

Late enhancement of the left ventricular myocardium in patients with aortic valve stenosis and left ventricular hypertrophy

T. Schlosser¹, P. Hunold², K. Nassenstein², F. Breuckmann², N. Malyar², and J. Barkhausen²

¹Radiology, University Hospital Essen, Essen, Germany, ²University Hospital Essen

Introduction:

Almost a decade ago myocardial late enhancement has been introduced to characterize myocardial damage in patients suffering from coronary artery diseases. Motivated by the promising results several research groups started investigating the late enhancement technique in non-ischemic cardiac disease. Several studies demonstrated that late gadolinium enhancement reflecting myocardial fibrosis can be detected in hypertrophic cardiomyopathy. However, late enhancement in other diseases associated with left ventricular hypertrophy has not been investigated in larger clinical trials so far.

Purpose:

Our study aimed to investigate the prevalence of myocardial late enhancement in patients with left ventricular hypertrophy caused by aortic stenosis.

Methods:

50 Patients with known aortic valve stenosis were examined with MRI. Patients with a history of myocardial infarction were excluded from the study. In the remaining 31 patients a significant coronary artery disease was ruled out by invasive coronary angiography. In all patients MR imaging was performed on a 1.5 T MR scanner (Magnetom Avanto, Siemens, Erlangen, Germany) using cine SSFP sequences (TrueFISP, TR: 2.9 ms, TE: 1.3 ms, flip angle: 65°) for aortic valve planimetry and the assessment of left ventricular volumes, function and mass. Five contiguous slices (slice thickness: 4 mm) were measured parallel to the aortic valve and manual planimetry was performed on the slice showing the minimum aortic valve area. For the assessment of the left ventricular function and mass 10 to 15 slices (slice thickness: 6 mm, 2 mm gap) were collected. 15 min after injection of 0.2 mmol/kg Gd-DTPA (Schering AG, Berlin, Germany) late enhancement MR imaging was performed using a segmented inversion-recovery gradient-echo sequence (TR: 8 ms; TE: 4.3 ms; flip angle: 25°).

Results:

The mean aortic valve area measured by MRI was 0.85 ± 0.2 cm². The mean left ventricular mass was 128 ± 24 g/m² BSA. In 7 of 31 patients (22 %), late enhancement was detected in the left ventricular myocardium mostly in the midmyocardial basal regions. The enhancement pattern was patchy and mainly found in the anteroseptal, septal, inferoseptal and lateral wall. In one patient, a diffuse, poorly demarcated enhancement was found in the entire left ventricular myocardium.

Conclusion:

In accordance to patients with hypertrophic cardiomyopathy, focal areas of late enhancement can also be observed in about 20% of patients with hypertrophic left ventricles caused by aortic valve stenoses. The areas of late enhancement show a non-ischemic pattern with sparing of the subendocardial region, and are typically located in the basal anterior and anteroseptal segments. Larger studies with long-term follow-up are required to investigate the influence on patients' prognosis.