Methylenetetrahydrofolate reductase gene C677T and A1298C polymorphisms, plasma homocysteine, folate, and vitamin B12 levels and the extent of coronary artery disease.

Abstract: The question of whether mild hyperhomocysteinemia is a risk factor for coronary artery disease (CAD) has long been debated and is still unclear. We investigated whether there is a link between methylenetetrahydrofolate reductase (MTHFR) gene C677T and A1298C polymorphisms or plasma homocysteine and CAD. This is a case-control study that included 2,121 consecutive patients (cases) with angiographically proved CAD and 617 patients without CAD (controls). MTHFR gene C677T and A1298C polymorphisms, plasma homocysteine, folate, and vitamin B(12) concentrations were determined and coronary angiography was performed in all subjects. The distribution of MTHFR gene C677T genotypes in patients (or controls) was: CC-genotype in 915 cases, 43.1% (266 controls, 43.1%); CT-genotype in 955 cases, 45.0% (283 controls, 45.9%); and TT-genotype in 251 cases, 11.9% (68 controls, 11.0%) (p = 0.84). The distribution of MTHFR gene A1298C genotypes in patients (or controls) was: AA-genotype in 973 cases, 45.9% (281 controls, 45.5%); AC-genotype in 905 cases, 42.7% (284 controls, 46.0%); and CC-genotype in 243 cases, 11.4% (52 controls, 8.5%) (p = 0.07). Patients with CAD had higher levels of plasma homocysteine (12.9 +/- 5.1 vs 11.9 +/-
4.5 micromol/L, p<0.001) and lower levels of folate (9.5 +/- 3.1 vs 9.9 +/- 3.8 ng/ml, p = 0.008) than controls. After adjustment for other risk factors for CAD, plasma homocysteine (p = 0.89), MTHFR gene C677T (p = 0.38), or A1298C polymorphisms (p = 0.13) were not independent correlates of CAD. This study demonstrated that MTHFR gene C677T or A1298C polymorphisms are not associated with the presence of angiographic CAD. Although there is an apparent association between elevated levels of homocysteine and CAD, this association is not independent of conventional cardiovascular risk factors.