

Poster presentation

Diagnostic value of cardiac magnetic resonance (cmr) before and after pulmonary transcatheter valve implantation: preliminary results

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Introduction

CMR can be used for a comprehensive noninvasive assessment of cardiac performance after pulmonary transcatheter valve implantation. A non-invasive evaluation of the valve is fundamental in young patients

Purpose

To evaluate the diagnostic value of CMR before and after pulmonary transcatheter valve (Melody, Medtronic) implantation.

Methods

After IRB approval and informed consent, patients with pulmonary valve disease were prospectively scheduled for 1.5-T CMR before and after transcatheter valve implantation. We used a cine true-FISP sequence (TR/TE = 45/1.5 ms, thickness 7 mm) for evaluating the right ventricle (RV) function and a turbo-FLASH phase-velocity mapping sequence (41/3.2 ms, 5 mm, respectively; velocity encoding 250 ms) for pulmonary flow evaluation. Pressure gradient (ΔP) was estimated from peak flow velocity using Bernoulli's equation. McNemar and Wilcoxon tests were used.

Results

From January 2008 to March 2009, we enrolled 12 patients, all of them studied within one week before valve implantation and 1 month after. All CMR examinations were diagnostic, with metallic artifacts limited to the

space internal to the valve and not impairing the flow evaluation before/after the valve. Before valve implantation, a pulmonary regurgitant fraction was observed in 7/12 with a mean ΔP of 40 ± 11 mmHg; after valve implantation, no patients had regurgitant fraction ($P = .016$) and mean ΔP was 18 ± 12 mmHg ($P = .003$). End-diastolic volume index (EDVI), end-systolic volume index (ESVI), and ejection fraction (EF) of right ventricle (RV) before valve implantation were 71 ± 20 mL/m², 34 ± 16 mL/m², and $53 \pm 9\%$, the same data after valve implantation being 64

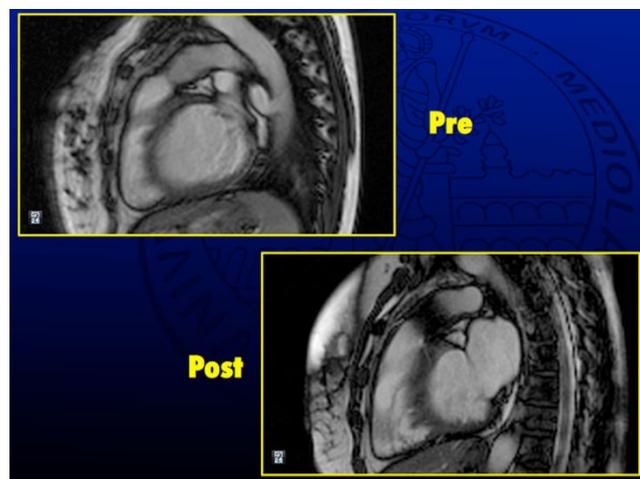


Figure 1

$\pm 16 \text{ mL/m}^2$ ($P = .065$), $28 \pm 10 \text{ mL/m}^2$ ($P = .027$), and $57 \pm 11\%$ ($P = .100$), respectively. EDVI, ESVI, and EF of left ventricle before valve implantation were $68 \pm 15 \text{ mL/m}^2$, $30 \pm 6 \text{ mL/m}^2$, and $55 \pm 7\%$, respectively, the same data after valve implantation being $68 \pm 18 \text{ mL/m}^2$ ($P = .533$), $29 \pm 7 \text{ mL/m}^2$ ($P = .057$), and $57 \pm 9\%$ ($P = .432$) Figure 1.

Conclusion

CMR evaluation of patients after Melody™ implantation is not impaired by metal artifacts outside the valve. One month after implantation, we observed a complete nulling of regurgitant fraction and a significant decrease of ΔP and of ESVI of RV; the other RV parameters showed a trend in favor of a positive implant effect. No significant change was observed for the left ventricle (with a borderline significance for a slightly reduced ESVI).

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