Kinetics of Circulating Endothelial Progenitor Cells in Congestive Heart Failure

Mutuko Sakurai, Kei Yamamoto, Noriko Ueda, Yoshiko Nishimura, Masaru Ishida, Kazuo Murai, Kazuyoshi Shimada, Joichi Medical School, Tochigi, Japan

Background: Endothelial progenitor cells (EPCs) circulate in the adult peripheral blood (PB) and contribute to neovascularization. EPCs are considered to be included in CD34+ mononuclear cells (CD34+ MNCs). Kinetics of circulating EPCs in congestive heart failure (CHF) has not been fully investigated.

Methods: We determined the numbers of WBC and CD34+ MNCs, plasma BNP, serum erythropoietin, VEGF and thrombomodulin levels in 16 mild CHF patients (NYHA I or II), 10 severe CHF patients with acute exacerbation (NYHA III or IV), and 22 control subjects. In severe CHF patients, blood sampling was performed at admission and on 14 days after admission. The number of CD34+ MNCs in PB was quantified by flow cytometry.

Results: The ratio of CD34+ MNCs: WBC (x1000) in mild CHF patients (0.462±0.107) was higher than that in control subjects (0.267±0.018, p<0.05). Interestingly, the ratio of CD34+ MNCs: WBC in severe CHF patients at admission (0.155±0.035) was significantly lower than that in control subjects (p<0.05). Levels of BNP (1183±505 pg/ml) and erythropoietin (1117±52 mU/ml) in severe CHF patients were significantly higher than those (BNP, 306±117, p<0.05; erythropoietin, 275±5, p<0.05) in mild CHF patients. However, VEGF and thrombomodulin levels were not different between mild and severe CHF patients. In addition, the ratio of CD34+ MNCs: WBC in severe CHF patients increases in proportion to the amelioration of CHF during hospitalization, and this increase correlates with the decrease in BNP levels.

Conclusion: The ratio of CD34+ MNCs: WBC was decreased in severe CHF. These findings suggest that impaired EPC recruitment might be involved in the pathophysiology of severe CHF.

Percutaneous Intravascular Transplantation of Autologous Stem Cells After Acute Myocardial Infarction

Clemens Steinwender, Robert Hofmann, Klaus Kerschner, Michael Grund, Kurt Stihlocher, Alexander Kypa, Jürgen Kammerer, Wilma Maschek, Christian Gabriel, Franz Leisch, Cardiovascular Division City-Hospital Linz, Linz, Austria, Blutzentrale Linz, Linz, Austria

Background: Recent publications have shown that transplantation of autologous stem cells (ASC) after myocardial infarction (MI) improves cardiac function, but ASC were always won by bone marrow aspiration. We derived ASC by apheresis from peripheral blood and transplanted them via the infrarenal-related coronary artery (IRCA).

Methods: Patients (P) with acute MI and primary intervention of the IRCA were included. Two days after MI we initiated stimulation of the bone marrow with granulocyte colonystimulating factor (G-CSF, Neupogen®). Having achieved a peak of CD34-positive cells in peripheral blood, apheresis and transplantation of ASC were performed. The ASC were injected via the lumen of a balloon catheter, which was inflated within the stent of the former intervention of the IRCA.

After 6 months, stress-echoangiography, 18-FDG-positrone emission tomography (PET), and mean ejection fraction (45.2±1.7) were available. Echocardiographic markers, PET and the mean ejection fraction (45.2±1.7) were successfully performed in 9 P. I P revealed an asymptomatic reocclusion of the IRCA.

Results: We included 10 P with a mean age of 57±4 years. One patient (10%) died in the first postoperative days due to perforation of the IRCA. After 6 months, all 9 P were alive. No new ischemic or arrhythmogenic events have been noted. After 6 months, stress-echoangiography, 18-FDG-positrone emission tomography (PET), and mean ejection fraction (45.2±1.7) were successfully performed in 9 P. I P revealed an asymptomatic reocclusion of the IRCA.

Conclusion: Randomized studies are neccessary to determine the clinical benefit of this procedure.
Methods: Sixty-four consecutive patients (mean age 63.5 ± 14.8 years; 65.6% male) diagnosed to have tuberculous pericarditis were included. All patients underwent surgical treatment. Detailed echocardiographic examinations were performed before operation. Their clinical manifestations were analyzed from the medical recordings.

Results: After a median follow-up period of 5.37 ± 3.68 years (range 1 month to 15 years), there were 24 (37.5%) deaths among this cohort. We found that thickened pericardium observed by the echocardiography (95.8 vs. 45.0%, odds ratio [OR] 2.18, p <0.001) and initial symptoms of congestive heart failure (CHF) (79.2 vs. 40.0%, OR 1.81, p = 0.004) were more common among patients complicated with mortality. In addition, less frequent treatment with corticosteroids and shorter duration of anti-TB treatment were found among mortality patient group (20.0 ± 7.4 vs. 56.9 ± 2.5, p = 0.003; 2.16 ± 0.38 vs. 7.11 ± 4.14 months, p <0.001). Multivariate Cox regression analysis showed that thickened pericardium was an independent and significant predictor of death (hazard ratio 2.38, p = 0.02) as were CHF symptoms (hazard ratio 2.39, p = 0.02), usage of corticosteroids (hazard ratio 4.56, p=0.04) and an anti-TB treatment duration longer than 6 months (hazard ratio 0.33, p = 0.001).

Conclusion: We conclude that the echocardiographic finding of thickened pericardium and symptoms of CHF can be survival predictors for tuberculous pericarditis. Combination usage of corticosteroids and anti-TB treatment longer than 6 months may improve the outcome of tuberculous pericarditis.