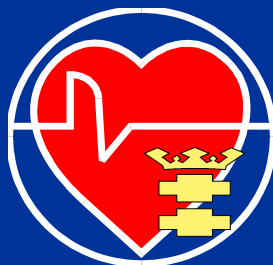


Nowości w kardiologii po kongresie ESC 2015



Dr hab. n. med. Ludmiła Daniłowicz – Szymanowicz

Klinika Kardiologii i Elektroterapii
II Katedra Kardiologii GUMed
Gdańsk, 22.10.2015r.

Nowe wytyczne 2015

- VA and SCD
- NSTEMI – ACS
- Pulmonary Hypertension
- Infective endocarditis
- Pericardial Diseases

Arytmie komorowe

Nagły zgon sercowy

Implantable cardioverter defibrillator implant in patients with left ventricular dysfunction

Recommendations	Class ^a	Level ^b
ICD therapy is recommended, to reduce SCD in patients with symptomatic HF (NYHA Class II-III) and LVEF $\leq 35\%$, after ≥ 3 months of optimal medical therapy, who are expected to survive at least 1 year with good functional status:		
• Ischaemic aetiology (at least 6 weeks after myocardial infarction).	I	A
• Non-ischaemic aetiology.	I	B

HF = heart failure; ICD = implantable cardioverter defibrillator; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association SCD = Sudden Cardiac Death

^aClass of recommendation

LVEF $\leq 35\%$ + NYHA II/III

No change from ESC-HF GL 2012
(NYHA class II-III HF)

Implantable cardioverter defibrillator in patients with NYHA Class IV listed for heart transplantation		
Recommendations	Class	Level ^b
ICD implantation should be considered for primary and secondary prevention of SCD in patients who are listed for heart transplant.	Ila	C

ICD = implantable cardioverter defibrillator; SCD = sudden cardiac death

^aClass of recommendation.

^bLevel of evidence.

NYHA IV

This is a slight “change” from ESC HF GL 2012, which said:

ICD therapy is not indicated in patients in NYHA class IV with severe, drug-refractory, symptoms who are not candidates for CRT, a ventricular assist device, or cardiac transplantation (because such patients have a very limited life expectancy and are more likely to die from pump failure)

ICD implantation should be considered for primary and secondary prevention of SCD in patients who are listed for heart transplant.

Ila

C

This recommendation is based on (randomized) studies:
Frohlich et al (Heart 2013) and SCD-HeFT (Circulation 2001)

ICD
profilaktyka
pierwotna

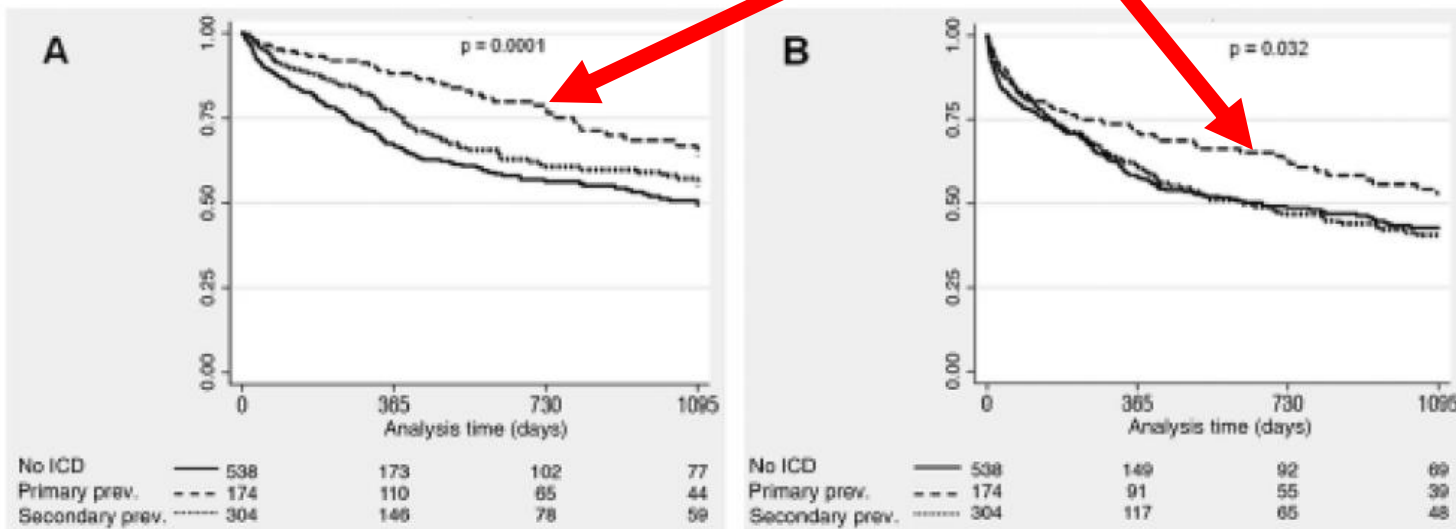


Figure 2 Effect of ICD treatment on all-cause mortality and/or need for an assist device. Kaplan-Meier curves for freedom from all-cause mortality (A) and death from any cause or need for implantation of an assist device (B) in patients without ICDs, primary prevention ICD recipients, and secondary prevention ICD recipients. ICD, implantable cardioverter defibrillator; prev., prevention.

ICD

czy u wszystkich

z $LVEF \leq 35\%$

???

ICD u pts z LVEF $\leq$ 35%

Use of Primary Prophylactic Implantable Cardioverters Defibrillators in Europe Data from the EU-CERT-ICD Registry

C. Sticherling¹, J.H. Svendsen², S. Wijers³, M. Scharfe¹, G. Schmidt⁴, B. Vandenberk⁵, A. Lubinski⁶, B. Merkely⁷, F. Braunschweig⁸, M. Svetlosak⁹, C. Meyer-Zürn¹⁰, H. Huikuri¹¹, P. Flevari¹², M. Zabel¹³, for the EU-CERT-ICD Investigators

¹ University Hospital Basel, CH; ² Rigshospitalet Copenhagen, DK; ³ UMC Utrecht, NL; ⁴ TU Munich, DE; ⁵ University Hospital Leuven, BE; ⁶ MU Lodz, PL; ⁷ Semmelweis University Budapest, HU; ⁸ Karolinska Institute Stockholm, SE; ⁹ SMU Bratislava, SK; ¹⁰ University of Tübingen, DE; ¹¹ University of Delft, NL; ¹² Attikon University Athens, GR; ¹³ University Medical Center Göttingen, DE



Background

In the EU, each year more than 100'000 ICDs are implanted for primary prevention of sudden cardiac death (SCD) (costs > 2 billion €)

More than 2/3 of pts never receive an ICD shock and risk stratification remains a challenge.

The landmark studies (MADIT II, SCD-HeFT) enrolled patients before 2001, almost 15 years ago.

Contemporary primary preventive ICD populations may differ, because of earlier invasive revascularisation strategies and significant advances in heart failure therapy.

The EU-CERT-ICD project (Comparative Effectiveness Research to Assess the Use of Primary Prophylactic Implantable Cardioverter Defibrillators in Europe) is funded by the European Union and aims to identify the role of primary prophylactic ICD therapy in contemporary European populations.

Purpose

To assess the overall mortality and the incidence of appropriate and inappropriate shocks in an ICD cohort implanted with their ICD between 2002 and 2014

Methods

The study comprises a retrospective registry of primary preventive ICD patients with a LVEF $\leq$ 35% collected from 14 centres in 11 European countries.

Demographic baseline data as well as the survival status and the occurrence of appropriate ICD shocks during follow-up were collected

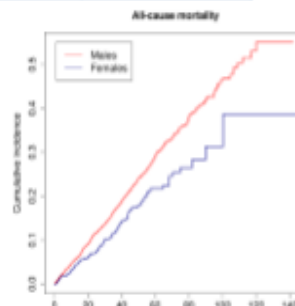
Results

4751 pts followed for a median of 31 (IQR 15-53) months

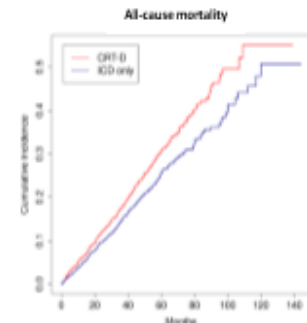
Male	81%
Mean age at implantation	64.1 yrs
Ischemic cardiomyopathy	63%
Mean ejection fraction	24 $\pm$ 6%
QRS width	132 $\pm$ 34 ms
Diabetes mellitus	19%
h/o atrial fibrillation	20%
VVI/ICD/CRT-ICD	39%/17%/44%
NYHA class III/IV	36%/47%
ICD generator change	11%

2 year mortality: 9%
5 year mortality: 26%

Women had a lower cumulative mortality HR 0.7 (95% CI 0.54-0.91, p=0.02) and received fewer appropriate shocks HR 0.53 (95% CI 0.28-1.01, p=0.05)



CRT-D pts had an increased cumulative mortality HR 1.26 (95% CI 1.08-1.46, p=0.01) but the same incidence of appropriate shocks HR 0.84 (95% CI 0.62-1.14, p=0.2)



Conclusions

In a contemporary ICD population:

- the 2-year mortality is lower than in the MADIT II population (9% vs 14.2%) and
- the 5-year mortality almost comparable to the SCD-HeFT population (26% vs. 29%)
- Women are under-represented and showed a 30% lower overall mortality
- 44% of all primary preventive ICD were CRT-D
- During a median F/U of 31 months, the mortality in the CRT-D group was higher (12% vs. 11%)

Additional risk stratifiers are needed to better allocate primary preventive ICD, particularly in women.

ICD u pts z LVEF ≤ 35%

Use of Primary Prophylactic Implantable Cardioverters Defibrillators in Europe Data from the EU-CERT-ICD Registry

C. Sticherling¹, J.H. Svendsen², S. Wijers³, M. Scharfe¹, G. Schmidt⁴, B. Vandenberk⁵, A. Lubinski⁶, B. Merkely⁷, F. Braunschweig⁸, M. Svetlosak⁹, C. Meyer-Zürn¹⁰, H. Huikuri¹¹, P. Flevari¹², M. Zabel¹³, for the EU-CERT-ICD Investigators

¹ University Hospital Basel, CH; ² Rigshospitalet Copenhagen, DK; ³ UMC Utrecht, NL; ⁴ TU Munich, DE; ⁵ University Hospital Leuven, BE; ⁶ MU Lodz, PL; ⁷ Semmelweis University Budapest, HU; ⁸ Karolinska Institute Stockholm, SE; ⁹ SMU Bratislava, SK; ¹⁰ University of Tübingen, DE; ¹¹ University of Delft, FI; ¹² Attikon University Athens, GR; ¹³ University Medical Center Göttingen, DE



Background

In the EU, each year more than 100'000 ICDs are implanted for primary prevention of sudden cardiac death (SCD) (costs ~ 2 billion €).

More than 2/3 of pts never receive an ICD shock remains a challenge.

The landmark studies (MADIT II, SCD-HeFT) end 2001, almost 15 years ago.

Contemporary primary preventive ICD population of earlier invasive revascularisation strategies and in heart failure therapy.

The EU-CERT-ICD project (Comparative Effectiveness to Assess the Use of Primary Prophylactic Implantable Cardioverter Defibrillators in Europe) is funded by the European Union and aims to identify the role of primary prophylactic ICD therapy in contemporary European populations.

Purpose

To assess the overall mortality and the incidence of appropriate and inappropriate shocks in an ICD cohort implanted with their ICD between 2002 and 2014

Methods

The study comprises a retrospective registry of primary preventive ICD patients with a LVEF ≤ 35% collected from 14 centres in 11 European countries.

Demographic baseline data as well as the survival status and the occurrence of appropriate ICD shocks during follow-up were collected

Results

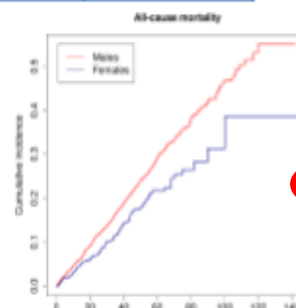
4751 pts followed for a median of 31 (IQR 15-53) months

- 2-letnia śmiertelność 9% (vs 14,2% w MADIT II)
- 5-letnia śmiertelność 26% (vs 29% w SCD-HeFT)
- Śmiertelność u kobiet o 35% mniejsza
- 44% pts z CRT-D (12% vs 11% ICD FU 3 lata)

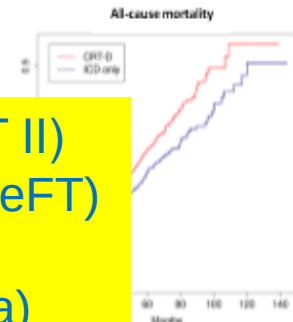
h/o atrial fibrillation	20%
VVI/ICD/CRT-D	39%/17%/44%
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CRT-D pts had an increased cumulative mortality



Conclusions

In a contemporary ICD population:

- the 2-year mortality is lower than in the MADIT II population (9% vs 14.2%) and
- the 5-year mortality almost comparable to the SCD-HeFT population (26% vs. 29%)
- Women are under-represented and showed a 30% lower overall mortality
- 44% of all primary preventive ICD were CRT-D
- During a median F/U of 31 months, the mortality in the CRT-D group was higher (12% vs. 11%)

Additional risk stratifiers are needed to better allocate primary preventive ICD, particularly in women.

ICD in NYHA Class I, and in HFPEF

NYHA I → bez ICD

There are currently no controlled, randomized studies demonstrating the value of an ICD in asymptomatic patients (NYHA Class I) with systolic dysfunction (LVEF $\leq 35\%$ or 40%), or in HF patients with preserved LVEF $>40\text{-}45\%$, so ICD is not recommended for primary prevention in these patients.

ICD u pts z LVEF $\leq$ 35%

Anti-tachycardia Pacing is Not Associated with Increased Mortality

Shining Sun¹, Mark L. Blown², James W. Johnson³, Vinod Sharma², Owen A. Obermeyer²

¹University of Texas Southwestern Medical Center, Dallas, TX, USA; ²Medtronic plc, Mounds View, MN, USA; ³Veteran Affairs Medical Center of North Texas, Dallas, TX, USA

INTRODUCTION

Several analyses from primary prevention trials on implantable cardioverter-defibrillator (ICD) therapy have shown a clear association between ICD shocks and increase mortality. Recently a large trial comparing traditional versus conservative ICD programming suggested a possible link between anti-tachycardia pacing (ATP) and increased mortality. The objective of this study was to examine the relationship between types of ICD therapy received and survival among patients with ICD and CRT-D devices.

METHODS

ICD capable devices within the Medtronic CareLink database implanted from January 9, 2006 through May 15, 2014 with baseline programming as determined from the earliest CareLink transmission (ranging from 1 to 182 days post implant) shown in the table were included in the analysis.

Survival data in CareLink comes from the Medtronic Device and Registrant Tracking (DART) database. Because of delays in the reporting of mortality, data on implants, deaths, and treated spontaneous arrhythmias after May 15, 2014 were excluded from the analysis.

Patients with arrhythmias (VF, VT, or FVT) occurring through May 15, 2014 were classified based on the categories in therapy types table. A Cox regression analysis was used to compare the risk of death among groups. The regression model considered therapy group as a time-dependent covariate and included age at implant as an independent factor. Statistical analysis was done using software from SAS, Inc. (version 9.4)

BASELINE PROGRAMMING

VF NID 18/24, 24/32, or 30/40

VF detection interval $\leq$ 320 ms

SVT V. limit $\geq$ 260 ms

At least one PR logic parameter programmed ON (for DR/CRT-D devices, this included AF/AFL, sinus tachycardia, other A:A SVTs or wavelet; for VR devices only wavelet

ATP before/during charging programmed ON

THERAPY TYPES

No episodes or therapies

Treated only with one or more ATP therapies

Treated only with one more shocks

At least one arrhythmia was treated with ATP therapies and at least one arrhythmia was treated with one or more shocks, or at least one arrhythmia was treated with both ATP and shock therapy

RESULTS

We analysed 66968 patients with a mean age of 66 ± 12 years. Seventy-four percent of patients were male. The mean follow-up was 31.3 ± 21.3 months and 7197 (10.7%) died. The number of patients within each treatment category and the corresponding number of episodes and death with hazard ratio as compared to patients with no episodes is shown in the following table.

	No VT/VF	ATP only	Shock only	ATP + Shock
Number of patients	47433	7471	1902	10162
Number of episodes	--	60632	3812	147386 ATP 12370 Shock 26073 ATP + Shock
Number of deaths	4631 (9.8%)	782 (10.5%)	260 (13.7%)	1524 (15.0%)
Hazard ratio compared to No VT/VF	--	1.06 (0.98, 1.14) $p = 0.146$	2.02 (1.79, 2.30) $p < 0.001$	2.10 (1.98, 2.23) $p < 0.001$

CONCLUSION

In this large observational study of 'real world' ICD use, ATP therapy is not associated with increased risk of death. Delivering ATP before or during adds no incremental mortality risk to shock alone. Deaths are likely underreported in the CareLink database and is a limitation of our analysis.

