Cardiac Effects of Experimental Intravenous Bone Marrow Cell Transplantation after Myocardial Infarction


Objectives
Chronic heart failure after myocardial infarction is still a serious problem without a fundamental therapy. Direct intramyocardial transplantation of bone marrow cells (BMC) is promising but difficult to perform. Therefore, cardiac effect of experimental intravenous application of BMC after myocardial infarction (MI) is evaluated.

Methods
20 Lewis rats underwent suture ligation of the LAD. One month after the MI, they were randomized to receive either intravenous Lewis-BMC or saline injection. Hearts were explanted and histologically examined another month later. Transthoracic echocardiography was performed before MI and intravenous injection as well as before explantation.

Results
BMC transplanted animals developed less cartilaginous metaplasia (BMC-group: 30% vs Control-group: 50%, p <0.01). Moreover, systolic thickness of the interventricular septum (IVSs) increased significantly in the BMC-group only: pre-Tx 1.4 ± 0.5 mm vs post-Tx 2.3 ± 0.5 mm, p = 0.02; whereas, systolic left ventricular posterior wall diameter (LVPWD) increased in the control groups only: pre-Tx 2.6 ± 0.5 mm vs post-Tx 3.4 ± 0.8 mm, p = 0.04. BMC transplantation showed a tendency towards a smaller infarct area (BMC group, 11% vs. Control group, 13%; p = 0.07) and increases in LVEF and FS after an intravenous injection (p = 0.08).

Conclusion
Intravenous BMC-Tx led to less calcifying remodelling and a compensatory hypertrophy within the infarction area that probably contributes to functional recovery.