



האיגוד הישראלי לכירורגית לב וחזה  
THE ISRAEL SOCIETY OF CARDIOTHORACIC SURGERY

האיגוד הקרדיולוגי בישראל  
ISRAEL HEART SOCIETY



The 60<sup>th</sup> International Conference of the Israel Heart Society  
in association with the Israel Society of Cardiothoracic Surgery

22-23 April 2013, ICC International Convention Center, Jerusalem

# Outcome of Patients with Advanced Heart Failure who Receive Device-Based Therapy for Primary Prevention of Sudden Cardiac Death

M. Suleiman, G. Amit, N. Samniah, A. Pekar, S. Ben-Zvi, R. Rosso, N. Gavrielov-Yusim, I. Marai, I. Goldenberg, M. Glikson

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# Background

- Approximately 50% of deaths among patients with HF are sudden.
  - The percentage of SCD decreases as NYHA class increases
  - It is widely believed that patients with more advanced HF symptoms are less likely to die suddenly and therefore would not benefit from ICD implantation
  - Results of landmark ICD trials were inconsistent
- Sweeney MO. Pacing Clin Electrophysiol 2001;24:871-88.  
Kjekshus J. Am J Cardiol 1990;65:421-481.



# Purpose

To examine the effect of HF functional class on the outcome of patients who receive device therapy in a real world setting.



# Methods

- **Israeli ICD Registry Database**
- **Period: Jul 2010-June 2012**
- **2108 primary prevention patients**
- **Study end points**
  - **Death**
  - **Appropriate ICD therapies for VA**
  - **Readmission to hospital for HF**
  - **The combined endpoints of HF or death and VA or death**



# Baseline Characteristics

Variable	NYHA class		p
	I+II (n=1185, 56%)	III+IV (n=923, 44%)	
Age, mean $\pm$ SD	64 $\pm$ 12	66 $\pm$ 11	<0.001
Female gender (%)	14	21	<0.001
Ethnicity (%)			0.87
Jews	56	44	
Arabs	56	44	
<b>Medical History</b>			
Old MI (%)	68	63	0.28
CABG (%)	30	34	0.002
PCI (%)	58	55	0.86
Dilated CM (%)	21	30	<0.001



# Baseline Characteristics

Variable	NYHA class		p
	I+II (n=1185, 56%)	III+IV (n=923, 44%)	
Atrial fibrillation, %	16	28	<0.001
Cerebrovascular disease	7	10	0.02
Diabetes, %	33	47	<0.001
Hypertension, %	63	65	0.20
Dyslipidemia, %	52	61	<0.001
Ch lung disease, %	8	16	<0.001
Chronic kidney disease (GFR<60), %	28	47	<0.001
Currently on dialysis, %	2	5	0.006
Smoker, %	33	29	0.02
Glaucoma, %	5	12	<0.001



# Baseline Characteristics

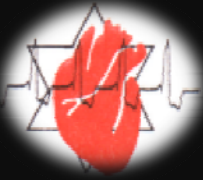
Variable	NYHA class		p
	I+II (n=1185, 56%)	III+IV (n=923, 44%)	
<b>Meds on admission, %</b>			
Beta Blockers	80	87	<0.001
ACE- inhibitors/ARB ant	75	80	0.006
Diuretics	64	90	<0.001
Oral anticoagulants	12	15	0.02
Anti-arrhythmic drugs	9	14	<0.001
Amiodaron	5	10	0.01