ICD u pts z LVEF ≤ 35%

Blizna w badaniu CMR

Primary prevention indication for implantable cardioverter-defibrillator: the value of myocardial infarction scar characterization by magnetic resonance imaging

Damien VOILLIOT, Freddy ODILLE, Marius ANDRONACHE, Isabelle MAGNIN-POULL, Damien MANDRY, Pierre-Yves MARIE, Jacques FELBLINGER, Etienne ALIOT, Nicolas SADOUL and Christian De CHILLOU

University Hospital Brabois, Cardiology Department, ILCV, IADI, INSERM U947 and Department of nuclear medicine, NANCY, France

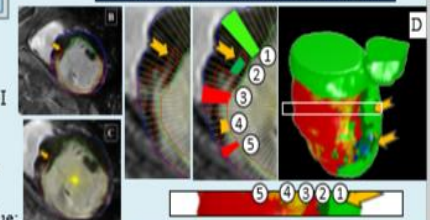
No disclosures

Background: The use of implantable cardioverter-defibrillators (ICD) in post myocardial infarction patients (MI) and low left ventricular ejection fraction (LVEF) is recommended to prevent sudden cardiac death (SCD). However, most of patients never receive ICD therapy and ventricular tachycardia (VT) may occur in patients with subnormal LVEF. Our current risk stratification based on LVEF seems inadequate.

VT is due to a re-entrant circuit in MI scar and magnetic resonance imaging (MRI) provide high definition imaging of this scar.

Aim: We studied whether the characteristics of MI scar, as assessed by MRI, could predict the occurrence of VT in post MI patients.

Figure 1: Post treatment of DCE images



Yellow arrows show IntS scar in inferoseptal area

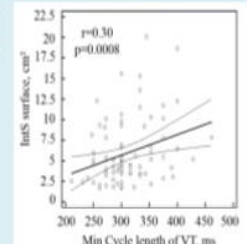
Population and Methods

- Group I: 74 patients (62 men, mean age 60±11 years), remote MI, 1ary prevention indication of ICD. Used to define best criterion to predict the occurrence of VT
 - Group II : 54 patients (46 men, mean age 61±12 years), remote MI and 2 ary prevention indication of ICD, LVEF<40 %
 - Group III : 15 patients (14 men, mean age 63±12 years), remote MI and 2 ary prevention indication of ICD, LVEF≥40 %
- Used to test the criterion defined on group I
- Cardiac MRI study: ECG triggered acquisition, 5 mm short axis thickness slices, delayed contrast enhancement (DCE)
 - Post treatment: manual delineation of endocardial, epicardial and scar borders (Panel B), radial segmentation map consisting of a multiple radii grid perpendicular to the LV long axis and centered on it (Panel C), the location and transmural extent of the scar were calculated along each radius
 - 3D ventricular reconstruction (MATLAB environment), color-coded to provide information as to infarct location and depth as follows: epicardial scars (EpiS) in blue; intramural scars (IntS) in dark green; endocardial (EndS) to transmural (TransS) scars from yellow to orange then red and healthy myocardium in pale green (Panel D)

Results

- MVT occurred in 22 patients (30%) after a mean follow-up of 47±28 months (range: 12 ±114 months)
- MRI showed areas with intramural and/or epicardial scar at the infarct border (adjacent to areas showing endocardial or transmural scar) in all patient.

Association between IntS surface and the minimum cycle length of VT



Clinical and demographic data differences between the 2 groups

MRI characteristics differences between the groups

	No VT n=52, 70%	VT n=22, 30%	p		No VT n=52, 70%	VT n=22, 30%	p	Group II n=54	Group III n=15
Demographic data				LVEDV, mL	285±80	286±89	0.97	282±77	203±37
Male gender, n(%)	45 (87)	17 (77)	0.33	Myocardial mass, g	146±47	138±41	0.53	140±27	133±36
Age at implantation, years	60±10	60±12	0.99	LVEF, %	26±8	28±9	0.35	29±6	47±6
Risk factors			NS	MI scar surface, cm²	77.8±31.9	81.9±30.4	0.61	86±31.3	42.8±27.2
Beta blockers, n (%)	48 (92)	20 (91)	0.84	TransS surface, cm²	39.7±31.7	40.4±21.9	0.93	37.6±24.1	14.8±12.7
Amiodarone, n (%)	7 (13)	2 (9)	0.59	EndS surface, cm²	33.9±21.4	32.4±22.0	0.79	38.4±23.2	20.4±15.3
Remote MI characteristics				EpiS surface, cm²	1.5±2.2	4.2±4.5	0.0007	3.3±2.3	1.9±1.5
Anterior wall, n (%)	24 (46)	16 (74)		IntS surface, cm²	2.7±2.8	4.9±3.9	0.008	6.7±4.2	5.7±3.1
Inferior wall, n (%)	15 (29)	3 (14)	0.11	IntS surface>1.65 cm²				100%	100%
Ant+Inf wall, n (%)	13 (25)	3 (14)							
PTCA, n (%)	24 (46)	7 (32)	0.25						

Univariate and multivariate Cox regression analysis

Variables	Univariate			Multivariate		
	HR	95% CI	p	HR	95% CI	p
IntS surface	1.35/cm²	1.16-1.58	0.003	1.17/cm²	1.02-1.35	0.02
EpiS surface	1.31/cm²	1.10-1.56	0.03	1.04/cm²	0.93-1.16	0.50



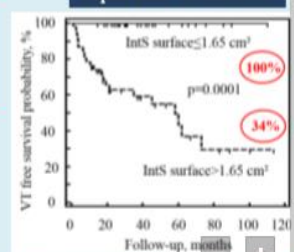
No VT:
Multiple tiny islands
of IntS without
contiguous line

VT:
Contiguous area of Int+EpiS
parallel or perpendicular
to the mitral annulus

Prediction of the occurrence of VT

Variable	Se	Sp
IntS surface>1.65 cm²	100 %	54 %

Kaplan-Meier survival curves



Conclusion: A critical surface of Intramural scar at an infarct border may be key factor for the occurrence of VT after MI, regardless of LVEF, and may be block and/or slow conduction area

The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

OCTOBER 10, 2013

VOL. 369 NO. 15

Cardiac-Resynchronization Therapy in Heart Failure with a Narrow QRS Complex

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ABSTRACT

CRT in HF with narrow QRS (<130 ms)

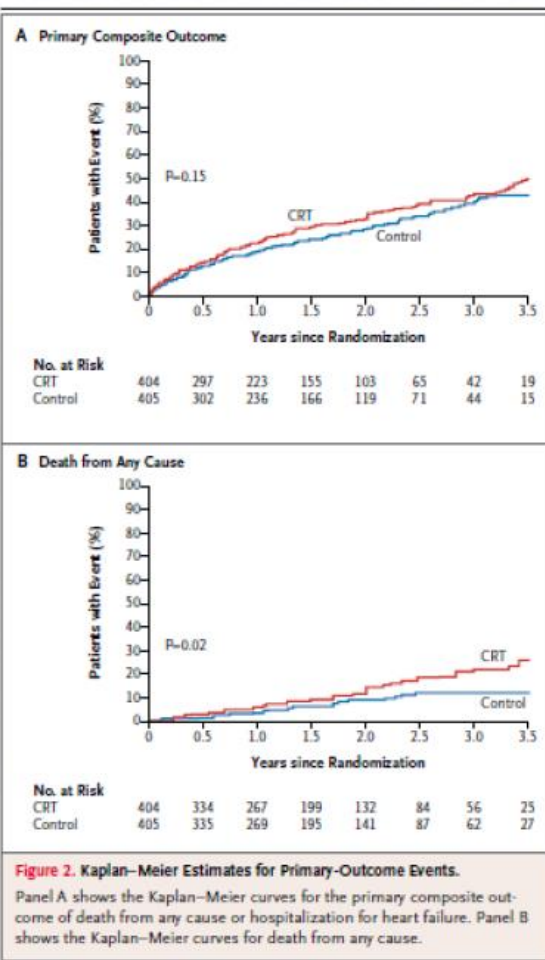


Table 2. Protocol-Specified Cardiovascular Outcomes.*

Outcome	Control Group (N = 405) no. of patients with event (%)	CRT Group (N = 404) no. of patients with event (%)	Adjusted Hazard Ratio (95% CI)	P Value
Primary composite outcome				
Death from any cause or hospitalization for heart failure	102 (25.2)	116 (28.7)	1.20 (0.92–1.57)	0.15
Components of primary outcome				
Hospitalization for heart failure	90 (22.2)	99 (24.5)	1.16 (0.87–1.55)	0.25
Death from any cause	26 (6.4)	45 (11.1)	1.81 (1.11–2.93)	0.02
Other cardiovascular outcomes				
Hospitalization for cardiovascular event	137 (33.8)	147 (36.4)	1.11 (0.88–1.40)	0.36
Death				
Cardiovascular event	17 (4.2)	37 (9.2)	2.26 (1.27–4.01)	0.004
Heart failure	10 (2.5)	17 (4.2)	1.74 (0.80–3.81)	0.15
Follow-up data censored				
Owing to LVAD implantation	10 (2.5)	7 (1.7)	—	—
Owing to heart transplantation	5 (1.2)	3 (0.7)	—	—
Death after data were censored owing to LVAD implantation or heart transplantation†	4 (1.0)	1 (0.2)	—	—

* Hazard ratios were calculated by means of the Cox model with adjustment for country, and P values were calculated by the stratified log-rank test. LVAD denotes left ventricular assist device.

† Because these deaths occurred after LVAD implantation or heart transplantation, they were not included in the analysis of mortality.

Nowości w elektroterapii

Nowości w elektroterapii



Problemy związane z elektrodami

Problemy związane z możliwościami implantacji elektrod

Nowości w elektroterapii: ICD

Identifying a population of patients suitable for the implantation of a subcutaneous defibrillator (S-ICD) among patients implanted with a conventional transvenous device (TV-ICD)

L. Zabala Diaz¹, J. Romero Roldan¹, J. Abad Vicente¹, L. Perez², X. Vinolas³, J.B. Martinez⁴, F. Perez⁵, E. Garcia⁶, J. Alzueta⁷, E. Diaz Infante⁸ - (1) Complejo Hospitalario de Navarra, Área Clínica del Corazón, Pamplona, Spain (2) Complejo Hospitalario Universitario de A Coruña, A Coruña, Spain (3) Hospital de la Santa Creu i Sant Pau, Barcelona, Spain (4) Hospital Universitario Araba, Vitoria-Gasteiz, Spain (5) Hospital General Universitario Reina Sofía, Murcia, Spain (6) Complejo Hospitalario de Vigo, Vigo, Spain (7) Hospital Universitario Virgen de la Victoria, Málaga, Spain (8) Hospital Universitario Virgen Macarena, Sevilla, Spain

PURPOSE

The new S-ICD minimizes the complications associated with the use of intravascular leads in a TV-ICD. However, it has limitations such as the inability to provide pacemaker function or anti-tachycardia pacing (ATP) to treat ventricular tachycardia (VT). There are a few trials that analyze the potential candidates for this new device. The aim of our study was to identify patients implanted with TV-ICD who would be potential candidates for S-ICD, and would continue to be during follow up

METHODS

We included patients from UMBRELLA, a prospective study involving ICD patients followed through the Carelink system

Inclusion criteria:

- Patients who underwent a single-chamber ICD first implantation in both primary and secondary prevention

Exclusion criteria:

- Patients presenting with monomorphic ventricular tachycardia
- Indication for pacing at the time of the implant procedure (sinus node disease or AV block, pacing parameters set to VVI > 40 bpm)

During the follow-up we evaluated:

- The emergence of new indication of stimulation, defined as the need for pacing settings adaptation or a pace burden > 20%
- The appearance of at least one episode of VT successfully ended by ATP

RESULTS

Among a total of 1652 analysable patients who underwent a first time ICD implantation, 444 met the inclusion criteria (26.9%). During a median follow-up of 31 months, 31 patients (6.9%) needed stimulation, 56 patients (12.6%) presented episodes of VT terminated by ATP and 76 patients achieved the combined endpoint (17.1%)

Multivariate analysis showed the following predictors of the defined endpoints:

	Need for stimulation		Effective ATP		Combined Endpoint	
	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Age (per 1 year)	1.03 (1.00-1.07)	0.071	0.99 (0.97-1.02)	0.494	1.01 (0.99-1.04)	0.372
Male gender	1.69 (0.37-7.72)	0.497	1.39 (0.50-3.90)	0.528	1.53 (0.61-3.88)	0.368
Secondary prevention	1.00 (0.24-4.14)	1.000	2.39 (0.69-8.33)	0.172	2.44 (0.88-6.74)	0.085
Ischemic disease	1.46 (0.38-5.68)	0.424	0.60 (0.30-1.19)	0.145	0.80 (0.43-1.49)	0.483
Heart failure	1.14 (0.44-3.01)	0.787	1.63 (0.70-3.81)	0.255	1.37 (0.69-2.76)	0.381
QRS<120 ms	1.55 (0.67-3.60)	0.310	1.03 (0.50-2.12)	0.941	0.90 (0.48-1.73)	0.756
Atrial Fibrillation	3.27 (1.44-7.42)	0.005	3.16 (1.61-6.20)	0.001	2.77 (1.53-5.02)	0.001
LVEF<35%	0.40 (0.14-1.21)	0.105	3.77 (1.26-11.29)	0.018	1.92 (0.80-4.58)	0.144

The presence of Atrial Fibrillation and LVEF<35% at the time of the implant predicted the endpoints

CONCLUSION

Selected candidates for S-ICD implantation depending on the absence of need for stimulation and monomorphic VT episodes at the time of the implant procedure, maintain the suitability for such device throughout the time, especially if they do not present with atrial fibrillation or severe LVEF depression



Complejo Hospitalario de Navarra, Área Clínica del Corazón, Pamplona, Spain

Dr. Zabala declare no conflict of interest

Nowości w elektroterapii: stymulatory

Today's Leadless Pacemaker System The Nanostim Device

- **Percutaneous femoral vein delivery**
 - 18F introducer /steerable catheter
 - <30 minute skin-to-skin procedure
- **Self-contained device in ventricle**
 - No lead or surgical pocket
 - Inherently MRI compatible
- **Conventional Features**
 - Temperature-Based Rate Response
 - >10-yr battery life
 - Hysteresis
 - Magnet Mode
- **Flexible replacement options**
 - Catheter-based retrieval
 - Place additional leadless pacemakers
 - Revert to conventional pacing lead



Future of Leadless Pacemakers

Potentiated by Device-to-Device Communication

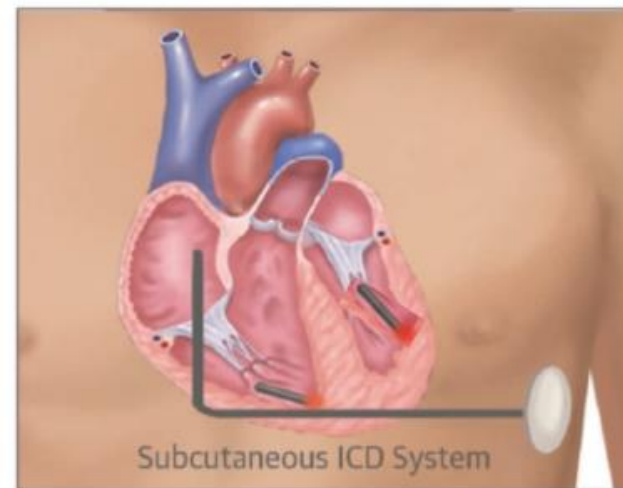
Bradycardia

Cardiac Resynchronization



Sudden Cardiac Death

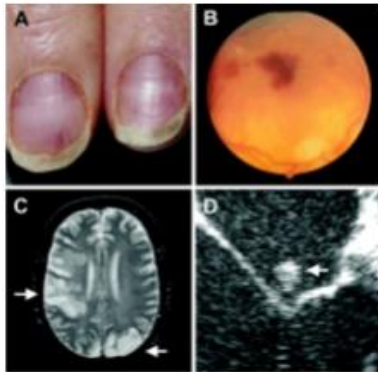
CRT-D



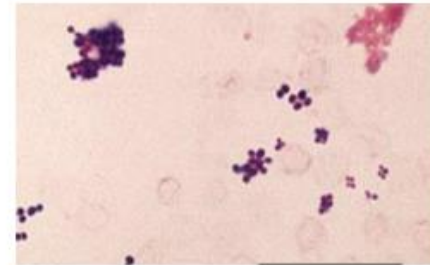
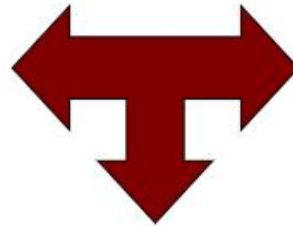
ZAPALENIE WSIERDZIA

Diagnostyka IE

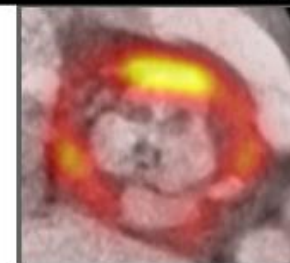
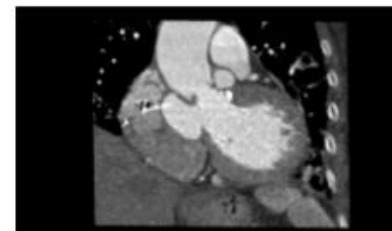
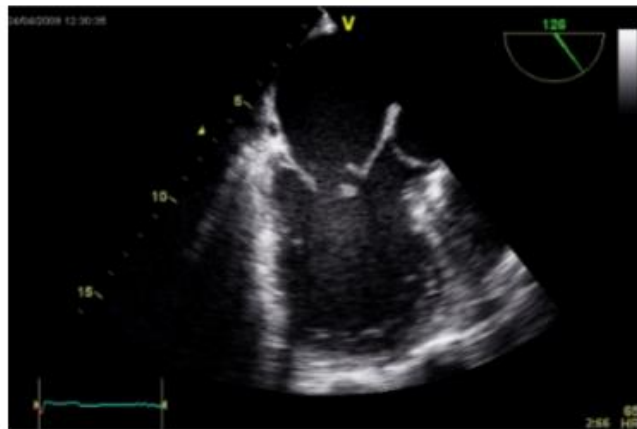
Diagnosis of IE



