

Update on Ventricular Arrhythmias: What's Current and What's New

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2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death

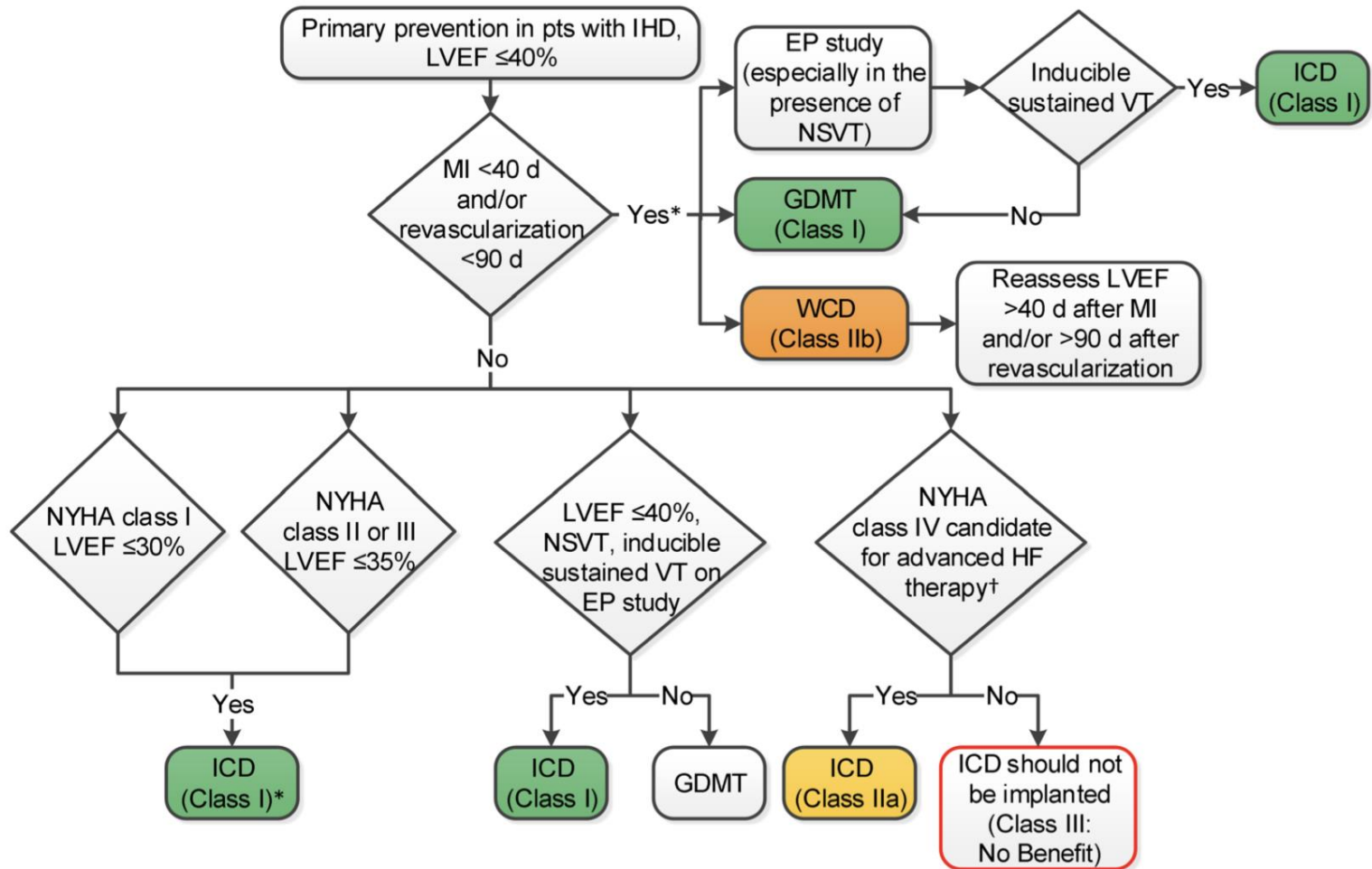
A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society

Developed in Collaboration With the Heart Failure Society of America

- **Emphasis on GDMT**
- **Where does the DANISH study fit?**
- **Role for ablation to control VT symptoms**
- **Role of genetic screening**
- **Individualized/shared decision making re: ICD implantation and generator replacement**

