

PROGNOSTIC SIGNIFICANCE OF MYH7 G1816A GENOTYPES IN THE DEVELOPMENT AND CLINICAL COURSE OF CHRONIC HEART FAILURE

¹ M.M. Kadirova, ¹ U.Kh. Musashaykhov, ² O.A. Aripov, ³ K.T. Boboev

¹ Andijan State Medical Institute

² Center for the Development of Professional Qualifications of Medical Workers

³ Republican Specialized Scientific and Practical Medical Center of Hematology

Relevance of the Study

Chronic heart failure (CHF) is one of the severe complications of ischemic heart disease (IHD), in the development of which myocardial contractile function and structural changes in the cardiac muscle play an important role [1–2]. The MYH7 gene, which encodes the β -myosin heavy chain, one of the major proteins of myocardial sarcomeres, plays an important role in these processes [3–4].

Investigating the G1816A polymorphism of the MYH7 gene is relevant for identifying genetic factors associated with CHF development in patients with IHD, determining risk groups, and predicting the disease's clinical course [5–6]. Identifying the association between this genetic polymorphism and CHF development may help improve early diagnosis and optimize individualized preventive and therapeutic approaches.

Aim of the Study

To determine the role of the MYH7 gene polymorphism in the development of chronic heart failure and to assess its prognostic significance.

Materials and Methods

The study followed standard diagnostic criteria for chronic heart failure. We used instrumental, biochemical, molecular genetic and statistical research methods.

Results

Results for the G1816A polymorphism of the MYH7 gene showed a high prevalence of the G allele and G/G genotype at this locus. In the main patient group, the G allele accounted for 99.0%, while the G/G genotype was observed in 97.3% of cases. The A allele and G/A genotype were detected at very low frequencies. In the control group, the G allele and G/G genotype were detected in 100% of participants, indicating that the G variant predominates in the studied population. Therefore, the overall distribution of the polymorphism did not differ significantly between the patient and control groups.

Analysis by left ventricular ejection fraction (LVEF) also showed a high frequency of the G/G genotype. The A allele was not detected in groups with LVEF >50% and LVEF 40–49%, whereas the presence of the A allele and the G/A genotype among patients with LVEF <40% was noteworthy. In particular, the G/A

genotype was detected in 9.4% of patients in this group, suggesting that the rare A allele was more frequently represented among patients with more pronounced systolic impairment.

Conclusion

The G allele predominates in the MYH7 G1816A polymorphism, whereas the A allele is rare. The absence of the A/A genotype indicates a low frequency of this variant in the studied population. The presence of the A allele in patients with LVEF <40% may indicate a possible association with impaired myocardial systolic function. However, given the low frequency of the A allele and its absence in the control group, further studies involving larger populations are required to establish its significance as an independent risk factor.

References

1. McDonagh T.A., Metra M., Adamo M., et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *European Heart Journal*. 2021;42(36):3599–3726.
2. McDonagh T.A., Metra M., Adamo M., et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *European Journal of Heart Failure*. 2022;24(1):4–131.
3. Ommen S.R., Mital S., Burke M.A., et al. 2024 AHA/ACC/AMSSM/HRS/PACES/SCMR Guideline for the Management of Hypertrophic Cardiomyopathy. *Journal of the American College of Cardiology*. 2024.
4. Lopes L.R., Ho C.Y., Elliott P.M. Genetics of hypertrophic cardiomyopathy: established and emerging implications for clinical practice. *European Heart Journal*. 2024.
5. Naderi N., Mohsen-Pour N., Nilipour Y., et al. A novel heterozygous missense MYH7 mutation potentially causes an autosomal dominant form of myosin storage myopathy with dilated cardiomyopathy. *BMC Cardiovascular Disorders*. 2023; 23:487.
6. Day S.M., Tardiff J.C., Ostap E.M., et al. Myosin modulators: emerging approaches for the treatment of cardiomyopathies and heart failure. *Journal of Clinical Investigation*. 2022;132(5).