Clinical picture



Microbiology



Imaging techniques: ECHO, CT, PET/CT

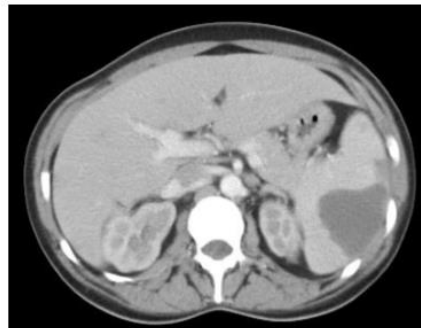
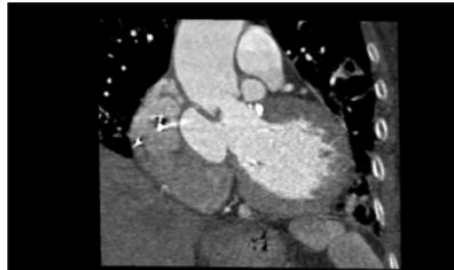
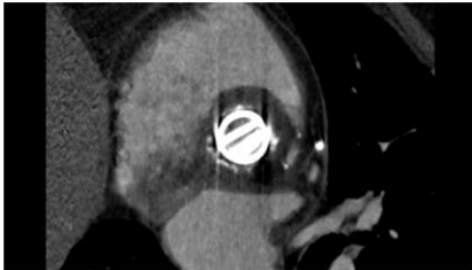
TK

New imaging modalities in the diagnosis of IE MSCT

- MSCT is possibly superior to ECHO in information regarding paravalvular extension of IE (abscesses, pseudoaneurysms, fistulae, especially in prosthetic valve endocarditis)
 - Feuchner JACC 2009, Fogelman EuroRadiol 2012
- MSCT has a high sensitivity for the diagnosis of non cardiac complications of IE

Major diagnostic criteria: Definite paravalvular lesions by MSCT

Minor diagnostic criteria: Vascular phenomena



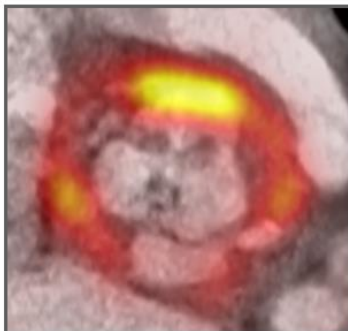
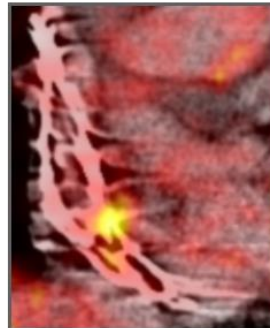
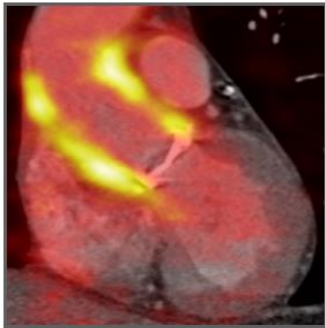
PET

New imaging modalities in the diagnosis of IE Nuclear medicine

- 18FDG PET/CT is useful in cases with negative or doubtful echos. It also detects peripheral embolism
18FDG PET/CT is also very useful to rule out the diagnosis of IE in difficult situations due to its high negative predictive value
 - Saby JACC 2015, Pizzi ESC 2014
 - Pizzi Circulation 2015 (in press)
- Radiolabelled WBC SPECT/CT is more specific but the technique is more complex and time consuming
 - Erba et al. J Nucl Med 2012

Major diagnostic criteria: Abnormal activity around PV detected by 18FDG PET/CT or radiolabelled SPECT/CT

Minor diagnostic criteria: vascular phenomena



MRI

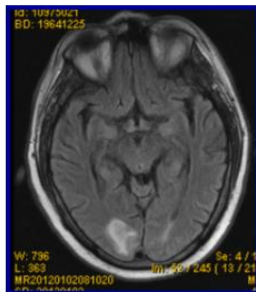
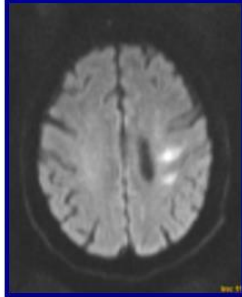
New imaging modalities in the diagnosis of IE MRI

MRI increases the likelihood of detecting cerebral consequences of IE

- Systematic MRI
 - Cerebral MRI in IE reports lesions in 60-80% of patients
 - Ischemic lesions in 50-80%, hemorrhages (parenchymal or subarachnoidal), abscesses or mycotic aneurysms, microbleeds
 - Cooper et al Circulation 2009, Duval et al Ann Intern Med 2010

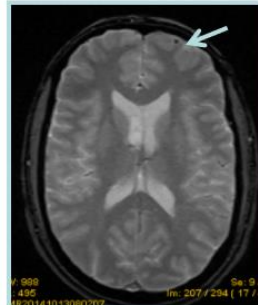
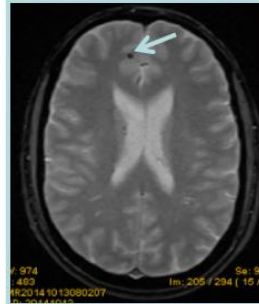
Minor diagnostic criteria: vascular phenomena

Ischemic emboli



Minor criteria

Microbleeds



NO Minor criteria

ESC 2015 modified criteria for diagnosis of IE:

Major criteria

Major criteria

1. Blood cultures positive for IE

- a. Typical microorganisms consistent with IE from 2 separate blood cultures:
 - *Viridans streptococci*, *Streptococcus gallolyticus* (*Streptococcus bovis*), *HACEK* group, *Staphylococcus aureus*; or
 - Community-acquired enterococci, in the absence of a primary focus; or
- b. Microorganisms consistent with IE from persistently positive blood cultures:
 - ≥ 2 positive blood cultures of blood samples drawn >12 h apart; or
 - All of 3 or a majority of ≥ 4 separate cultures of blood (with first and last samples drawn ≥ 1 h apart); or
- c. Single positive blood culture for *Coxiella burnetii* or phase I IgG antibody titre $>1:800$

2. Imaging positive for IE

- a. Echocardiogram positive for IE:
 - Vegetation
 - Abscess, pseudoaneurysm, intracardiac fistula
 - Valvular perforation or aneurysm
 - New partial dehiscence of prosthetic valve
- b. Abnormal activity around the site of prosthetic valve implantation detected by ^{18}F -FDG PET/CT (only if the prosthesis was implanted for >3 months) or radiolabelled leukocytes SPECT/CT.
- c. Definite paravalvular lesions by cardiac CT.

KARDIOMIOPATIE

HCM

2014 ESC Guidelines on diagnosis and management of hypertrophic cardiomyopathy

Authors/Task Force members: Perry M. Elliott (Chairperson) (UK), Aris Anastasakis (Greece), Michael A. Borger (Germany), Martin Borggrefe (Germany), Franco Cecchi (Italy), Philippe Charron (France), Albert Alain Hagege (France), Antoine Lafont (France), Giuseppe Limongelli (Italy), Heiko Mahrholdt (Germany), William J. McKenna (UK), Jens Mogensen (Denmark), Petros Nihoyannopoulos (UK), Stefano Nistri (Italy), Petronella G. Pieper (Netherlands), Burkert Pieske (Austria), Claudio Rapezzi (Italy), Frans H. Rutten (Netherlands), Christoph Tillmanns (Germany), and Hugh Watkins (UK).

Additional Contributor: Constantinos O'Mahony (UK).

HCM with intermediate SCD

HCM Risk-SCD Calculator

Age	42	Years	Age at evaluation
Maximum LV wall thickness	13	mm	Transthoracic Echocardiographic measurement
Left atrial size	46	mm	Left atrial diameter determined by M-Mode or 2D echocardiography in the parasternal long axis plane at time of evaluation
Max LVOT gradient	2	mmHg	The maximum LV outflow gradient determined at rest and with Valsalva provocation (irrespective of concurrent medical treatment) using pulsed and continuous wave Doppler from the apical three and five chamber views. Peak outflow tract gradients should be determined using the modified Bernoulli equation: $\text{Gradient} = 4V^2$, where V is the peak aortic outflow velocity
Family History of SCD	☒ No ☐ Yes		History of sudden cardiac death in 1 or more first degree relatives under 40 years of age or SCD in a first degree relative with confirmed HCM at any age (post or ante-mortem diagnosis).
Non-sustained VT	☒ No ☐ Yes		3 consecutive ventricular beats at a rate of 120 beats per minute and <30s in duration on Holter monitoring (minimum duration 24 hours) at or prior to evaluation.
Unexplained syncope	☒ No ☐ Yes		History of unexplained syncope at or prior to evaluation.

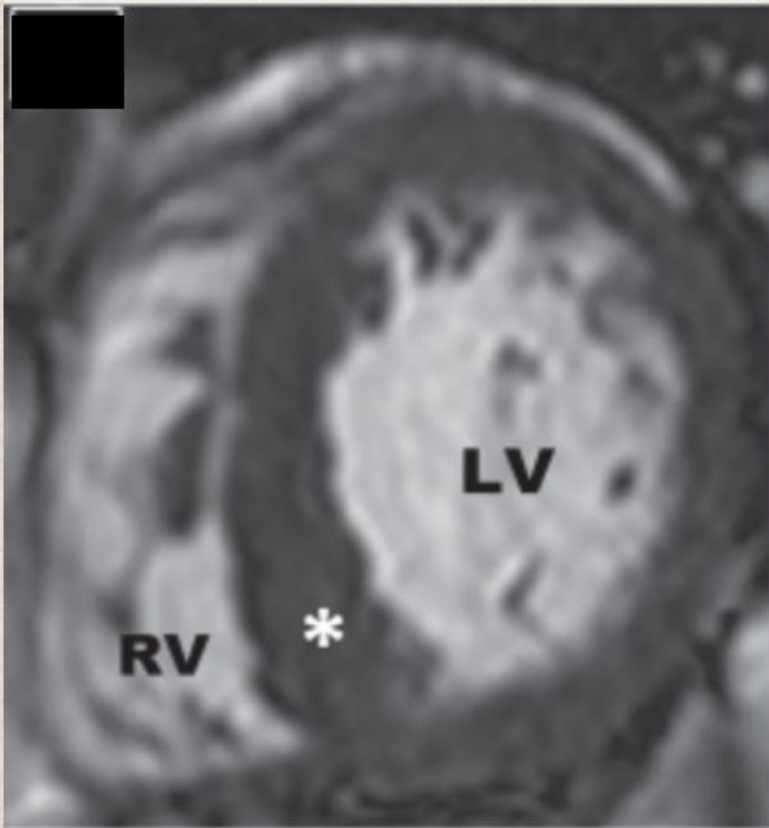
Risk of SCD at 5 years (%): 1.5

ESC recommendation: ICD generally not indicated **

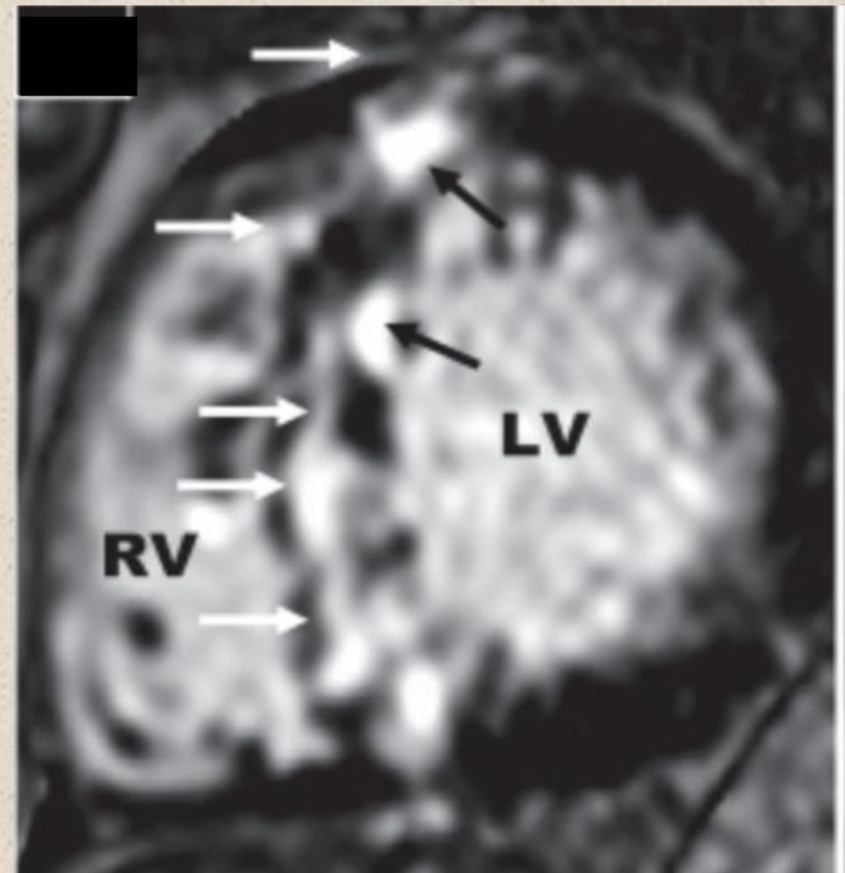
** ICD not recommended unless there other clinical features that are of potential prognostic importance and when the likely benefit is greater than the lifelong risk of complications and the impact of an ICD on lifestyle, socioeconomic status and psychological health.

HCM

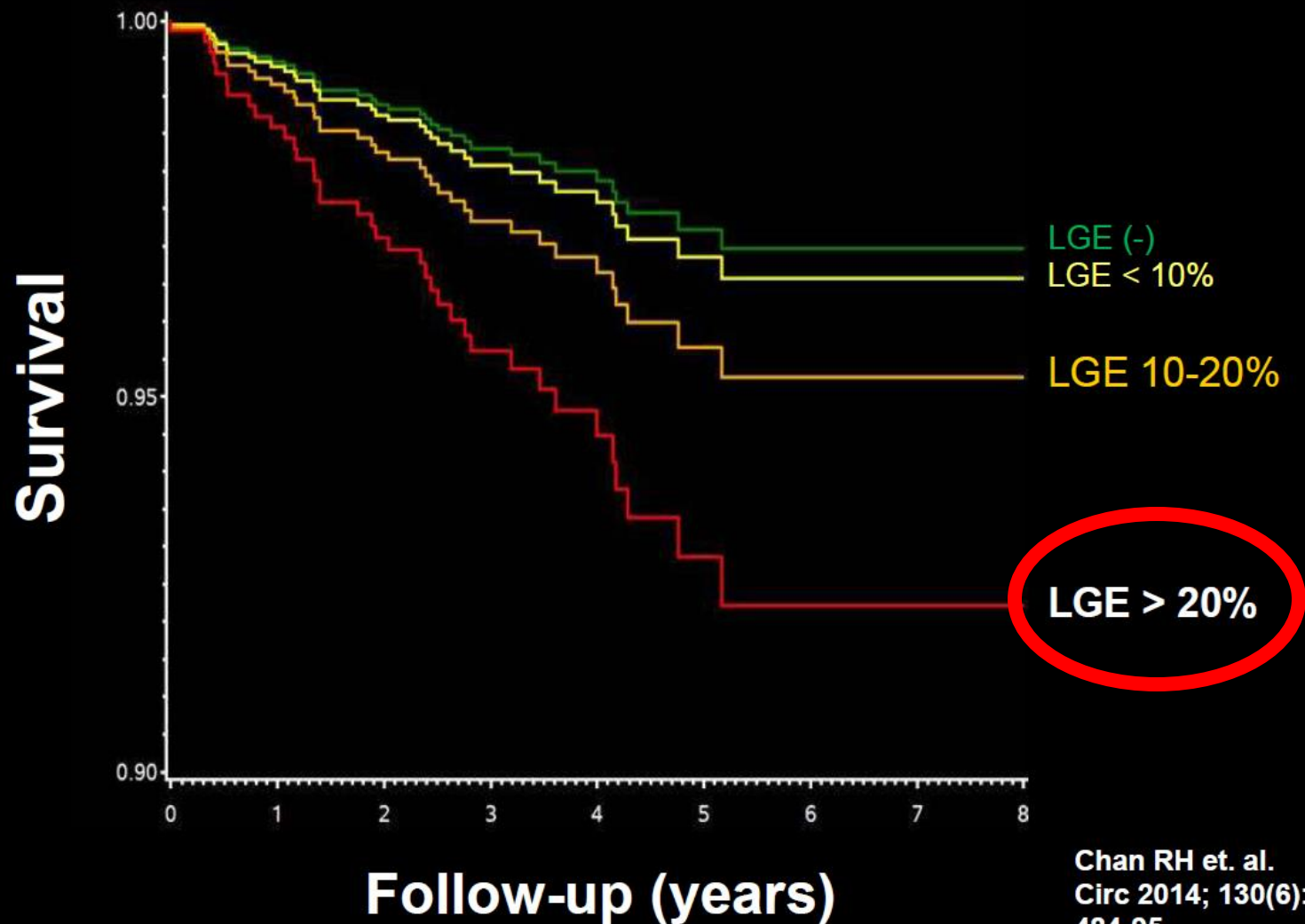
HCM with intermediate SCD



HCM with intermediate SCD



Extent of LGE vs. Sudden Death Risk in HCM



HCM

2° prevention

Cardiac arrest/sustained VT

1° prevention

Family history HCM-SD

Unexplained syncope

Multiple-repetitive NSVT (Holter)

