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Influence of left ventricular hypertrophy and geometry on diagnostic accuracy of wall motion and perfusion analysis during dobutamine stress magnetic resonance

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Introduction

Despite the consistently high endocardial border visualization achieved with cine MR imaging, visual identification of developing wall motion abnormalities may be challenging in hypertrophied hearts.

Purpose

To examine the influence of left ventricular hypertrophy and geometry on the diagnostic accuracy of wall motion and perfusion analysis during high dose dobutamine stress magnetic resonance (DSMR).

Methods

Combined wall motion (DSMR) and perfusion imaging (DSMRP) was performed in a single session in 156 patients scheduled for invasive coronary angiography. Patients were classified into four categories based on LV mass (normal ≤81 g/m^2 in men, ≤62 g/m^2 in women) and relative wall thickness (RWT, normal <0.45): normal geometry, concentric remodeling, concentric hypertrophy and eccentric hypertrophy. Wall motion and perfusion images were interpreted sequentially, blinded to other data. Significant coronary artery disease (CAD) was defined as ≥70% stenosis.

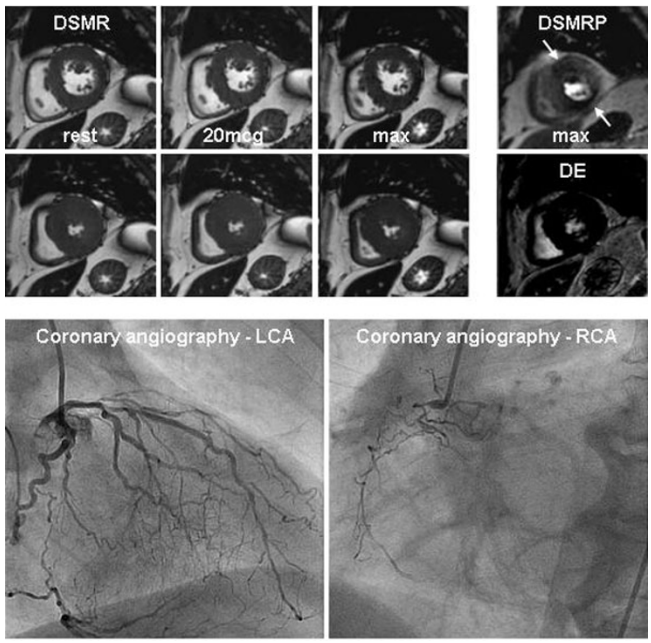

Figure 1

Results

The accuracy of DSMR in patients with concentric hypertrophy (71%) or concentric remodeling (73%) was lower than in patients with normal geometry (83%, $P < 0.05$) or eccentric hypertrophy (90%, $P < 0.05$). While accuracy of DSMRP was higher compared to DSMR in patients with concentric hypertrophy (84% vs. 71%, $P < 0.05$) and concentric remodeling (86% vs. 73%, $P < 0.05$), accuracy of DSMR was superior compared to DSMRP (90% vs. 85%, $P < 0.05$) in patients with eccentric hypertrophy, Figure 1.

Conclusion

The accuracy of DSMR is influenced by LV mass and geometry. In patients with concentric remodeling and concentric hypertrophy additional first-pass perfusion imaging during high dose dobutamine stress improves the diagnostic accuracy for the detection of CAD.