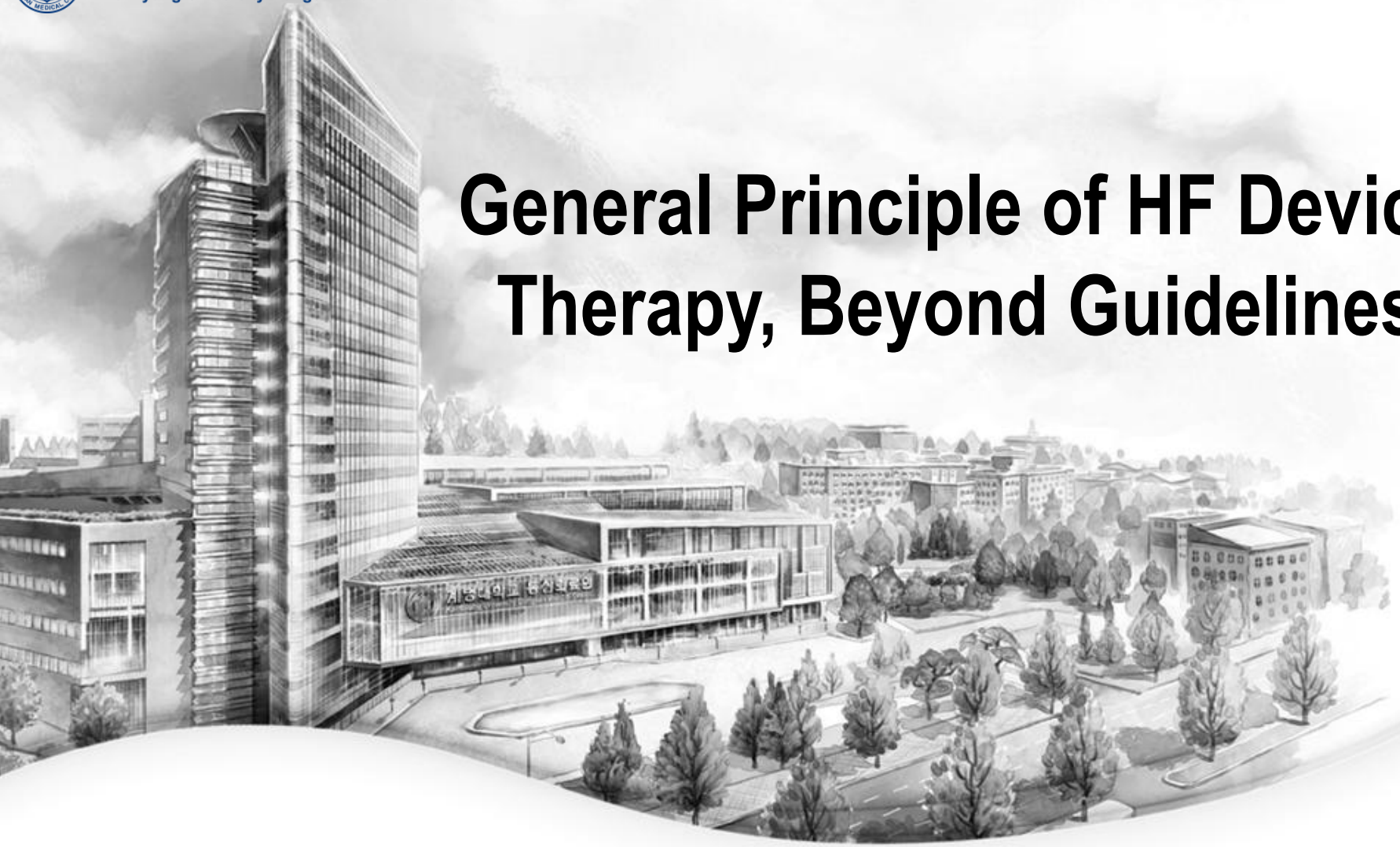
General Principle of HF Device Therapy, Beyond Guidelines



Seongwook Han, MD.PhD.
Professor of Medicine, Keimyung University School of Medicine
Arrhythmia Service, Cardiology, Dongsan Medical Center

Disclosure

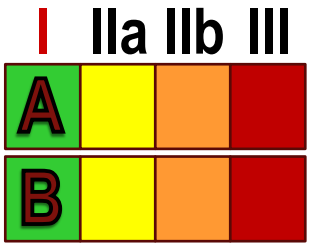
- ***Served as a speaker or a consultant***: Bayer, Biosense Webster, Boehringer Ingelheim, Boston Scientific, Bristol-Myers Squibb, Daiichi-Sankyo, Pfizer, Servier, St. Jude Medical

- ***Received research grants***: Servier, Yuhan

- ***Served as a member of advisory board***: Bayer, Boehringer Ingelheim, Bristol-Myers Squibb, Pfizer, Boston Scientific, Daiichi-Sankyo

2013 ACCF/AHA Guideline for the Management of Heart Failure

ICD therapy is recommended for ***primary prevention of SCD*** in selected patients with ***HFrEF*** at least 40 d post-MI with ***LV EF ≤35%*** and NYHA class ***II or III*** symptoms on chronic GDMT*, who are expected to live >1 y

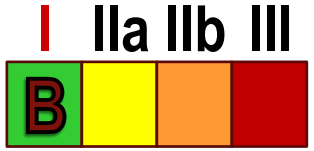


CRT is indicated for patients who have ***LVEF ≤ 35%*** , **sinus rhythm**, ***LBBB*** with a ***QRS ≥ 150 ms***, & ***NYHA class II, III, or ambulatory IV*** symptoms on GDMT*

**Guideline-Directed Medical Therapy*

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure



ICD therapy is recommended for ***primary prevention of SCD*** in selected patients with HFrEF at least 40 d post-MI with ***LV EF ≤30%*** and NYHA ***class I*** symptoms while receiving GDMT, who are expected to live >1 y

Yancy CW, et al. Circulation 2013;128:e240

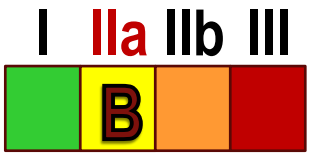
2013 ACCF/AHA Guideline for the Management of Heart Failure

CRT can be useful for patients who have ***LV EF ≤ 35%, sinus rhythm***, a ***non-LBBB*** pattern with a ***QRS ≥ 150 ms*** & NYHA class ***III/ambulatory IV*** symptoms on GDMT

CRT can be useful for patients who have ***LV EF ≤ 35%, sinus rhythm***, ***LBBB*** with a ***QRS 120 to 149 ms***, & NYHA class ***II, III, or ambulatory IV*** symptoms on GDMT

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure



CRT can be useful in patients with ***AF*** and ***LV EF ≤ 35%*** on GDMT if a) the patient ***requires ventricular pacing or otherwise meets CRT criteria*** and b) ***atrioventricular nodal ablation or rate control allows near 100% ventricular pacing with CRT***

CRT can be useful for patients on GDMT who have ***LVEF ≤ 35%,*** & are undergoing placement of a new or replacement device implantation with anticipated ***ventricular pacing (>40%)***

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure

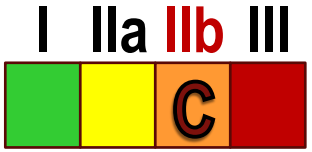
An **ICD** is of ***uncertain benefit*** to prolong meaningful survival in patients with a ***high risk of non-sudden death*** such as frequent hospitalizations, frailty, or severe comorbidities

CRT may be considered for patients who have ***LV EF ≤35%, sinus rhythm***, a ***non-LBBB*** with a ***QRS 120 to 149 ms***, and NYHA class ***III/ambulatory IV*** on GDMT

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure

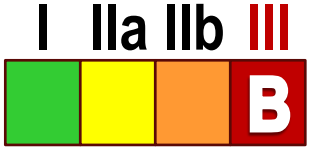
CRT may be considered for patients who have ***LV EF ≤35%, sinus rhythm***, a ***non-LBBB*** with a ***QRS ≥150 ms***, and NYHA ***class II*** symptoms on GDMT



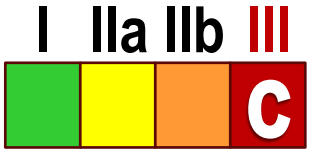
CRT may be considered for patients who have ***LV EF ≤30%, ischemic*** etiology of HF, ***sinus rhythm, LBBB with QRS ≥150 ms***, and NYHA ***class I*** symptoms on GDMT

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure



CRT is not recommended for patients with NYHA ***class I or II*** symptoms and ***non-LBBB*** with a ***QRS <150 ms***



CRT is not indicated for patients whose comorbidities and/or frailty limit survival to <1 y

Yancy CW, et al. Circulation 2013;128:e240

2013 ACCF/AHA Guideline for the Management of Heart Failure

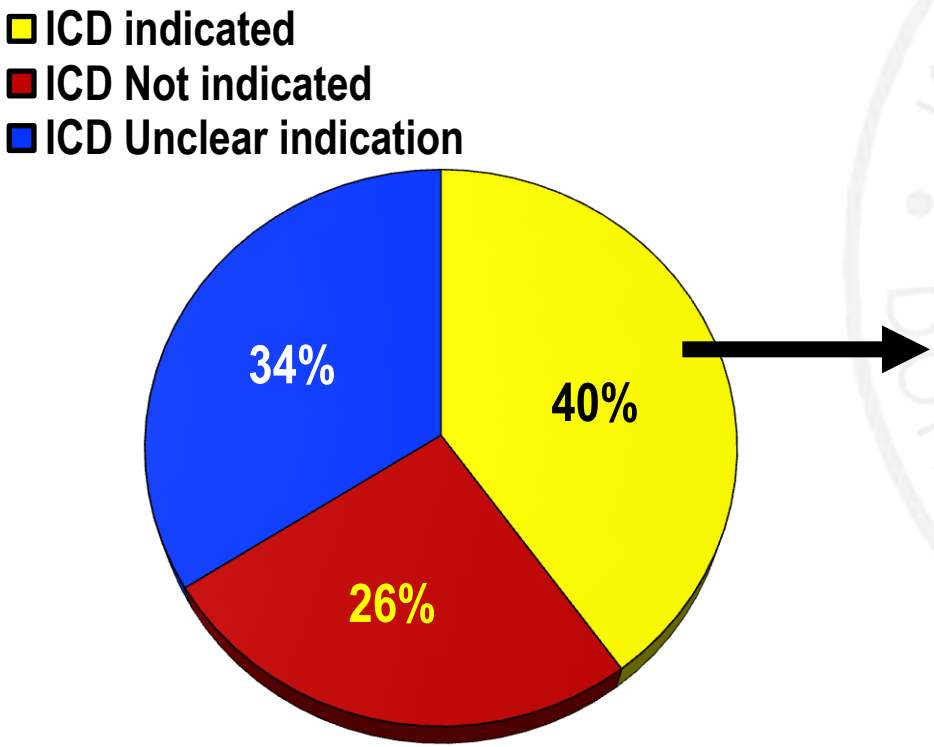
NYHA I	NYHA II	NYHA III/Ambulatory IV	Special Ix
LVEF ≤ 30% QRS ≥ 150ms LBBB, sinus Ischemic CM	LVEF ≤ 35% QRS ≥ 150ms LBBB, sinus	LVEF ≤ 35% QRS ≥ 150ms LBBB, Sinus	Anticipated to require frequent ventricular pacing (>40%)
QRS < 150 ms Non-LBBB	LVEF ≤ 35% QRS 120-149ms LBBB, Sinus	LVEF ≤ 35% QRS 120-149ms LBBB, Sinus	AF, if ventricular pacing is required & rate control will result in near 100% ventricular pacing with CRT
	LVEF ≤ 35% QRS ≥ 150ms Non-LBBB, sinus	LVEF ≤ 35% QRS ≥ 150ms Non-LBBB, Sinus	
	QRS ≤ 150ms Non-LBBB	LVEF ≤ 35% QRS 120-149ms Non-LBBB, Sinus	