Abnormal exercise BP response

LGE $\geq 15\%$ of LV mass

~~Massive LGE $\geq 25\%$~~

Rare subgroups/potential arbitrators

End-stage (EF < 50%)

LV apical aneurysm

Marked LV outflow obstruction (rest)

Modifiable

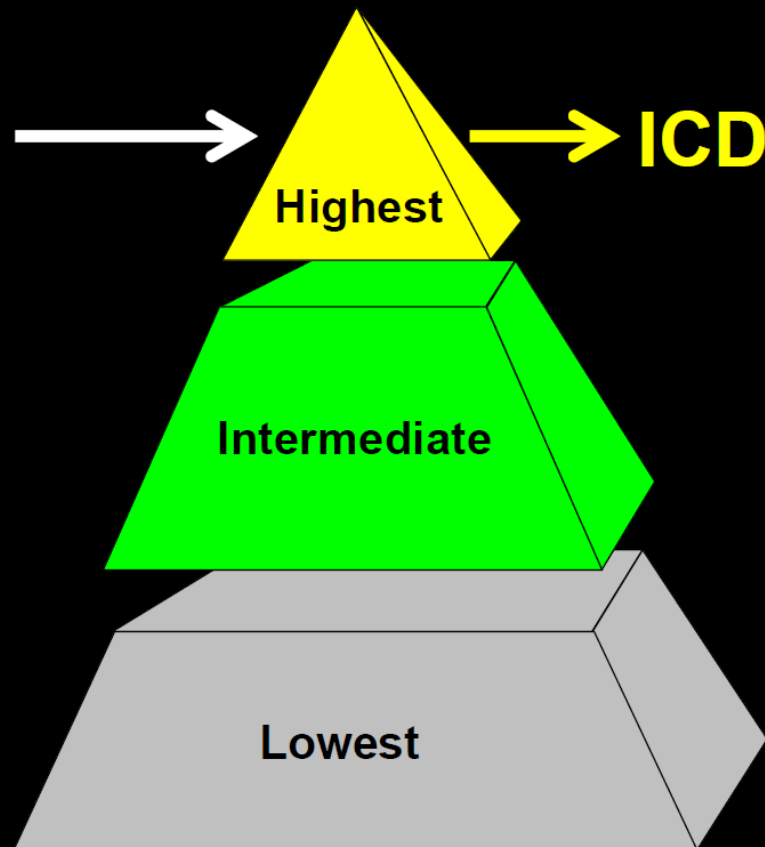
Intense competitive sports

CAD

LGE $\geq 15\%$ of LV mass

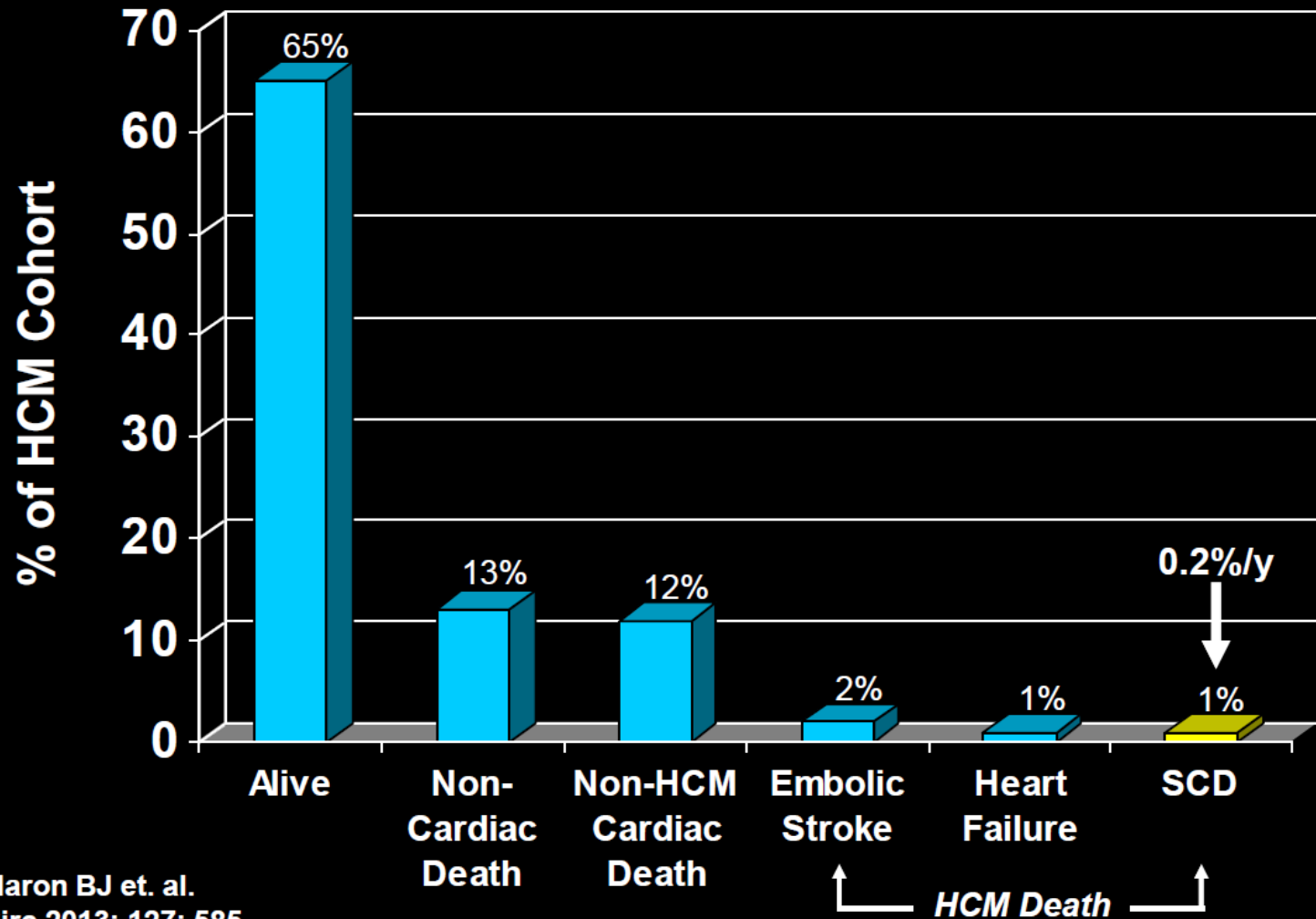
Age ≥ 60 y

Alcohol septal ablation (?)



Outcome of HCM Patients First Evaluated ≥ 60 Year

Aging is Good in HCM



Maron BJ et. al.
Circ 2013; 127: 585

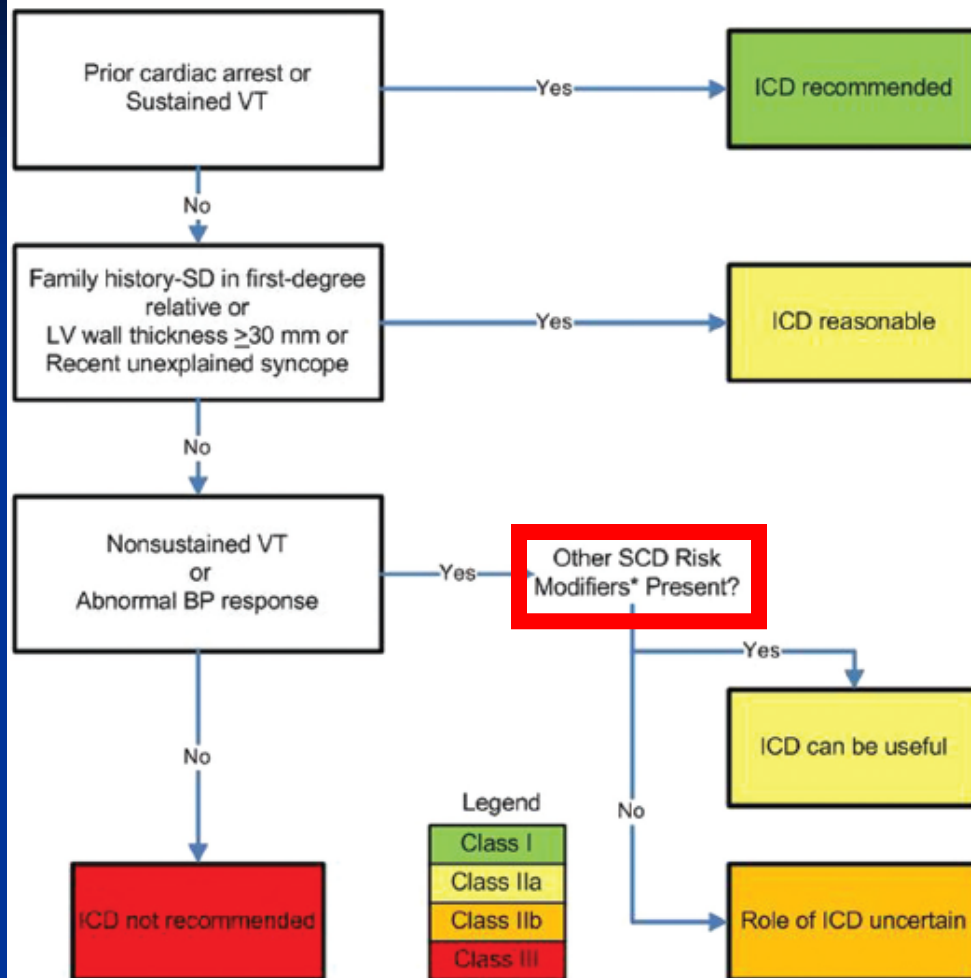


Figure 1. Indications for ICDs in HCM. *SCD risk modifiers include established risk factors and emerging risk modifiers (Section 9.4.2). BP indicates blood pressure; ICD, implantable cardioverter-defibrillator; LV, left ventricular; SCD, sudden cardiac death; SD, sudden death; and VT, ventricular tachycardia.

Regardless of the level of recommendation put forth in these guidelines, the decision for placement of an ICD must involve prudent application of individual clinical judgment, thorough discussions of the strength of evidence, the benefits, and the risks (including but not limited to inappropriate discharges, lead and procedural complications) to allow active participation of the fully informed patient in ultimate decision making.

HCM

Thromboembolism: Key Points

- *Use of the CHA_2DS_2 -VASc score to calculate stroke risk is NOT recommended.*
- *In general, lifelong therapy with oral anticoagulants is recommended, even when sinus rhythm is restored.*
- *As left atrial size is a consistent predictor for AF and stroke in patients with HCM, patients in sinus rhythm with LA diameter ≥ 45 mm should undergo 6–12 monthly 48-hour ambulatory ECG monitoring to detect AF.*

HCM

Thromboembolism: Key Points

- Use of anticoagulants is NOT recommended in patients with HCM and Risk-CVA)



European Journal of Heart Failure (2015)
doi:10.1093/ehj/ehf316

Prediction of thrombo-embolic risk in patients with hypertrophic cardiomyopathy (HCM Risk-CVA)

Oliver P. Guttman¹, Menelaos Pavlou², Constantinos O'Mahony¹, Lorenzo Monserrat³, Aristides Anastakis⁴, Claudio Rapezzi⁵, Elena Biagini⁶, Juan Ramon Gimeno⁶, Giuseppe Limongelli⁷, Pablo Garcia-Pavia⁸, William J. McKenna¹, Rumana Z. Omar^{2,9} and Perry M. Elliott^{1,8} for the Hypertrophic Cardiomyopathy Outcomes Investigators

- In HCM, the risk of stroke is NOT significantly increased in patients with LA diameter ≥ 45 mm.
- Asymptomatic patients with LA diameter ≥ 45 mm have a significantly higher risk of stroke in HCM compared to the general population.

N=4821 HCM (1986 and 2008)
172 (3.6%) CVA), (TIA), or systemic peripheral embolus within 10 years.

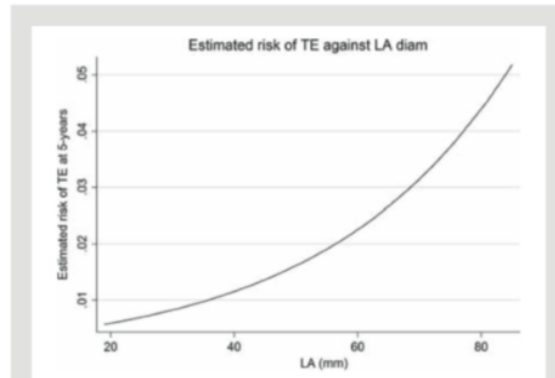
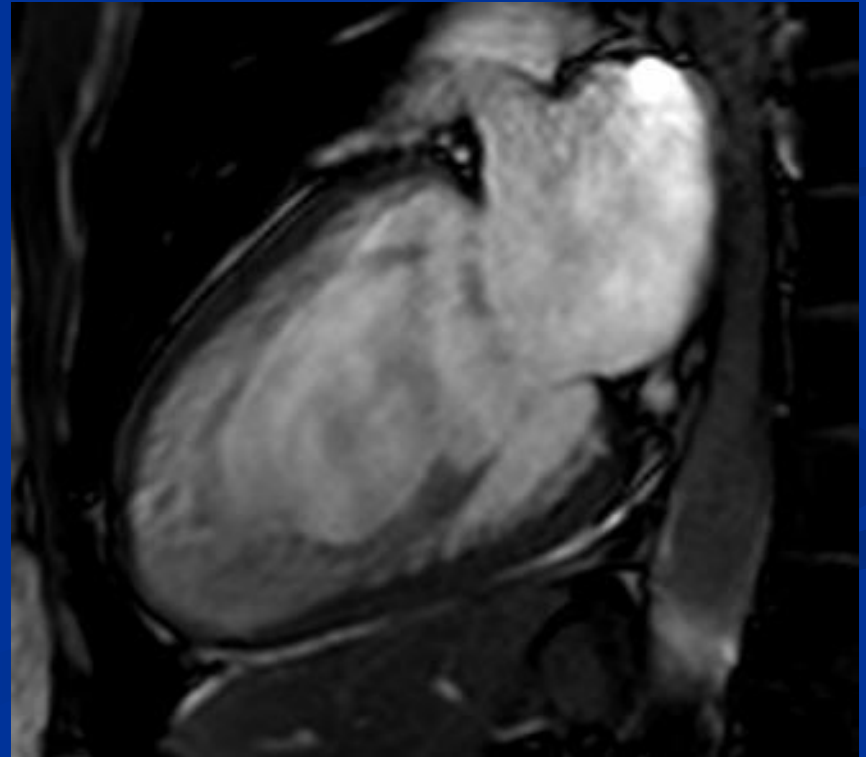
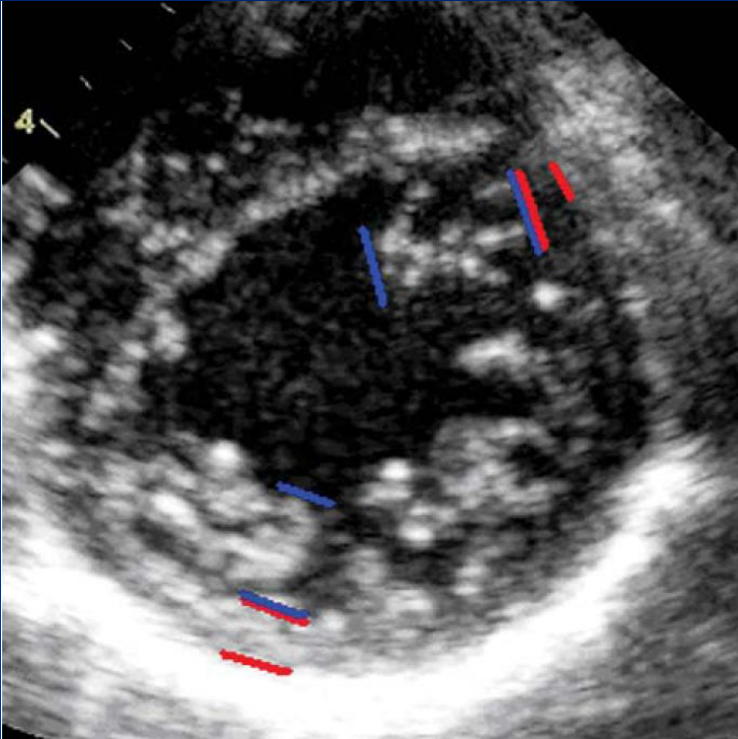


