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Absence of late gadolinium enhancement does not exclude total coronary occlusion

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Introduction

CMR has potential to differentiate the etiology of heart failure. Late gadolinium enhancement (LGE) can precisely depict myocardial infarction scars. The presence or absence of LGE is sometimes used to confirm or exclude coronary artery disease (CAD). However, in the case of extensive collaterals even severe CAD can be present without infarction scars.

Purpose

We tested the ability of LGE imaging to exclude coronary artery disease by comparing CMR and invasive angiography results.

Methods

We retrospectively searched our clinical database from January 2004 to June 2009 for all patients with total coronary occlusions in coronary angiography and a CMR scan. We identified 1077 patients with total coronary occlusions and a CMR report. 523 were excluded due to non-contrast CMR study or presence of coronary bypass grafts. The remaining 554 patients formed the study group. In all had of them we obtained a contiguous short axis stack of segmented inversion recovery gradient echo images (TR 11 ms, TE 4 ms, slice thickness 10 mm, inversion time set to null viable myocardium) after 0.2 mmol/kg bw gadolinium-DTPA. Left ventricular ejection fraction (LVEF) was calculated based on biplanar long axis SSFP cine loops. We used cross validation and logistic regression analysis to compare patients with and without scar.

Results

Median time between CMR and coronary angiography was 5 days. Median age was 69 years. 85% were male. Body mass index was 28 ± 5 kg/m2. Mean LVEF was 45 ± 14%. 36 patients (7%) had normal wall motion, 138 (25%) had normal LVEF. In 49 of 554 (8.8%) CMR could exclude myocardial scar despite coronary occlusion. All were chronic CAD patients with angiographic evidence of coronary collaterals. There was a trend for higher age and better LVEF in patients without scar. The groups did not differ in sex, BMI or presence of risk factors. Hypertension was prevalent in 31% of the patients. 77% were diabetic, 72% were smokers.

Conclusion

In almost 10% of patients even total coronary occlusion can occur without the formation of moycardial scar. The absence of myocardial scar does not rule out extensive coronary artery disease, even if ejection fraction or wall motion is normal.