

# Genetic polymorphisms of Matrix Metalloproteinase - 9 and Tissue Inhibitor of Metalloproteinase - 1 in the development of new onset of atrial fibrillation after coronary artery bypass graft surgery

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**Purpose.** To estimate the association of the genetic polymorphisms of Matrix Metalloproteinase - 9 (MMP-9) and Tissue Inhibitor of Matrix Metalloproteinase - 1 (TIMP-1) with new onset of atrial fibrillation (AF) in postoperative period of coronary artery bypass graft (CABG) surgery in patients with coronary artery disease (CAD).

**Methods.** Studied were 80 patients who underwent CABG. In all the patients we studied genetic polymorphisms of MMP-9 A8202G and

TIMP-1 C536T. All the patients were divided into two groups: 1 group comprised 56 patients without AF (78.6% men, mean age  $61.0 \pm 7.5$  years, 2 group - 24 patients with AF development after CABG (83.3% men, mean age  $64.7 \pm 7.9$  years).

**Results.** During the observation period AF occurred in 30.0% patients, on average  $4.7 \pm 3.5$  days after surgery. Patients of group 2 had longer history of CAD ( $86.8 \pm 71.6$  vs.  $47.7 \pm 32.5$  months,  $p = 0.02$ ), NYHA III (33.3% vs. 9.0%,  $p=0.02$ ) and larger left atrial (LA) dimension ( $43.9 \pm 3.8$  mm vs.  $37.7 \pm 3.6$  mm,  $p < 0.001$ ) comparing with group 1.

We found that genotype AA MMP-9 was observed in 32.1% patients of the 1 group and in 16.7% patients of the 2 group ( $p=0.04$ ), genotype AG - in 48.2% and 54.2% ( $p=0.4$ ), genotype GG - in 19.7% and 29.2% ( $p=0.06$ ) respectively. Genotype CC TIMP-1 C536T was found in 98.2% and 100% patients of the 1 and 2 group respectively ( $p=0.7$ ), genotype CT - in 1.8% patients of the 1 group. We found a significant increase in the preoperative concentration of MMP-9 in patients with the GG genotype when compared with the AA genotype of the MMP-9 gene A8202G (20375.80 (13112.9-29516.5) / mg plasma protein vs. 15349.0 (12432.0- 20355.6) / mg plasma protein,  $p=0.03$ ).

According to the result of multivariate regression analysis the odds ratio for AF development in postoperative period of CABG for NYHA III was 0.79 (95% CI, 0.14-4.6,  $p=0.79$ ), for history of CAD more than 20 months - 1.5 (95% CI, 1.1-7.6,  $p=0.04$ ), for LA dimension more than 39 mm - 3.8 (95% CI, 1.3-7.8,  $p < 0.0001$ ), for allele G MMP-9 A8202G - 2.8 (95% CI, 1.4-8.7,  $p=0.04$ ).

**Conclusion.** Our investigation showed that an increased left atrial dimension, the history of coronary artery disease and the presence of G allele of MMP-9 A820G were associated with postoperative atrial fibrillation development in patients who underwent coronary artery bypass graft surgery.