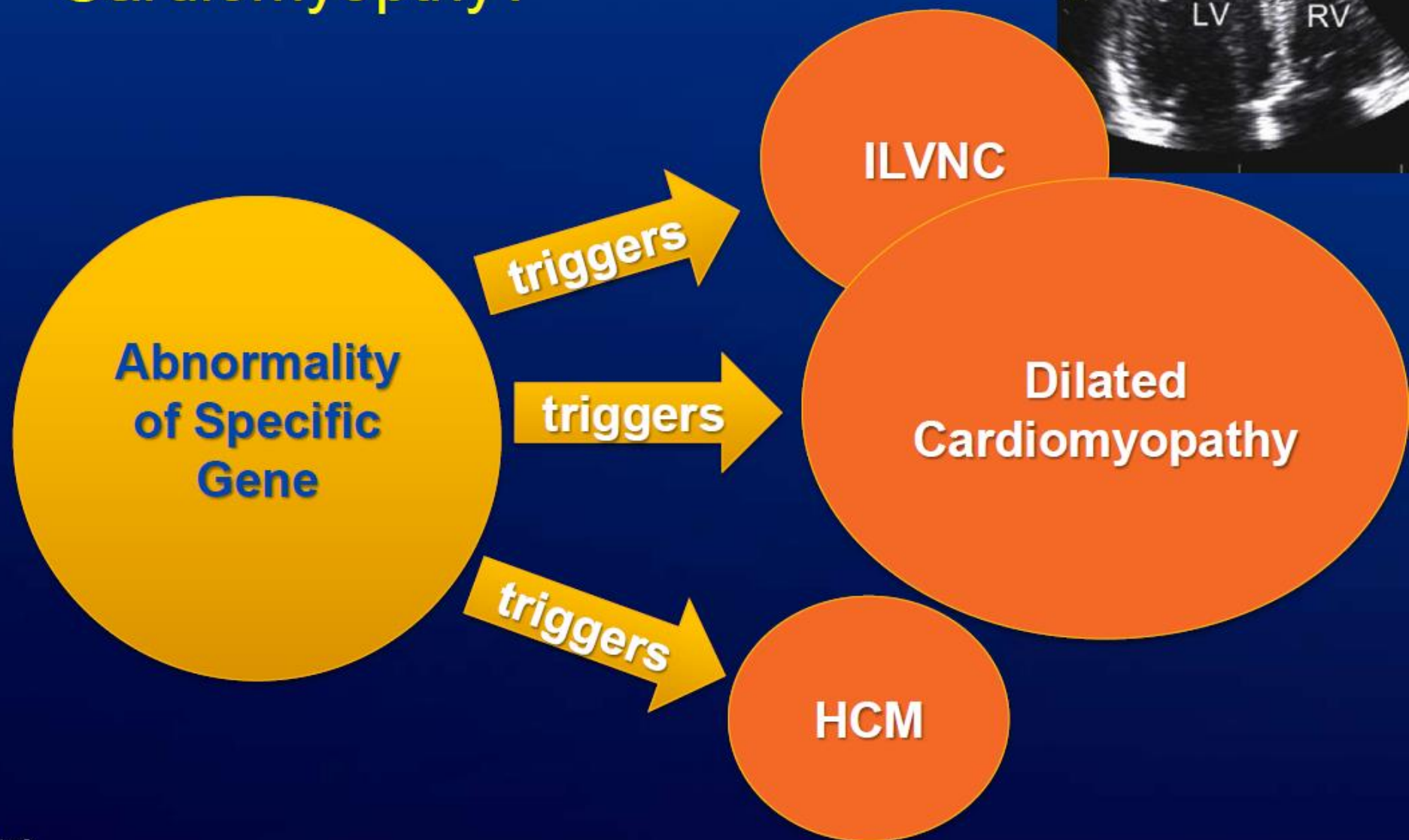
Figure 3 Relationship of left atrial (LA) size to risk of thrombo-embolism (TE).

Guttman O et al. Eur Heart Journal 2015

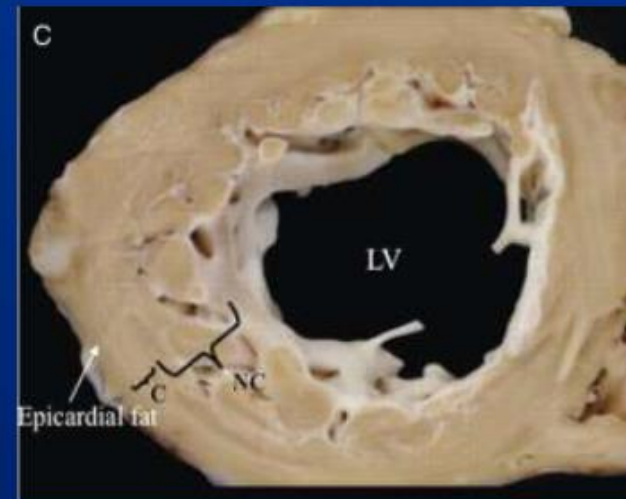
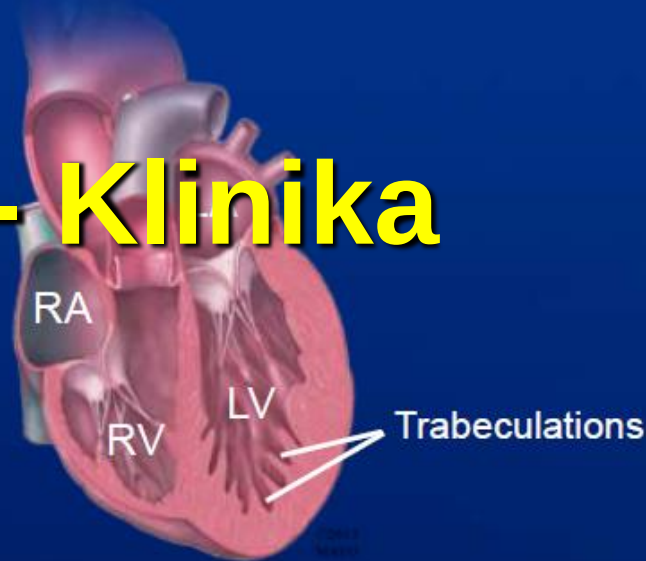
Niescalenie lewej komory



Variant Phenotype of Genetic Cardiomyopathy?

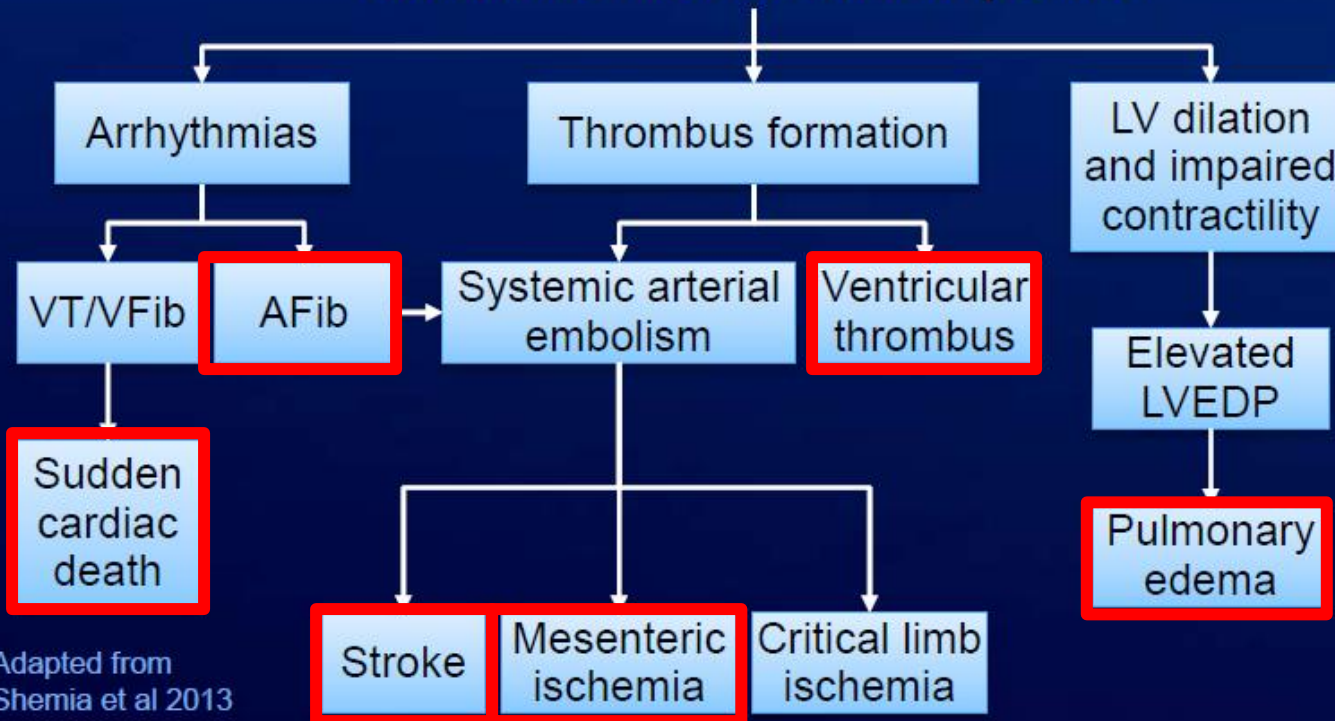


LVNC - Klinika



Oeschlin and Jenni EHJ 2010

Isolated Ventricular Noncompaction



Stanton...Friedman AJC 2009

Adapted from
Shemia et al 2013

How Much Do We Know About ILVN

Rare, but visible

Tip of iceberg

- Sudden death
- Stroke
- Heart failure

Common, but
not seen

How deep
is the
base?

- Normal variants are underdiagnosed and may be common and benign (athletes, african americans)
- Sequelae related to other co-condition (DCM, HCM, etc)

HRS/EHRA Expert Consensus Statement on the State of Genetic Testing for the Channelopathies and Cardiomyopathies

STATE OF GENETIC TESTING FOR LEFT VENTRICULAR NONCOMPACTION (LVNC)

State of Genetic Testing

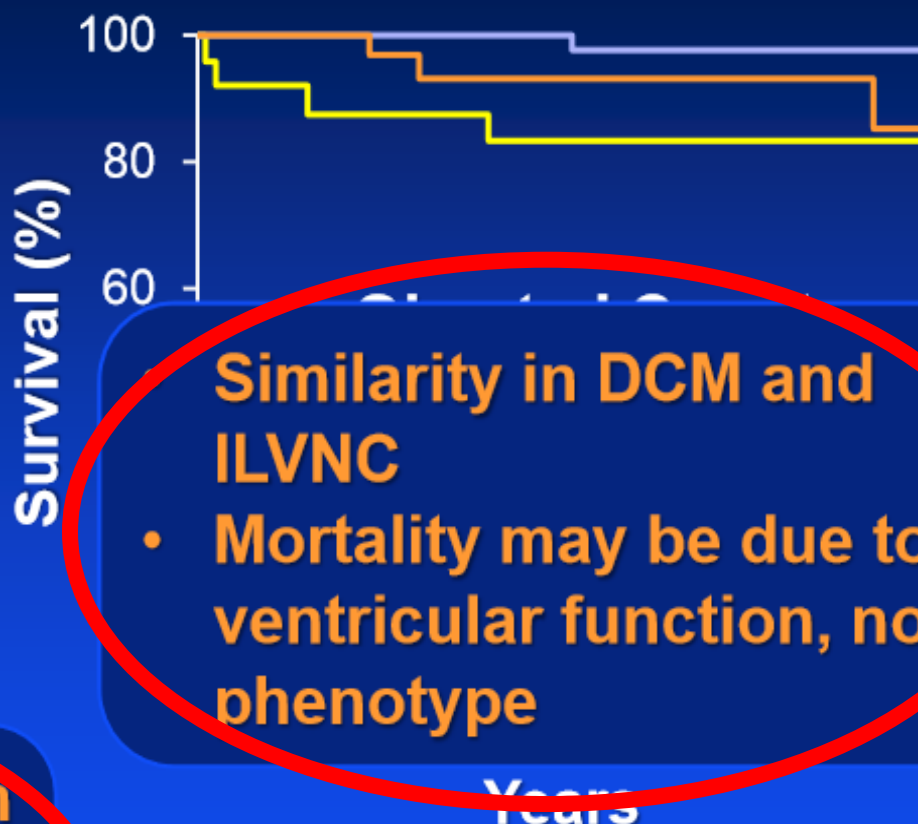
Badania genetyczne są pomocne w wyłonieniu nosicieli choroby

Aktualnie nie są pomocne w podjęciu decyzji o implantacji ICD

LVNC genetic testing can be useful for patients in whom a cardiologist has established a clinical diagnosis of LVNC based on examination of the patient's clinical history, family history, and electrocardiographic/echocardiographic phenotype.

Mortality ILVC, DCM and Controls

- ILVC (n=30) vs DCM vs community controls
- Reviewed 141,047 echos 2001-2006: Found in 0.02%
- Used Jenni echo criteria
- Mean age at dx: 39



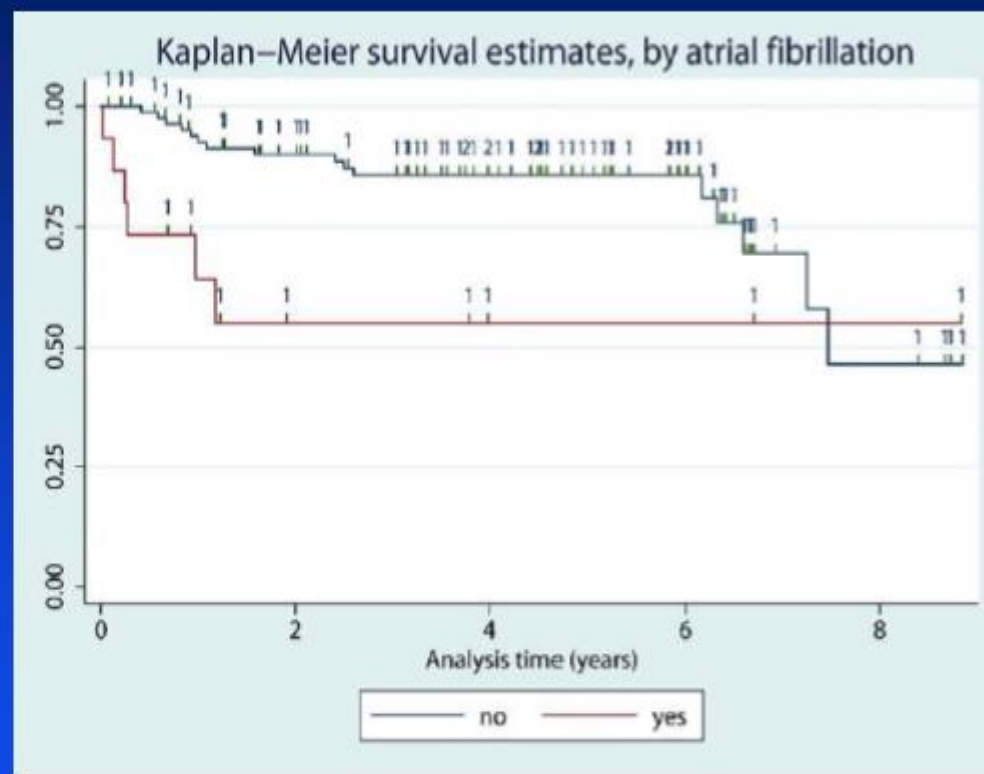
- No deaths in patient with ILVNC and normal EF
- All ILVNC who died >70 y/o and had low EF

- Death: 3 ILVNC, 5 DC, 1 control
- CVA: 2 DC, none ILVNC
- Mean f/u 2.5 years

Does AF predict a worse outcome in ILVNC

Findings	Total <i>n</i> (%) (<i>n</i> =102)	with AF <i>n</i> (%) (<i>n</i> =15)	without AF <i>n</i> (%) (<i>n</i> =87)
Left ventricular enddiastolic diameter*, mm (±SD)	63.9(12.8)	67.4(10.6)	63.3(13.1)
Left ventricular fractional shortening*, % (±SD)	23.1(11.3)	14.3(3.9)	24.6(11.5)***
Interventricular septal thickness*, mm (±SD)	12.4(3.1)	12.4(2.8)	12.4(3.2)
Left ventricular posterior wall thickness*, mm (±SD)	12.4(2.9)	12.6(3.0)	12.3(2.9)
Valvular abnormalities, <i>n</i> (%)	55(54.5)	13(92.9)	42(48.3)***
LVHT location			
Apex, <i>n</i> (%)	95(93.1)	15 (100)	80(92.0)
Anterior wall, <i>n</i> (%)	3(2.9)	0 (0)	3(3.4)
Posterior wall, <i>n</i> (%)	17(16.7)	3(20.0)	14(16.1)
Lateral wall, <i>n</i> (%)	45(44.1)	13(86.7)	32(36.8)***
LVHT extension, ventricular segments*, (±SD)	1.6(0.7)	2.1(0.6)	1.5(0.7)***

*mean; ** $p < 0.05$, *** $p < 0.01$.



Patients with AF have a worse prognosis. This may reflect more advanced disease.



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CARDIOLOGY®

Europace
doi:10.1093/europace/eut272

HRS/EHRA/APHRS CONSENSUS STATEMENT

Executive summary: HRS/EHRA/APHRS expert consensus statement on the diagnosis and

No mention of idiopathic left ventricular noncompaction

Document Reviewers: Michael Ackerman (USA), Bernard Belhassen (Israel), N. A. Mark Estes III (USA), Diane Fatkin (Australia), Jonathan Kalman (Australia), Elizabeth Kaufman (USA), Paulus Kirchhof (UK and Germany), Eric Schulze-Bahr (Germany), Christian Wolpert (Germany), Jitendra Vohra (Australia), Marwan Refaat (USA), Susan P. Etheridge (USA), Robert M. Campbell (USA), Edward T. Martin (USA), Swee Chye Quek (Singapore)

The di

investigation, is subject to F.R.E. 408, and is subject to final DOJ authorization.