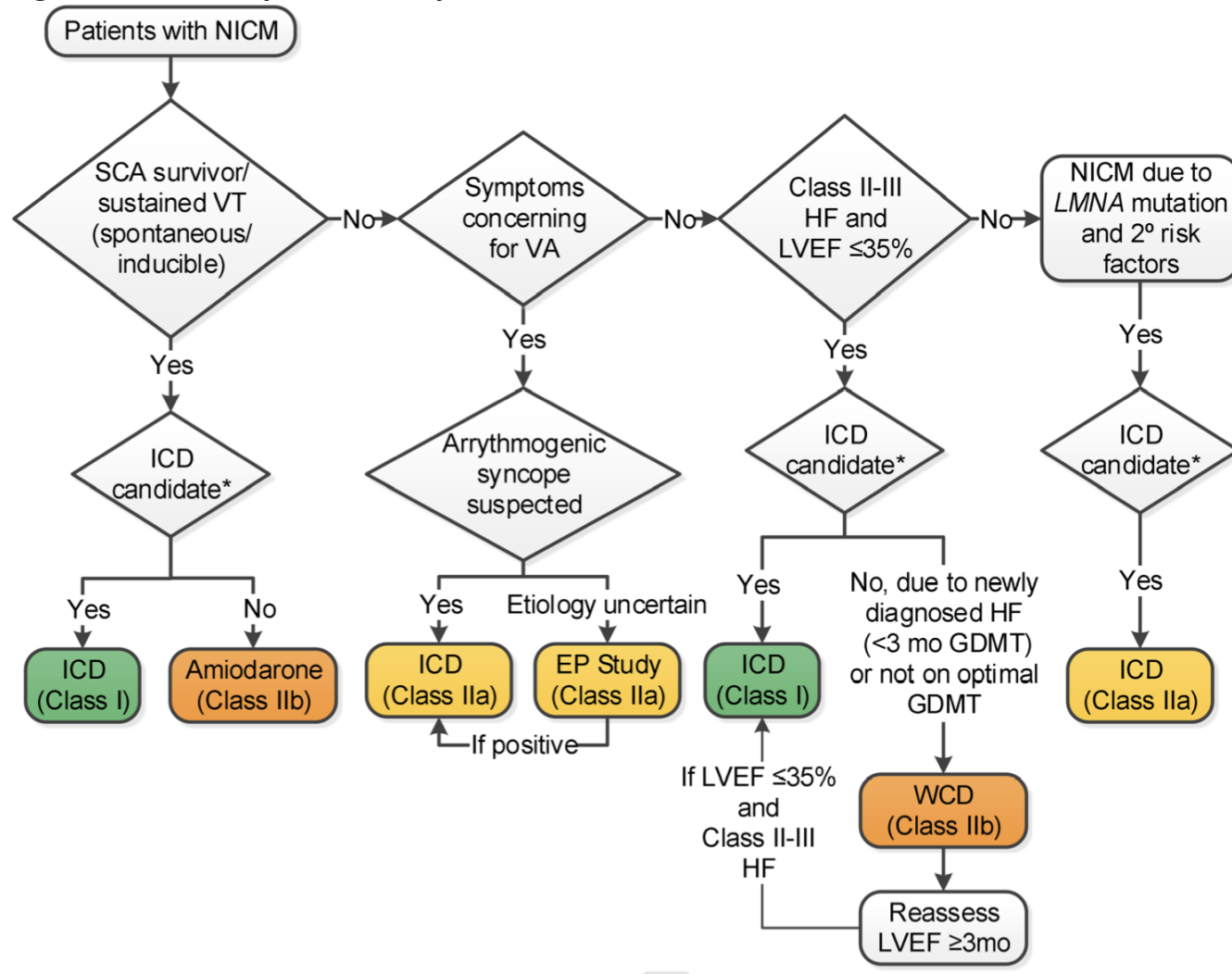
Primary Prevention ICD Ischemic Cardiomyopathy

Figure 4. Primary Prevention of SCD in Patients With Ischemic Heart Disease



Primary Prevention ICD Non-Ischemic Cardiomyopathy

Figure 6. Secondary and Primary Prevention of SCD in Patients With NICM



ICD Criteria

Important Points

Importance of guideline directed medical therapy (GDMT)

- Point of emphasis to treat with beta-blocker, ACE-I or ARB, and mineralocorticoid blocker for at least three months
- Up to **50%** have improvement in LVEF to over 35% with GDMT after initial diagnosis!
- Only 61% of primary prevention ICDs had ACEI/ARB and BB filled in last 90 days
 - Lower survival in patients not receiving GDMT (16.2% vs 11.1% mortality)