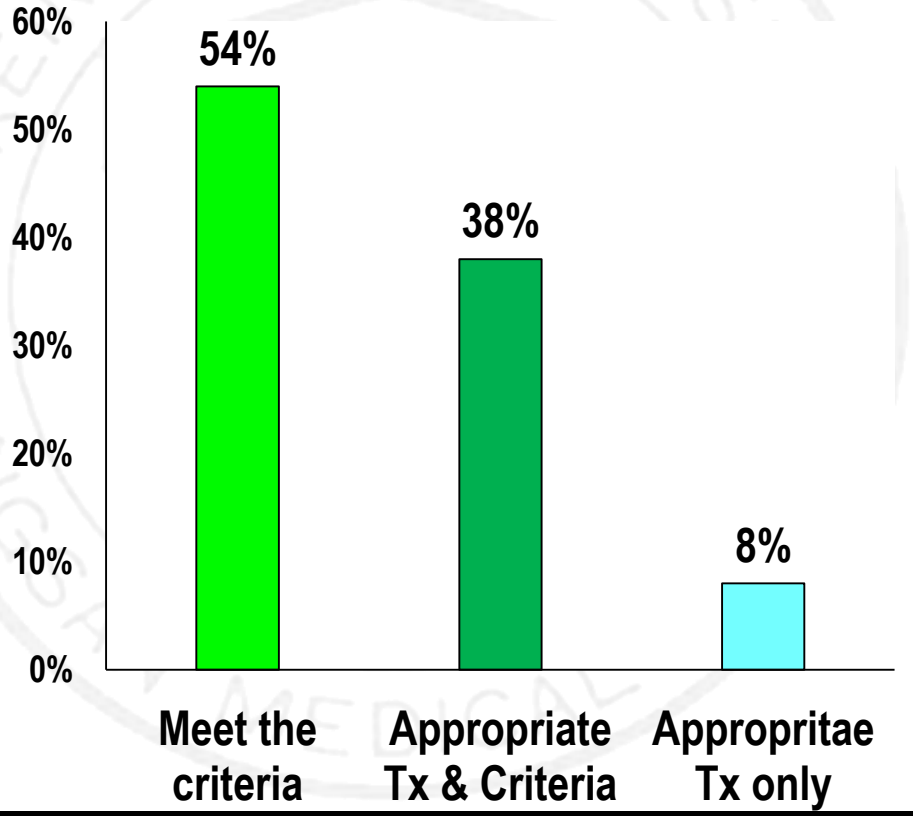
I IIa IIb III

Yancy CW, et al. Circulation 2013;128:e240

Appropriateness of Primary Prevention ICDs at the Time of Generator Replacement

- To determine how often patients with 1° prevention ICD meets guideline-derived indications at the time of generator replacement
- 231 patients from 2 VA hospitals in the US: Retrospective review

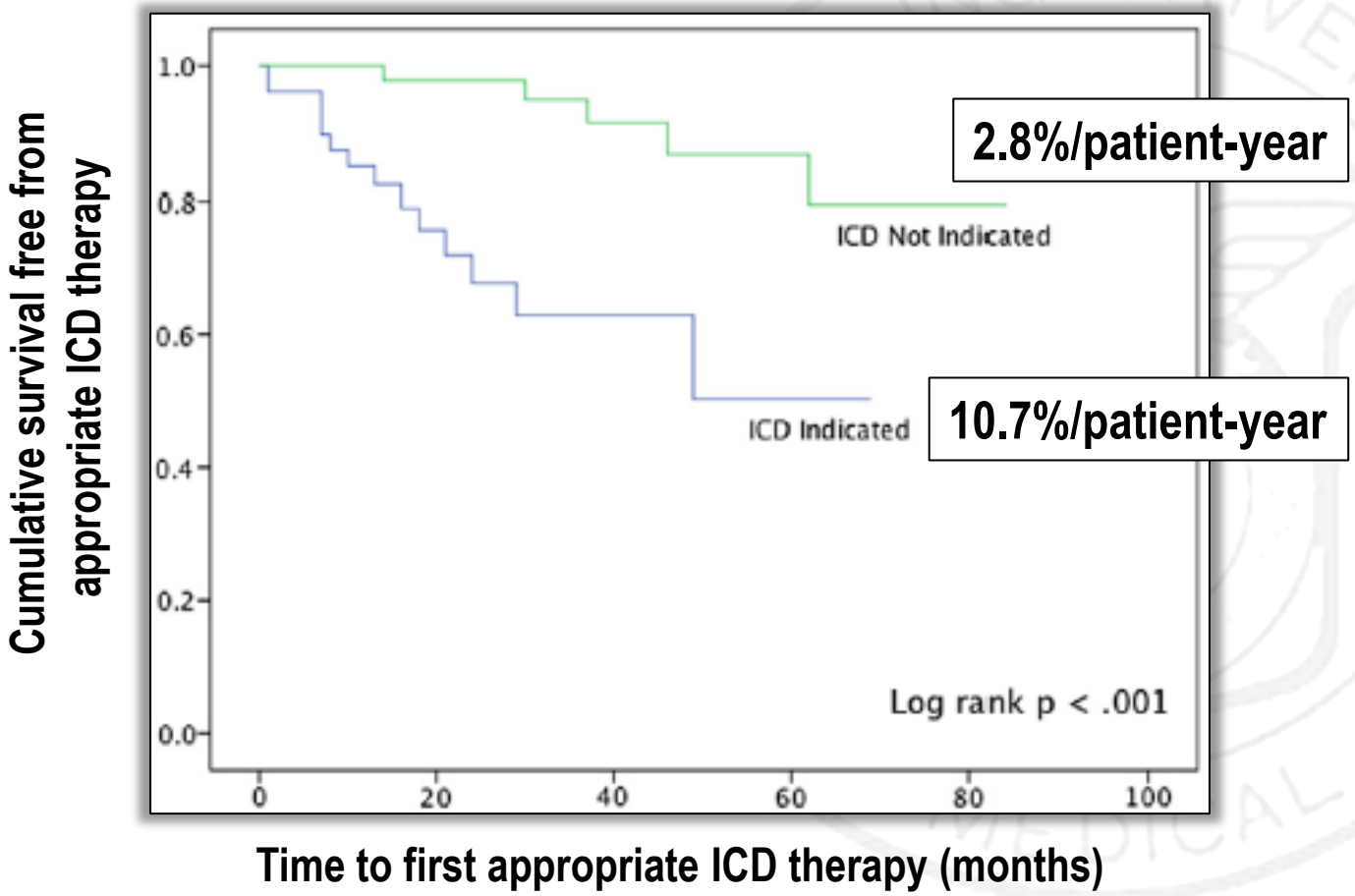




Kini V, et al. JACC 2014;63:2388

Appropriateness of Primary Prevention ICDs at the Time of Generator Replacement

Subsequent ICD therapies after elective generator replacement



Kini V, et al. JACC 2014;63:2388

Appropriateness of Primary Prevention ICDs at the Time of Generator Replacement

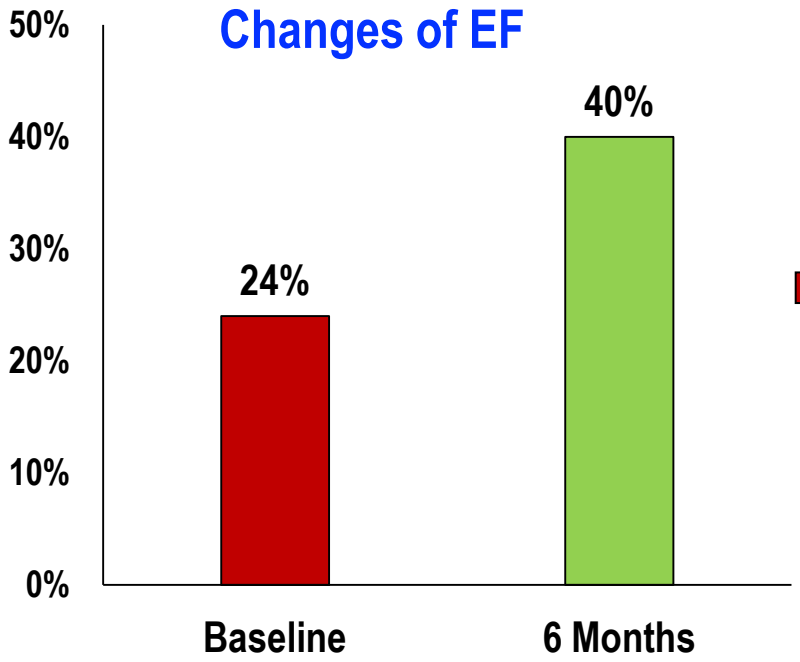
- ***Baseline LVEF of 30-35%*** (compared with LVEF of < 30%) was the only significant characteristic associated with a ***lower likelihood*** of ***meeting primary prevention ICD criteria*** at the time of generator replacement (OR: 0.52; 95% CI: 0.3 to 0.88; p=0.01)

