145

**AORTIC REGURGITATION AFTER COREVALVE
TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI):
ASSESSMENT BY ECHOCARDIOGRAPHY AND
CARDIOVASCULAR MAGNETIC RESONANCE**

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Background Transcatheter Aortic Valve Implantation (TAVI) is increasingly used to treat patients with severe aortic stenosis at high surgical risk. The severity of post-implantation valvular or paravalvular regurgitation has been shown to adversely affect patient outcome. The aim of the study was to assess the prevalence and severity of aortic regurgitation (AR) at 6 months post-TAVI using cardiovascular magnetic resonance (CMR).

Figure 1 Quantification of aortic regurgitation by CMR phase contrast velocity mapping before and 6 months after TAVI implantation.

Figure 2 Comparison of aortic regurgitation grading by CMR and transthoracic echocardiography.

Methods 25 severe aortic stenosis patients underwent a 1.5T CMR (Intera, Philips Healthcare) scan at baseline and 6 months after CoreValve™ TAVI. LV function was assessed using cine imaging with a steady state free precession pulse sequence. The LV outflow tract was imaged in two planes and through-plane phase contrast velocity imaging was performed perpendicular to the aortic valve and transverse to the aorta at the sinotubular junction. Post-processing was performed using QMass 7.2 and QFlow 5.2 (Medis, The Netherlands). AR severity was defined using regurgitant fraction (RF) as: none to mild <8%, mild to moderate 8–19%, moderate to severe 20–29% and severe >30%. Transthoracic echocardiography (iE33, Philips Healthcare) was performed at baseline and 6 months follow-up. Aortic regurgitation was graded using a comprehensive integrated approach following the recent Valve Academic Research Consortium (VARC) guidelines.

Results Mean age was 80.6 ± 6.6 years, 44% were female, Logistic EuroSCORE 19.5 ± 14.9 LV ejection fraction significantly improved post-TAVI ($52.1 \pm 11.8\%$ vs $55.9 \pm 9.6\%$, $p < 0.0001$) and reduction in indexed end-systolic LV volume ($46 \pm 18 \text{ ml/m}^2$ vs $41 \pm 17 \text{ ml/m}^2$, $p = 0.02$). The end-diastolic volume ($95 \pm 18 \text{ ml/m}^2$ vs $91 \pm 20 \text{ ml/m}^2$, $p = \text{ns}$) and stroke volume ($48 \pm 10 \text{ ml/m}^2$ vs $50 \pm 10 \text{ ml/m}^2$, $p = \text{ns}$) did not change. There was a significant reduction in aortic

RF 6 months post-TAVI (median RF 12.4%, IQR 5.6–16.8% vs 6.2% IQR 3.6 to 13.2%, $p = 0.034$) (figure 1). There was no significant difference between the transthoracic echo grading and CMR grading of aortic regurgitation. ($\chi^2 = 3.74$ $p = 0.159$) (figure 2). Echocardiography showed statistically significant reductions in peak forward flow velocity ($4.87 \pm 0.57 \text{ ms}^{-1}$ vs $1.98 \pm 0.35 \text{ ms}^{-1}$ $p < 0.05$), peak pressure gradient ($96.1 \pm 24.3 \text{ mm Hg}$ vs $17 \pm 5.7 \text{ mm Hg}$ $p < 0.05$) and mean pressure gradient ($54.8 \pm 15.9 \text{ mm Hg}$ vs $8 \pm 3 \text{ mm Hg}$ $p < 0.05$) compared to baseline; the effective orifice area (EOA) was significantly larger compared to the baseline state ($0.57 \pm 0.03 \text{ cm}^2$ vs $1.63 \pm 0.3 \text{ cm}^2$ $p < 0.05$).

Conclusions There was an overall reduction in aortic regurgitant fraction post-TAVI even in the presence of pre-existing AR. CMR can be used in the TAVI population, pre- and post-procedure to quantify the degree of aortic regurgitation.

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