Role of Dobutamine Stress MRI for Preoperative Cardiac Risk Assessment before Major Vascular Surgery

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Background:
Over the past years, dobutamine stress magnetic resonance (DSMR) has proven its efficacy as an integrated part of the diagnostic armamentarium in cardiology; however, the use of DSMR for preoperative cardiac risk assessment before major vascular cardiac surgery has not evaluated.

Methods:
Twelve consecutive patients (65.6 ± 14.3, range 37 - 85) were referred for DSMR to assess preoperative cardiac risk. Vascular surgical procedures included arterial bypass in the lower extremities (n = 9), abdominal aortic aneurysm repair (n = 2), and carotid endarterectomy (n = 1). Cine images were acquired in 3 short- and 3 long-axis views. Patients were examined at rest and during a standard dobutamine-atropine protocol. The examination was terminated if new or worsening inducible wall-motion abnormalities (IWMA) or chest pain occurred or when > 85% of age-predicted maximum heart rate was reached. Image quality and wall-motion at rest and maximum stress level were evaluated using a four-point scale for the visibility of the endocardial border (score: 1 = barely or not visible; 2 = moderately or partly visible; 3 = well visible; and 4 = excellently visible).

Results:
In 11 patients DSMR was successfully performed and completed in an average of 54 ± 5 minutes. One patient could not be examined because of claustrophobia. No serious side effects were observed during DSMR and the target heart rate had been reached in all patients. Two patients had positive DSMR results but were clinically asymptomatic and had only mild ischemia (IWMA in only one segment) and therefore did not undergo coronary angiography. All 11 patients did not experience any cardiac event (death, myocardial infarction, or congestive heart failure) during surgery or in their postoperative course.
The segmental intra-observer agreement for wall motion assessment was nearly perfect ($\kappa = 0.80$; $p < 0.0001$) and the average image quality was excellent without difference of the rest versus maximal stress cine images (3.8 ± 0.38 vs. 3.7 ± 0.40, p= 0.125; respectively).

Conclusion:
Our initial clinical experience demonstrated the clinical applications and safety of DSMR for predicting cardiac event during or after major vascular surgery.