



# The Prognostic Value of Myocardial Fibrosis in Non-ischemic Cardiomyopathy Patients Without Left Ventricular Dilatation

---

Pier Giorgio Masci, MD\*; Alberico Del Torto, MD#; Andrea Barison, MD, PhD\*;  
Giovanni Donato Aquaro, MD\*; Sara Chiappino, MD\*; Giuseppe Vergaro,  
MD\*; Claudio Passino; MD#; Michele Emdin, MD, PhD\*

---

\*Fondazione CNR/Regione Toscana 'G. Monasterio' – Pisa (Italy)  
#Scuola Superiore Sant' Anna – Pisa (Italy)

**EuroCMR @ Wien**  
**15-18 May 2014**

---

# Fibrosis in NonIschemic Cardiomyopathy

---

## - Background & Aims -

### Background

1. Non-ischemic dilated cardiomyopathy (**NIDCM**) is defined as dilated left ventricle with concomitant systolic dysfunction (**SD**) in the absence of an ischemic cause.
2. A certain proportion of non-ischemic cardiomyopathy patients shows LV-SD without dilatation.

### Aims

We sought to determine the prevalence, clinical characteristics and prognostic determinants in patients with only LV-SD (iLV-SD)

### Study

Prospective Longitudinal Study / Composite End-Point: CV death, HF admission, worsening of NYHA class, and aborted SCD (median 23 months, 25<sup>th</sup>-75<sup>th</sup>:11-39 months)

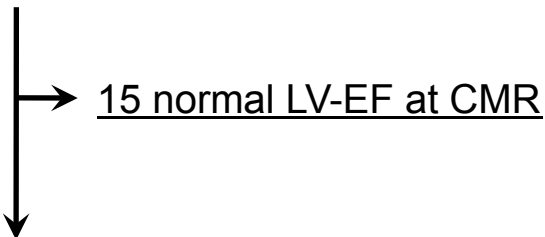
---

# Fibrosis in NonIschemic Cardiomyopathy

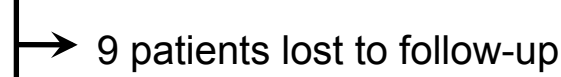
---

## - Methods & Results -

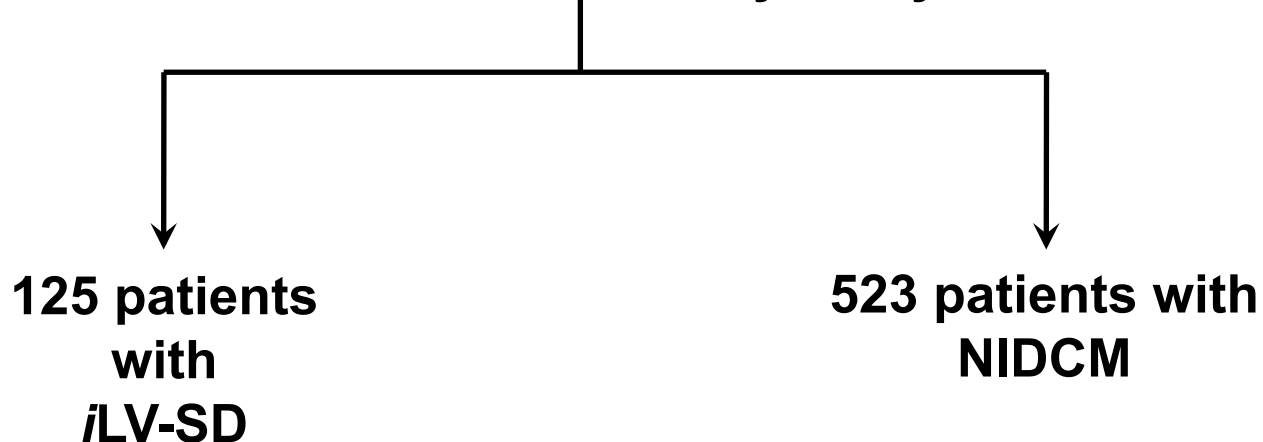
672 patients with NICM evaluated  
with CMR



