

Meeting abstract

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2001 Effects on myocardial perfusion at 3 and 15 months in recanalized chronic total occlusions – randomized comparison of blood-derived progenitor cells and inactive serum

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from 11th Annual SCMR Scientific Sessions
Los Angeles, CA, USA. 1–3 February 2008

Published: 22 October 2008

Journal of Cardiovascular Magnetic Resonance 2008, **10**(Suppl 1):A270 doi:10.1186/1532-429X-10-S1-A270

This abstract is available from: <http://jcmr-online.com/content/10/S1/A270>

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Introduction

MRI is an excellent diagnostic tool for serial assessment of changes in myocardial perfusion, left ventricular function, and infarct size. In chronic total occlusions (CTO) the effects of recanalization on perfusion and function are contradictory and might depend primarily on viability. Circulating progenitor cells (CPC) injected intracoronarily after successful CTO recanalization might improve perfusion and function.

Purpose

To assess, if CPC improve perfusion and subsequently infarct size and left ventricular function in comparison to control.

Methods and results

Twenty-eight patients with reperfused CTO were randomized to either CPC's or inactive serum (control), which were infused into the target vessel. First-pass myocardial perfusion MRI at rest and stress using adenosine at standard dose revealed a significant improvement of the myocardial perfusion reserve index (MPRI) in the affected segments. The baseline MPRI in affected segments was 1.50 ± 0.17 in CPC versus 1.46 ± 0.16 in control ($p = 0.62$). In CPC the MPRI improved to 1.76 ± 0.16 ($p < 0.001$) at 3 and 1.82 ± 0.20 ($p < 0.001$) at 15 months; in control the change was 1.58 ± 0.10 ($p = 0.01$) at 3 and 1.61 ± 0.08 ($p = 0.004$) at 15 months follow-up. However, the MPRI recovery was significantly better in CPC as com-

pared to control at 3 ($p = 0.004$) and 15 months ($p = 0.005$). In remote myocardium the MPRI was 1.70 ± 0.30 and 1.69 ± 0.25 ($p < 0.01$ versus affected segments), respectively. At follow-up there was no significant improvement for both groups. The change in MPRI at 3 and 15 months was correlated with a change in overall infarct size for CPC (3 months: $r = -0.68$, $p = 0.02$; 15 months: $r = -0.81$, $p = 0.001$), whereas in control there was no correlation ($r = -0.38$, $p = 0.26$; 15 months: $r = -0.21$, $p = 0.56$). Infarct transmuralty influenced MPRI improvement at follow-up. CPC patients had a trend towards more improved segments in particular those with higher transmuralty (Figure 1).

Conclusion

Analysis of serial contrast-enhanced MRI suggests that intracoronary application of CPC post recanalization of CTO is associated with improved myocardial perfusion and subsequent improved recovery of left ventricular function as compared to a control group at mid- and long-term follow-up. Further investigations of the pathophysiological CPC effects on macro- and microvascular function are required.

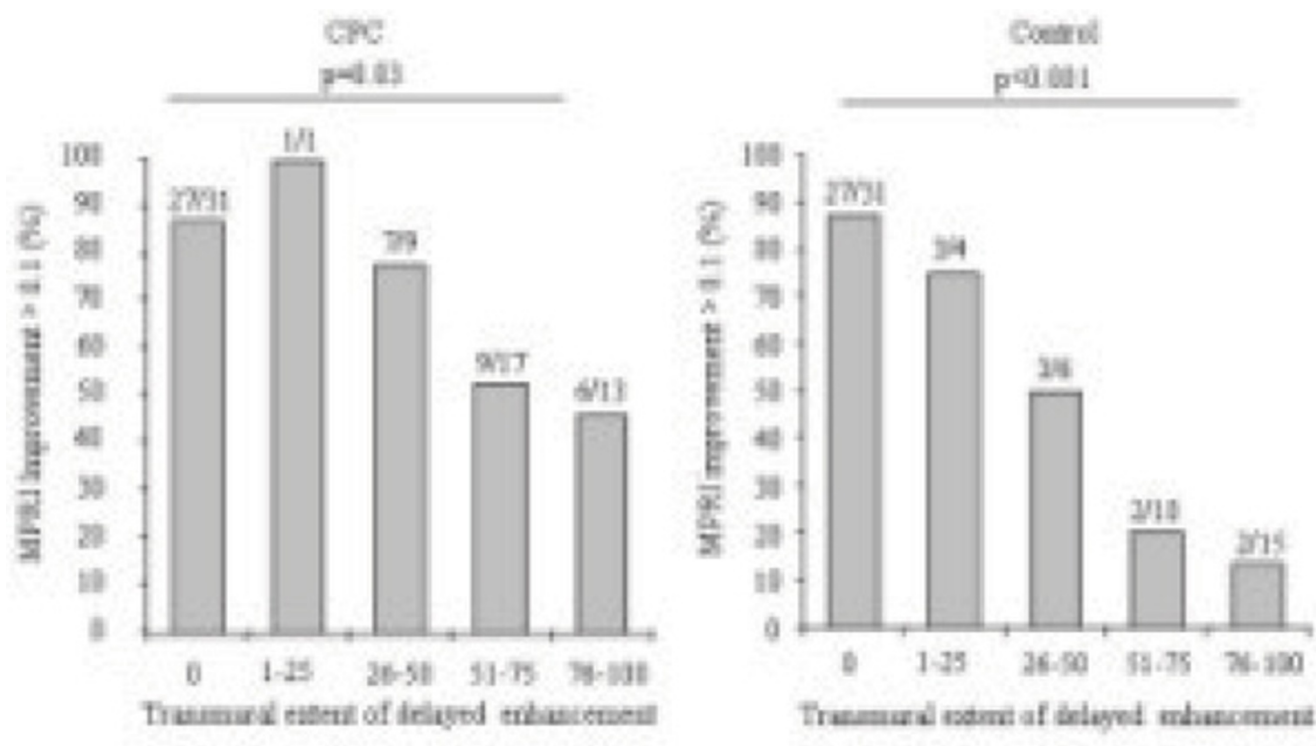


Figure 1

Endothelial progenitor cells in addition to recanalization of chronic total occlusions improve myocardial perfusion and subsequently infarct size and left ventricular ejection fraction.

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