ICD Criteria

Important Points

DANISH Trial

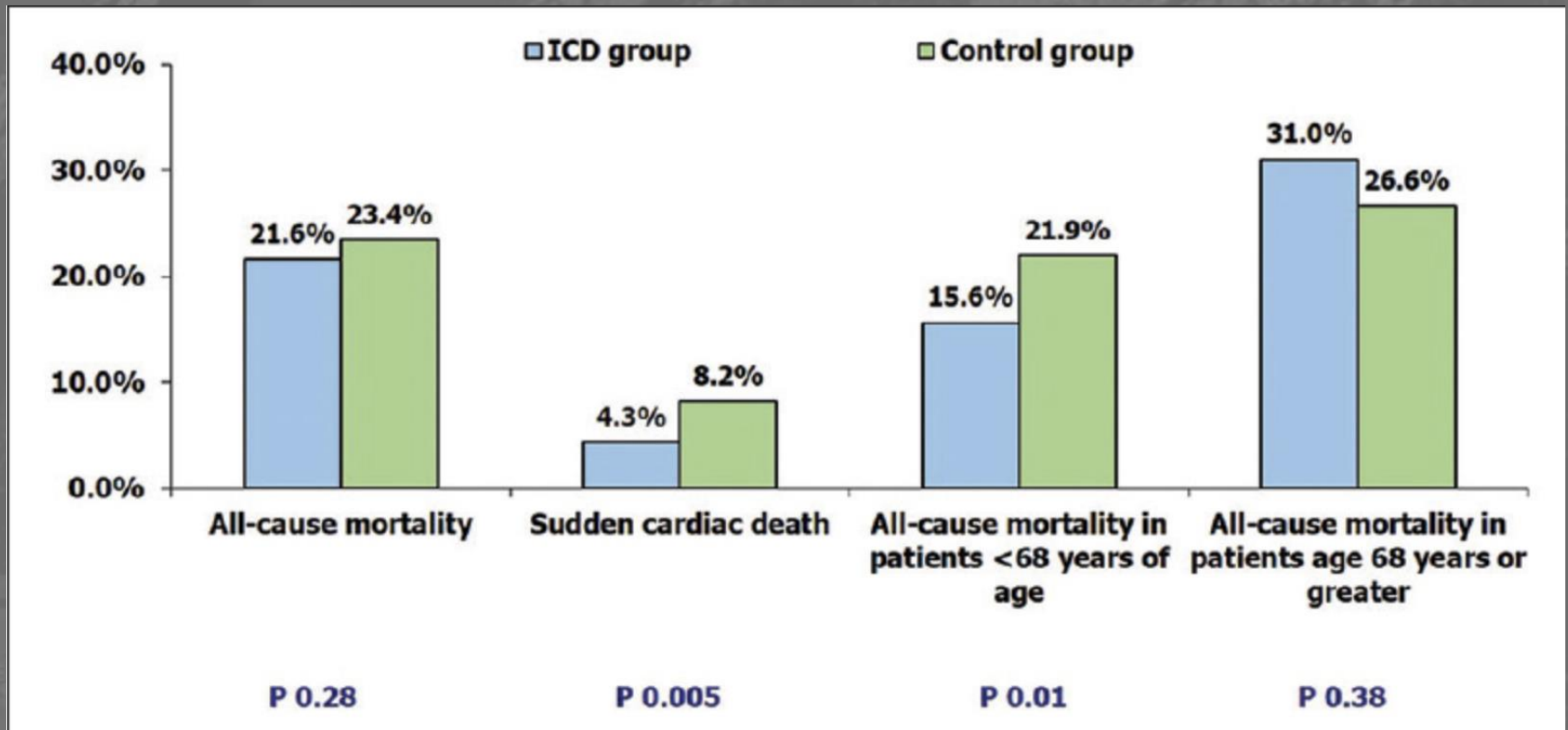
- 1116 patients with NICM enrolled
 - Half did not receive ICD
 - 58% of all patients in either group received CRT
 - Average time from CHF diagnosis to enrollment was 18-20 months
 - ? Survival bias ?

ICD Criteria

Important Points

DANISH Trial

Kober et al, NEJM 2016



ICD Criteria

Important Points

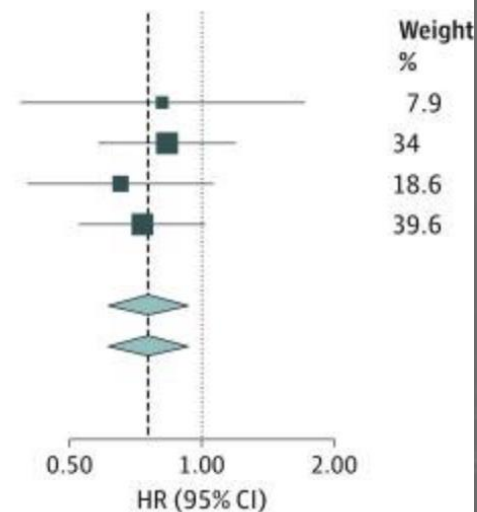
Why not alter the guidelines to reflect data from the DANISH study?

