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Right ventricular involvement in acute myocardial infarction: evaluation of edema, delayed enhancement and RV function by cardiac MRI

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Introduction

Edema and Delayed Enhancement can easily be visualized in the LV myocardium after acute myocardial infarction by cardiac MRI. Little data exists for right ventricular involvement in MI.

Purpose

To evaluate right ventricular (RV) function, edema and scar tissue in a large patient group after acute myocardial infarction (MI) and acute revascularisation using SSFP, T2-weighted and delayed enhancement (DE) sequences in MRI.

Methods

440 patients with a mean age of 64.5 ± 12.8 y were studied 48 h to 120 h after acute MI and acute PTCA using a 1.5 T Gyroscan Intera 1.5 T scanner (Philips). SSFP sequences in short axis (SA) orientation were used for volumetry, T2-weighted images in SA for visualisation of edema and 3D DE sequences in SA and 4-chamber-view orientation for the detection of scar tissue after the application of 0.15 mmol/kg gadolinium-DTPA. RV ejection fraction (RV-EF) of patients with RV involvement (group1) was compared to RV-EF of age matched MI patients without RV involvement (group2).

Results

60 of 440 patients (13.6%) showed a RV involvement (group1) with localized RV wall motion abnormalities. All patients in group 1 demonstrated with a localized right ventricular edema. The anterior RV wall (6 patients) was less often affected than the posterior RV wall (54 patients); $p < 0.01$. In DE imaging 49/60 patients showed an RV involvement, no microvascular obstruction could be detected. RV-EF was significantly lower in group 1 compared to group 2 (42.1 ± 10.5 vs. 51.5 ± 5.5; $p < 0.01$).

Conclusion

RV damage is present in more than 10% of patients after acute MI. It is more frequent in the posterior than in the anterior RV wall and related to a significant impairment of RV function. An edema is always present and could be easily assessed by T2-weighted sequence, whereas DE was not present in all patients after successful acute PTCA. Therefore, MRI can also be used to calculate the myocardial salvage in the RV. The phenomenon of microvascular obstruction probably does not exist at the RV.