

Circulating endothelial progenitor cells are actively involved in the reparative mechanisms of stable ischemic myocardium

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Background and aim: Mobilization of endothelial progenitor cells (EPCs) into circulation from bone marrow in patients with acute myocardial infarction has strong scientific evidence however less is known about EPC mobilization in patients with stable ischemic heart disease. The aim of this study was investigate the impact of stable ischemic heart disease on EPC level both in tissue and blood.

Methods: Consecutive patients admitted at our hospital for valve or CABG surgeries were included in the study. Exclusion criteria were emergencies and redo surgeries. Blood samples were collected in the morning before surgery and analyzed by flow-citometry in order to evaluate peripheral EPC levels (EPC/ml). Tissue EPC (CD34+VEGFR2+) levels were assessed on a right atrial appendage segment collected during cardioplegia induction. Tissues were fixed in formalin and embedded in paraffin. Three μm sections were quantified immunohistochemically by counting double positive cells. Continuous data are expressed as mean \pm SD, categorical data are expressed as frequency or percentage. T test was used in paired data. The interaction between the number of CD34+ VEGFR2+ cells and coronary artery disease was examined by multivariate analysis using the logistic regression model. Differences of $p < 0.05$ were considered statistically significant.

Results: 55 patients were included in the study. 46% were male with a mean age of 76 ± 5 . 53% of patients had coronary artery disease (CAD). 21% of patients had positive family history, 80% had hypertension, 22% of patients were smoker and 23% of patients were obese. The number of CD34+ VEGFR2+ cells in the tissue of patients with CAD was significantly higher when compared with control subjects ($30/\text{mm}^2$ vs $20/\text{mm}^2$ $p < 0.005$) and circulating EPC showed a tendency to be reduced by approximately 20% in peripheral blood of patients with CAD when compared with no CAD patients.

Conclusion: Patients with ischemic heart disease have higher EPC density value (EPC/mm^2) and are more likely to have lower EPC blood levels when compare with controls. These results show that chronic ischemic heart disease, same as acute myocardial infarction, can be a stimulus to increase bone marrow mobilization and homing in myocardium. However more studies needed to confirm these evidences in larger population.