Little practical guidance for the clinician, but endorse ICD concept

major complications of this disorder. Sudden death can occur at any age, and there are currently no techniques clinically useful for risk stratification for life-threatening arrhythmias with noncompaction. A impairment of systolic function, ventricular dysfunction is frequent in noncompaction. Approximately 50% of patients with noncompaction demonstrate arrhythmias. Available clinical data indicate that ICD is the most common cause of mortality in patients with noncompaction. In the absence of prospective trials or registry data, the current clinical data indicate that placement of an ICD is a reasonable strategy to reduce the risk of sudden death in patients with noncompaction. (Level of Evidence: C) clinical strategy (410,413–421).|

CLASS IIa

1. ICD therapy may be considered in patients with nonischemic heart disease who have an LVEF of less than or equal to 35% and who are in NYHA functional Class I. (Level of Evidence: C)
2. ICD therapy may be considered for patients with long-QT syndrome and risk factors for SCD. (Level of Evidence: B) (16,349–354)
3. ICD therapy may be considered in patients with syncope and advanced structural heart disease in whom thorough invasive and noninvasive investigations have failed to define a cause. (Level of Evidence: C)
4. ICD therapy may be considered in patients with a familial cardiomyopathy associated with sudden death. (Level of Evidence: C)
5. ICD therapy may be considered in patients with LV noncompaction. (Level of Evidence: C)

T. Bruce Ferguson, Jr, MD, FACC, FAHA*

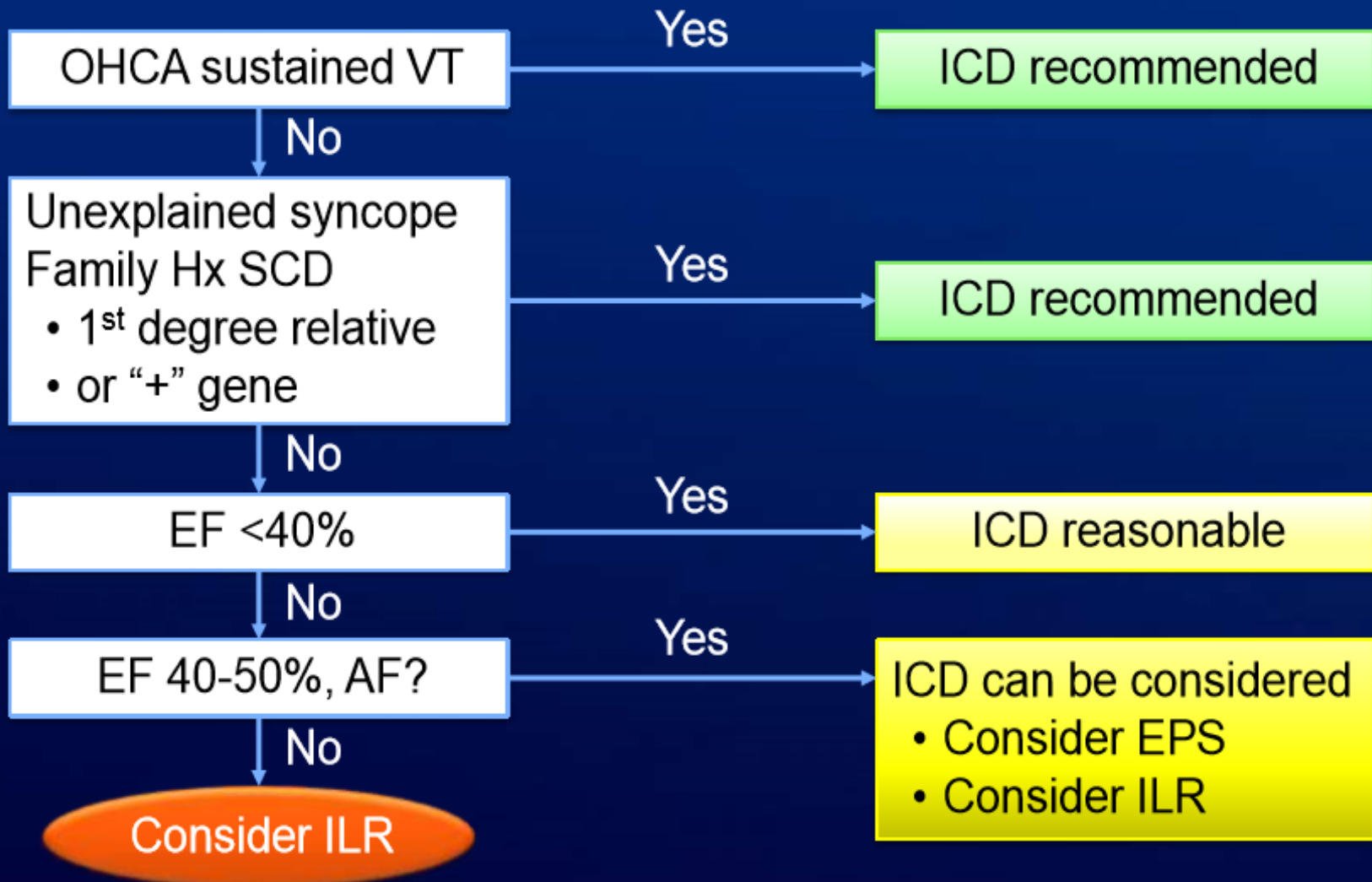
Pamela E. Karasik, MD, FACC, FHRS†

Joseph E. Marine, MD, FACC, FHRS†; Mark I.

Amit J. Shanker, MD, FACC, FHRS‡; Michael J. Silka, MD

William G. Stevenson, MD, FACC, FAHA, FHRS***; Paul D. Varosy, MD, FACC, FHRS†

ICD in Isolated Left Ventricular Non-Compaction Adults



VT? AF?

Unpublished recommendation

Niewydolność serca

problemy

„nowoczesnych” chorych

Zaostrzenia HF – podstawowa przyczyna hospitalizacji chorych z HF



**20-30% rehospitalizacji
w ciągu 2-3 miesięcy po wypisie**

HF: przyczyny wczesnej rehospitalizacji

- Nieodpowiednia farmakoterapia podczas hospitalizacji
- Zbyt krótka hospitalizacja
- Nieodpowiednia edukacja chorych

Chory z niewydolnością serca



European Journal of Heart Failure (2014) 16, 1230–1240
doi:10.1002/ejhf.170

Diuretic response in patients with acute decompensated heart failure: characteristics and clinical outcome—an analysis from RELAX-AHF

Adriaan A. Voors^{1*}, Beth A. Davison², John R. Teerlink³, G. Michael Felker⁴, Gad Cotter², Gerasimos Filippatos⁵, Barry H. Greenberg⁶, Peter S. Pang⁷, Bruce Levin⁸, Tsushung A. Hua⁹, Thomas Severin⁹, Piotr Ponikowski¹⁰, Marco Metra¹¹, for the RELAX-AHF Investigators

Chory z niewydolnością serca



European Journal of Heart Failure (2014) 16, 1230–1240
doi:10.1002/ejhf.170

Diuretic response in patients with acute

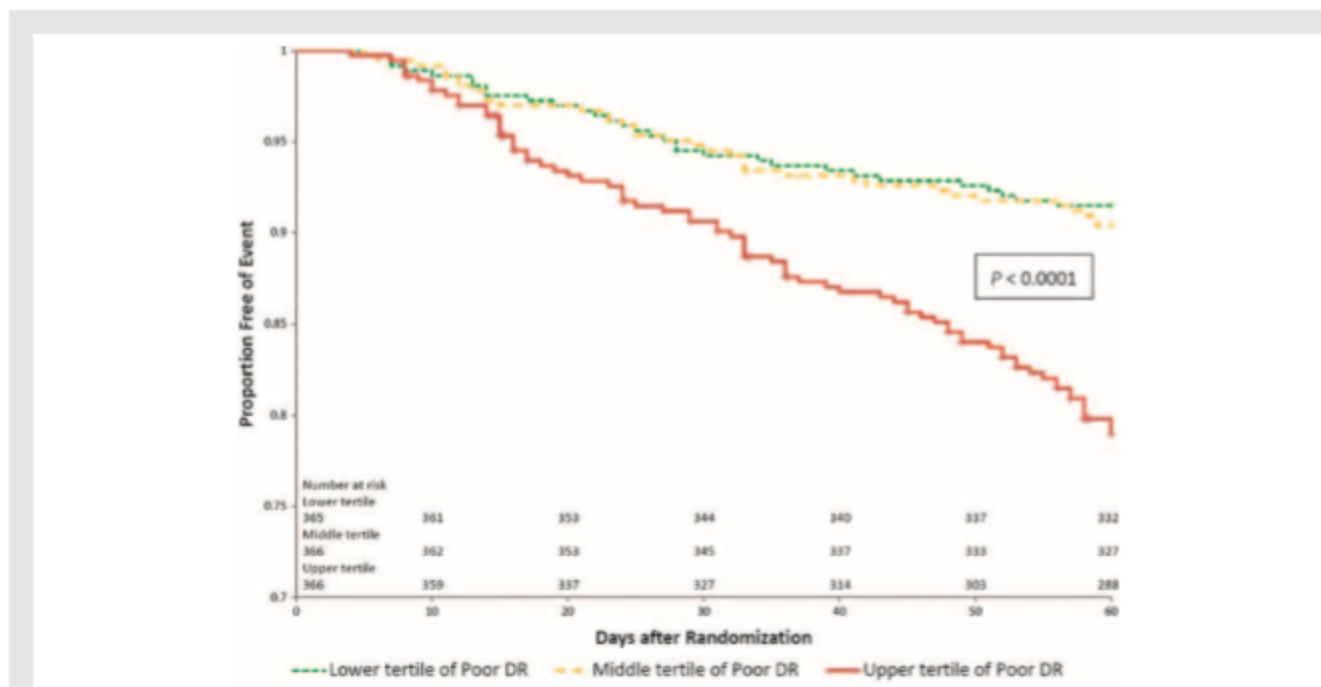
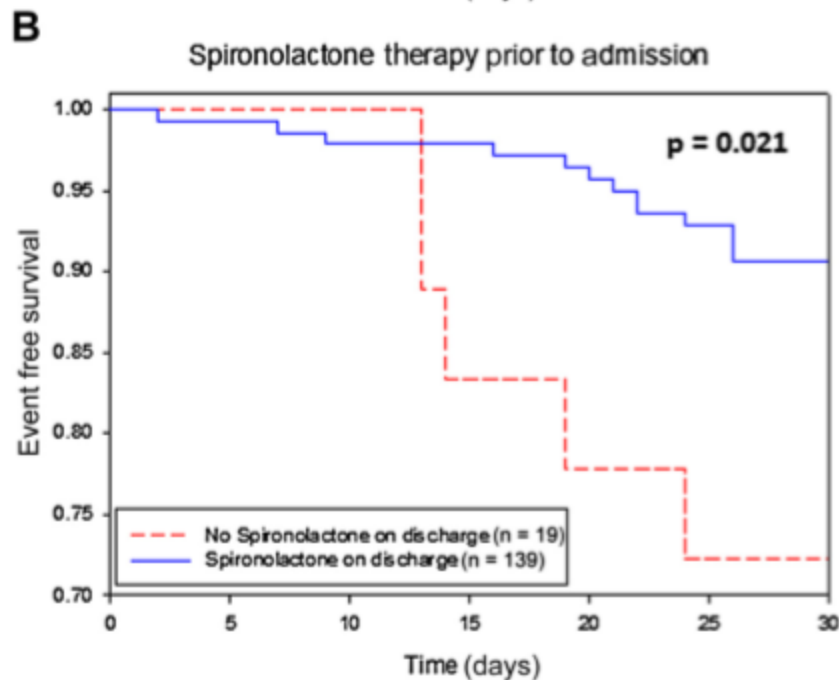
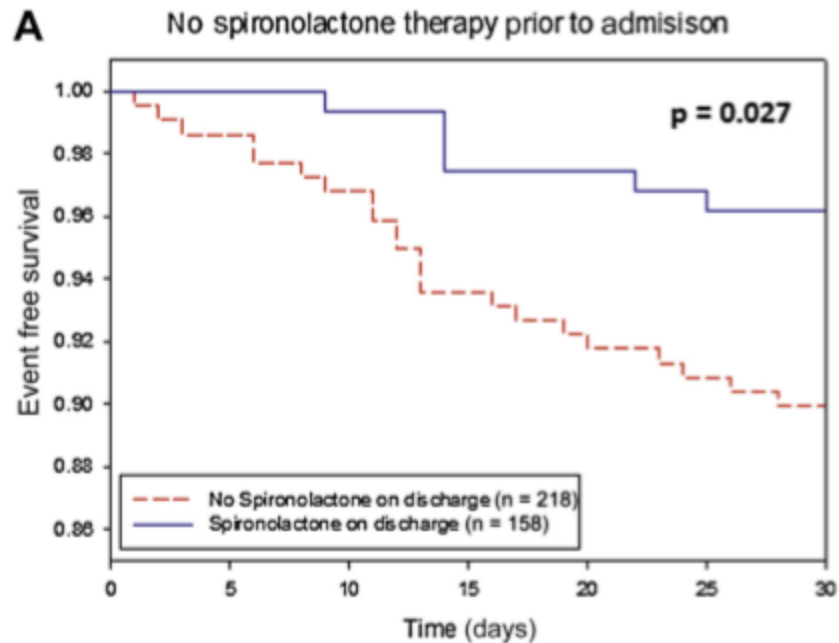


Figure 2 Kaplan–Meier survival curves presenting death or HF/RF readmission through day 60 according to tertiles of diuretic response. $P < 0.0001$ for log-rank test comparing diuretic response tertiles.

SPIRONOLACTONE



Maisel A, Am J Cardiol, 2014

HF a częstotliwość akcji serca

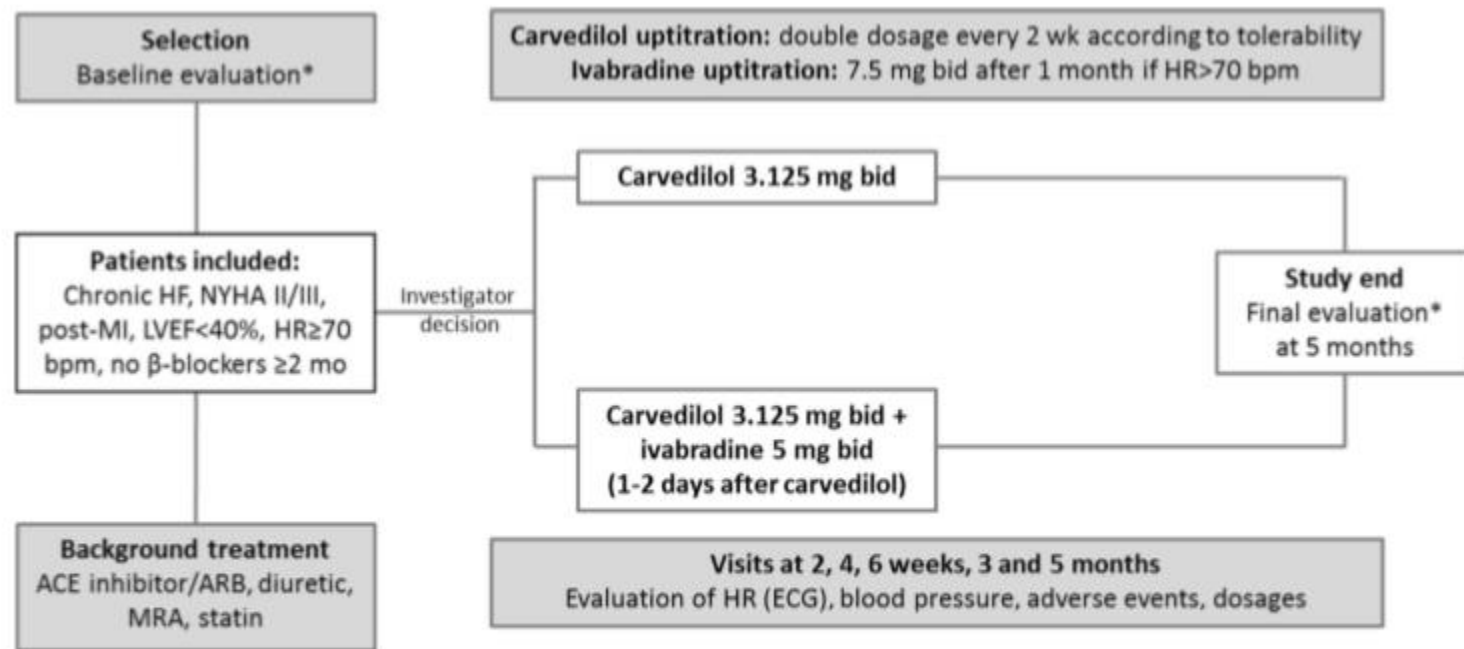
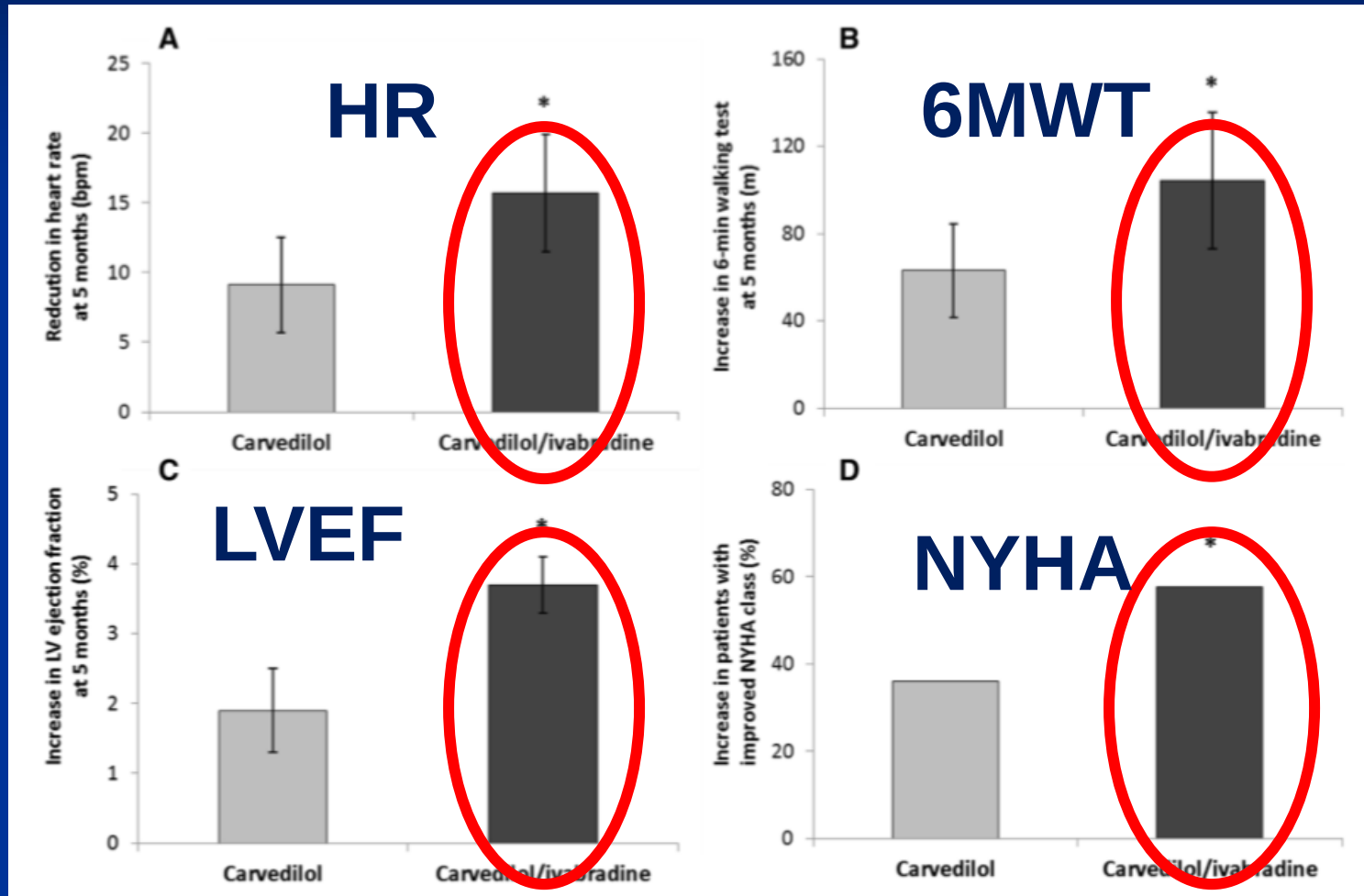