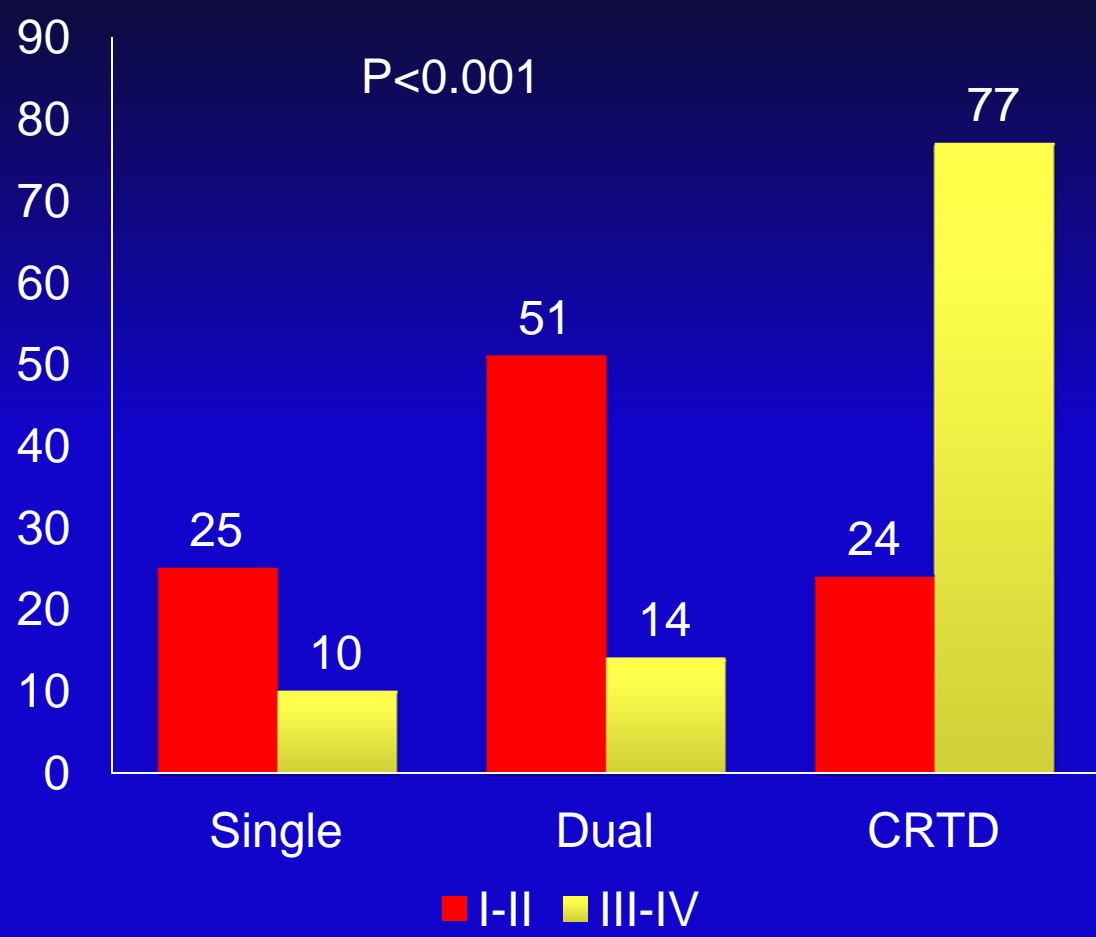
# Baseline Characteristics

Variable	NYHA class		p
	I+II (n=1185, 56%)	III+IV (n=923, 44%)	
<b>Diagnostic studies</b>			
LVEF, mean (%)	29±11	25 ± 10	<0.001
LVEF<30%	609 (52%)	680 (74%)	<0.001
QRS dur, mean (ms)	110± 26	136± 30	<0.001
QRS>120 ms	313 (27%)	572 (62%)	<0.001
Electrophysiologic study	273 (23%)	108 (12%)	<0.001





