

Poster presentation

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The usability of quantification of myocardial blood flow by cardiac magnetic resonance for evaluation of cell therapy for ischemic cardiomyopathy using a retrograde injection method

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Introduction

Bone marrow cells implantation (BMI) has been reported to efficiently improve ischemic cardiomyopathy (ICM). However, the method of accurate evaluation of the efficacy has not built up yet.

Purpose

The purpose of our study was to confirm the usability of fully quantitative analysis of myocardial blood flow (MBF) by myocardial perfusion magnetic resonance imaging (P-MRI) as compared with single-photon emission computed tomography (SPECT) to detect the effect of BMI therapy.

Methods

The candidate of this study was 5 cases of ICM (All Male, 64.3 ± 7.7 y/o). Bone marrow Mononuclear cells (BMMNC) were quickly injected retrogradely via the coronary vein into the myocardium of LAD area through the infusion catheter. The number of injected BMMNC is $1.47 \pm 0.35 \times 10^8$. P-MRI and SPECT were performed before and after procedure. P-MRI was obtained with a saturation recovery balanced TFE sequence, by injecting 0.05 mmol/kg of Gd-DTPA during vasodilator stress and at rest. Dual bolus method was used to correct for blood saturation. Absolute MBF was quantified by using a model based Pat-

lak analysis, with correction for flow-dependent alteration in extraction fraction of Gd-DTPA. Therapy evaluation were made, which were 1) Symptom of Angina pectoris with CCS scoring. 2) SPECT score: Summed rest Score (SRS), Summed stress score (SSS), Summed Difference Score (SDS). 3) BMF and Coronary Flow Reserve (CFR) from P-MRI.

Results

BMI was performed successfully in all cases. BMI improved chest discomfort frequency, but cardiac function and evaluation score by SPECT did not show improvement. There were no significantly BMF increases detected by P-MRI. But P-MRI indicated the increasing trend of BMF in LCX perfused area, instead of LAD. CFR data indicated increasing trend in LCX area ($P = 0.07$).

Conclusion

In this study, there was no significant difference detected by SPECT and P-MRI. But quantitative measurement of MBF by P-MRI could show some trend of BMF. There was some possibility that improvement of symptom was made by increased flow from LAD to LCX through micro collateral artery. Accurate quantification of MBF by P-MRI is thought as useful in terms of permission accurate assessment of the efficacy of BMI therapy.