

# LEFT ATRIAL VOLUME AND THE BENEFIT OF CARDIAC RESYNCHRONIZATION THERAPY IN MADIT-CRT

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# Conflict of Interests

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# Background

- Left atrial volume (LAV) is a reliable predictor of cardiovascular outcomes in heart failure and following myocardial infarction
- During diastole the LA is exposed to LV pressures, thus LAV often reflects the cumulative effects of filling pressure over time and provides a more sensitive expression of the severity of diastolic dysfunction than the LV
- CRT-D has emerged as an important therapeutic modality for patients with HF
- The clinical benefits of CRT are related to the reverse remodeling effects of the device on the LV and improvement in systolic and in diastolic function
- **However the role of LAV as an independent predictor of clinical outcome has not been established**



# Study Objectives and Methods

- To evaluate the impact of baseline LAV on the risk of HF and death in mildly symptomatic HF. To evaluate the relation between LAV and the clinical benefits of CRT-D . To evaluate the association between the reverse remodeling effects of CRT-D on LAV and subsequent clinical outcomes

## Study population:

- 1820 pts, ICM/NICM, NYHA class I/II, QRS  $\geq$  130 msec
- Echos were obtained at baseline for 1783 (98%) pts .Paired echos from baseline and after 12 months were available for 1372 pts
- LA and LV volumes were analyzed by an independent core lab blinded to treatment assignment or clinical outcome

## Primary Endpoints

- Time to the occurrence of heart failure, hospitalization or death whichever occurred first, All cause mortality
- Landmark analysis was utilized in order to assess the risk of CHF or death in the CRT-D group subsequent to the 1 year echo by LAV change at one year (both as continuous measure and categorized into approximate quartiles)

# Baseline Clinical Characteristics

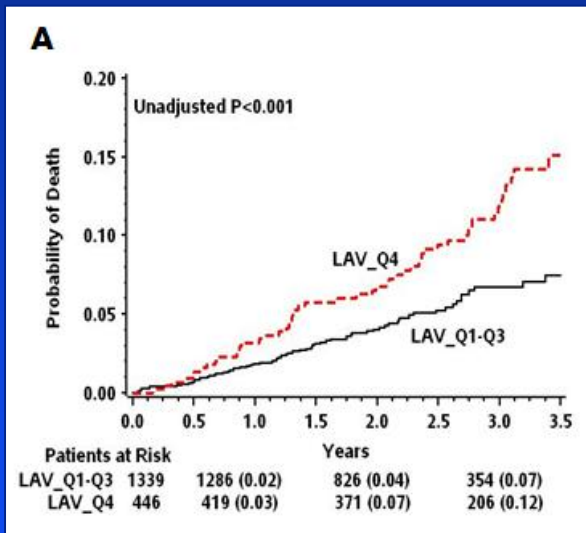
	LAVi Q1-Q3( $\leq 52\text{ml/m}^2$ ) (n=1339)	LAVi Q4( $>52\text{ml/m}^2$ ) (n=446)	p
LAVi ( $\text{ml/m}^2$ )	42 $\pm$ 6	60 $\pm$ 7	
Age(years)	64 $\pm$ 11	65 $\pm$ 11	0.52
Ischemic NYHA CLASS I	15	14	0.70
Ischemic NYHA CLASS II	40	42	0.48
Diabetes Mellitus	31	29	0.65
Hypertension	65	60	0.05
Prior atrial arrhythmias	10	16	<0.001
Prior Ventricular arrhythmias	7	9	0.07
SBP( mmHg)	123 $\pm$ 17	120 $\pm$ 18	0.001
QRS (ms)	157 $\pm$ 19	162 $\pm$ 22	<0.001
CLBBB	69	74	0.05
LVEDVi ( $\text{ml/m}^2$ )	116 $\pm$ 21	145 $\pm$ 36	<0.001
LVESVi ( $\text{ml/m}^2$ )	89 $\pm$ 16	107 $\pm$ 29	<0.001
LVEF %	30 $\pm$ 3	27 $\pm$ 3	<0.001

Data are presented as percentage or mean  $\pm$  standard deviation

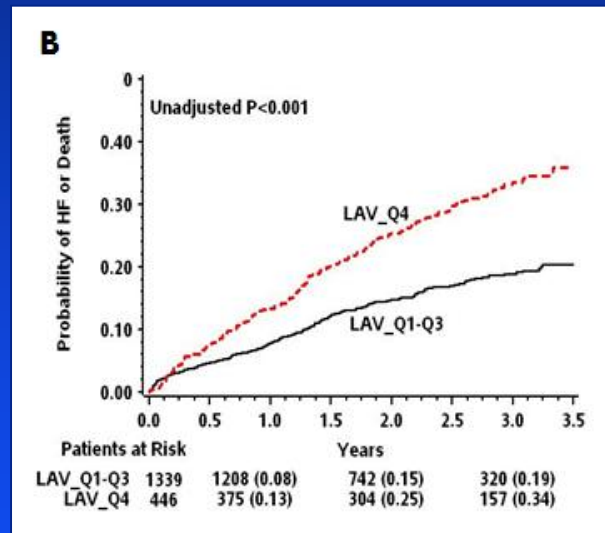


# Results

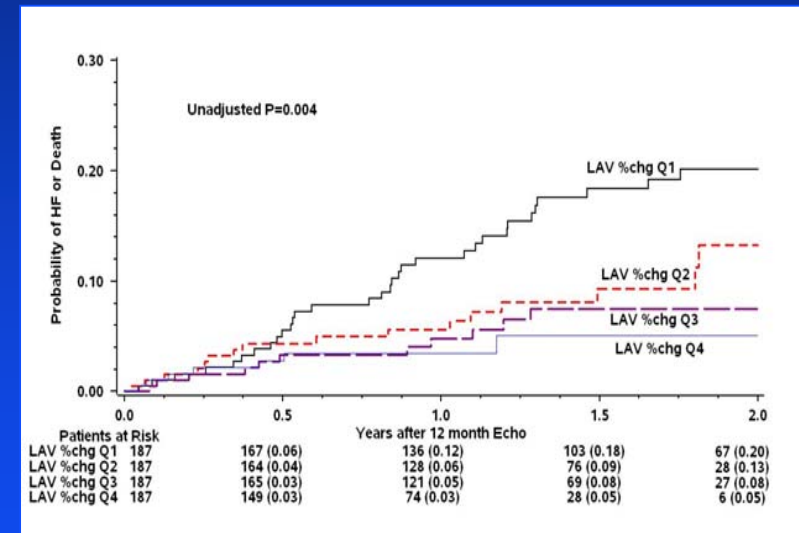
## Cumulative Probability of Death by LAVi



## Cumulative Probability of Heart Failure or Death by LAVi



## Cumulative Probability of HF or Death following the 12 months Echo in the CRT-D group by LAV response, Divided in Quartiles



Every 1ml ↑ in LAVi is associated with 3% ↑ in the risk of HF or death and with a 2% ↑ in the risk of death

Every 1% ↓ in LAVi is associated with a 4% ↓ in the risk of HF or death



# Conclusions

- LAV is an independent predictor of prognosis in patients mild heart failure treated with CRT-D
- CRT exerts pronounced reverse remodeling effects on the LA, which may provide improved assessment of the clinical response to CRT
- These findings suggest that baseline and follow up measures of LA should be routinely employed in patients who undergo CRT-D implantation