

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 ( $\Delta P$ ) 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  $\Delta P$  of  $40 \pm 11$  mmHg; after valve implantation, no patients had regurgitant fraction ( $P = .016$ ) and mean  $\Delta P$  was  $18 \pm 12$  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  $71 \pm 20$  mL/m<sup>2</sup>,  $34 \pm 16$  mL/m<sup>2</sup>, and  $53 \pm 9\%$ , the same data after valve implantation being 64

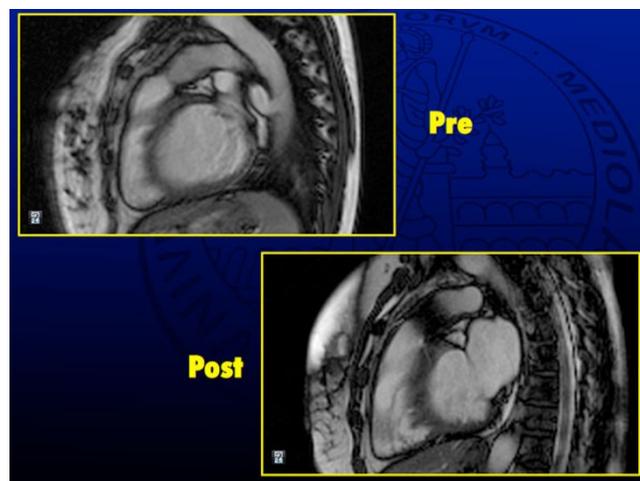


Figure 1

$\pm 16 \text{ mL/m}^2$  ( $P = .065$ ),  $28 \pm 10 \text{ mL/m}^2$  ( $P = .027$ ), 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  $\Delta P$  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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