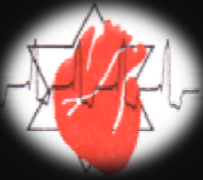
# Device implanted



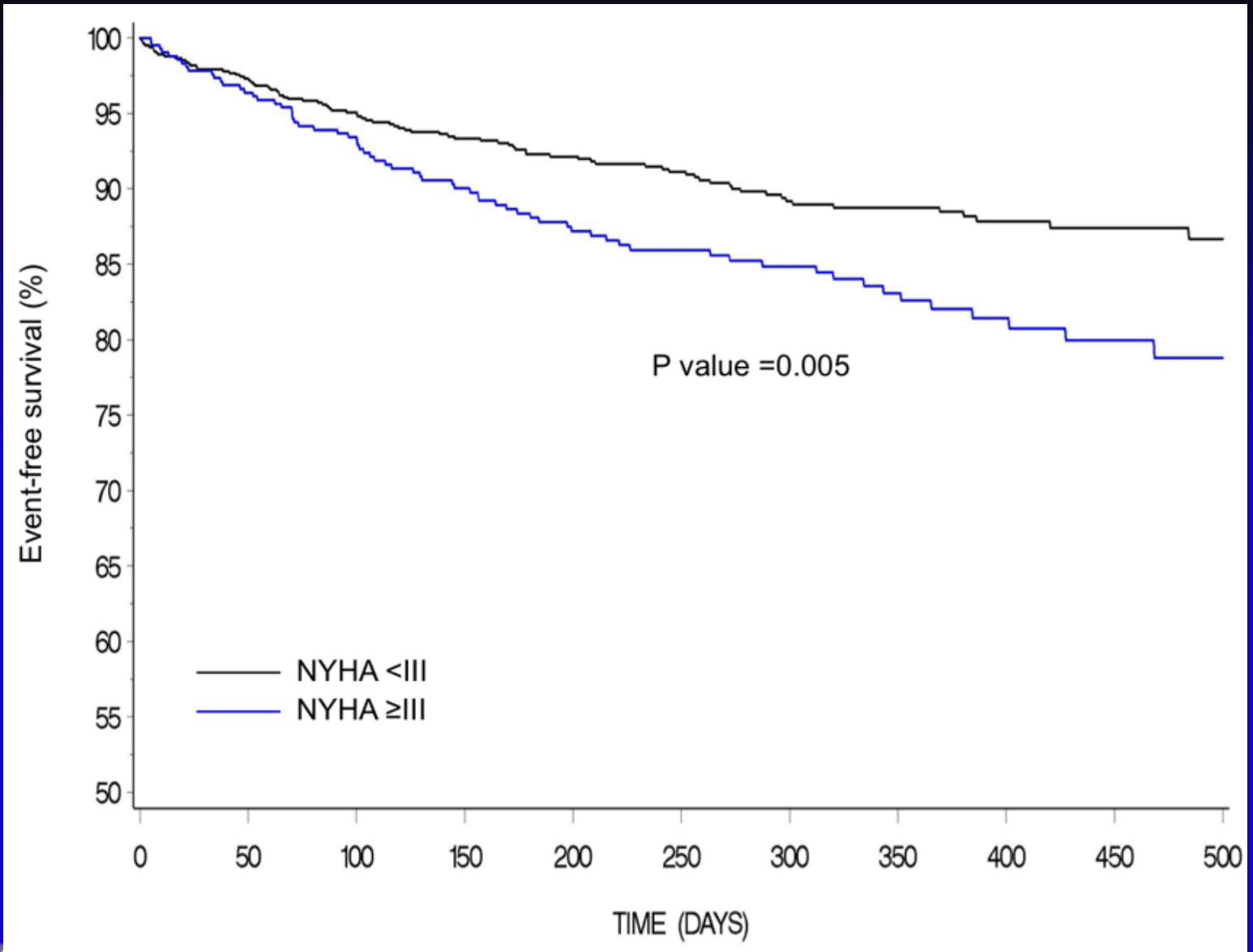


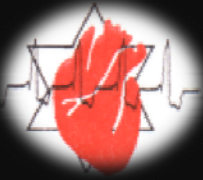
# Outcomes

- 1016 unselected registry patients were prospectively followed for the occurrence of clinical outcomes.