Fig. 1 Study design. *Baseline and final evaluations: laboratory tests, electrocardiography (ECG), echocardiography (ECHO), 6-min walking test, New York Heart Association (NYHA) class. *HF* heart failure, *HR* heart rate, *MI* myocardial infarction,

LVEF left ventricular ejection fraction, *ACE* angiotensin-converting enzyme, *ARB* angiotensin II receptor blocker, *MRA* mineralocorticoid receptor antagonist, *Bid* twice daily, *Mo* month

HF: carvedilol + ivabradyna



Terapia skojarzona w kardiologii

Nadciśnienie tętnicze

Hypertension

JOURNAL OF THE AMERICAN HEART ASSOCIATION

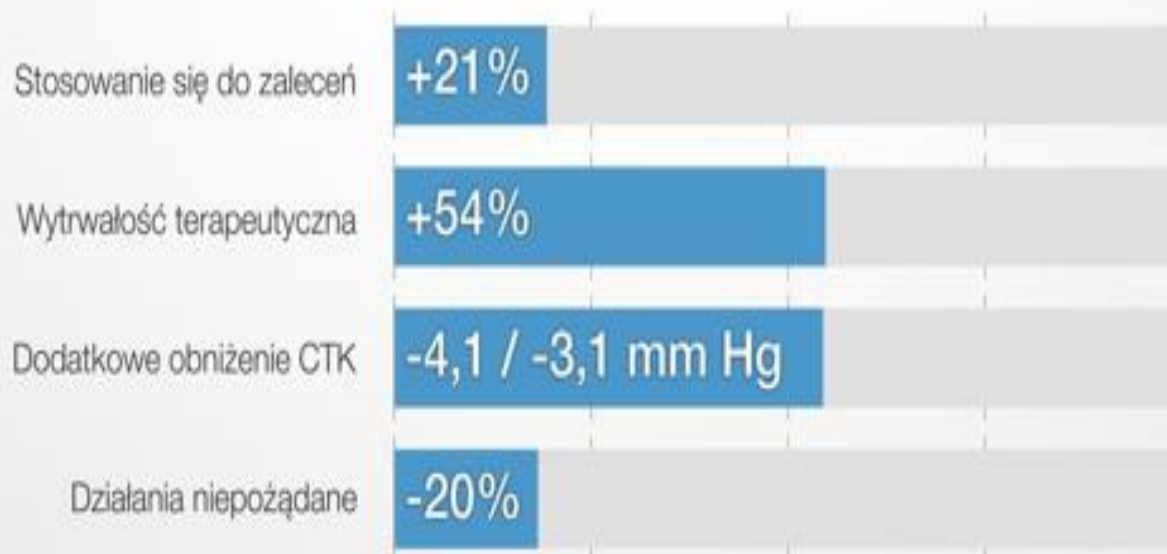


American
Heart
Association®

Compliance, Safety, and Effectiveness of Fixed-Dose Combinations of Antihypertensive Agents: A Meta-Analysis

Ajay K. Gupta, Shazia Arshad and Neil R. Poulter

Stosowanie preparatów złożonych w NT





Strategia terapii hipotensyjnej wg zaleceń PTNT 2015

PTNT 2015

Wybierz pomiędzy

Nadciśnienie łagodne
Obniżenie RR o $< 20/10$



Nadciśnienie umiarkowane
i ciężkie
Obniżenie RR o $> 20/10$



Jeden lek

Kombinacja dwóch leków

Ten sam lek
w pełnej dawce

Zmień na inny
lek

Ta sama kombinacja
w pełnej dawce

Dodaj trzeci lek

Połączenie 2 lub 3 leków
w pełnych dawkach

Monoterapia
pełną dawką

Kombinacja 3 leków
w pełnych dawkach

Ciśnienie nadal wysokie

Ciśnienie nadal wysokie



Strategia terapii hipotensyjnej wg zaleceń PTNT 2011

PTNT 2015

Wybierz pomiędzy

Nadciśnienie łagodne
Obniżenie RR o $< 20/10$



Nadciśnienie umiarkowane
i ciężkie
Obniżenie RR o $> 20/10$



Jeden lek
(z grupy podstawowej)

Kombinacja dwóch leków
(preferowane preparaty złożone)

Ciśnienie nadal wysokie

Rozpoczynanie leczenia nadciśnienia
tętniczego II stopnia od leków złożonych

Ciśnienie nadal wysokie

Ten sam lek
w pełnej dawce

Zmierz

Połączenie 2 lub 3 leków
w pełnych dawkach

Monoterapia
pełną dawką

Kombinacja 3 leków
w pełnych dawkach

Choroba niedokrwienna serca

- **Nowe wytyczne NSTEMI (2015)**
- **Wytyczne rewaskularyzacji (2014)**
- **Wytyczne terapii stabilnej CAD (2013)**
- **Wytyczne STEMI (2012)**

Choroba niedokrwienna serca



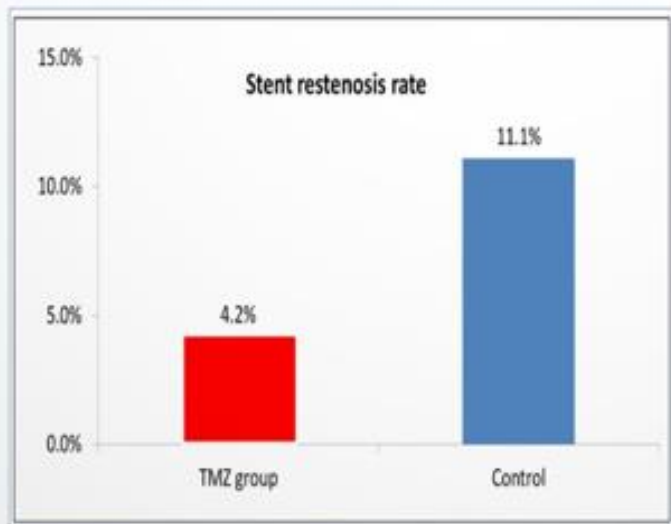
Contents lists available at ScienceDirect
International Journal of Cardiology
journal homepage: www.elsevier.com/locate/ijcard



Chronic treatment with trimetazidine after discharge reduces the incidence of restenosis in patients who received coronary stent implantation: A 1-year prospective follow-up study

Jinsong Chen¹, Shandun Zhou¹, Jing Jin, Feng Tian, Yanfeng Han, Jing Wang, Jie Liu, Yundai Chen^{*}

¹Division of Cardiology, Chinese PLA General Hospital, Beijing 100031, China



Yundai Chen, et al. Int J Cardiol. 2014 Jul 1;174(3):634-9.

ATP PCI

The efficacy and safety of Trimetazidine in Patients with angina pectoris having been treated by percutaneous Coronary Intervention.

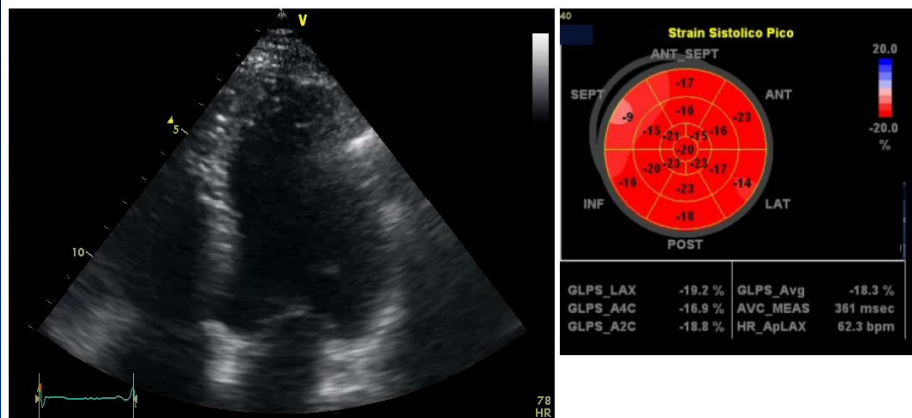
Skuteczność i bezpieczeństwo stosowania Trimetazydyny MR u pacjentów z dusznicą bolesną leczonych przezskórną interwencją wieńcową.

międzynarodowe, wieloośrodkowe, randomizowane, prowadzone metodą podwójnie ślepej próby, kontrolowane za pomocą placebo

Pierwszorzędowy złożony punkt końcowy:

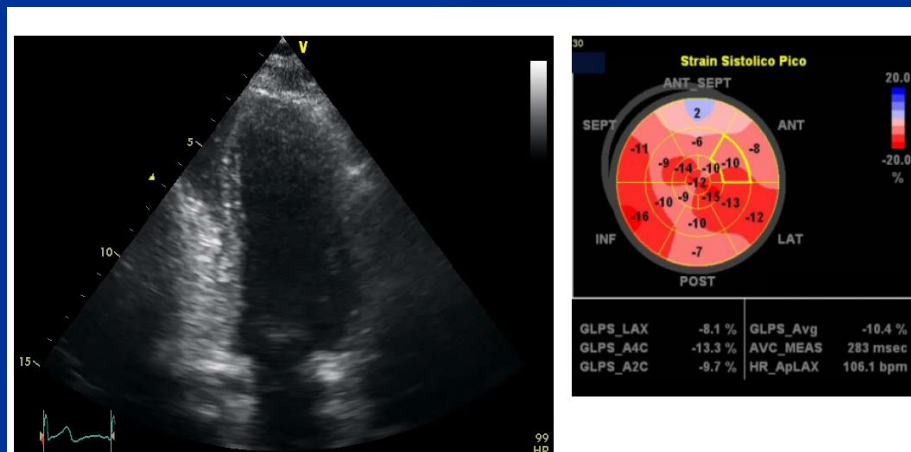
- Zgon z przyczyn sercowych
 - Hospitalizacja z powodu zdarzenia sercowego
 - Nawracająca lub uporczywa dławica piersiowa, wymagająca dołączenia nowego leku, zmiany leczenia lub zwiększenia dawki jednego z leków przeciwdławicowych o potwierdzonej skuteczności
 - Wykonanie angiografii wieńcowej
-
- Zastosowanie leku dodatkowo do zalecanego leczenia ChW po PCI
 - 5 300 pacjentów z ChW w 54 krajach (800 ośrodków)

Kardioonkologia



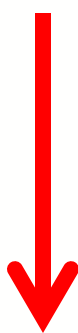
EF 67%

**Chemioterapia
(antracykliny)**



EF 43%

Cardiotoxicity due to Anthracyclines

- ✓ Early onset: during therapy or within first year after treatment: 1.6-2.1%.
 - ✓ Cumulative dose dependent toxicity:
 - 1.7% at 300 mg/m²
 - 4.7% at 400 mg/m²
 - 15% at 500 mg/m²
 - 48% at 650 mg/m²
- 

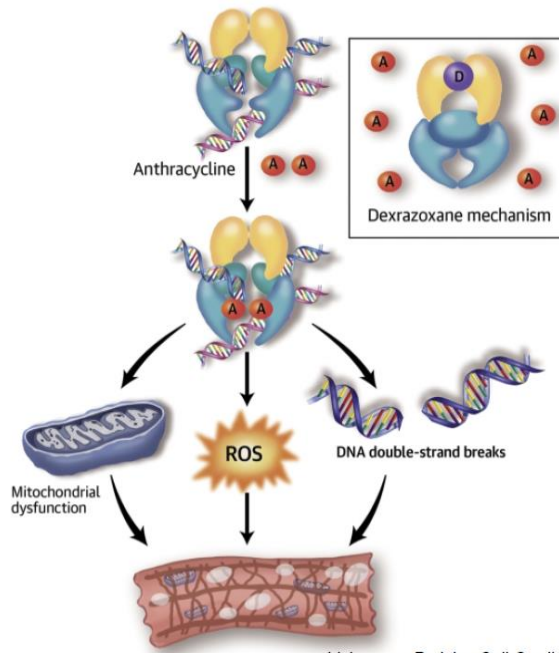
Cardiotoxicity due to Anthracyclines

Cardiotoxicity due to Anthracyclines

✓ Early
treat

✓ Cum

– 1.
– 4.
– 15
– 48



Vejpongsa P. J Am Coll Cardiol. 2014;64(9):938-945.

- ✓ ROS generation, iron complex leading to mitochondrial dysfunction, cell membrane damage and reducing nitric oxide synthase function.
- ✓ Impairs mitochondrial ATP synthesis.
- ✓ Inhibits Topoisomerase (Top 2 β).
- ✓ GTPase Rac1: an essential regulator of DNA damage.
- ✓ Inhibits cardiac progenitor cells.
- ✓ Impairs calcium signaling
- ✓ Inhibits prosurvival signaling (NRG-1 and ErbB inhibition).
- ✓ Irreversible.

r after

Cardiotoxicity due to Anthracyclines

CME

Anthracycline-Induced Cardiomyopathy

Clinical Relevance and Response to Pharmacologic Therapy

Daniela Cardinale, MD, PhD,* Alessandro Colombo, MD,* Giuseppina Lamantia, MD,* Nicola Colombo, MD,* Maurizio Civelli, MD,* Gaia De Giacomi, MD,* Mara Rubino, MD,† Fabrizio Veglia, PhD,† Cesare Fiorentini, MD,† Carlo M. Cipolla, MD*

Milan, Italy

Chemotherapy-induced cardiotoxicity is a rapidly evolving area, as well as one of growing interest, due to the increasing number of long-term cancer survivors. The most common clinical presentation of cardiotoxicity is a dose-dependent cardiomyopathy (CMP) leading to chronic heart failure (HF), frequently occurring after administration of chemotherapy including anthracyclines (ACs) (1,2).

Because most studies and registries have not specifically analyzed anthracycline-induced cardiomyopathy (AC-

(3,4). Data from oncology literature, however, indicate that more than one-half of all patients exposed to AC will show some degree of cardiac dysfunction 10 to 20 years after chemotherapy, and 5% of them will develop overt HF (5). As more than 60,000 patients are treated every year with AC in the U.S., the overall incidence of this complication is probably greatly underestimated (6). The onset of AC-CMP, even asymptomatic, not only negatively impacts the cardiac outcome of cancer patients (7,8), but also seriously

Conclusions

In cancer patients developing AC-CMP, LVEF recovery and cardiac event reduction may be achieved when cardiac dysfunction is detected early and a modern HF treatment is promptly initiated. (J Am Coll Cardiol 2010 55:213–20) © 2010 by the American College of Cardiology Foundation

From the European Institute of Oncology (D.C., A.C., G.L., N.C., M.R., C.M.C.), Milan, Italy. This study was funded by the European Institute of Oncology. Manuscript received January 2, 2009; revised manuscript received March 10, 2009; accepted March 10, 2009.

AC-CMP has been associated with an especially poor prognosis, with a 2-year mortality rate of up to 60% (3,14,15), and is also believed to be refractory to conven-

Cardiotoxicity due to Anthracyclines Management

- ✓ The reduction in LVEF of more than 20% from baseline despite adequate ventricular function or a decline of 10% to **fall to less than 45% require reassessment, treatment discontinuation and close clinical monitoring.** (Class I, Level of Evidence: C).

