ABSTRACT

Atherosclerosis is a cardiovascular disease, initiated and progressed by the fatty material deposition leading to the plaque formation, which in turn clogs the arteries. The present project was designed to determine the role of single nucleotide polymorphisms in *matrix metallothionine* gene and possible outcomes of these SNPs in causing atherosclerosis in the population of Pakistan. Two SNPs in *MMP2* gene rs243865 *(BfaI)* and rs243865 (*Nla III*) were selected for genetic analysis. For this purpose, we collected a total of 200 blood samples out of which 100 blood samples were taken from atherosclerotic patients from Punjab institute of cardiology and 100 healthy blood samples were collected for control group. These patients were clinically diagnosed with the Ischemic heart disease according to W.H.O criteria and they were interviewed for assessment of the clinical, physical and social aspects. Genomic DNA was isolated from each blood sample and targeted sequence was amplified by PCR. Basic techniques used for genotyping were RFLP-PCR and direct sequencing. It was observed that males were at higher risk of disease development as compared to females. Midlife age and elevated body mass index as well as smoking, positive family history and other clinical risk factors like hypertension, cholesterol level, and diabetes are significantly associated with the atherosclerosis. As a result of genotyping it was observed that the allele and genotype frequency of rs243865 (*BfaI*) polymorphism differed significantly between atherosclerotic patients and controls. Significant association of *A* allele of rs243866 (*NlaIII*) polymorphism was found to be associated with atherosclerosis. However there was no difference in genotype frequency between atherosclerotic patients and controls. Haplotype analysis indicated that CA, CG and TA haplotypes are significantly associated with the atherosclerosis ($P < 0.01$). However, haplotype TG frequency was higher in control individuals so act as a protective factor against the atherosclerosis development.