

Poster presentation

## Pulmonary vein and left atrial changes during the cardiac cycle, pre and post pulmonary vein isolation

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from 13th Annual SCMR Scientific Sessions  
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

*Journal of Cardiovascular Magnetic Resonance* 2010, **12**(Suppl 1):P142 doi:10.1186/1532-429X-12-S1-P142This abstract is available from: <http://jcmr-online.com/content/12/S1/P142>

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### Introduction

High resolution late gadolinium enhancement (LGE) of the left atrium (LA) and pulmonary veins (PV) performed after PV isolation (PVI) demonstrates the ablation pattern, but would benefit from imaging during the period of least motion. LA area changes during the cardiac cycle have been studied in normal subjects [1]. The PV ostial size variations throughout the cardiac cycle have also been measured in pre-PVI patients [2].

### Purpose

To improve high resolution imaging, by finding the period of minimal motion of the PVs and LA in patients with atrial fibrillation (AF) before and after PVI.

### Methods

Five patients were studied in sinus rhythm prior to and about 30 days after PVI. A 2-chamber cine scan containing the LA and 8 sagittally-oriented slices were acquired around the left and right PV ostia. Scan parameters were:  $2 \times 2 \times 8$  mm, 30 cardiac phases,  $TR/\theta = 4.1$  ms/ $60^\circ$  retrospective ecg-gating with balanced SSFP. ROIs were traced around the PV ostia of the right inferior, right superior, left inferior and left superior PVs (RIPV, RSPV, LIPV, LSPV), and the LA chamber. The area was measured, and recorded in 15 equally spaced phases throughout the RR.

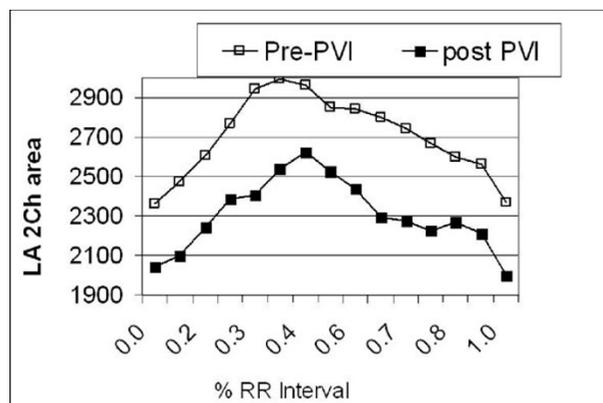
### Results

Figure 1 demonstrates the LA 2-chamber size pre- and post-PVI. The diastolic rest periods extended from 65% to 85% of the cardiac cycle, both pre- and post-PVI. Figure 2

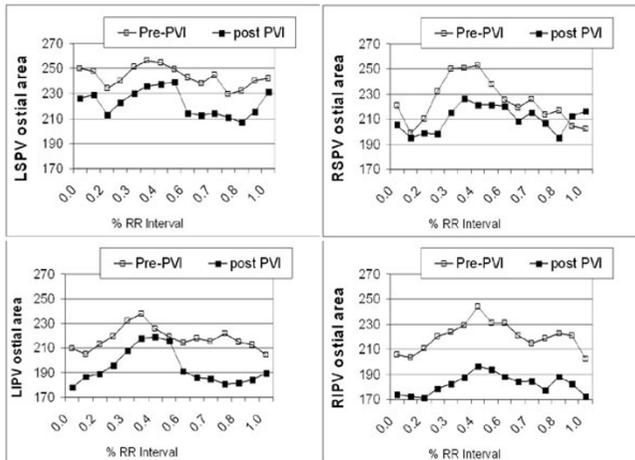
demonstrates the PV ostial sizes vs. cardiac cycle. The PV ostial sizes are largest in end-systole, and there is a diastolic period of minimal motion, beginning at about 65% to 85% of the cardiac cycle, both pre and post PVI. The LSPV ostial area changed the least during the cardiac cycle. The RIPV ostia exhibited greater change during the atrial kick, of all PVs.

### Conclusion and discussion

A period of minimal motion for the LA and PVs exists from 65 to 85% of the RR interval, as previously reported (1). This study is limited by the challenge of reproducibly choosing the optimal slice at the ostia of the PV.



**Figure 1**  
Left atrial are (mm<sup>2</sup>) changes during the RR interval.



**Figure 2**  
Average PV ostial size changes (mm<sup>2</sup>) the RR interval pre and post pulmonary vein isolation.

**References**

1. Hauser TH, et al.: *Amer Heart J* 2006, **152**:974.e1.
2. Patel AR, et al.: *Heart Rhythm* 2008, **5**:787.

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