657 met the Inclusion Criteria



648 Included in the Study Analyses



# Fibrosis in NonIschemic Cardiomyopathy

## - Methods & Results -

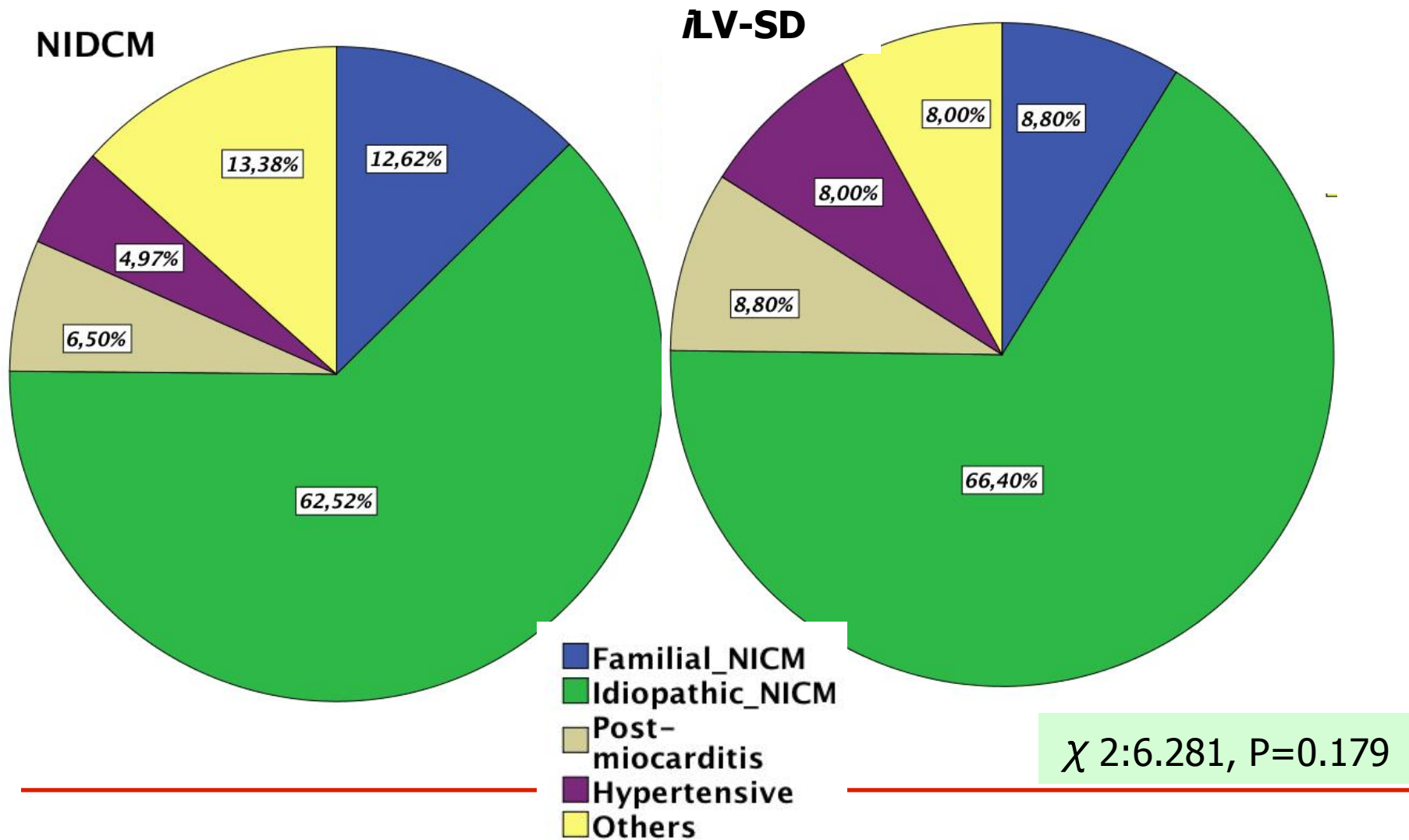
Table 1 Baseline characteristics.

