufficiently large in the world. The most common among the adult population is rheumatoid arthritis [1]. Rheumatoid arthritis (RA) is an autoimmune rheumatic disease of unknown etiology, characterized by chronic and erosive arthritis and systemic lesions of internal organs [1]. The role of genetic factors in the development of the disease has been confirmed by various studies on immune genetics [2-4]. It is estimated that about 40% of the total genetic component of RA refers to the major histocompatibility complex the HLA system [5].

Material and Methods

In the study, we surveyed 133 people, 100 of them diagnosed with RA, 33 with RA and autoimmune thyroid disease. Typing genes HLA class I and class II loci DRB1, DQA1, DQB1 was performed by PCR using sets of reagents of firm “DNA Technology” and the sequence of a set of primer [8]. Statistical processing included calculation of the frequency of occurrence of the Gene (PX) and antigens (C%) is calculated in accordance with the law of hardy-Weinberg equilibrium, Pearson’s x² with Yates’s correction for continuity and the criterion odds ratio.

Results and Discussion

The group of patients with RA

Among the total number of examined patients with RA were 83 women and 17 men. All patients were divided into groups according to the classification of rheumatoid arthritis [1]. The age of the patients was from 20 to 75 years, mean age was 52.3±11.4 years. Disease onset age from 16 to 70 years, average age of onset of the disease amounted to 42.4±14.8 years.

The group of patients with pathology of the thyroid gland

Under our supervision there were 33 patients with pathology of autoimmune thyroid pathology, 5 of them men and 28 women, which confirms the data about greater prevalence of thyroid disease in women than in men [9,6]. The average age of the patients was 52, 48±14.03 years. The average duration of the presence of clinically expressed thyroid disease - 3, 82±3.21
years. The onset is on average 48.6±13.6 years. In the presence of patients with thyroid disease as follows: chronic autoimmune Thyroiditis, euthyroid–31%, primary hypothyroidism and 27%, diffuse toxic goiter–30%, mixed toxic goiter–12%. In our study when comparing groups of patients with RA revealed statistically significant increase in the frequency of the Gene DR B1 (p < 0.05, OR = 3.2, 95% CI = 1.4-6.8), the gene B8 (p < 0.05, RR = 2.6; 95% CI = 1.8-4.3). But HLA-DR5, HLA- DR2, HLA-DR3 and HLA-DR7 was found rarely, only in 8% of patients. In patients with autoimmune thyroid disease, most frequently found genes HLA-B8 (94% patients) HLA-DR3 (67%) and HLA-DR5 (72%).

Table 1: The frequency of detection of the studied genes.

<table>
<thead>
<tr>
<th>Gene/% Positive</th>
<th>DR B1</th>
<th>B8</th>
<th>DR3</th>
<th>DR5</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>75</td>
<td>92</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>RA+ autoimmune thyroid pathology</td>
<td>34</td>
<td>94</td>
<td>67</td>
<td>72</td>
</tr>
</tbody>
</table>

It is assumed that the gene HLA-DR5 may be involved in the mechanism of formation of goiter; while HLA-DR5 is the acceptor of T-suppressors and stimulates them to release of prostaglandins, and HLA-DR3 calls a helper function of T-lymphocytes.

Conclusion

Thus, the identified carriers of the predisposing gene (HLA-B8) is not an indication of a mandatory development of RA in the presence of auto threading disease and / or thyroid destruction in RA, but when exposed to certain factors may act as one of the causes of development of multi-organ autoimmune process. We can assume that a genetic predisposition to pathological autoimmune processes determines the ability of various cross-syndromes and combinations of systemic and organ-specific autoimmune diseases in one patient, which is a characteristic feature of this disease. In conclusion, it should be noted that the problem of thyroid disease in rheumatoid arthritis relevant. Controversial and sometimes contradictory literature data concerning the characteristics of the relationship of the thyroid gland and rheumatic diseases, suggest the need for further research in this area.

Acknowledgment

None.

Conflict of Interest

None.

References