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# The role of polymorphism of the fibrinogen gene FGB G (-455) A in the development of myocardial ischemia in patients with type 2 diabetes mellitus in Azerbaijan

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**Relevance**: Fibrinogen plays a crucial role in the pathophysiological process of cardiovascular diseases. There is sporadic data on the association of FGB gene polymorphism with an increased risk of developing ischemic heart disease in patients with type 2 diabetes mellitus. The DNA region in the regulatory region of the FGB gene, in which Guanine (G) is replaced by Adenine (A) at position -455, is designated as the G (-455) A genetic marker. The presence of a substitution affects the intensity of fibrinogen protein synthesis.

Fibrinogen is a protein produced in the liver and circulating in the blood plasma. When the blood coagulation system is activated, it undergoes enzymatic cleavage by the enzyme thrombin. The resulting fibrin monomer, under the action of the active blood coagulation factor F13 precipitates in the form of white filaments of fibrin polymer. Fibrin is the basis of a blood clot and subsequently forms a thrombus, completing the clotting process.

For this marker, there is no concept of "norm" and "pathology", since the gene polymorphism is being studied.

The purpose of the study is to determine the frequency of three genetic variants of the FGB gene in patients with type 2 diabetes mellitus complicated by ischemic heart disease.

**Materials and methods**: The study included 48 people aged 55.6+8.5 years, of which 24 patients with T2DM complicated by ischemic heart disease. The control group consisted of 24 healthy people without these pathologies. Determination of polymorphism of the fibrinogen gene FGB G (-455) A was carried out by mass spectrometry (MALDI-TOF) on a Seguenon mass spectrometer (USA). The study material was whole blood. Statistical processing of the results was carried out using the Microsoft Office Excel, Statistic 16.0 application package. All analyses were performed at a significance level of $p<0.05$.

**Results**: As a result of our studies of the occurrence of polymorphism of the FGB G (-455) A gene of fibrinogen responsible for the formation of thrombosis and myocardial ischemia in the group of patients with T2DM and ischemic heart disease, the prevalence of the mutant homozygous genotype G/G-58.3% (control-58.3); heterozygous mutant genotype G/A was found in 33.3% (control-41.7%); normal homozygous genotype A/A-8.3% (control-0).

The distribution of G/G genotypes of the FGB fibrinogen polymorphism showed no significant differences between the group of patients with type 2 diabetes mellitus and the control group ($p>0.05$). Also, there were no significant differences between the group of patients with T2 diabetes mellitus and the control group in the detection of the normal homozygous A/A genotype ($p>0.05$).

The distribution of the mutant heterozygous genotype G/A in patients with T2DM and İHD compared with the control group had a significant difference ($p<0.05$).

**Conclusion**: The distribution of the homozygous G/G genotype and the homozygous mutant A/A genotype of the FGB gene showed no significant differences between patients with type 2 diabetes mellitus and CAD and the control group ($p>0.05$). The heterozygous G/A genotype was more common in patients with T2DM and CHD compared with the control group ($p<0.05$).

The FGB G (-455) A gene encodes the beta-polypeptide chain of the fibrinogen protein. The substitution of G (guanine) for A (adenine) in the regulatory region of the FGB gene is associated with an increased concentration of the fibrinogen protein in the blood plasma, which is one of the factors in the development of a thrombus in patients with diabetes mellitus.

A statistically significant difference in the frequency of occurrence of the GA polymorphism of the fibrinogen gene FGB G (-455) A was found in Azerbaijani patients with DM2 and CHD compared to the group of people without diabetes. The data obtained suggests that carriers of the G/A variant have a high risk of thrombus formation. Additional measures are required to prevent and treat thrombotic complications in patients with type 2 diabetes.

## Biography

Nazirova Vafa Balabay is affiliated to the Special Medical Health Complex, Baku, Azerbaijan. Her research interests reflect in her wide range of publications in various national and international journals.

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