- Patients with ***ICM tended to be more likely*** than patients with NICM to meet criteria for ICD at the time of generator replacement (OR: 1.89; 95% CII: 0.90 to 3.95; p=0.09)

Kini V, et al. JACC 2014;63:2388

Clinical and Demographic Predictors of Outcomes in Recent Onset DCM: *IMAC-2*

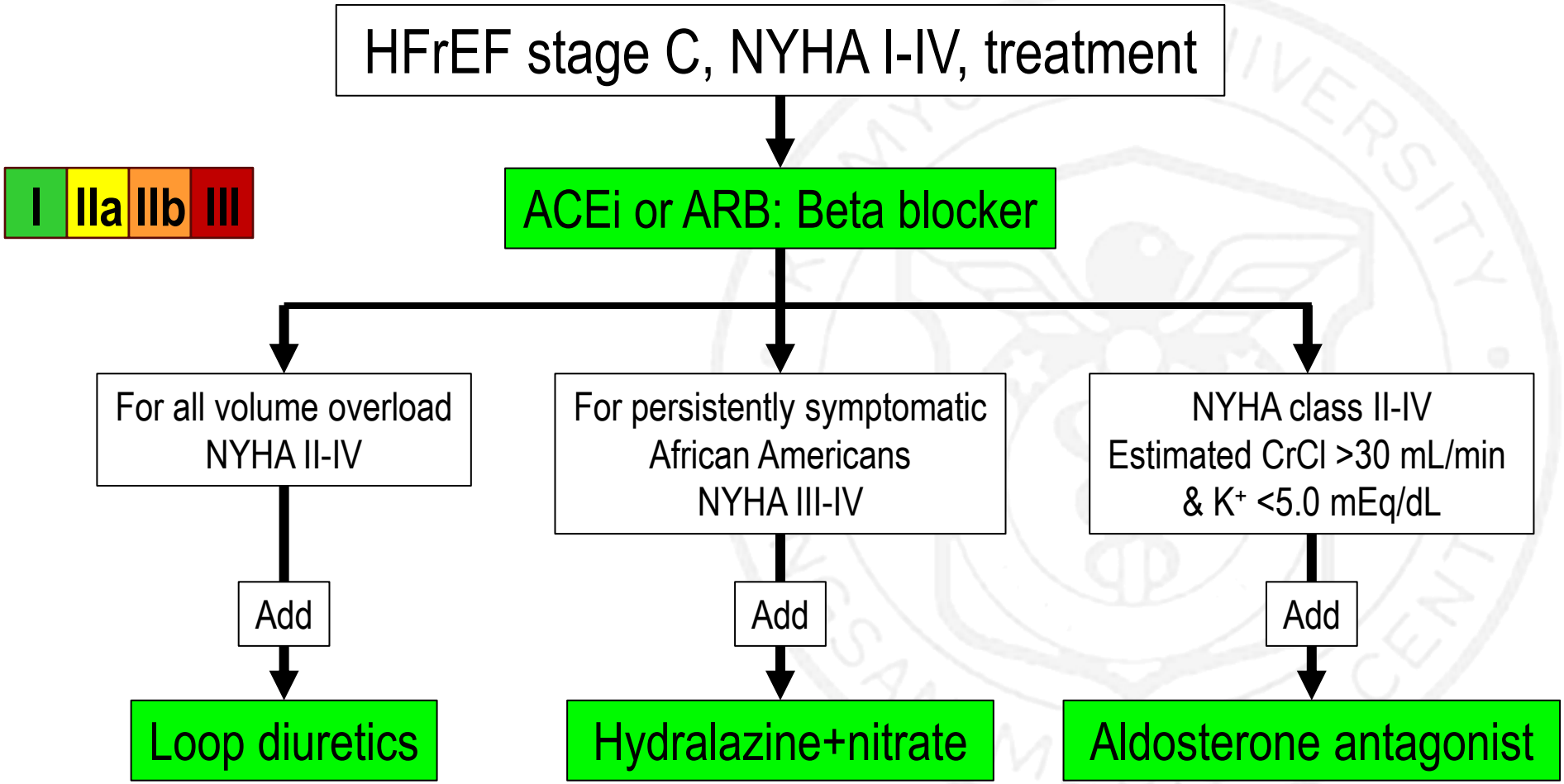
- To determine clinical predictors of recovery of LV fx of recent onset CM
- 373 patients with LV EF ≤ 40% & ≤ 6 mo duration of symptoms
- 10% Peripartum CM, 12% cardiac biopsy (inflammation 4%, myocarditis 2.6%)
- ACEi/ARB 91→92%; Beta blocker 82→94%@6 mo: A total of 4 yr FU



- 70% of patients had an absolute increase in LV EF of 10%
- 25% had complete or near-complete (LVEF > 50%) resolution of their CM

Dennis M, et al. JACC 2011;58:1112

2013 ACCF/AHA Guideline for the Management of Heart Failure



Yancy CW, et al. Circulation 2013;128:e240

Things to Remember

GDMT (Guideline Directed Medical Therapy)

- Combination of an ***ACE inhibitor or ARB and beta blocker*** therapy adjusted to target doses as tolerated, with diuretics adjusted (the addition of ***aldosterone antagonists***)

- Clinical improvement during the ***first 3 to 6 months***

- ***GDMT should be provided for at least 3 months*** before planned reassessment of LV function to consider device implantation

Things to Remember

ICD implantation < 9 months from the initial Dx of NICM

- Implantation of an ICD for primary prevention is ***not recommended*** within the ***first 3 months after initial diagnosis*** of NICM

- In patients with ***NICM < 9 months*** it is ***generally prudent to delay ICD*** until the full effect of medical therapy can be evaluated

kusumoto FM, et al. DOI:10.1016/j.hrthm.2014.03.041

Things to Remember

ICD implantation within 90 days of revascularization

- ***Survival benefit*** with an ICD within the ***first 90 days*** after revascularization ***is lacking*** from the large, randomized, primary prevention trials
  - ✓ MADIT: excluded ≤ 2 mo after CABG, ≤ 3 mo after PTCA
  - ✓ MADIT II: excluded ≤ 3 mo after revascularization
- MADIT II: ICD was of benefit only at least 6 mo after revascularization
- CABG in patients with reduced LV EF: ***30% improved LV function*** on 9-12 Mo after surgery[1]

kusumoto FM, et al. DOI:10.1016/j.hrthm.2014.03.041
[1]Rizzello V, et al. Heart 2009;95;1273

Consequences of Frequent Shocks

- Posttraumatic stress syndrome
- Decrease quality of life
- Acceleration of heart failure
- Proarrhythmia (rare)
- Mortality ?

shock cause this increase or simply marker of risk is unknown

Pacing Fast Ventricular Tachycardia Reduces Shock Therapies (*PAINFREE II Rx*) Trial

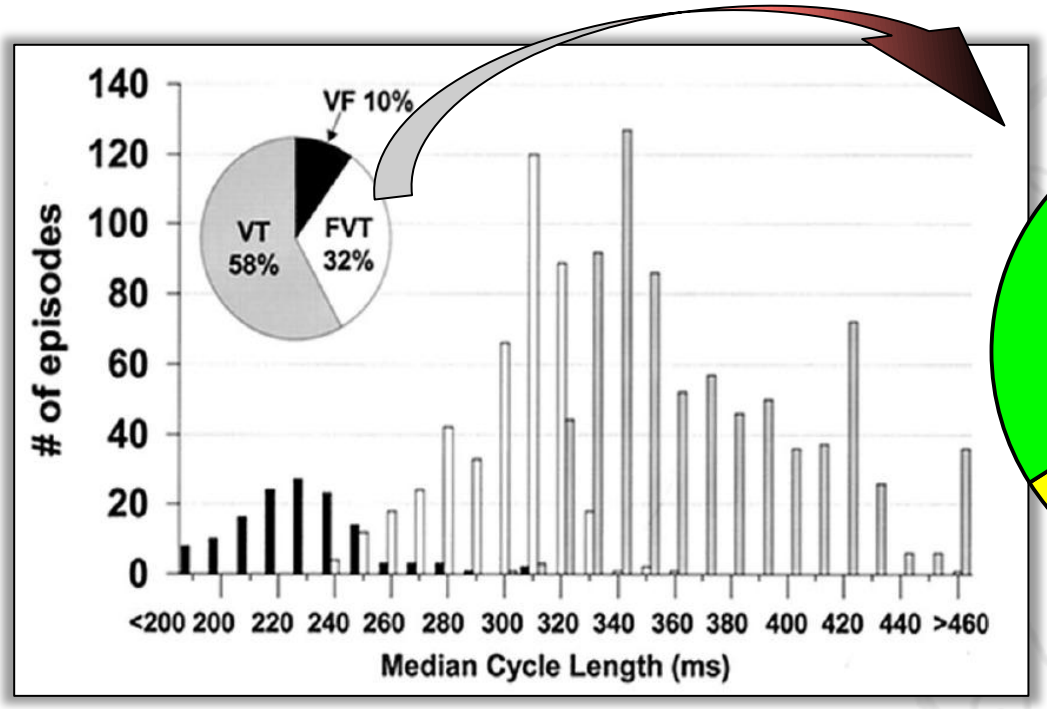
- ATP terminates 78~94% of VTs <188-200 BPM with acceleration risk (2-4%)
- Fast VT (>200 BPM) is often treated by shock d/t safety concern
- ***634 ICD*** patients randomized to ***ATP (n=313) vs shock (n=321)***
- ***Efficacy, safety, QoL with Tx*** @ 11.2±3 Months FU