- After long deliberations, the guideline writing committee made a decision to keep this recommendation Class I in light of the nuances of the DANISH trial in which 58% of patients in each arm of the trial ended up with a cardiac resynchronisation therapy device. The deliberations were also informed by the results of meta-analyses generally showing a significant 25% relative risk reduction in the risk of mortality with an ICD

ICD Criteria

Important Points

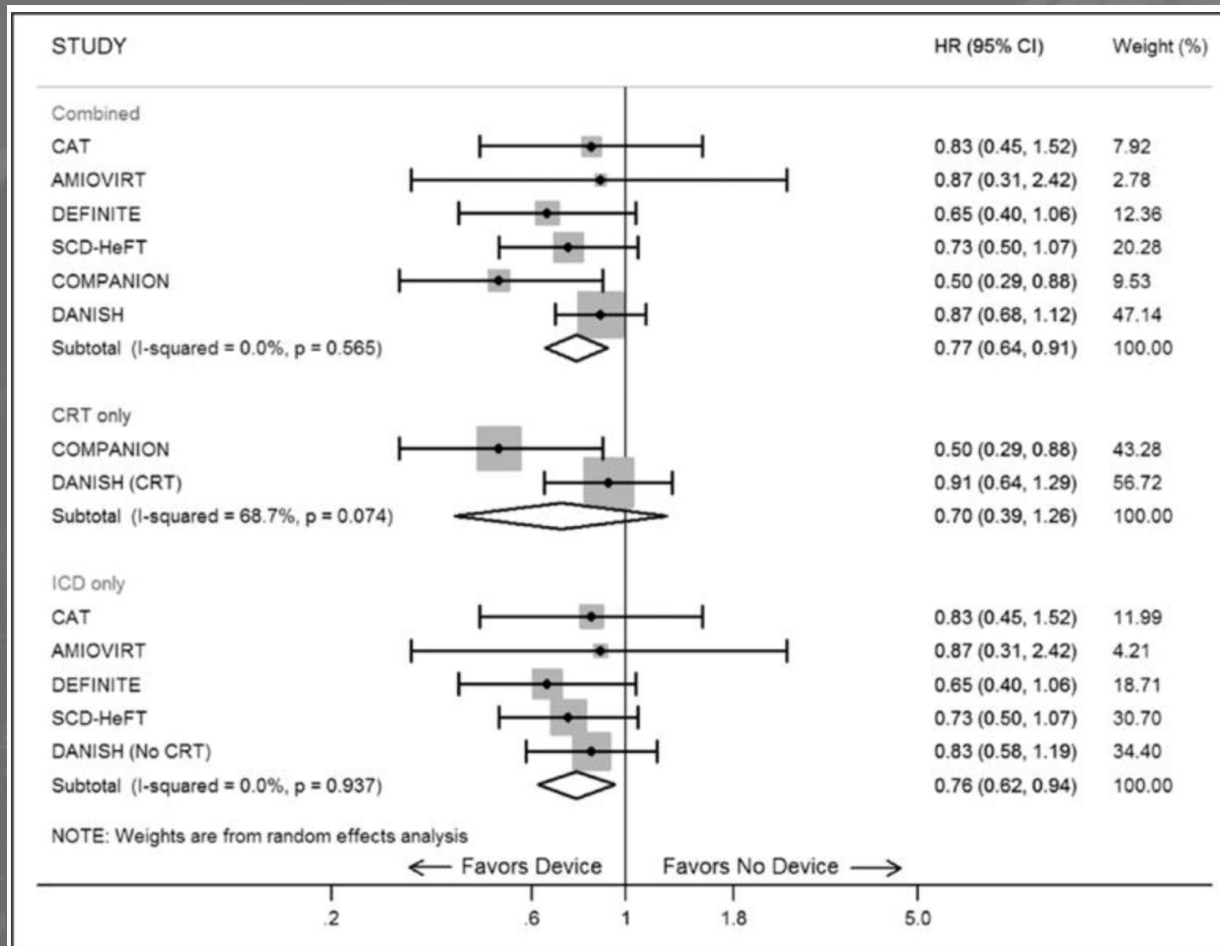
Source (Trial Name)	Duration of Follow-up, mo	No. of Events		No. of Patients		HR (95% CI)	Weight %
		ICD Group	Control Group	ICD Group	Control Group		
Bänsch et al, ⁵ 2002 (CAT)	66	13	17	50	54	0.81 (0.38-1.71)	7.9
Køber et al, ⁴ 2016 (DANISH)	67.6	58	65	234	237	0.83 (0.58-1.19)	34
Kadish et al, ¹ 2004 (DEFINITE)	29	28	40	229	229	0.65 (0.40-1.06)	18.6
Bardy et al, ² 2005 (SCD-HeFT)	45.5	71	95	424	417	0.73 (0.52-1.02)	39.6
Total		170	217	937	937		
Fixed-effect model						0.75 (0.61-0.93)	
Random-effects model						0.75 (0.61-0.93)	
Overall $P = .008$							
Heterogeneity, $I^2 = 0\%$, $\tau^2 = 0$, $P = .87$							



