

Mobilization of bone marrow stem cell subpopulations to peripheral blood in patients with acute myocardial infarction and acute angina pectoris

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Introduction: The illusion that the heart does not regenerate has been invalidated in this century with the emergence of cell therapy, however, our experience and that of several clinical trials conducted to the date, have not elucidated precisely which subpopulations of bone marrow stem cells, really act on the improvement of the ventricular function, reduction of infarct size, tissue regeneration and angiogenesis. For improve our work with cellular therapy, we show in this study, the bone marrow cell subpopulations that are mobilized to the bloodstream as a result of inflammatory events, that occur during an acute myocardial infarction and acute angina, the state in which they are into the cellular cycle, as well as their relationship with different levels of inflammatory interleukins and SDF1.

Material and method: Blood samples were taken within 24 hours of admission to the coronary care unit of patients with acute angina and acute myocardial infarction. The amount and state in the cell cycle in which were the bone marrow stem cells, which were mobilized to peripheral blood, was determined by flow cytometry for CD34, CD117, CD 48, CD90, CXCR4, CD133, ANCP and Ki67; the inflammatory process with IL2, IL6, IL8 and SDF1. The diagnostic of myocardial infarction was made with EKG, with levels of CK-MB and troponin I. The diagnostic of acute angina pectoris was made with clinical data. For statistical analysis we used SPSS 20.0 for Windows and statistical significance was considered with $p < 0.05$

Results: There were no significant differences in age of patients with acute angina and AMI (66 ± 5 vs 61 ± 4 years, $p = 0.21$). The levels of CK-MB and troponin were significantly different between groups (Angina: 160 U/l vs. AMI 3.71U/l, $p = 0.03$; Troponin 446 ng/ml and 69 ng/ml, $p = 0.001$). The subpopulations of stem cells mobilized to peripheral blood in patients with AMI vs. Acute Angina Pectoris were significantly different except for CD48. (See Table)

	Acute Myocardial Infarction %	Acute Angina Pectoris %	
CD48	2.2±0.5	1.6 ±0.3	0.25
CD133	56.2±12	6.1 ±0.4	0.001
CD117	45.6±11.9	2.7 ±0.6	0.001
CD34	33.2±8.2	3.7 ±1.1	0.001
CXCR4	52.1±13	8.6± 2.4	0.001

The levels of cytokines, SDF 1, the cell cycle status and its relationship to the size of infarction, will be show in the presentation

Conclusion

- There are a significant difference in subpopulations of bone marrow stem cells mobilized to peripheral blood between patients with acute myocardial infarction and patients with acute angina pectoris.
- The intensity of inflammation process and dimensions of myocardial tissue infarcted could have close relationship with amounts, kinds and status in cellular cycle in which are bone marrow stem cells mobilized to the peripheral blood.

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