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Evaluation of Plasma Soluble Human Leukocyte Antigen-G Level in Asthmatic Children Aged 2 to 14 Years Old in Ghaem Hospital

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ABSTRACT

Introduction: To evaluate serum level of plasma soluble human leukocyte antigen-G (sHLA-G) in asthmatic children aged 2 to 14 years old.

Materials and Methods: This prospective, cross-sectional study was conducted on 83 patients aged 2-14 years in Ghaem Hospital, Mashhad, Iran, during 2013-2015. The participants were divided into two groups of asthmatic patients (n=29) and healthy children (n=54). Blood samples were drawn from the case (on admission) and control groups.

Results: In the control group, 33 cases were male (61.1%) and 21 (38.9%) were female. In the case group, 18 patients (62.1%) were male and 11 (37.9%) were female (P=0.65). Mean ages of the control and case groups were 4.75±3.57 and 4.93±2.38 years, respectively (P=0.17). Mean serum levels of sHLA-G in the control and case groups were 396.51±279 U/ml and 184.58±302.08 U/ml, respectively (P<0.001).

Conclusion: Serum level of sHLA was significantly lower in the asthmatic children compared to healthy ones.

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Introduction

Asthma is one of the most common chronic respiratory diseases in the pediatric population, and its prevalence rate varies from 1% to 16% in different countries (1). This disease is associated with poor quality of life, frequent absence from school, long periods of hospitalization, substantial number of emergency department visits, and high rates of mortality (2). Asthma is characterized by airway inflammation and causes airway hyper-responsiveness that present with episodic or chronic wheeze or cough.

During the recent years, the prevalence rate of asthma in children (5% to 9%) has increased. Although there are theories on the role of human leukocyte antigen-G (HLA-G) in asthma pathophysiology, there is a scarcity of data regarding this issue (2).

HLA-G a non-classical major histocompatibility complex class I gene that is divided into four membrane--bound and soluble forms (1, 2). This gene may play a role in immune tolerance in some viral infections and immune diseases (3, 4). Soluble HLA-G (sHLA-G) acts as an immune tolerance-inducing molecule (5), which can be detected in peripheral blood and amniotic fluid and is mainly secreted by monocytes in the blood (6). HLA-G plays a protective role in inflammatory responses (7). Tahan (4) studied 53 asthmatic children and 13 controls aged 6-17 years old and showed that there was not any significant difference between the two groups in terms of plasma sHLA-G levels, but it was higher in atopic asthmatics.

Zheng (6) studied 78 asthmatic children aged 2-12 years and 186 healthy controls. It was detected that plasma sHLA-G level was significantly higher in the atopic asthmatic patients than controls.

On the other hand, Rizzo et al. studied 20 patients with moderate to severe asthma and 24 healthy children as controls. They found that sHLA-G was significantly lower in the asthmatic children (8). Considering the controversy on the role of sHLA-G in asthmatic children and the limited number of previous studies, we performed this study to evaluate serum level of sHLA-G in asthmatic children.

Materials and Methods

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This prospective, cross-sectional study was performed on 83 patients aged 2-12 years in Ghaem Hospital, Mashhad, Iran, during 2013-2015. The participants were divided into two groups of case (n=29) and control (n=54). The exclusion criteria were acute bronchiolitis, congenital heart disease, failure to thrive, chronic kidney disease, diabetes mellitus, cystic fibrosis, and patients on mechanical ventilation and those experiencing acute, severe asthma attack since six weeks before admission.

Blood samples were drawn into EDTA tubes from the asthmatic patients (on admission) and controls (as outpatients). To evaluate sHLA-G level, ELISA kit (Biovendor) with sensitivity of 2 U/ml. The obtained data were coded and entered into SPSS, Version $_{16}$. Chi-squared and Fisher's exact tests were performed to compare qualitative variables. Normality of the quantitative variables was evaluated by Kolmogorov-Smirnov test, and Mann–Whitney U test was run for abnormally distributed variables. P-value less than 0.05 was considered statistically significant.

Results

In the healthy children, 33 out of 54 were male (61.1%), while in the case group 18 out of 29 (62.1%) were male (P=0.56). Mean ages of the control and case groups were 4.75±3.57 and 4.93±2.38 years, respectively (P=0.17). Mean serum sHLA-G level in the healthy children was 396.51±279 U/ml (range: 23.36-1050.96 U/ml), and in the asthmatic group it was 184.58±302.08 U/ml (range: 21.92-994.88 U/ml; P<0.001).

Discussion

Serum sHLA-G level in the asthmatic patients was significantly lower than in the healthy children. In a study by Tahan (4) on 53 asthmatic children aged 6-17 years, it was shown that there was not any significant difference between serum levels of sHLA of asthmatic and healthy children. However, atopic asthmatic cases had significantly higher serum levels of sHLA-G; atopy might be the reason for this finding.

Zheng (6) studied 72 patients with atopic asthma and 76 healthy children and demonstrated that the case group had significantly higher levels of serum sHLA-G than controls (median: 179.28 vs. 35.23 U/ml). On the other hand, in a study by Rizzo (8), serum level of sHLA-G was significantly lower in asthmatic children compared to healthy ones. In our study, serum sHLA-G level was significantly low in the asthmatic children. Although the reason for this finding is not clear, it is suggested that deficiency in cytokines production can lower serum sHLA-G level. The limitation of this study was limited sample size.

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