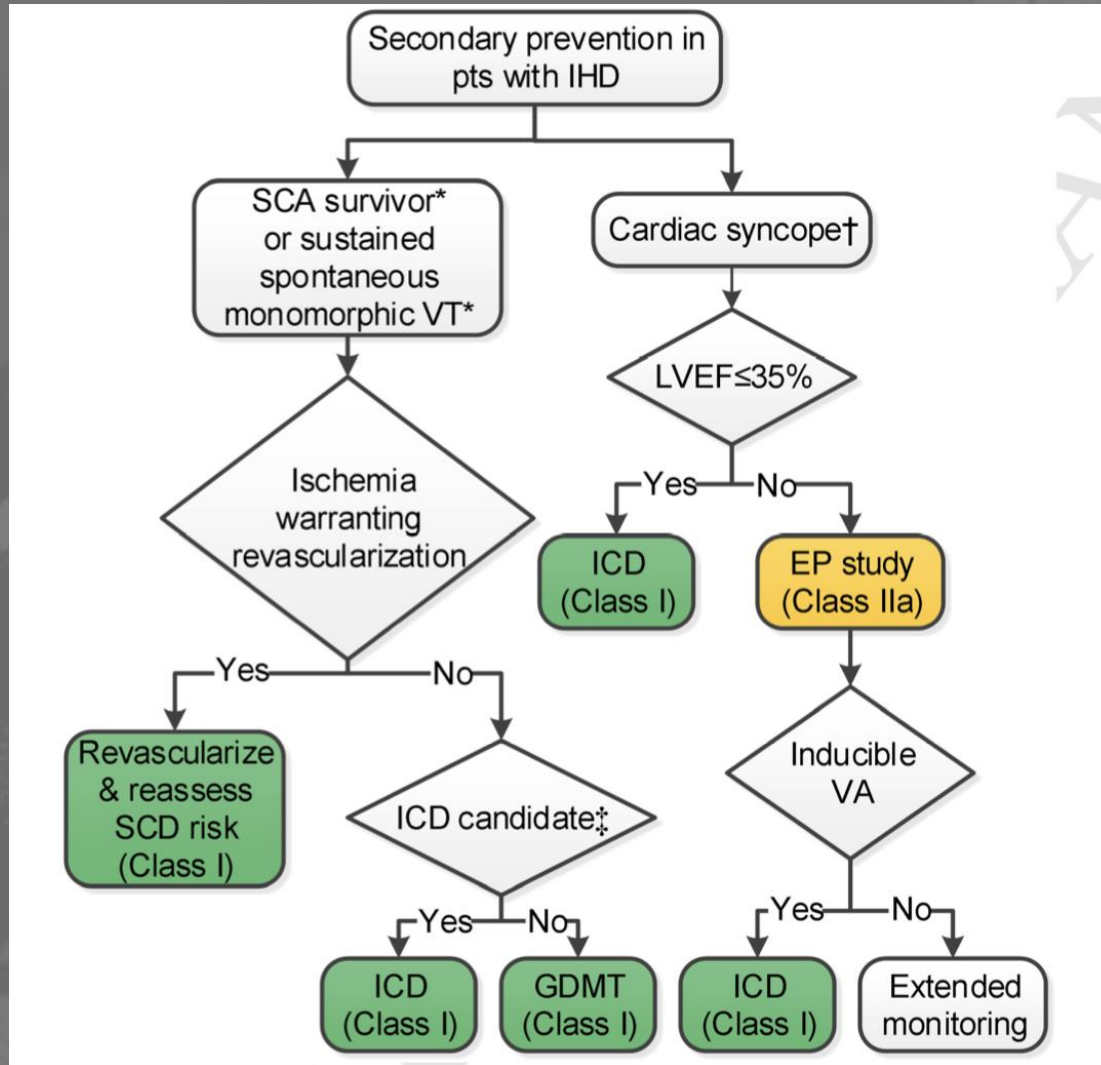
Al-Khatib et al, JAMA Cardiol 2017

ICD Criteria

Important Points



Secondary Prevention ICD Ischemic Cardiomyopathy



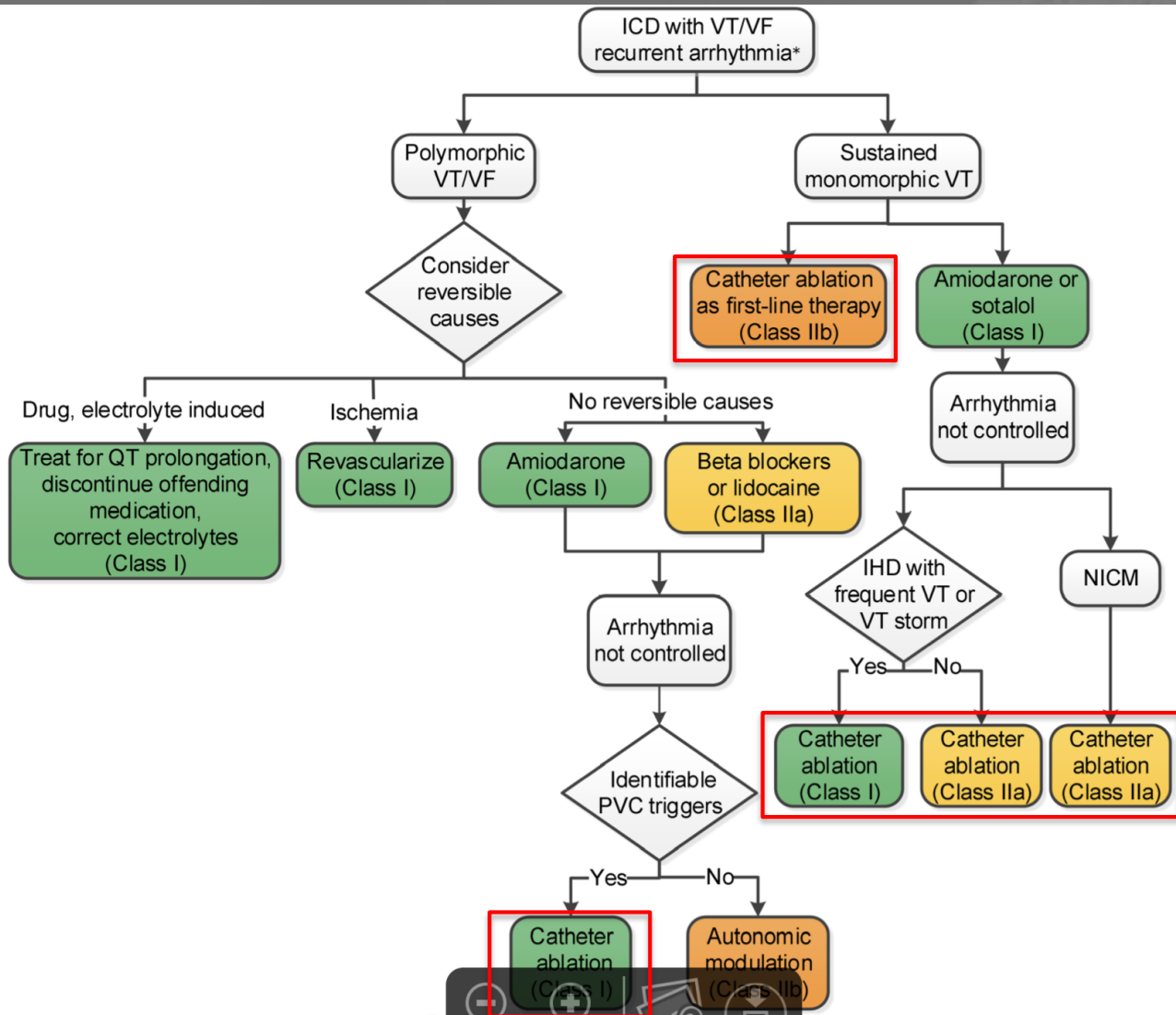
Secondary Prevention ICD Non-ischemic Cardiomyopathy

Recommendations for Secondary Prevention of SCD in Patients With NICM

References that support the recommendations are summarized in [Online Data Supplement 25 and 26](#).

COR	LOE	Recommendations
I	B-R	1. In patients with NICM who either survive SCA due to VT/VF or experience hemodynamically unstable VT (LOE: B-R) (1-4) or stable VT (LOE: B-NR) (5) not due to reversible causes, an ICD is recommended if meaningful survival greater than 1 year is expected.
	B-NR	
IIa	B-NR	2. In patients with NICM who experience syncope presumed to be due to VA and who do not meet indications for a primary prevention ICD, an ICD or an electrophysiological study for risk stratification for SCD can be beneficial if meaningful survival greater than 1 year is expected (6-11).
IIb	B-R	3. In patients with NICM who survive a cardiac arrest, have sustained VT, or have symptomatic VA who are ineligible for an ICD (due to a limited life-expectancy and/or functional status or lack of access to an ICD), amiodarone may be considered for prevention of SCD (12, 13).

Management of Ventricular Arrhythmias



Management of Ventricular Arrhythmias

- Sustained monomorphic VT in the setting of prior MI is typically due to scar-related reentry and is not due to acute ischemia.
- Although it may be appropriate to recommend revascularization when another indication for revascularization exists, revascularization alone is unlikely to reduce the recurrence of monomorphic VT and specific therapies such as antiarrhythmic medications or ablation may be needed to prevent recurrence.
- Revascularization might be beneficial in patients with ischemic heart disease and VF, polymorphic VT, or exercise-induced arrhythmias associated with ischemia

Role of Genetic Screening

- Suspicion for a genetic cause of an arrhythmia is based on clinical features and family history
- Genetic screening can (1) confirm a diagnosis when a test is available, and (2) offer cascade screening in family members
- Emphasize the importance of genetic counseling before or in conjunction with genetic testing/screening