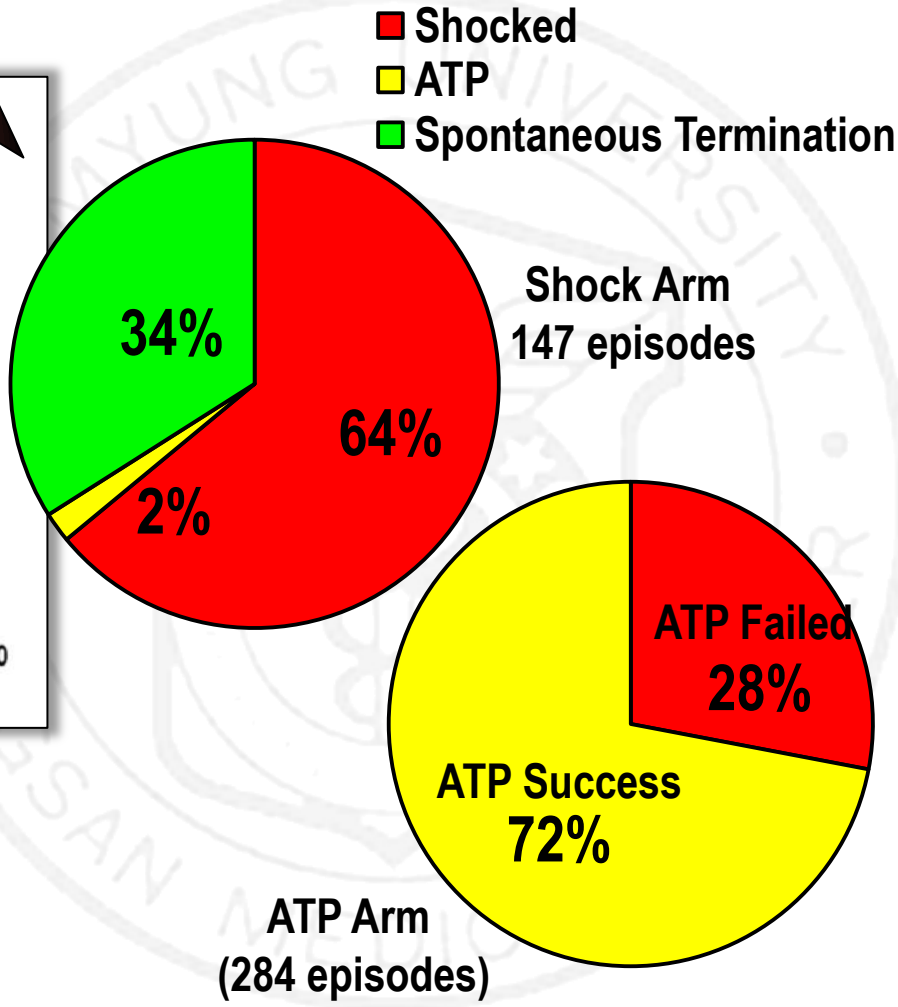
VF zone: ≤ 240ms (≥ 250 BPM)	NID 18/24: last 8 RR < 240ms: shock
FVT zone: 320-240ms (188-250 BPM)	NID 18/24: last 8 RR ≥ 240ms: single ATP (8 burst with 88% of VT CL), shock if failed
VT zone: 360-320ms (167-188 BPM)	3 sequences of 8 pulses @ 88% of VT CL, with 20 ms decrements

SVT discrimination was **ON** up to 320 ms

Wathen MS, et al. Circulation 2004;110:2591

Pacing Fast Ventricular Tachycardia Reduces Shock Therapies (*PAINFREE II Rx*) Trial





Wathen MS, et al. Circulation 2004;110:2591

Pacing Fast Ventricular Tachycardia Reduces Shock Therapies (***PAINFREE II Rx***) Trial

- **FVT**: 32% of ventricular tachyarrhythmias & ***76% of those that would be detected as VF & shocked with traditional ICD programming***
- Acceleration, episode duration, syncope, and sudden death were similar between arms

- **Conclusions** — Compared with shocks, ***empirical ATP for FVT is highly effective, is equally safe***, and ***improves quality of life***. ***ATP may be the preferred FVT therapy*** in most ICD patients

Wathen MS, et al. Circulation 2004;110:2591

Strategic Programming of Detection and Therapy Parameters In ICD Reduces in Shock in Primary Prevention Patients ***PREPARE***

- 700 patients with primary prevention ICD: Followed for 1 year
- Control group: EMPIRIC & MIRACLE ICD trials
- ***NID: 30 of 40***, ***ATP is the first Tx for FVT*** (***182-250 BPM***), ***SVT discriminators were used for <200 BPM (300ms)***

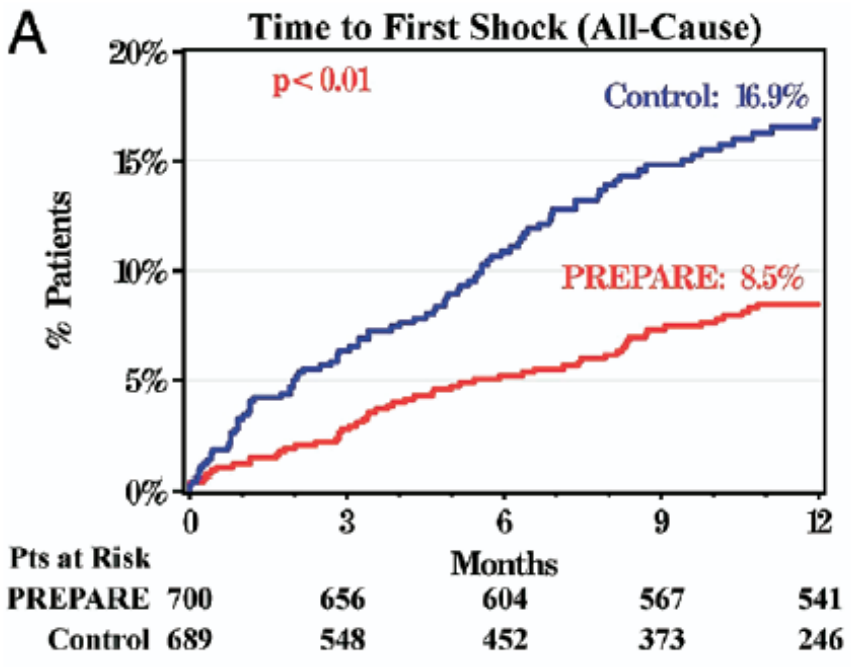
Table 1 PREPARE VT/VF Programming Parameters

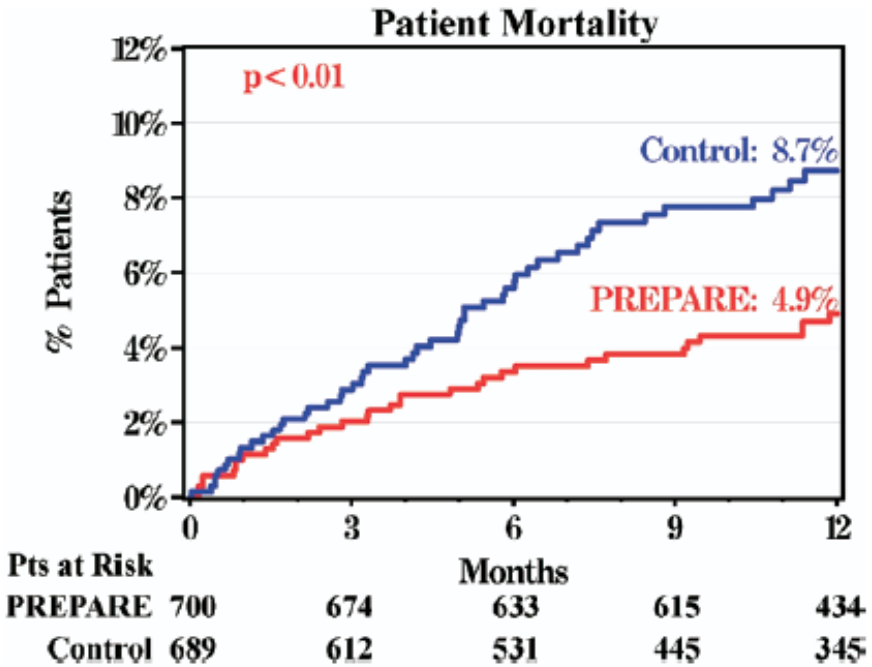
	Detection	Threshold	Beats to Detect	Therapies
VF	On	250 beats/min	30 of 40	30 to 35 J (max output) × 6
FVT	via VF	182 beats/min	30 of 40	Burst (1 sequence), 30 to 35 J (max output) × 5
VT	Monitor	167 beats/min	32	Off

Wilkoff BL, et al. JACC 2008;52:541

Strategic Programming of Detection and Therapy Parameters In ICD Reduces in Shock in Primary Prevention Patients ***PREPARE***

Conclusions Strategically chosen VT/VF detection and therapy parameters ***can safely reduce shocks and other morbidities*** associated with ICD therapy in patients receiving an ICD for primary prevention indications





Wilkoff BL, et al. JACC 2008;52:541

CONTEMPORARY REVIEW

Implantable cardioverter-defibrillator shock prevention does not reduce mortality: A systemic review

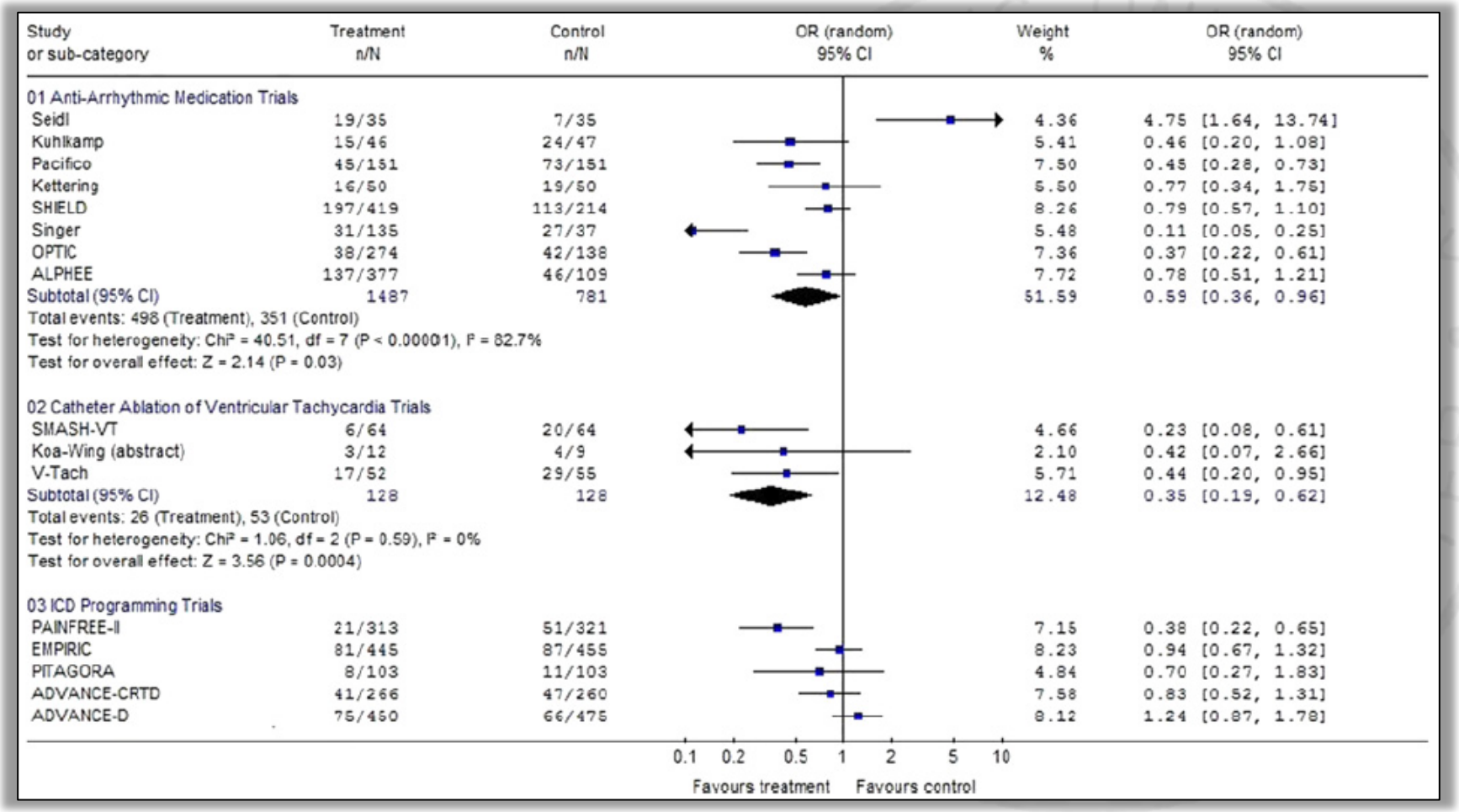
Andrew H. Ha, MD,* Inje Ham, BSc,* Girish M. Nair, MBBS,† Stuart J. Connolly, MD,† Paul Dorian, MD,‡ Carlos A. Morillo, MD, FHRS,† Jeff S. Healey, MD, MSc, FHRS†