	Overall study population (n=648)	iLVSD (n=125)	NIDCM (n=523)	P-value <sup>a</sup>
Age (years)	55±15	51±16	56±14	<b>0.003</b>
Male Gender n, (%)	463 (71)	88 (70)	375 (72)	0.772
BMI (kg/m <sup>3</sup> )	26±6	26±4	26±7	0.902
Disease duration (months)	7 (1-53)	4 (1-29)	9 (2-60)	<b>0.032</b>
Hypertension	237 (37)	47 (38)	190 (36)	0.755
Diabetes mellitus	74 (11)	11 (9)	63 (12)	0.305
Dyslipidaemia	194 (30)	38 (30)	156 (30)	0.910
Smoking habit	265 (41)	48 (38)	217 (42)	0.517
History of CHF	196 (30)	30(24)	166 (32)	<b>0.028</b>
NYHA class				<b>0.013</b>
I-II	537 (83)	113 (90)	424 (81)	
III-IV	111 (17)	12 (10)	99 (19)	
Creatinine (ml/dL)	1.03±0.36	0.95±0.24	1.04±0.38	<b>0.049</b>
Hemoglobin (g/L)	13.9±1.6	14.0±1.5	13.9±1.6	0.713
Atrial fibrillation	71 (11)	15 (13)	56 (11)	0.720
LBBS	194 (30)	19 (15)	175 (34)	<b>&lt;0.001</b>

	Overall study population (n=648)	iLVSD (n=125)	NIDCM (n=523)	P-value <sup>a</sup>
<i>CMR data</i>				
LV-EDVi (mL/m <sup>2</sup> )	128±43	83±12	139±41	<b>&lt;0.001</b>
LV-ESVi (mL/m <sup>3</sup> )	86±44	45±9	95±43	<b>&lt;0.001</b>
LV-Mi (g/m <sup>3</sup> )	86±26	72±18	90±26	<b>&lt;0.001</b>
LV-SVi (mL/m <sup>3</sup> )	43±12	38±9	44±12	<b>&lt;0.001</b>
LV-EF (%)	35±12	45±8	33±12	<b>&lt;0.001</b>
LV-EF ≤35%	320 (49)	15 (12)	305 (58)	<b>&lt;0.001</b>
Cardiac Index (mL/min/m <sup>2</sup> )	2856±710	2711±595	2919±747	<b>0.010</b>
LGE	254 (39)	39 (31)	215 (41)	<b>0.041</b>
LGE number of segments		3 (2-5)	3 (2-5)	0.188

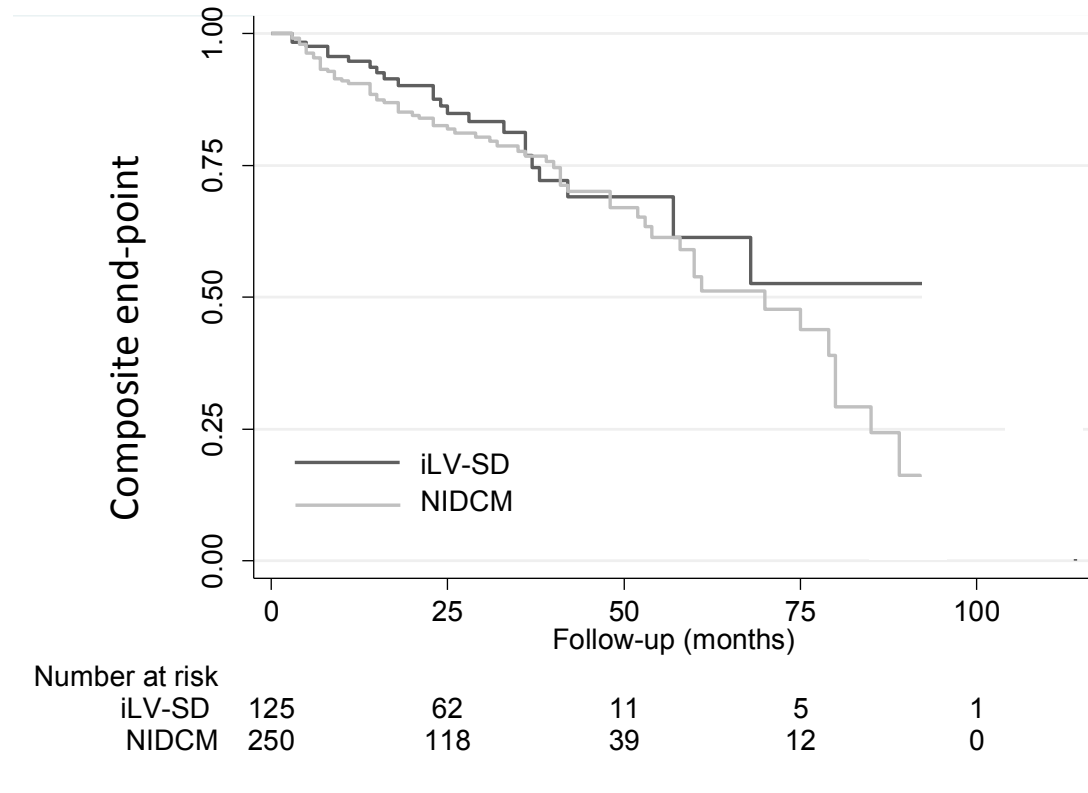
# Fibrosis in NonIschemic Cardiomyopathy

