Association of Arg389Gly polymorphism of ADRβ1 gene and T393C of GNAS1 gene with risk of development of acute coronary syndrome in patients with arterial hypertension

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Background. According to the observations in recent years, arterial hypertension in patients is often accompanied by obesity, diabetes, and hypercholesterolemia. The risk of development of hypertension and the severity of its clinical manifestations, including the occurrence of complications in the form of acute coronary syndrome (ACS), depends on many circumstances, such as genetic factors, lifestyle, and environmental factors.

Objective. The aim of the study is to determine the role of Arg389Gly polymorphisms of the ADRβ1 gene and T393C polymorphisms of the GNAS1 gene in the risk of developing ACS.

Methods. The study encompassed 550 patients undergoing treatment for hypertension in the Sumy region (Ukraine) within a period of 7 years. In the process of observing the included subjects, 211 of them were diagnosed with ACS with/without the elevation of the ST segment. Other 334 patients with hypertension were in the control group; five patients were excluded from the study early, because they could not be reached. The T393C polymorphisms of the GNAS1 gene (rs7121) and Arg389Gly of the ADRβ1 gene (rs1801253) were determined by the polymerase chain reaction (PCR) method. To determine the risk of ACS, we calculated the odds ratio (OR) with a 95 % confidence interval (95 % CI), using polynomial logistic regression.

Results. In the analysis of the dominant model with adjustments for age, sex, and excess body weight, the risk of developing ACS was 1.49-fold higher in Arg/Arg genotype carriers than in Arg/Gly and Gly/Gly genotype carriers (OR = 1.49 (1.04−2.14); p = 0.028). Upon a further calculation, this tendency persisted in the recessive model (OR = 2.06 (1.28−3.31); p = 0.001) and homozygous model (OR = 2.53 (1.52−4.20); $p < 0.001$). Subsequent analysis showed the following associations: increased risk of ACS development in carriers of the C/C genotype compared with the carriers of T/T and T/C genotypes based on the recessive model (OR = 3.39 (2.00−5.74); $p < 0.001$); increased risk in carriers of the C/C genotype compared with the carriers of the T/T genotype based on the homozygous model (OR = 3.42 (1.89−6.17); $p < 0.001$).

Conclusions. In our study, we discovered the relationship of the Arg389Gly polymorphism of the ADRβ1 gene and the T393C polymorphism of the GNAS1 gene with the risk of ACS development in the Ukrainian population. Carriers of the Arg389 allele of the polymorphism of the ADRβ1 gene and the C393 allele of the polymorphism of the GNAS1 gene showed a higher risk of ACS development relative to the opposite alleles in these gene polymorphisms.

Keywords: arterial hypertension, acute coronary syndrome, gene polymorphism.
Ключові слова: артеріальна гіпертензія, гострий коронарний синдром, поліморфізм генів.
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