- Meta analysis with trials assessing the efficacy of intervention to prevent ICD shocks
- 5875 patients from 17 randomized trials

Ha AH, et al. Heart Rhythm 2012;9:2068

Implantable cardioverter-defibrillator shock prevention does not reduce mortality: A systemic review

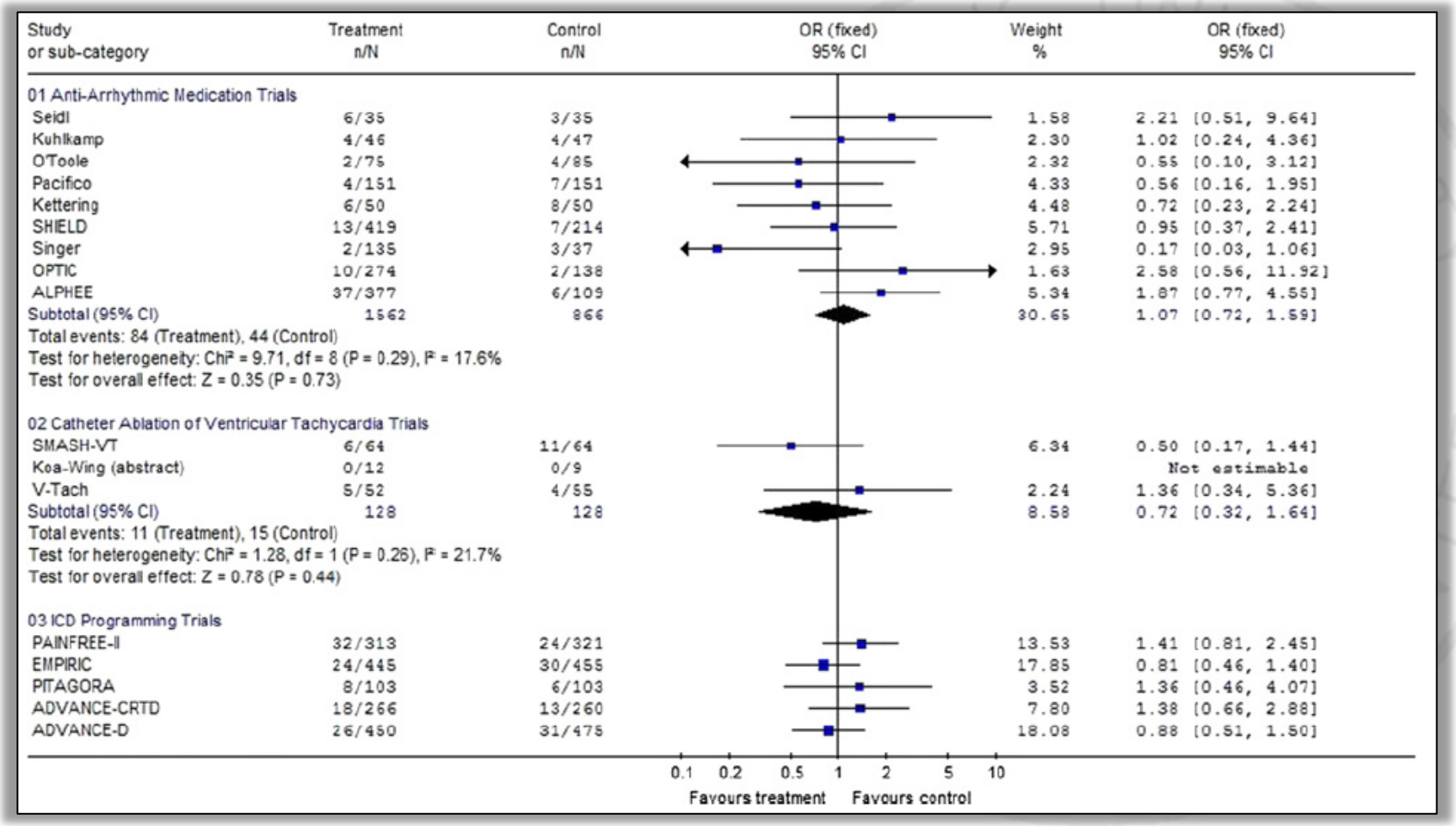
Shock reductions were achieved by AAA & Catheter ablation



Ha AH, et al. Heart Rhythm 2012;9:2068

Implantable cardioverter-defibrillator shock prevention does not reduce mortality: A systemic review

No significant reduction in mortality



Study or sub-category	Treatment n/N	Control n/N	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
01 Anti-Arrhythmic Medication Trials					
Seidl	6/35	3/35		1.58	2.21 [0.51, 9.64]
Kuhlkamp	4/46	4/47		2.30	1.02 [0.24, 4.36]
O'Toole	2/75	4/85		2.32	0.55 [0.10, 3.12]
Pacifico	4/151	7/151		4.33	0.56 [0.16, 1.95]
Kettering	6/50	8/50		4.48	0.72 [0.23, 2.24]
SHIELD	13/419	7/214		5.71	0.95 [0.37, 2.41]
Singer	2/135	3/37		2.95	0.17 [0.03, 1.06]
OPTIC	10/274	2/138		1.63	2.58 [0.56, 11.92]
ALPHEE	37/377	6/109		5.34	1.87 [0.77, 4.55]
Subtotal (95% CI)	1562	866		30.65	1.07 [0.72, 1.59]
Total events: 84 (Treatment), 44 (Control)					
Test for heterogeneity: Chi² = 9.71, df = 8 (P = 0.29), I² = 17.6%					
Test for overall effect: Z = 0.35 (P = 0.73)					
02 Catheter Ablation of Ventricular Tachycardia Trials					
SMASH-VT	6/64	11/64		6.34	0.50 [0.17, 1.44]
Koa-Wing (abstract)	0/12	0/9			Not estimable
V-Tach	5/52	4/55		2.24	1.36 [0.34, 5.36]
Subtotal (95% CI)	128	128		8.58	0.72 [0.32, 1.64]
Total events: 11 (Treatment), 15 (Control)					
Test for heterogeneity: Chi² = 1.28, df = 1 (P = 0.26), I² = 21.7%					
Test for overall effect: Z = 0.78 (P = 0.44)					
03 ICD Programming Trials					
PAINFREE-II	32/313	24/321		13.53	1.41 [0.81, 2.45]
EMPIRIC	24/445	30/455		17.85	0.81 [0.46, 1.40]
PITAGORA	8/103	6/103		3.52	1.36 [0.46, 4.07]
ADVANCE-CRTD	18/266	13/260		7.80	1.38 [0.66, 2.88]
ADVANCE-D	26/450	31/475		18.08	0.88 [0.51, 1.50]

Ha AH, et al. Heart Rhythm 2012;9:2068

CONTEMPORARY REVIEW

Implantable cardioverter-defibrillator shock prevention does not reduce mortality: A systemic review

Andrew H. Ha, MD,* Inje Ham, BSc,* Girish M. Nair, MBBS,† Stuart J. Connolly, MD,† Paul Dorian, MD,‡ Carlos A. Morillo, MD, FHRS,† Jeff S. Healey, MD, MSc, FHRS†

- 5 ICD programming trials had sufficiently heterogeneous intervention that pooling of their results was not performed
- Only PAINFREE II trial reduced ICD shocks (OR 0.38, 95% CI 0.22-0.65) but not mortality (OR 0.41, 95% CI 0.81-2.45)

Conclusion: There is ***no compelling evidence that existing interventions that reduce ICD shocks significantly improve survival***

Ha AH, et al. Heart Rhythm 2012;9:2068

Reduction In Inappropriate Therapy and Mortality through ICD programming. ***MADIT-RIT trial***

- 1500 patients with a primary-prevention indication
- Randomized, 3-arm study of patients randomized 1:1:1 to either conventional, high-rate cutoff, or duration-delay programming
- Primary endpoint: first episode of inappropriate therapy (shock or ATP)
- Secondary endpoint: All cause mortality, syncope