## - Methods & Results -



# Fibrosis in NonIschemic Cardiomyopathy

## - Methods & Results -



Frequency of events occurred among patients with LV systolic dysfunction only (iLVSD) and NIDCM control patients.

Endpoint	iLV-SD (n=125)	NIDCM (n=250)	P-value	HR (95% CI)
Primary EP	24 (19)	66 (26)	0.291	1.293 (0.803-2.083)
CV death/ transplantation	4 (3)	7 (3)	0.729	0.804 (0.234-2.761)
HF admission	8 (6)	19 (8)	0.749	1.145 (0.501-2.617)
Aborted SCD	1 (1)	9 (4)	0.188	4.017 (0.507-31.837)
Progression of NYHA	11 (9)	31 (12)	0.434	1.332 (0.650-2.730)

# Fibrosis in NonIschemic Cardiomyopathy

## Univariate Cox regression models in iLV-SD (n=125)

Variable	P-value	Unadjusted HR (95% CI)
Age	0.027	1.033 (1.004 - 1.063)
Gender	0.411	1.424 (0.613 - 3.311)
BMI	0.893	0.994 (0.904 - 1.092)
Familiarity	0.992	1.007 (0.296 - 3.423)
Hypertension	0.637	0.813 (0.344 - 1.919)
Diabetes	0.486	1.541 (0.457 - 5.203)
Dyslipidemia	0.320	1.524 (0.665 - 3.493)
Smoking	0.472	0.728 (0.305 - 1.731)
Alcohol abuse	0.638	1.621 (0.217 - 12.109)
Idiopathic vs other etiologies	0.465	1.451 (0.535 - 3.936)
CM duration	0.378	1.003 (0.996 - 1.011)
NYHA class (3/4 vs 1/2)	0.425	1.820 (0.418 - 7.923)
Previous Heart Failure	0.727	1.172 (0.482 - 2.852)
Creatinine (ml/dL)	0.291	2.919 (0.399 - 21.358)
Hemoglobin (g/L)	0.085	1.409 (0.954 - 2.082)
Atrial Fibrillation	0.538	1.371 (0.502 - 3.745)
LBBB	0.701	0.751 (0.174 - 3.242)
LGE presence	0.008	3.122 (1.341 - 7.268)
LV_EDVI (ml/m <sup>2</sup> )	0.190	0.978 (0.945 - 1.011)
LV_ESVI (ml/m <sup>2</sup> )	0.420	1.020 (0.972 - 1.071)
LV_MI (g/m <sup>2</sup> )	0.763	1.003 (0.980 - 1.028)
LV_SVI (ml/m <sup>2</sup> )	0.012	0.940 (0.896 - 0.986)
LV_EF (%)	0.060	0.954 (0.909 - 1.002)
cardiac_index (L/min/m <sup>2</sup> )	0.005	0.999 (0.998 - 1.000)