Monoclonal Antibodies: Trastuzumab.

- ✓ Asymptomatic LV dysfunction: 9.8%*
- ✓ Symptomatic severe HF: 2.7%*.
- ✓ Anthracycline combination**:
 - ✓ LV dysfunction: 16-20%
 - ✓ Severe HF: 15%.
- ✓ High Risk factors: HT, DM & CAD.
- ✓ Reversible: most cases are reversible after discontinue drugs or with HF treatment initiation during the first year.

*Procter M. J Clin Oncol 2010; 28: 3422

**Bowles EJ. J Natl Cancer inst 2012; 104: 1293

Cardiotoxicity due to Anthracyclines

- ✓ Traditional treatment (anthracyclines) has well known and irreversible complications
- ✓ New target therapies also have complications but are reversible.
- ✓ Key point: early detection and treatment.
- ✓ β-blockers, ACE inhibitors and statins are the present treatment.
- ✓ Multidisciplinary collaboration: cardio-oncology.

Nagły zgon sercowy u młodych ($< 35-40$ r.ż.)

Nagły zgon sercowy u młodych

Sudden death in young individuals

- SCD < 18 yrs: 0.5-1.5/ 100.000

*Wren et al. Sudden death in children and adolescents.
Heart 2002;88:426-431*

- SCD < 21 yrs: 3.0/ 100.000

*Bardai et al. Incidence, causes and outcome of OHCA in children.
J Am Coll Cardiol 2011;57:1822-8*

- SCD < 35 yrs: 2.9/ 100.000

*Winkel et al. Nation wide study of SCD in persons aged 1-35 years.
Eur Heart 2011.*

Nagły zgon sercowy u młodych

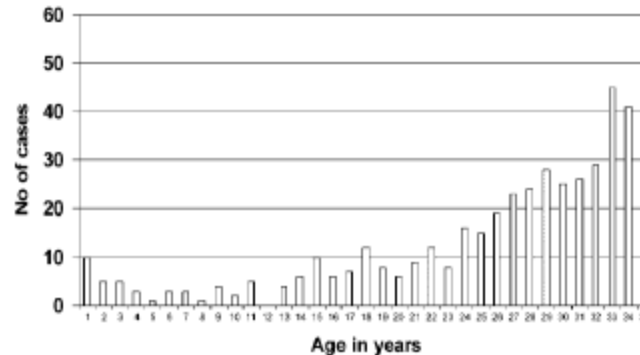
Epidemiology

♥ Male dominates

- 67% men
- 33% women

♥ Median age: 29 years

♥ For every decade, the risk of SCD roughly doubled compared to the previous decade



Nagły zgon sercowy u młodych

Epidemiology



♥ Male dominates

- 67% men
- 33% women

♥ Median age: 29 y

♥ For every decade
compared to the p

Epidemiology

♥ Witnessed deaths: 45%

♥ Out of Hosp deaths: 89%

♥ Death during sleep: 34%

♥ Death during any kind of physical activity: 11%

Place of death, (n = 417)	n	~%
At home	285	68
In-hospital deaths	44	11
of which death in emergency room	12	3
of which death during hospitalization	32	8
Public area	73	18
At work	15	4
Activity at death, (n = 409)	n	~%
Awake and relaxed	206	50
Sleeping	141	34
Eating	7	2
Moderate to high intensity activity including sport	43	11
At general practitioner	4	1
Waken up by loud noise	2	0
Aroused state of mind (exaltated)	3	1
Shower	3	1

Winkel BG, et al. EurHJ, 2010

Nagły zgon sercowy u młodych

Total pediatric SD 9.0/100000 pediatric persons-years
cardiac causes 3.2/100000 pp-years

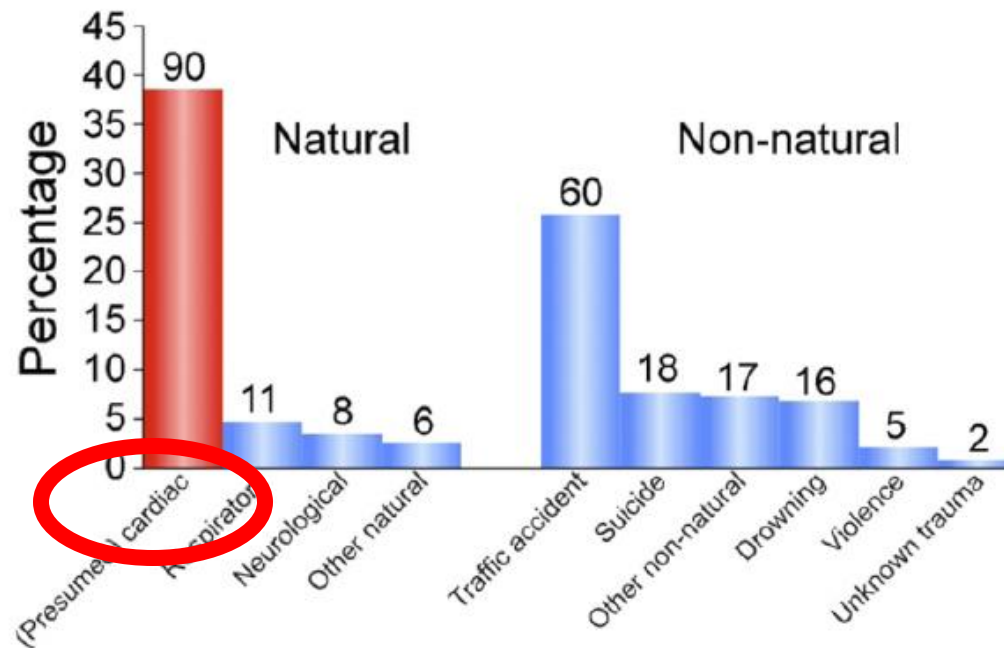


Figure 1 Causes of Out-of-Hospital Cardiac Arrest

Nagły zgon sercowy u młodych

*Total pediatric SD 9.0/100000 pediatric persons-years
cardiac causes 3.2/100000 pp-years*

Sudden death in young individuals

Post mortem investigation of the deceased ind.

Figure 1 Causes of Out-of-Hospital Cardiac Arrest

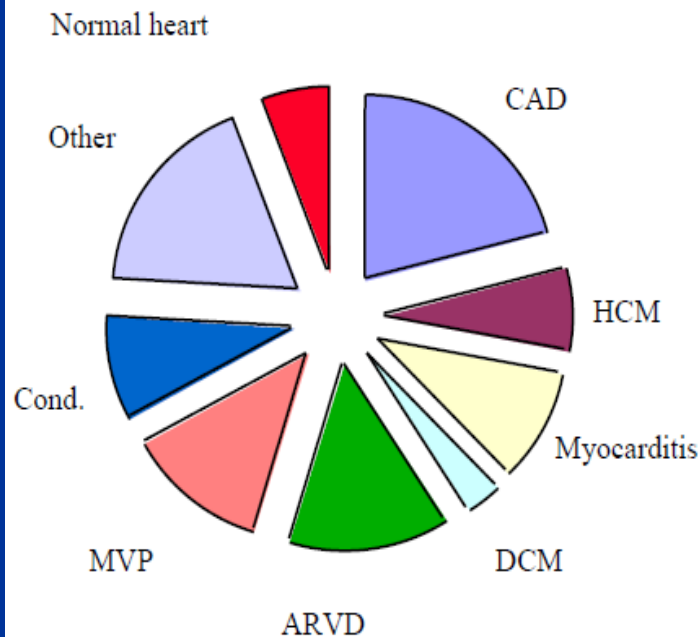
Bardai A, et al. JACC, 2011

The Burden of Sudden Cardiac Death in Persons Aged 1–49 Years – A Nationwide Study in Denmark

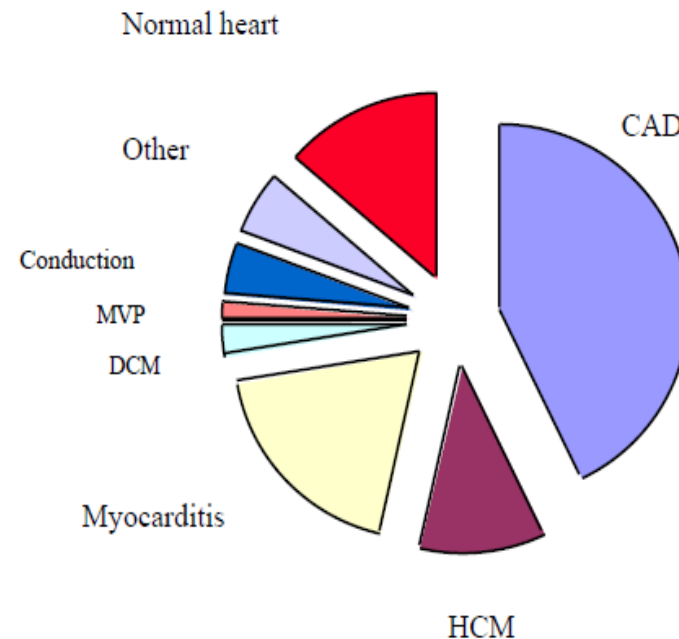
Bjarke Risgaard, Bo Gregers Winkel, Reza Jabbari, Elijah R. Behr, Ole Ingemann-Hansen, Jørgen Lange Thomsen, Gyda Lolk Ottesen, Gunnar Gislason, Henning Bundgaard, Stig Haunso, Anders Gaarsdal Holst and Jacob Tfelt-Hansen

Circ Arrhythm Electrophysiol. published online March 6, 2014;
Circulation: Arrhythmia and Electrophysiology is published by the American Heart Association, 7272 Greenville Avenue

Sudden death in young individuals



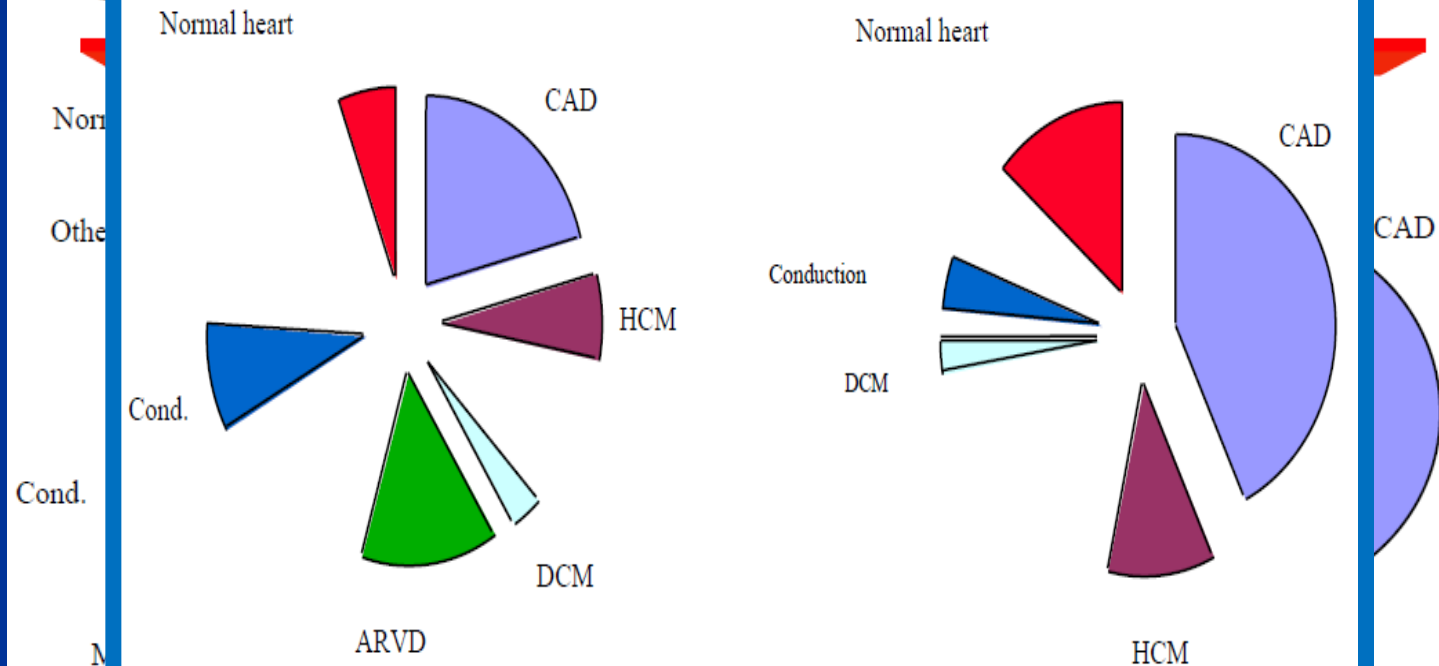
Basso et al, 2001 (Italy)
N=273, Age:1-35



Drory et al, 1991 (Israel)
N=138, Age:9-39

The Burden of Sudden Cardiac Death in Persons Aged 1–49 Years – A Nationwide Study in Denmark
Bjarke Risgaard, Bo Gregers Winkel, Reza Jabbari, Elijah R. Behr, Ole Ingemann-Hansen, Jørgen

Sudden death in young individuals



potentially inherited diseases 60-75%

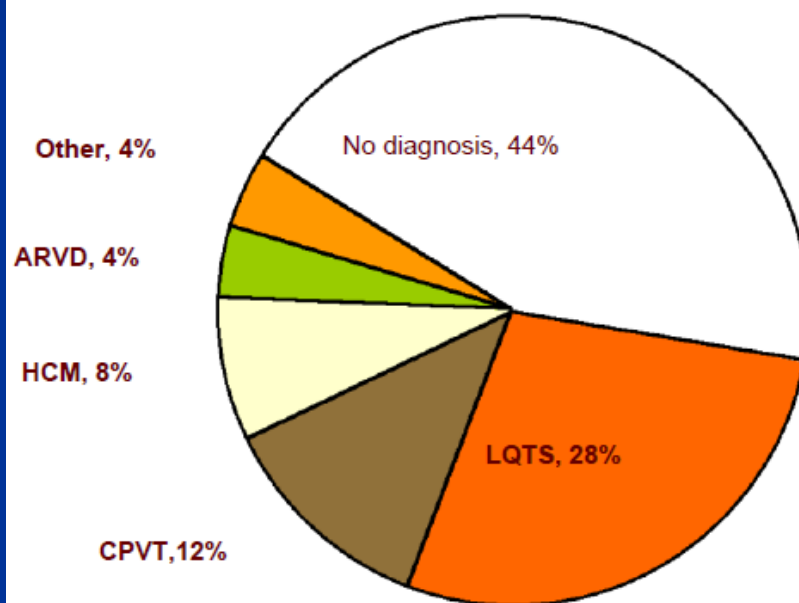
Nagły zgon sercowy u młodych

Family screening after SCD

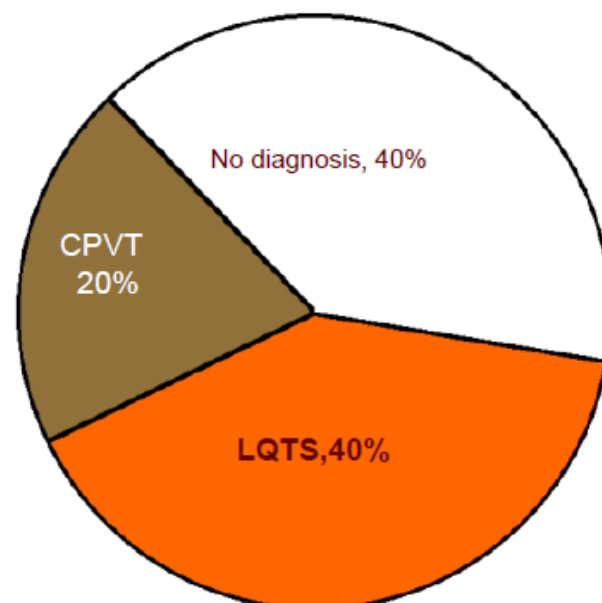
- ♥ 140 families with at least 1 S(C)D $\leq$ 50 years
- ♥ no diagnosis in the deceased individual(s)
- ♥ no diagnosis in family members
- ♥ Yield of routine cardiological evaluation
 - ECG, X-ECG, ECHO, bloodtesting, (MRI)
 - Patho-anatomical specimens revised
 - Molecular genetic screening (include Trop-T)

Nagły zgon sercowy u młodych

Family screening after SCD (children)



Family screening after SCD
(n=25)



Investigation proband after OHCA (n=10)

Nagły zgon sercowy u młodych

In conclusion:

Sudden cardiac death in the young

- ♥ is more prevalent than previously thought
- ♥ prevalence: $\pm 3/100000$ person-years
- ♥ is subject to genetic predisposition
- ♥ Pathology: 40-70% genetic cause
- ♥ expert investigation mandatory!
- ♥ Screening of relatives is fruitful!
 - $\pm 40\%$ diagnostic yield
 - $\leq 18y$ $\pm 60\%$ diagnostic yield (maximum?)

PODSUMOWANIE

- Nowe wytyczne ESC
- Nowe zastosowanie testów genetycznych (LVNC, rodziny osób zmarłych nagle w młodym wieku...)
- Nowe techniki w kardiologii inwazyjnej (elektroterapii)
- Czy wszyscy pts z $LVEF \leq 35\%$ potrzebują ICD?
- Nowe metody farmakoterapii – nie zawsze nowe leki, terapia złożona
- Nowe kierunki stratyfikacji ryzyka SCD: rodziny osób zmarłych nagle w młodym wieku

Dziękuję za uwagę