

Association of ADAM33 polymorphisms to the presence, severity and control of asthma in a Brazilian sample population

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Abstract

Asthma is an inherited disease that results in complex inflammation of the lungs, obstruction of the airways and bronchial hyperresponsiveness. The analysis of genes that act in the Asthma is recent, and one of these genes as well as its variants most studied in asthma in different populations is ADAM33, responsible for the synthesis of a homonymous glycoprotein that acts restricted in cellular processes of the smooth muscles of the airways. The objective of the study was to verify the genotypic frequency of rs2280091 (T1) and rs2280090 (T2) variants in ADAM33 gene, and analyze whether they act in the presence, control and severity of asthma. The analysis was performed using the PCR-RFLP technique of 51 patients with asthma and 109 healthy individuals. In agreement with some other studies in different populations, our results showed no association between frequency of genotype of T1 and asthma. However, we noticed a positive association between T2 genotype and asthma.

Key words:

ADAM33, Polymorphisms, Asthma

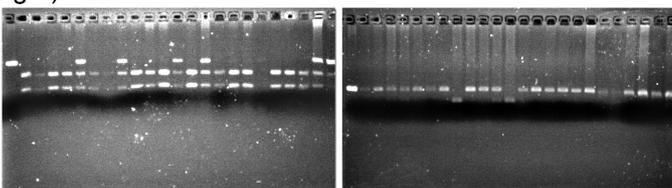
Introduction

Asthma is an inherited disease that results in complex inflammation of the lungs, obstruction of the airways and bronchial hyperresponsiveness (Tripathi et al. 2014). The analysis of genes that act in the Asthma is recent, and one of these genes as well as its variants most studied in asthma in different populations is ADAM33, responsible for the synthesis of a homonymous glycoprotein that acts restricted in cellular processes of the smooth muscles of the airways (Howard et al., 2013). Two variants of the ADAM33 gene (rs2280091 and rs2280090) were evaluated in previous studies and demonstrated association with the presence of asthma. The objective of the study was to verify the genotypic frequency of rs2280091 (T1) and rs2280090 (T2) variants in ADAM33 gene and to analyze whether they act in the presence, control and severity of asthma.

Results and Discussion

In this study, 51 patients with asthma from the Pulmonology Clinic of the Hospital de Clínicas / Unicamp and 109 healthy individuals were analyzed by the PCR-RFLP (Restriction Fragment Length Polymorphism) technique. Patients with asthma were classified using questionnaires, according to severity and disease control (ISSAC). From the genotypes obtained by agarose gel electrophoresis (Image 1), the Chi-Square Test and Fisher Exact Test were used to compare the prevalence of SNPs between the groups of patients with asthma and the group of controls individuals.

Image 1. Results obtained by agarose gel electrophoresis for rs2280091 (left) and rs2280090 (right).



The Hardy-Weinberg Equilibrium was calculated and confirmed by the OEGE (Online Encyclopedia for Genetic Epidemiology Studies). In the statistical analysis values of p less than 0.05 were considered significant.

Regarding the analysis of rs2280091 (50 patients and 96 healthy individuals), no significant results were observed for the presence of the homozygous rare allele (p value = 0.304), nor when grouping for the presence of the rare allele in homozygous with the presence of the rare allele in heterozygosity (p value = 0.135).

Regarding the analysis of rs2280090 (48 patients and 104 healthy individuals), no significant results were observed for the presence of the homozygous rare allele (p value = 0.103). However, when grouping for the presence of the rare allele in homozygous + heterozygosity was performed, a positive association was observed (p value = 0.039; AA + GA group \rightarrow Odds Ratio = 2.299; 95% CI = 1.031 to 5.127). In addition, significant results were not observed between the different groups regarding the control and severity of the disease in both polymorphisms.

Conclusions

In agreement with previous studies in different populations, our results showed no association between frequency of genotype or alleles of T1 and asthma. We noticed a positive association between T2 genotype and asthma. More studies with larger number of patients and healthy individuals are needed for concluding involvement of these ADAM33 polymorphisms in asthma in the Brazilian population.

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