# Fibrosis in NonIschemic Cardiomyopathy

## - Methods & Results -

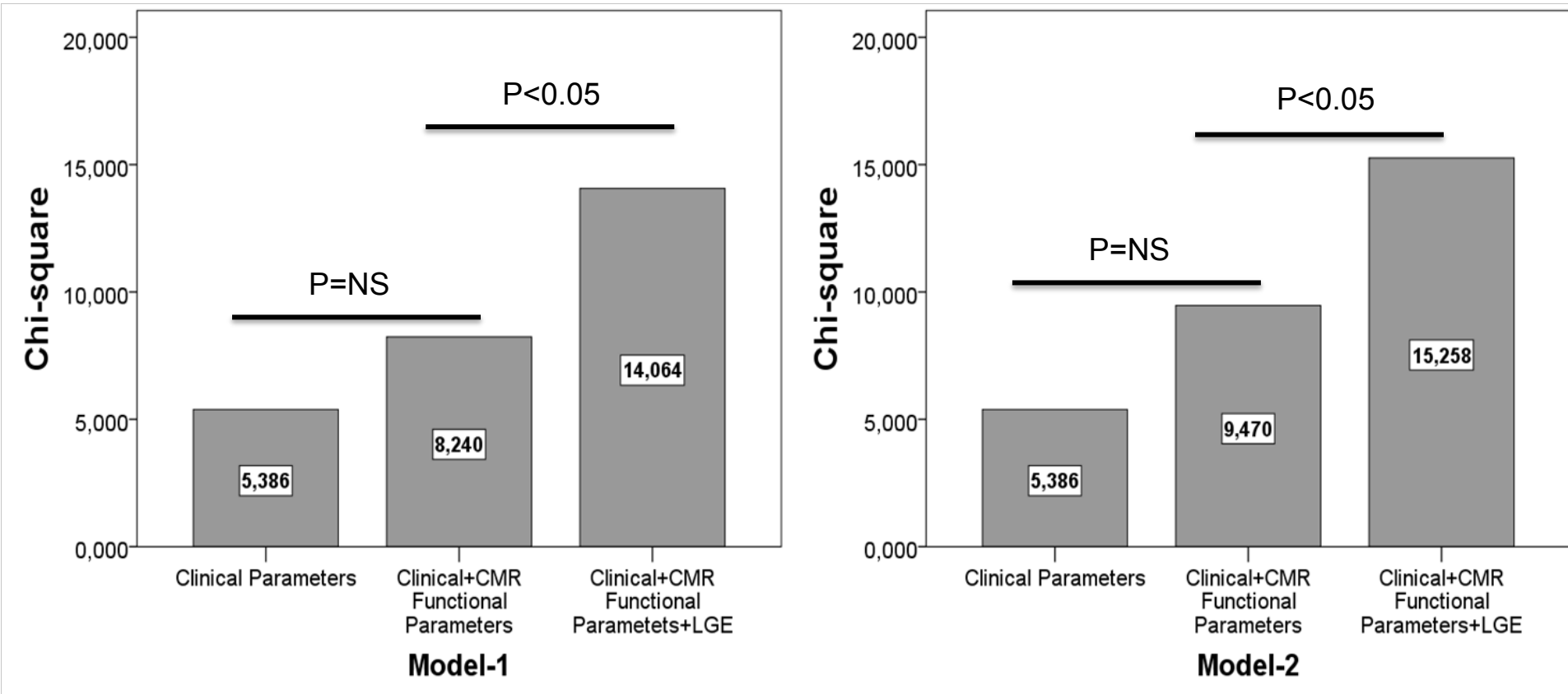
### Multivariate Cox Regression Analysis

Variables	Model-1		Model-2	
	HR (95% CI)	P-Value	HR (95% CI)	P-Value
Age (years)	1.017 (0.986-1.049)	0.284	1.014 (0.984-1.045)	0.369
LV ejection-fraction	1.005 (0.920-1.097)	0.918	0.999 (0.934-1.067)	0.965
LV stroke-volume index	0.946 (0.863-1.038)	0.946	NA	NA
LV cardiac index	NA	NA	0.999 (0.998-1.000)	0.092
Presence of LGE	2.809 (1.196-6.597)	0.018	2.868 (1.218-6.750)	0.016



# Fibrosis in NonIschemic Cardiomyopathy

## - Methods & Results -



# Fibrosis in NonIschemic Cardiomyopathy

---

## - Conclusions -

1. Subjects with  $\lambda$ LV-SD represent a non-negligible proportion of non-ischemic CM (19%) and show a more favorable clinical & CMR profile than NIDCM patients.  
No differences in the cause of cardiomyopathy were found between  $\lambda$ LV-SD and NIDCM
  2. When compared to an age- and LV-EF matched group of patients with NIDCM, patients with  $\lambda$ LV-SD show comparable prognosis with respect to the composite end-point (CV death, HF admission, worsening of NYHA class, and aborted SCD)
  3. Presence of LGE is a strong and independent prognostic predictor in  $\lambda$ LV-SD patients.
-