Role of Genetic Screening

In young patients (<40 years of age) without structural heart disease who have unexplained cardiac arrest, unexplained near drowning, or recurrent exertional syncope, genetic testing may be important to identify an inherited arrhythmia syndrome as a likely cause (*Class I*)

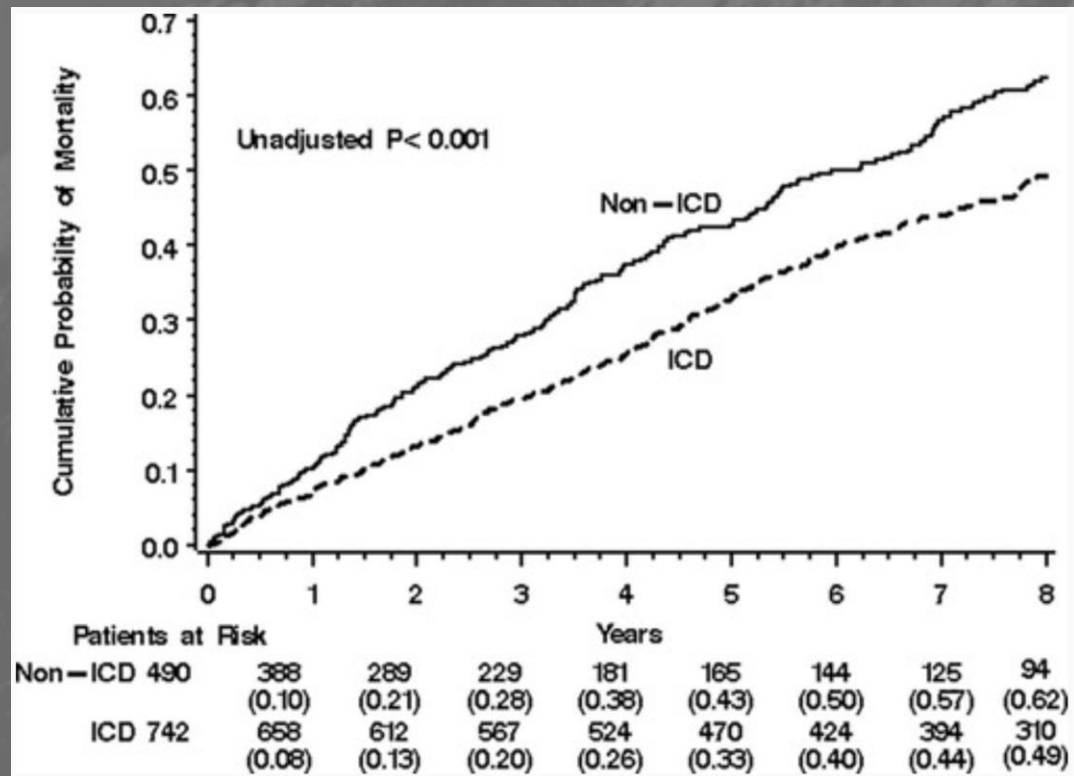
Role of Shared Decision Making

- Treatment decisions are based not only on the best available evidence but also on the patients' health goals, preferences, and values
- Patients should be informed of their individual risk of SCD and nonsudden death from HF or noncardiac conditions and the effectiveness, safety, and potential complications of the ICD in light of their health goals, preferences and values

Role of Shared Decision Making

MADIT-II 8 year follow-up

- NNT = 6



Role of Shared Decision Making

Patients have difficulty understanding the risks, benefits, and downstream burdens of their ICDs

- Patients with an ICD tend to overestimate the benefit and underestimate the risk
 - Those that decline an ICD tend to underestimate the risk of SCD
- Clinicians also often overestimate the benefits while downplaying the potential harms

What's New in VT Treatment?

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

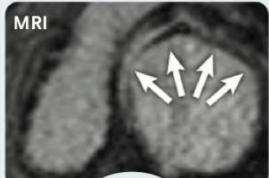
Noninvasive Cardiac Radiation for Ablation of Ventricular Tachycardia

Phillip S. Cuculich, M.D., Matthew R. Schill, M.D., Rojano Kashani, Ph.D.,
Sasa Mutic, Ph.D., Adam Lang, M.D., Daniel Cooper, M.D.,
Mitchell Faddis, M.D., Ph.D., Marye Gleva, M.D., Amit Noheria, M.B., B.S.,
Timothy W. Smith, M.D., D.Phil., Dennis Hallahan, M.D., Yoram Rudy, Ph.D.,
and Clifford G. Robinson, M.D.

