

POSTER PRESENTATION

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# Cine-CMR quantified left atrial diameter - a simple index of left atrial remodeling that closely parallels chamber area and stratifies longitudinal atrial arrhythmic risk

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## Background

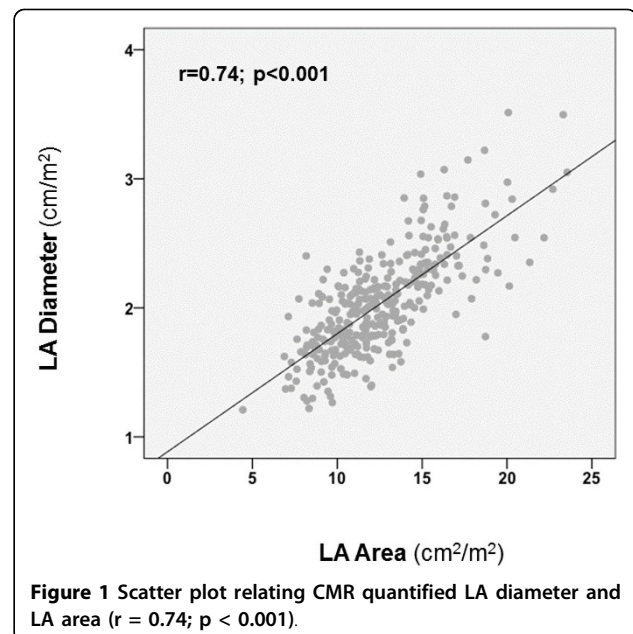
Cine cardiac magnetic resonance (cine-CMR) provides excellent endocardial delineation, enabling accurate quantification of left atrial (LA) chamber size. Relative utility of cine-CMR linear dimensions and area-based indices for prediction of LA-associated arrhythmias is unknown.

## Methods

The study comprised patients with coronary artery disease (CAD) included in a multimodality registry. Cine-CMR (1.5T) was performed using a standard 2-dimensional steady state free precession (SSFP) pulse sequence (typical TR 3.5 msec, TE 1.6 msec, flip angle 60°, temporal resolution 30-50 msec). Cine-CMR evidenced mitral regurgitation (MR) severity was graded in accordance with established conventions based on size of MR associated inter-voxel dephasing of the regurgitant jet. LA size was measured on cine-CMR at atrial end-diastole using two established methods: [1] linear diameter (measured in 3-chamber long axis orientation), [2] area (planimetered in 4-chamber long axis orientation), with both indices indexed to body surface area. Clinical follow-up was performed via medical record review, with atrial fibrillation (AF) or flutter (AFL) verified based on physician documentation.

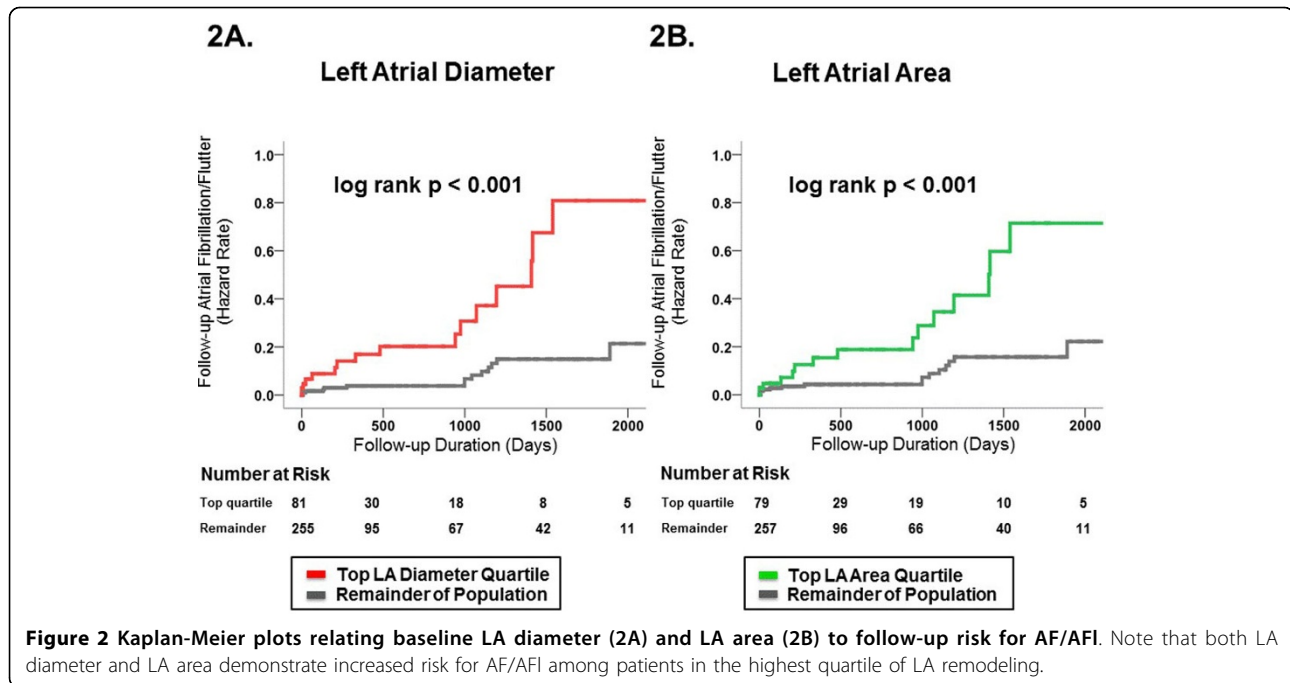
## Results

336 patients with CAD were studied (60 ± 12 yo, 79% M, 34% DM, 58% HTN); LA diameter (mean 2 ± 0.4 cm/m<sup>2</sup>) and area (12 ± 3 cm<sup>2</sup>/m<sup>2</sup>) yielded similar prevalence of chamber dilation (20% vs. 21%, p = 0.76) assigned using established cine-CMR population-based cutoffs. LA indices correlated highly (r = 0.74, p < 0.001; Figure 1), with similar magnitude of correlation among subgroups at risk for LA remodeling, such as patients



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with HTN ( $r = 0.74$ ,  $p < 0.001$ ) and DM ( $r = 0.77$ ,  $p < 0.001$ ). Severe MR was 9-fold more common among patients in the top quartile of LA diameter compared to the remainder of the population (19% vs. 2%,  $p < 0.001$ ), with similar results when prevalence of severe MR was compared among patients stratified by LA area (17% vs. 3%,  $p < 0.001$ ). Clinical follow-up (minimum 60 days) was available in 46% of the study population ( $n = 168$ ). During mean follow-up of  $1.5 \pm 1.9$  years, 31 patients (18%) developed AF/AFL: Cine-CMR quantified LA dimensions stratified arrhythmic risk, with a 5-fold increase in relative risk for AF/Fl among patients in the highest LA diameter quartile (HR 5.1, CI 1.5 - 17.1,  $p < 0.05$ ), and a 3-fold increase for those in the highest quartile of LA area (HR 3.4, CI 1.1 to 10.6,  $p < 0.05$ ) compared to the remainder of the population (Figure 2).

## Conclusions

Cine-CMR quantified LA diameter provides a simple measure of atrial remodeling that correlates well with LA area, yielding similar predictive value for stratifying MR as well as longitudinal risk for atrial arrhythmias.

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