

POSTER PRESENTATION

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# Quantitative analysis of post-TAVI aortic regurgitation with cardiovascular magnetic resonance and the relationship to transthoracic echocardiography

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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).

## Methods

Twenty five 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, Netherlands). AR severity was defined using regurgitant fraction (RF) as: none to mild <8%, mild to moderate 8 to 19%, moderate to severe 20 to 29% and severe >30% [1].

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±6.6yrs, 44% were female, Logistic EuroSCORE 19.5±14.9 LV ejection fraction significantly improved post-TAVI (52.1±11.8% vs. 55.9±9.6%,  $p < 0.0001$ ) and reduction in indexed end-systolic LV volume (46±18 ml/m<sup>2</sup> vs. 41±17 ml/m<sup>2</sup>,  $p = 0.02$ ). The end-diastolic volume (95±18 ml/m<sup>2</sup> vs. 91±20 ml/m<sup>2</sup>,  $p = ns$ ) and stroke volume (48±10 ml/m<sup>2</sup> vs. 50±10 ml/m<sup>2</sup>,  $p = ns$ ) did not change.

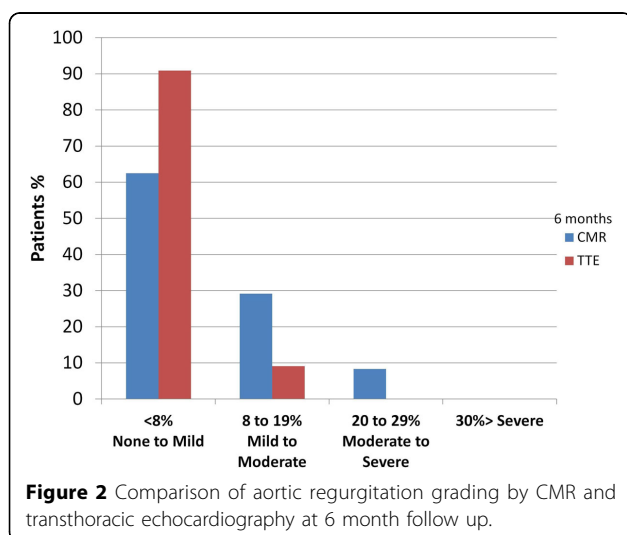
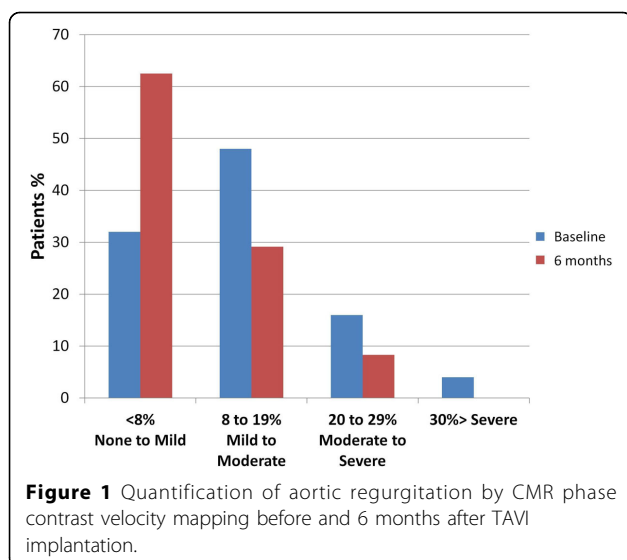
There was a significant reduction in aortic RF 6 months post-TAVI (median RF 12.4%, IQR 5.6 to 16.8% vs. 6.2% IQR 3.6 to 13.2%,  $p = 0.034$ ) (Figure 1). There was no significant difference between the transthoracic echo grading and CMR grading of aortic regurgitation. (Chi-squared = 3.74  $p = 0.159$ ) (Figure 2).

Echocardiography showed there was also a statistically significant reductions in peak forward flow velocity (4.87 ±0.57 ms<sup>-1</sup> vs. 1.98±0.35 ms<sup>-1</sup>  $p < 0.05$ ), peak pressure gradient (96.1±24.3 mmHg vs. 17±5.7 mmHg  $p < 0.05$ ) and mean pressure gradient (54.8±15.9 mmHg vs. 8±3 mmHg  $p < 0.05$ ) compared to baseline; the effective orifice area (EOA) was significantly larger compared to the baseline state (0.57±0.03 cm<sup>2</sup> vs. 1.63±0.3cm<sup>2</sup>  $p < 0.05$ ).

## 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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