Moss AJ, et al. NEJM 2012;367:2275

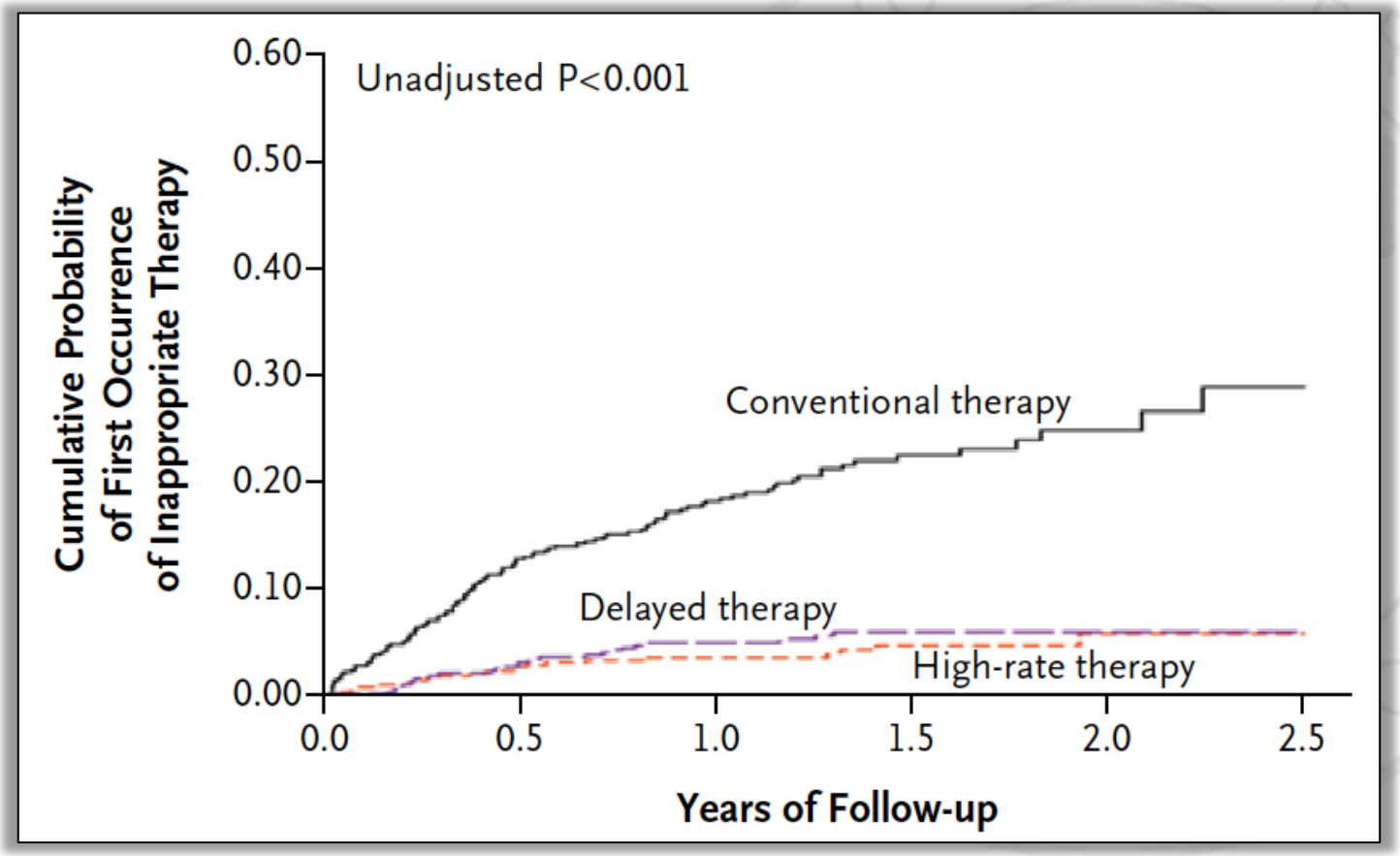
MADIT-RIT: ICD Programming

Arm A (Conventional)	Arm B (High-rate)	Arm C (Duration-delay)
Zone 1	**Zone 1**	**Zone 1**
≥170 bpm, 2.5s delay	**170 bpm**	**≥170 bpm, 60s delay**
Onset/Stability Detection Enhancements ON	Monitor only	Rhythm ID® Detection Enhancements ON
ATP + Shock		ATP + Shock
Zone 2	**Zone 2**	**Zone 2**
≥200 bpm, 1s delay	**≥200 bpm, 2.5s delay**	**≥200 bpm, 12s delay**
Quick Convert™ ATP	Quick Convert™ ATP	Rhythm ID® Detection Enhancements ON
Shock	Shock	ATP + Shock
		Zone 3
		≥250 bpm, 2.5s delay
		Quick Convert™ ATP + Shock

Moss AJ, et al. NEJM 2012;367:2275

Reduction In Inappropriate Therapy and Mortality through ICD programming. ***MADIT-RIT trial***

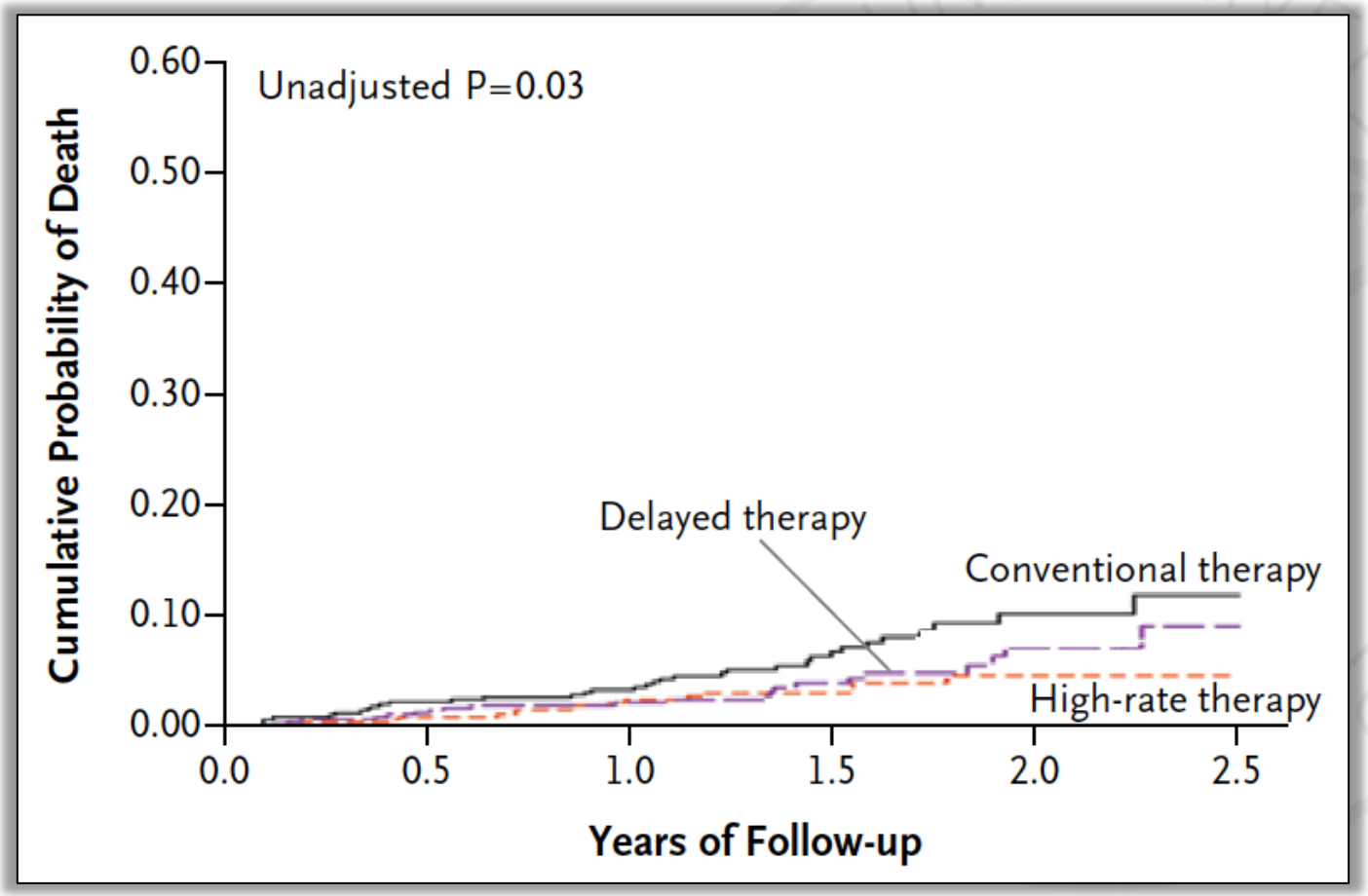
Cumulative Probability of First Occurrence of Inappropriate Tx



Moss AJ, et al. NEJM 2012;367:2275

Reduction In Inappropriate Therapy and Mortality through ICD programming. ***MADIT-RIT trial***

Cumulative Probability of Death



Moss AJ, et al. NEJM 2012;367:2275

Reduction In Inappropriate Therapy and Mortality through ICD programming. ***MADIT-RIT trial***

Table 3. Hazard Ratios for a First Occurrence of Inappropriate Therapy, Death, and a First Episode of Syncope According to Treatment Group.

Variable	Conventional Therapy (N=514)	High-Rate Therapy (N=500)	Delayed Therapy (N=486)	High-Rate Therapy vs. Conventional Therapy		Delayed Therapy vs. Conventional Therapy	
				Hazard Ratio (95% CI)	P Value	Hazard Ratio (95% CI)	P Value
	no. of patients						
First occurrence of inappropriate therapy	105	21	26	0.21 (0.13–0.34)	<0.001	0.24 (0.15–0.40)	<0.001
Death	34	16	21	0.45 (0.24–0.85)	0.01	0.56 (0.30–1.02)	0.06
First episode of syncope	23	22	22	1.32 (0.71–2.47)	0.39	1.09 (0.58–2.05)	0.80

CONCLUSIONS

Programming of ICD therapies for tachyarrhythmias of ≥ 200 BPM or with a prolonged delay in therapy at ≥ 170 beats BPM was associated with reductions in inappropriate therapy and all-cause mortality