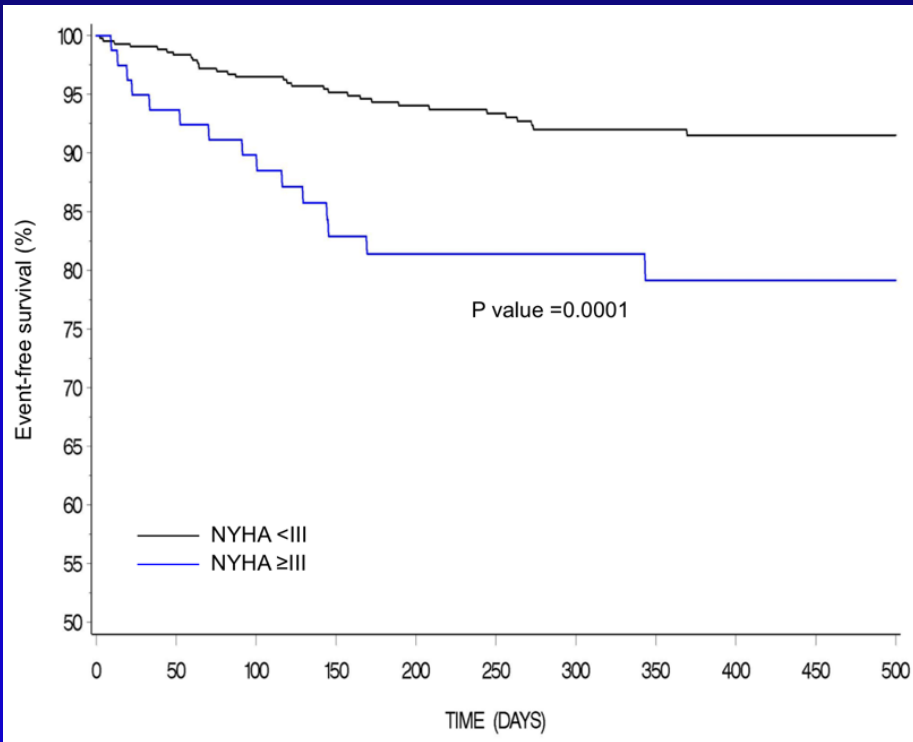
# Death or HF in the General Population



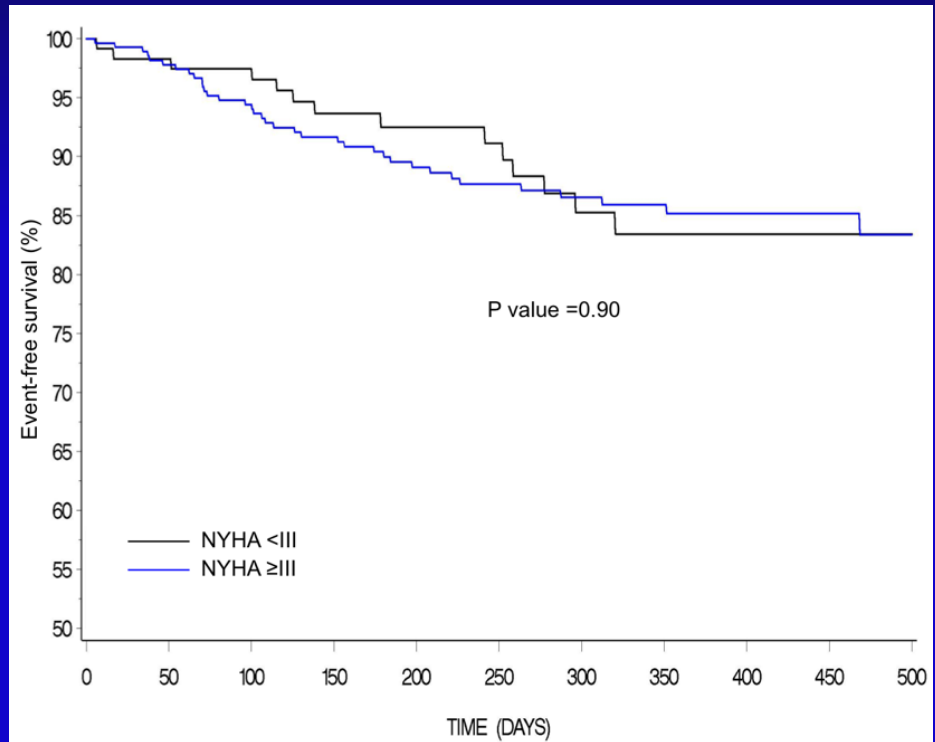


# Death or HF According to Device Type

## ICD recipients

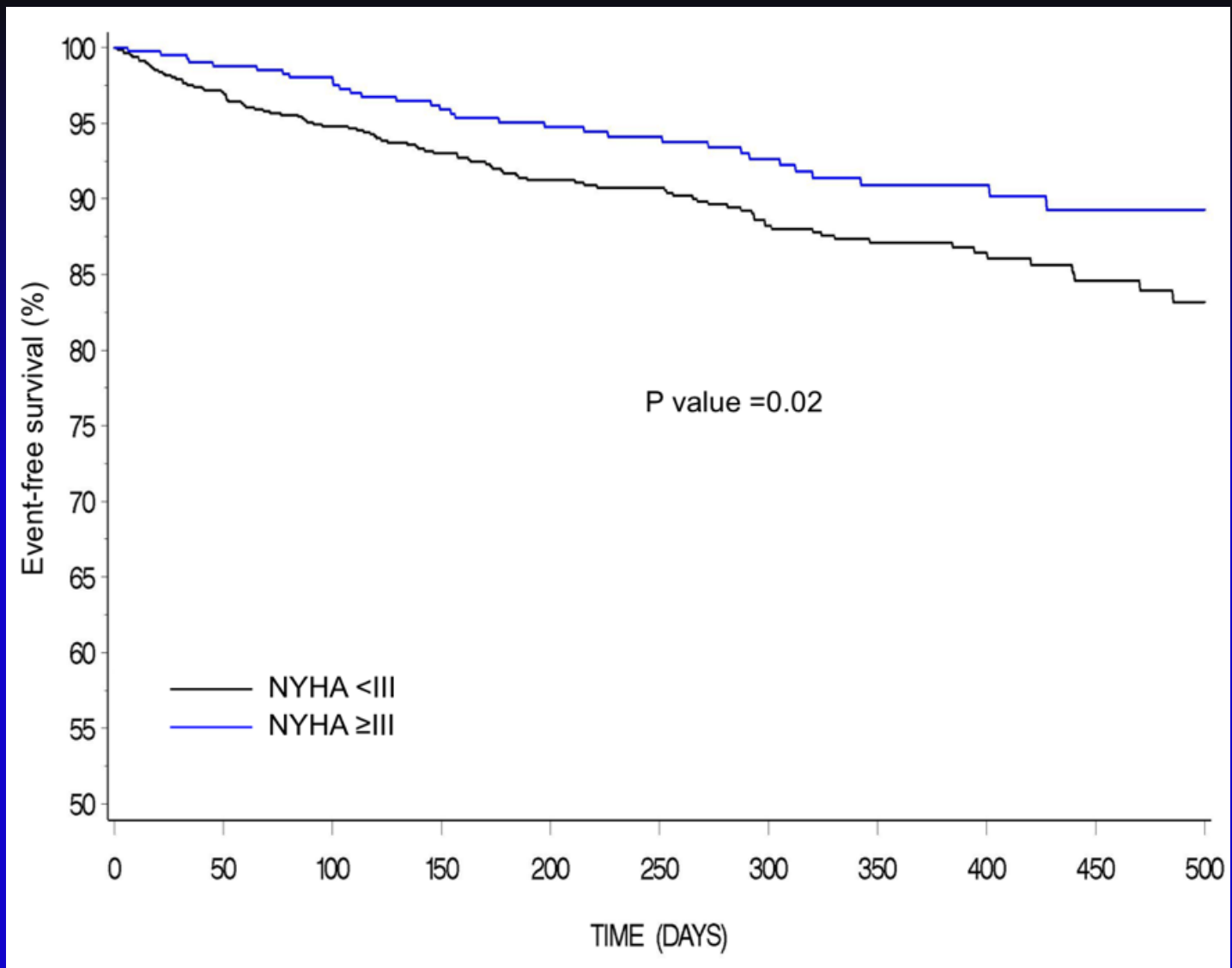


## CRTD recipients



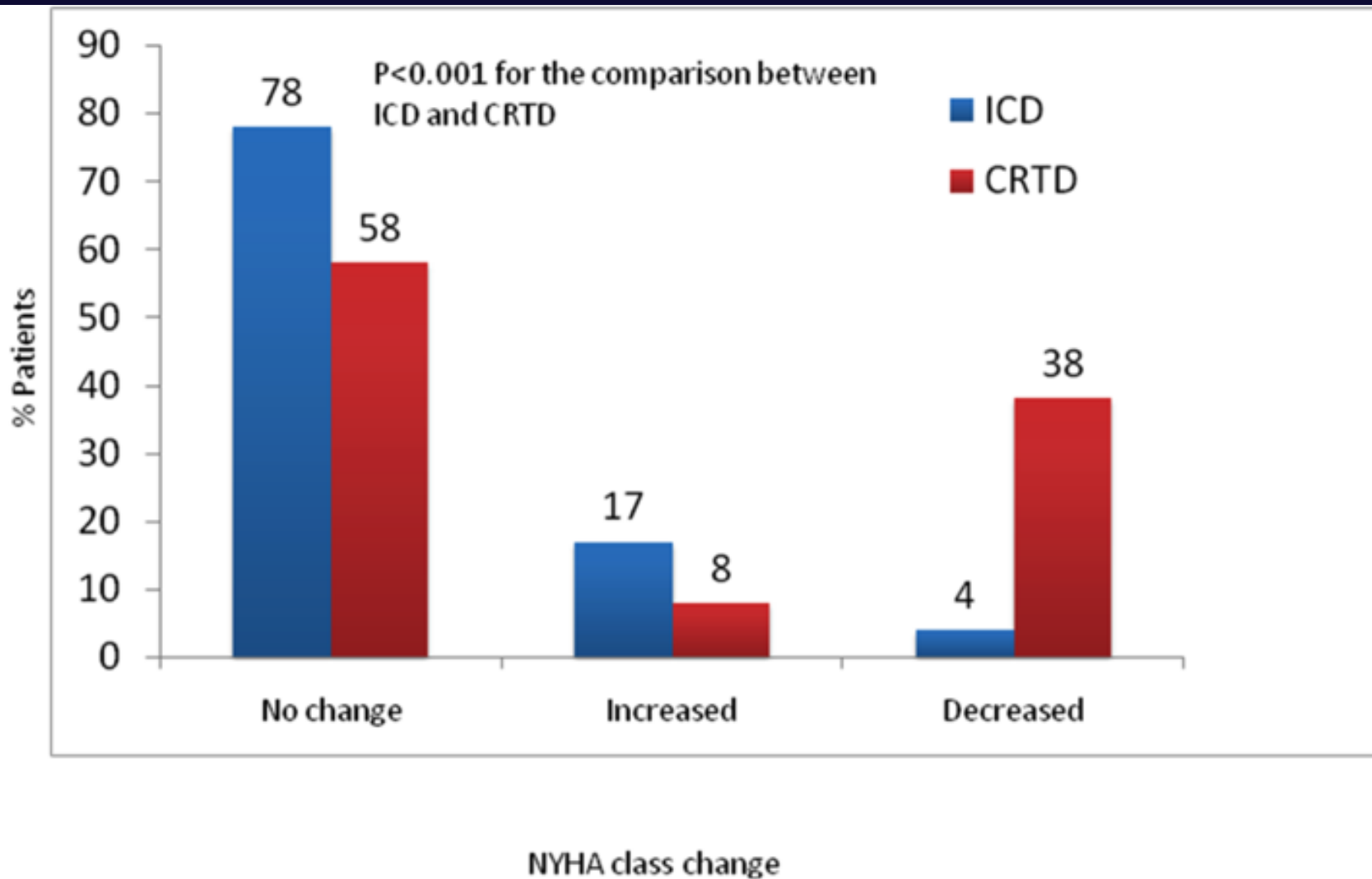


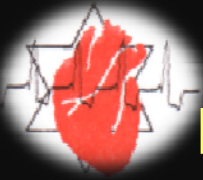
# Death or VA in the General Population





# Change in NYHA class during 1-year of follow-up in the ICD and the CRTD groups





## Multivariate analysis: Risk of endpoints by NYHA class $\geq$ III vs. <III

Endpoint	Total Population		ICD Recipients		CRTD Recipients	
	HR	p	HR	P	HR	p
<b>HF or death<sup>†</sup></b>						
<i>NYHA class <math>\geq</math>III vs. &lt;III</i>	3.21	<0.001	3.28	<0.001	0.97	0.92
