Endothelial Progenitor Cells and Development of Collatera Formation in Patients with Chronic Total Coronary Artery Occlusion

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Abstract

The aim of the present work was to study whether or not the number and function of endothelial progenitor cells (EPCs) were associated with the development of collateral formation in patients with single-vessel coronary artery disease of chronic total occlusion (CTO). We aimed also to examine the ability of EPCs to form new blood vessels and to differentiate into cardiomyocytes in an experimental model (canines) with acute myocardial infarctions (AMI).

Patients with good collaterals (n=10 Rentrop class 2 and 3) exhibited an increased number of CFUs and significant high expression of hVEGFR-2 and eNOS genes in the culture cells, compared with patients with poor collaterals (n=10, Rentrop class 0 and 1). For the experimental animals, ECG and Cardiac enzymes measurements showed increased cardiac activity in dogs treated with EPCs, while histopathology showed increased neovascularization and immunohistochemistry showed presence of hEPCs newly differentiated into cardiomyocyte-like cells in peri-infarct cardiac tissue.

Keywords: Human EPCs; CTO; Collaterals formation; Neovascularization; Canine; Acute myocardial infarction.