Moss AJ, et al. NEJM 2012;367:2275

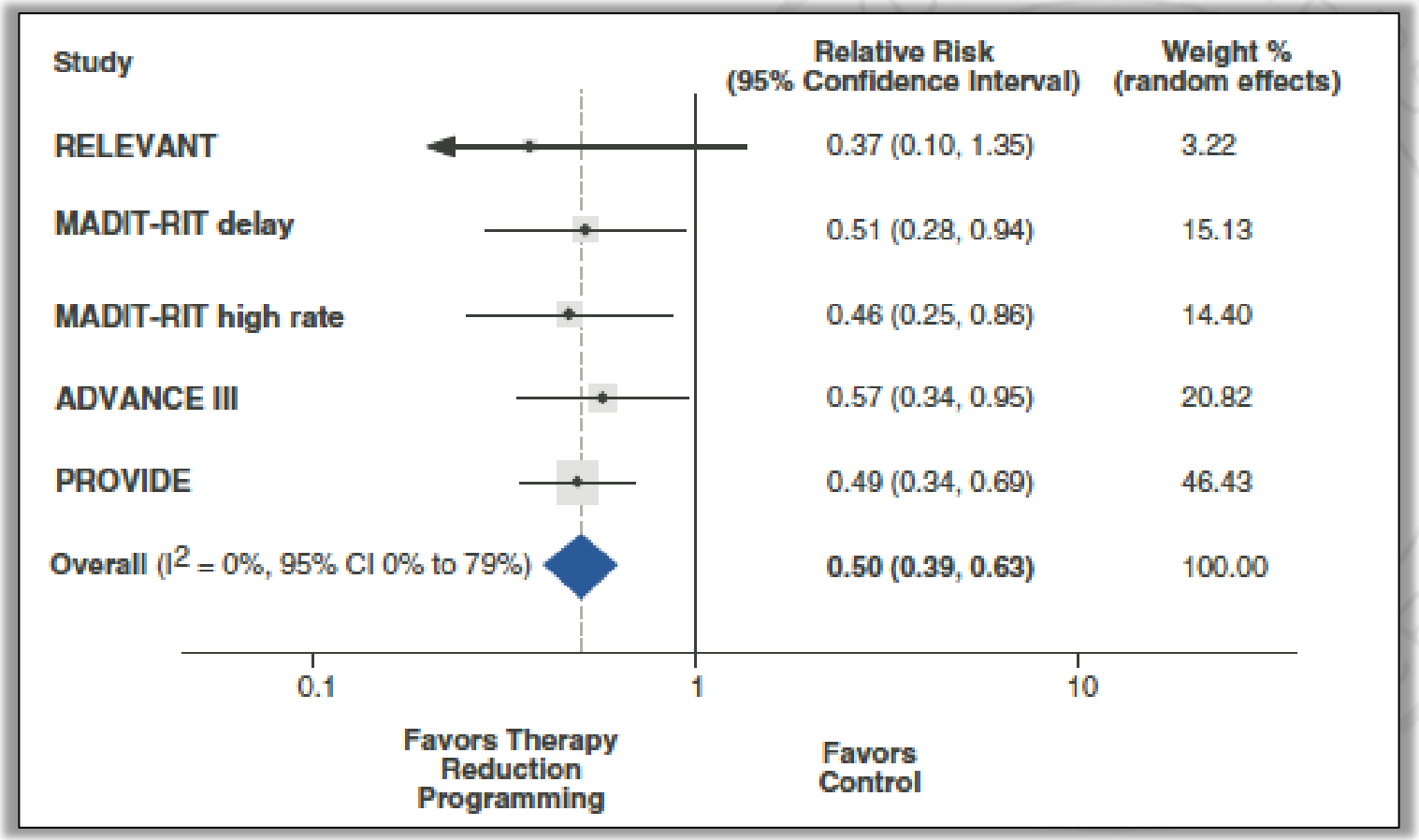
Impact of Programming Strategies Aimed at Reducing Nonessential Implantable Cardioverter Defibrillator Therapies on Mortality

- 7687 patients from 6 trials: 3598 conventional vs 4089 Therapy reduction programming
- EMPIRIC, MADIT-RIT, ADVANCE-III, PROVIDE, RELEVANT, PREPARE
- No significant heterogeneity among studies was observed (P =0.6)
- No significant difference in the risk of syncope (P =0.5)

Tan VH, et al. Circ AE 2014;7:164

Impact of Programming Strategies Aimed at Reducing Nonessential Implantable Cardioverter Defibrillator Therapies on Mortality

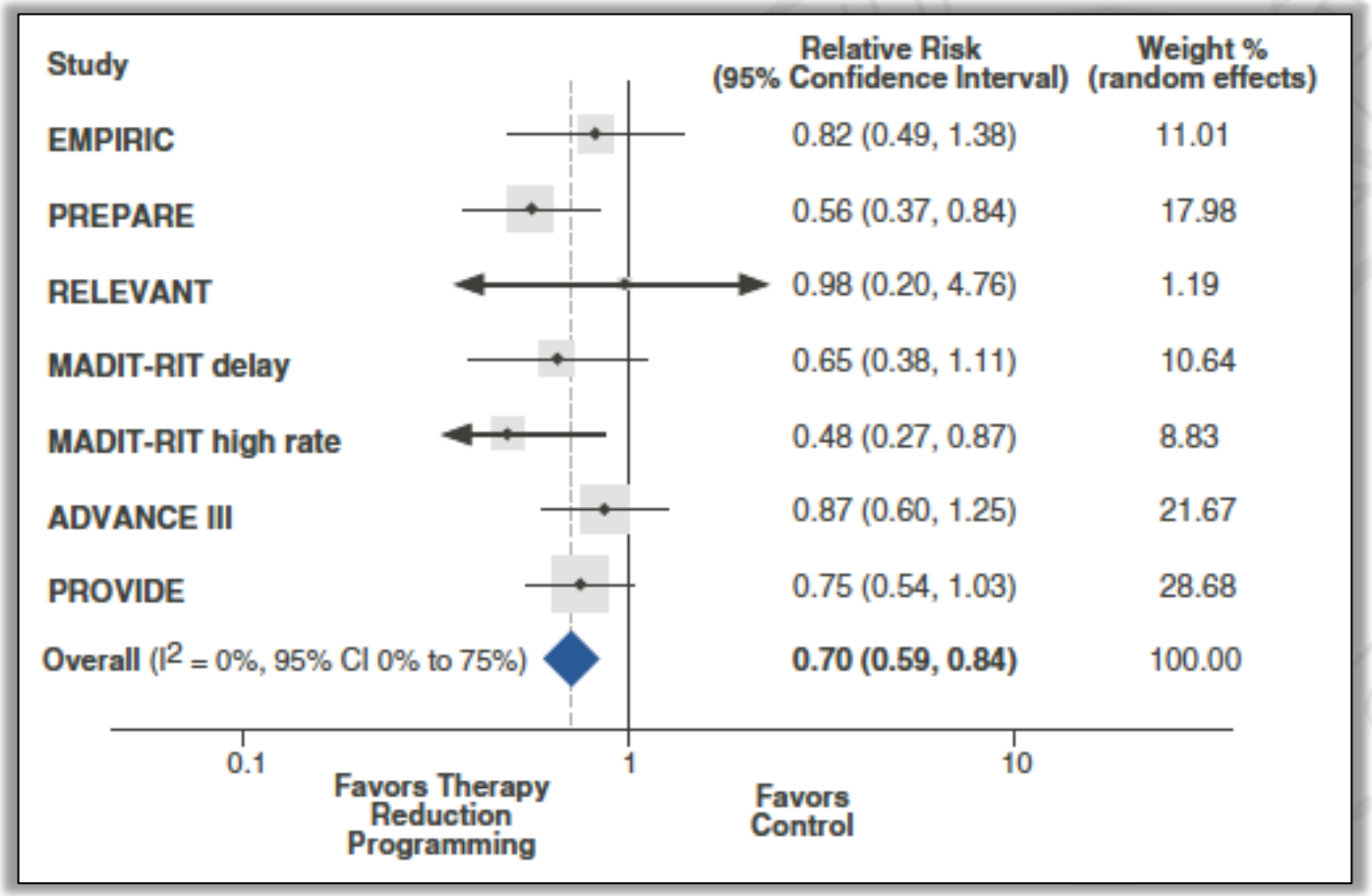
Risk of Inappropriate ICD Shocks



Tan VH, et al. Circ AE 2014;7:164

Impact of Programming Strategies Aimed at Reducing Nonessential Implantable Cardioverter Defibrillator Therapies on Mortality

Effects on the outcome of All-cause Mortality



Tan VH, et al. Circ AE 2014;7:164

Impact of Programming Strategies Aimed at Reducing Nonessential Implantable Cardioverter Defibrillator Therapies on Mortality

Conclusions—***Therapy reduction programming*** results in a ***large, significant, and consistent reduction in mortality***, with no apparent increase in the risk of syncope

Tan VH, et al. Circ AE 2014;7:164

Suggested ICD Programming

Condition	Arrhythmia	Programming
Primary Prevention	VF: ≥ 200 BPM	Longer detection time or 30/40 NID
	FVT: 170-199 BPM	Monitor only
Secondary Prevention	VF: ≥ 200 BPM	30/40 NID Use 1-2 sequences of burst
	FVT: 170-199 BPM	Use multiple sequences of ATP
	VT < 170 BPM	Monitor only

Madhavan M, Friedman PA. Circulation 2013;128:659

Recommended ICD Programming

zone	Primary Prevention			Secondary prevention		
	Lower rate (BPM)	Duration	Tx	Lower rate (BPM)	Duration	Tx
VF	220-250	32 intervals 16 intervals 5 seconds	≥ 30J X 6	220-250	18/24 intervals 16 intervals 5 seconds	≥ 30J X 6
FVT	182	30/40 intervals 16-20 intervals 7 seconds SVT ON	1 burst* ≥30J X 5	200	18/24 intervals 9-12 intervals 5 seconds SVT ON	1 burst* ≥30J X 5
VT	167	30/40 intervals 16-20 intervals 7 seconds SVT ON	Off (Monitor)	150	16 intervals 16 intervals 7 seconds SVT ON	3 bursts 20J X 1 ≥30J X 3

Clinical Cardiac Pacing, Defibrillation, Resynchronization Therapy: 3rd Ed,P381

2012 EHRA/HRS expert consensus statement on cardiac resynchronization therapy in heart failure: implant and follow-up recommendations and management

Electrocardiogram Evaluation of the CRT patients

- ✓ Atrial rhythm—NSR or atrial paced vs. atrial fibrillation
- ✓ Evidence of appropriate atrial sensing or capture
- ✓ Presence of ventricular pacing
- ✓ Presence, frequency, and morphology of PVCs
- ✓ Evidence of appropriate ventricular sensing or capture
- ✓ Morphology of paced QRS—evidence of LV capture
- ✓ Paced QRS width
- ✓ Evidence of pacing fusion or pseudo-fusion in QRS

Daubert JC, et al. Heart Rhythm 2012;9:1524

2012 EHRA/HRS expert consensus statement on cardiac resynchronization therapy in heart failure: implant and follow-up recommendations and management

Use of Device Diagnostic Data

- ***Ventricular pacing***
  - > 95% (Ideally near to 100%)
  - Make sure it's BiV pacing through ECG
- ***Ventricular sensing***
  - Should be close to 0%
- ***PVC/NSVT***
  - Reduce the time in effective CRT; should be suppressed
- ***AT/AF episodes/Mode switch***
  - Promote native AV conduction: depends on burden

