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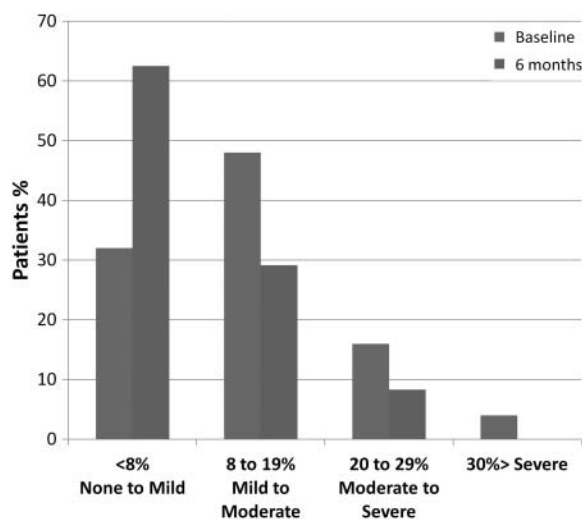
**AORTIC REGURGITATION AFTER COREVALVE  
TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI):  
ASSESSMENT BY ECHOCARDIOGRAPHY AND  
CARDIOVASCULAR MAGNETIC RESONANCE**

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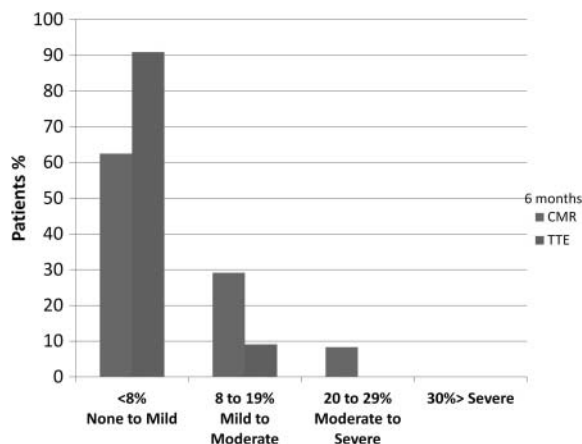
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**Background** Transcatheter Aortic Valve Implantation (TAVI) is increasingly used to treat patients with severe aortic stenosis at high surgical risk. The severity of post-implantation valvular or paravalvular regurgitation has been shown to adversely 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  $80.6 \pm 6.6$  years, 44% were female, Logistic EuroSCORE  $19.5 \pm 14.9$  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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