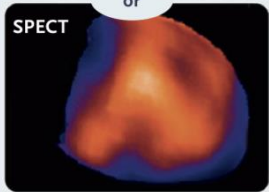
Stereotactic VT Ablation

- Five patients with refractory VT (anti-arrhythmic medications + ablation)
 - Combined 6577 VT episodes in prior three months
- Underwent stereotactic ablation with single dose of 25 Gy radiation
- Four VT episodes in total of 46 patient-months of follow-up
 - Four surviving patients, three of whom without ICD therapies post-ablation (all off anti-arrhythmics)

Visualize Anatomical Scar

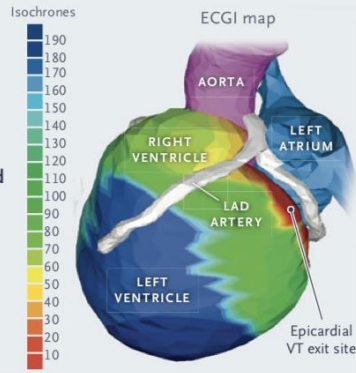


or



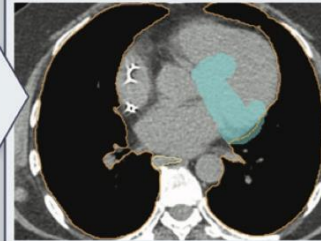
and

Perform EP Mapping



Identify Arrhythmogenic Scar Substrate

Create a contoured target volume



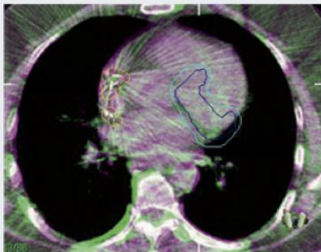
Position



Develop Plan



Image and Align

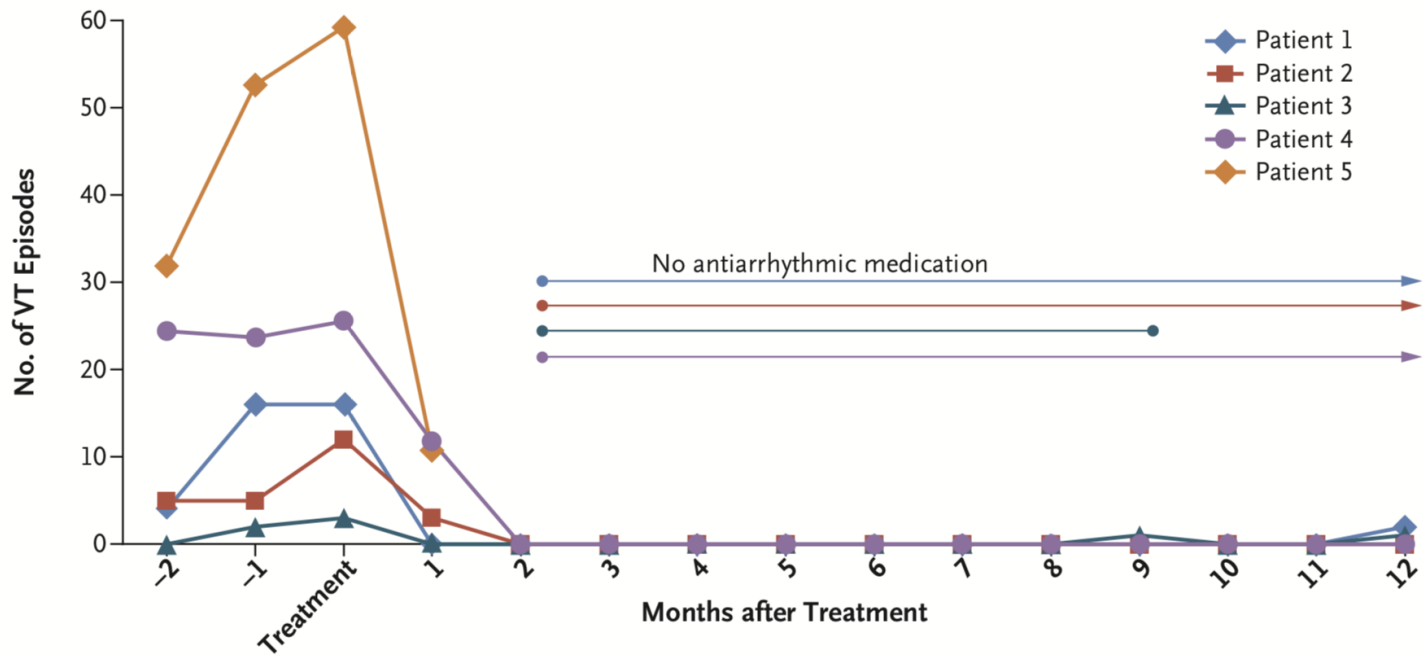


Treat



Stereotactic VT Ablation

A Monthly Assessment of All VT Episodes per Patient



Stereotactic VT Ablation

Risks

- Unknown ideal dose or amount of cardiac tissue targeted
- Risk of stroke
 - One patient died from CVA three weeks post-op
- Risk of damage to adjacent tissue
 - Evidence of lung injury on CT imaging several months post-op