Daubert JC, et al. Heart Rhythm 2012;9:1524

Radiofrequency Ablation of Premature Ventricular Ectopy Improves the Efficacy of Cardiac Resynchronization Therapy in Nonresponders

- 65 patients, CRT nonresponders with PVC > 10,000/24h
- Underwent PVC ablation
- Acute & long-term success: 91% & 88% in12±4 Mo FU

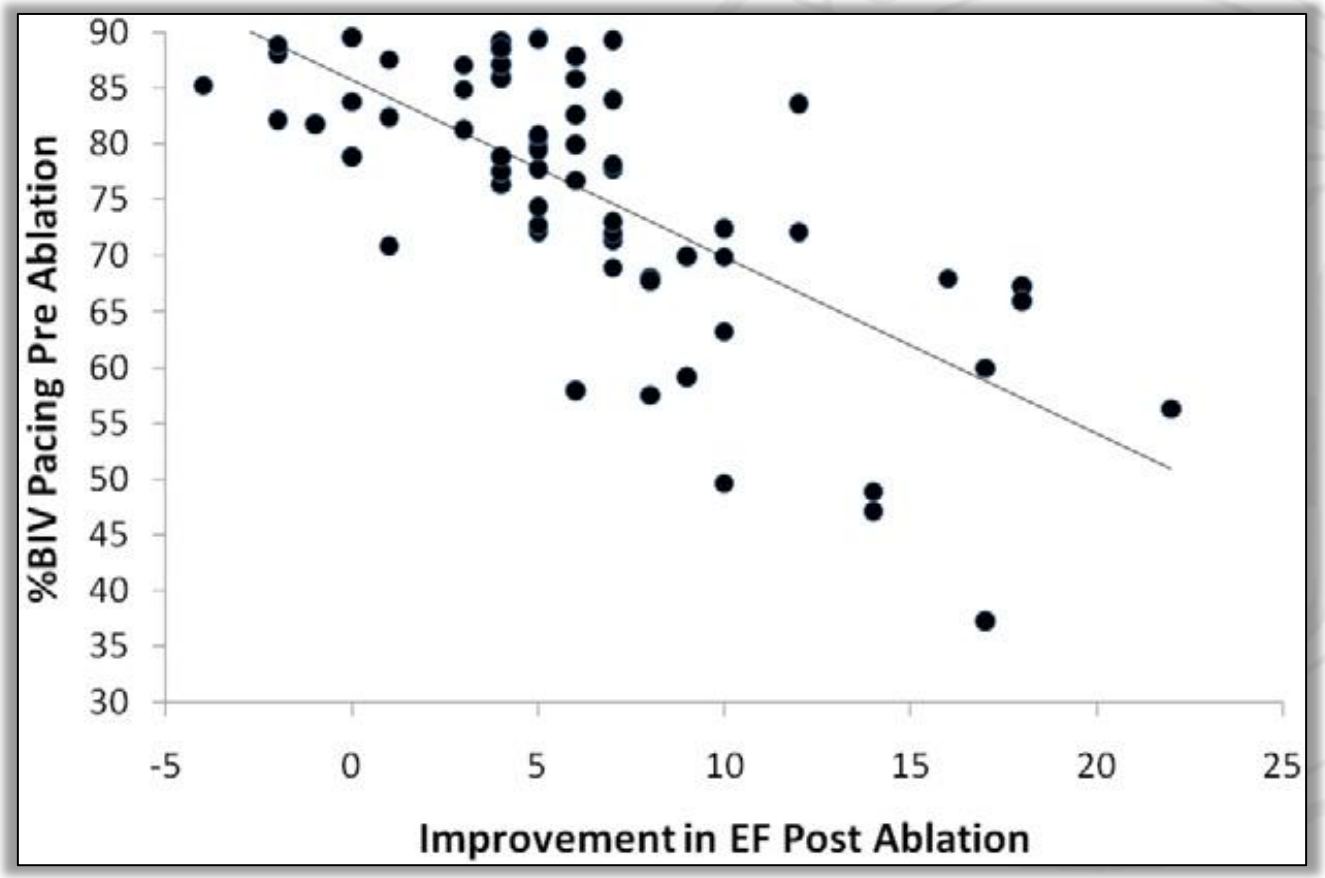
Changes in Various Echo Parameters Before and After PVC Ablation

Change in Echo Parameters	Pre-Ablation	Post-Ablation	Mean Improvement	p Value
Δ EF	26.2 ± 5.5	32.7 ± 6.7	6.42 ± 5.26	<0.001
Δ LVEDD	6.83 ± 0.83	6.51 ± 0.91	−0.32 ± 0.26	<0.001
Δ LVESD	5.83 ± 0.55	5.62 ± 0.32	−0.31 ± 0.23	<0.001
Δ LVESV	178 ± 72	145 ± 23	−33.17 ± 22.94	<0.001
Δ LVEDV	242 ± 85	212 ± 63	−30.65 ± 21.63	<0.001

Lakkireddy D, et al. JACC 2012;60:1531

Radiofrequency Ablation of Premature Ventricular Ectopy Improves the Efficacy of Cardiac Resynchronization Therapy in Nonresponders

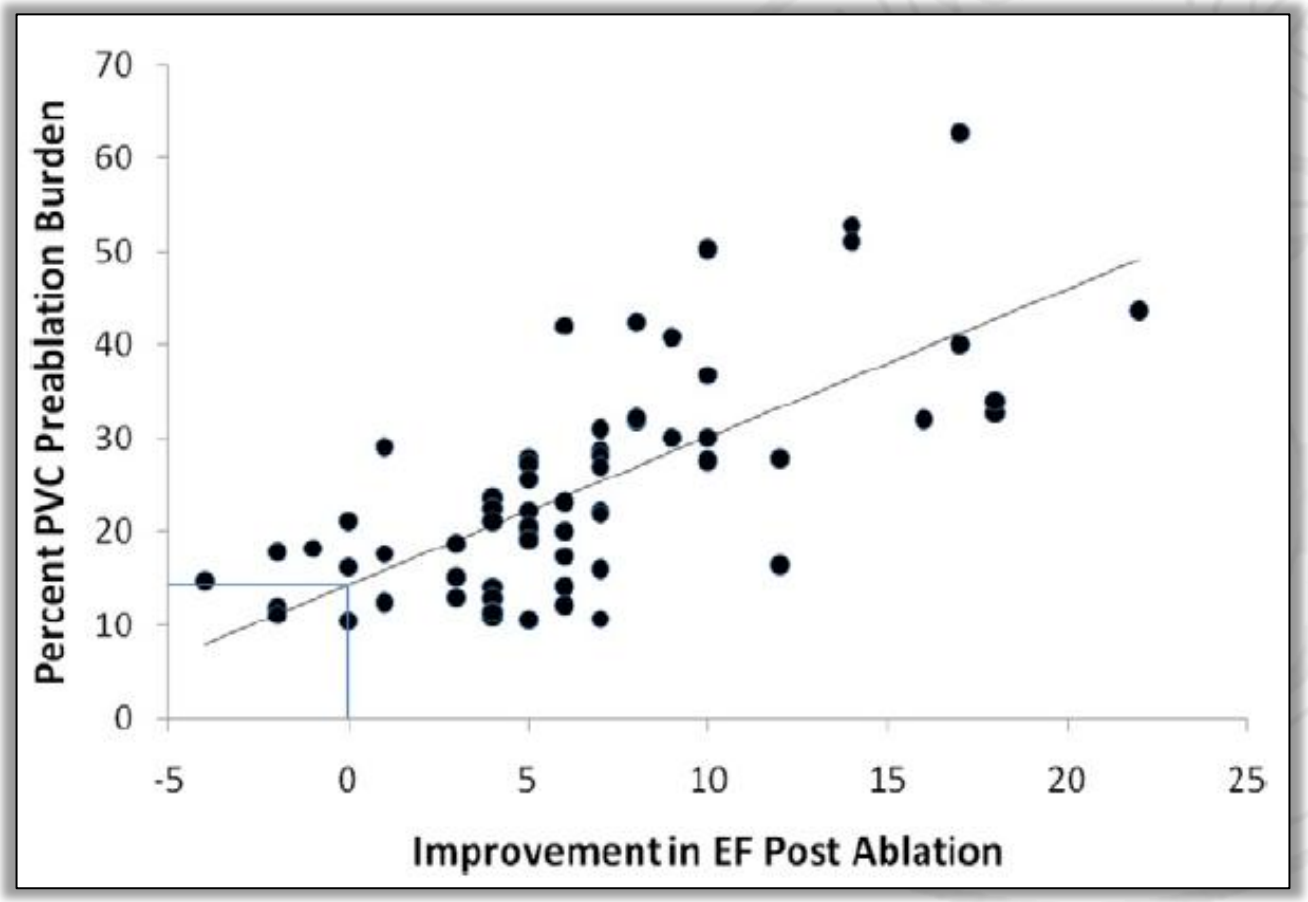
Correlation Between Pre-Ablation BIV Pacing % & Post-Ablation Improvement in EF



Lakkireddy D, et al. JACC 2012;60:1531

Radiofrequency Ablation of Premature Ventricular Ectopy Improves the Efficacy of Cardiac Resynchronization Therapy in Nonresponders

Correlation Between PVC Burden & EF Change Following Ablation



Lakkireddy D, et al. JACC 2012;60:1531

Radiofrequency Ablation of Premature Ventricular Ectopy Improves the Efficacy of Cardiac Resynchronization Therapy in Nonresponders

- ***Sites of PVC: LV (75%) vs RV (25%)***
  - ✓ LV submitral annulus: 28.94%, the rest of LV: (46.06%)
  - ✓ RVOT: 15.78%, the rest of RV: 9.22%

- ***Pre-ablation PVC burden (>22%/24h)*** revealed an improvement in ejection fraction

- ***Conclusions***: PVC ablation may be used to enhance CRT efficacy in nonresponders with significant PVC burden

Lakkireddy D, et al. JACC 2012;60:1531

Summary

- It is important to choose right patients according to current guidelines
- Several clinical and device parameters should be taken into account to achieve adequate results

계명대학교 동산의료원
Keimyung University Dongsan Medical Center

Thank You for Your Attention !

Seongwook Han, MD.PhD.
Professor of Medicine, Keimyung University School of Medicine
Arrhythmia Service, Cardiology, Dongsan Medical Center