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BIOCHEMICAL INVESTIGATION OF GENETIC POLYMORPHISM OF MTHFR (C677T) rs 1801133 WITH MYOCARDIAL INFARCTION

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Abstract

Myocardial Infarction (MI) occurs due to the blockage of coronary artery in which cardiac muscles receive less oxygen supply which leads to death of cardiac muscles as a result of decrease or incomplete blood supply to heart muscle. Prevalence of myocardial infarction is high in females as compared to that in males. The etiology of myocardial infarction is associated with various risk factors like environmental, occupational and genetics. Various studies have been conducted on polymorphism of various genes involved in myocardial infarction. Previous studies show that different variants of MTHFR have been involved in causing myocardial infarction by altering the folate and homocysteine metabolism. We genotyped a single variant MTHFR (C677T) rs 1801133 by Tetra ARMS-PCR method and associated it with biochemical markers of myocardial infarction. The rs 1801133 T/T variant was found to be associated to myocardial infarction under overdominance [OR=1.79, CI 95%= 0.45-1.42, P<0.05], whereas, no significance was found under codominance [OR=2.40, CI 95%= 0.71-8.17, P>0.05], Dominance [OR=0.92, CI 95%= 0.53-1.61, P>0.05], and Recessive [OR=1.00, P>0.05],when control and MI are compared. There was significant difference under the recessive [OR=3.27, CI 95%=1.02-10.52, P<0.05], whereas, no significance was found under Codominance [OR=2.78, CI 95%= 0.84-9.17, P>0.05], Dominance [OR=0.85, CI 95%= 0.49-1.48, P>0.05], and overdominance [OR=1.00, CI 95%= 0.34-1.07, P>0.05],when control and MD are compared. There was significant difference under the overdominance [OR=0.84, CI 95%=0.47- 1.50, P<0.05], whereas, no significance was found under Codominance [OR=2.78, CI 95%= 0.84-9.17, P>0.05], Dominance [OR=0.85, CI 95%= 0.49-1.48, P>0.05], and recessive [OR=1.00, CI 95%= 0.34-1.07, P>0.05], when MI and MD are compared. There was significant difference under the Codominance [OR=2.59, CI 95%=0.85-7.93, P<0.05] and recessive [OR=2.79, CI 95%= 0.99-8.86, P<0.05].whereas, no significance was found under overdominance [OR=1, CI 95%= 0.41-1.08, P>0.05]and dominance [OR=0.89, CI 95%= 0.55-1.43, P>0.05], when control and MI+MD is compared. Thus, genetic polymorphism of MTHFR (C677T) rs1801133 (T/T) variant may be associated with Myocardial infarction.

Keywords: Myocardial infarction, genetic mutation, genetic polymorphism, Pakistani population, Tetra ARMS-PCR.
Ethical Approval: This study was approved by the Ethical Review Committee, Government College University, Faisalabad, Pakistan (Ref. No. GCUF/ERE/36).
Conflict of Interest: This abstract is from the MPhil thesis of Miss Momina Shahid and from her thesis, one research article entitled: “Biochemical Association of MTHFR C677T Polymorphism with Myocardial Infarction in the Presence of Diabetes Mellitus as a Risk Factor” has been published in Metabolites 2023, 13(2), 251; https://doi.org/10.3390/metabo13020251.
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