<b>HF</b>						
<i>NYHA class <math>\geq</math>III vs. &lt;III</i>	2.53	0.005	4.58	<0.001	1.42	0.42
<b>VT/VF or death</b>						
<i>NYHA class <math>\geq</math>III vs. &lt;III</i>	0.52	0.04	0.81	0.80	0.43	0.01
<b>VT/VF</b>						
<i>NYHA class <math>\geq</math>III vs. &lt;III</i>	0.34	0.02	0.34	0.23	0.36	0.03

p-value for NYHA class by device type interaction = 0.002 for the combined endpoint of HF or Death  
 p-value for NYHA class-by-device type interaction >0.10 for both the endpoints of VA and of VA/death



# Main Findings

- This the first and largest study to prospectively address the association between baseline NYHA and clinical outcomes in patients undergoing device based therapy in real world setting
- Patients with advanced HF who receive ICD for primary prevention of SCD are at increased risk of recurrent HF hospitalization.





# Main Findings

- High baseline NYHA class was not associated with recurrent HF hospitalization in patients implanted with CRTD
- A higher baseline NYHA was associated with reduced VA risk regardless of device type



# Clinical Implication

- Patients with less advanced HF symptoms have greater risk for VA, and are therefore more appropriate candidates for ICD therapy than those with more advanced HF symptoms
- Future clinical trials should evaluate the benefit of biventricular pacing without a defibrillator in patients with more advanced HF symptoms



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