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Original Research Article

Association between blood group antigens and rheumatic valve involvement and severity ın endemic areas

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ABSTRACT

Background: Rheumatic valve disease is an important public health problem in developing countries. We sought to evaluate the possible role of blood antigens as a risk factor for severe rheumatic valve disease.
Methods: Two hundred and fifty-four patients with severe rheumatic mitral and/or aortic valve disease with the surgical indication were enrolled to the study. Control group was composed of age and gender matched 2668 healthy volunteers.
Results: There were 216 patients with aortic valve involvement and 249 patients with mitral valve involvement. One hundred and seventy-five patients had mitral stenosis, 96 patients had severe mitral regurgitation and 61 patients had severe aortic regurgitation. The distribution of blood groups among patients was as follows: Group A=42.9%, Group B=19.2%, Group AB=8.6%, and Group O=29.1%. The distribution of blood groups in the control group was Group A=40.8%, Group B=16.4%, Group AB=7.6%, and Group O=35.1%. There was no significant difference between blood groups of patients and controls ($p=0.141$).
Conclusion: Blood group does not seem to be a risk factor for rheumatic valve involvement or severity of the disease.

1. Introduction

Rheumatic valve disease is an important public health problem in developing countries [1]. It is an important sequelae of the acute rheumatic fever which is an immune mediated response to pharyngeal infections caused by β-hemolytic Streptococcus. Active inflammation and carditis frequently progress to stenosis and/or regurgitation of the affected valve [2]. Factors associated with disease progression are not clearly understood.

ABO antigens, also known as blood group antigens, are ubiquitously found in the body and are important players of

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the immune system. ABO antigens are also emphasized as a risk factor for certain infectious diseases, chronic inflammatory diseases, cancers and cardiovascular diseases [3]. We sought to determine the association between blood group antigens and rheumatic heart disease. Blood groups of patients with severe rheumatic valve disease living in Southeastern Anatolian Region, where rheumatic heart disease is endemic [1], were compared with the blood groups of healthy volunteers living in the same region.

2. Method

In our clinic, 254 patients with severe rheumatic mitral and/or aortic valve disease with surgical indication for correction were enrolled to the study. Blood groups of the patients were determined using standard haemagglutination tests. Control group consisted of 2668 healthy volunteers who donated blood to the Turkish Red Crescent in Gaziantep region. Data were analyzed using Statistical Package for Social Sciences (SPSS) version 16.0. Categorical variables were expressed as counts or percentages, and compared using a χ^2 test. In all two sided analyses a p-value <0.05 was considered to be statistically significant. For sample size power we estimated that we need to study at least 245 patients to be able to reject the null hypothesis that the exposure rates for case and controls are equal with probability (power) 0.8. The probability of Type I error associated with the null hypothesis of this test is 0.05.

3. Results

Mean age was 39 years (16–74) and female/male ratio was 89/165. There were 216 patients with aortic valve involvement and 249 patients with mitral valve involvement. One hundred and seventy-five patients had mitral stenosis, 96 patients had severe mitral regurgitation and 61 patients had severe aortic regurgitation. The blood groups of the patients were as follows: Group A 42.9% ($n=109$), Group B 19.2% ($n=49$), Group AB 8.6% ($n=22$), and Group O 29.1% ($n=74$). Blood groups of the control group were Group A: 40.8% ($n=1090$), Group B: 16.4% ($n=439$), Group AB: 7.6% ($n=204$), and Group O: 35.1% ($n=935$). There was no significant difference between blood groups of patients and controls ($p=0.141$). In addition, there was not any significant association between blood groups and mitral valve area ($p=0.294$), severity of mitral and aortic regurgitation ($p=0.581$ and $p=0.542$ respectively).

4. Discussion

In our study, we compared population based blood group antigens with blood groups of patients known to have severe rheumatic valve disease and sought to determine whether blood group per se is associated with the severity of the valvular disease.

Etiopathogenesis of rheumatic valve disease, although one of the oldest heart diseases, is still not clearly understood. In addition, why some patients recover completely and some patients experience a progressive disease is still an unresolved problem. Environmental and genetic factors are put forward but none have been consistently shown to be the cause.

Western countries researched the possible association between blood group antigens and rheumatic heart disease in relatively older times when rheumatic disease was frequent. [4,5]. In 1960s, echocardiography was not available and rheumatic heart disease was diagnosed by physical examination alone and results were conflicting.

Along with covering the surface of red blood cells, blood group antigens are found ubiquitously in the body, especially the parts which are in contact with the outside such as respiratory tract and gastrointestinal system. These antigens also have an important role in the elimination process of infectious agents [2]. Studies suggest that inflammatory response to certain infectious agents may vary according to the blood group antigens [6]. Clarke et al. [4] reported that patients with blood group O have a decreased tendency towards Streptococcus infections and also have a lower risk for rheumatic mitral stenosis and poststrepotoccocic glomerulonephritis. However there are some reports indicating the absence of such relationship [5]. We evaluated the association between the blood group antigens and severe rheumatic valve disease but could not find any relationship compared to control group. Recently, the association between blood group antigens and atherosclerotic heart disease is being investigated. Findings suggest that Group A can be considered as a risk factor for atherosclerotic heart disease [7,8]. A similar association could not be demonstrated in our study.

4.1. *Study limitations*

First, our data is applicable only to the patients suffering from severe rheumatic valve involvement, thus we cannot generalize our study results to patients with mild to moderate involvement. Second, this is a retrospectively study. Thus, potential unavoidable confounding factors related to the retrospective studies should be kept in mind.

In summary, there was no association between rheumatic valve disease and blood group antigens in people living in the Southeastern Anatolian endemic region. Blood group does not seem to be a risk factor for severe rheumatic valve involvement or the severity of the disease.

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