Ασθενής με ιστορικό εμφράγματος, κλάσμα εξώθησης 40% και κατάλληλες εκφορτίσεις απινιδωτή χωρίς να λαμβάνει αμιοδαρόνη. Πρέπει να υποβληθεί σε κατάλυση κοιλιακής ταχυκαρδίας ως πρώτη επιλογή;

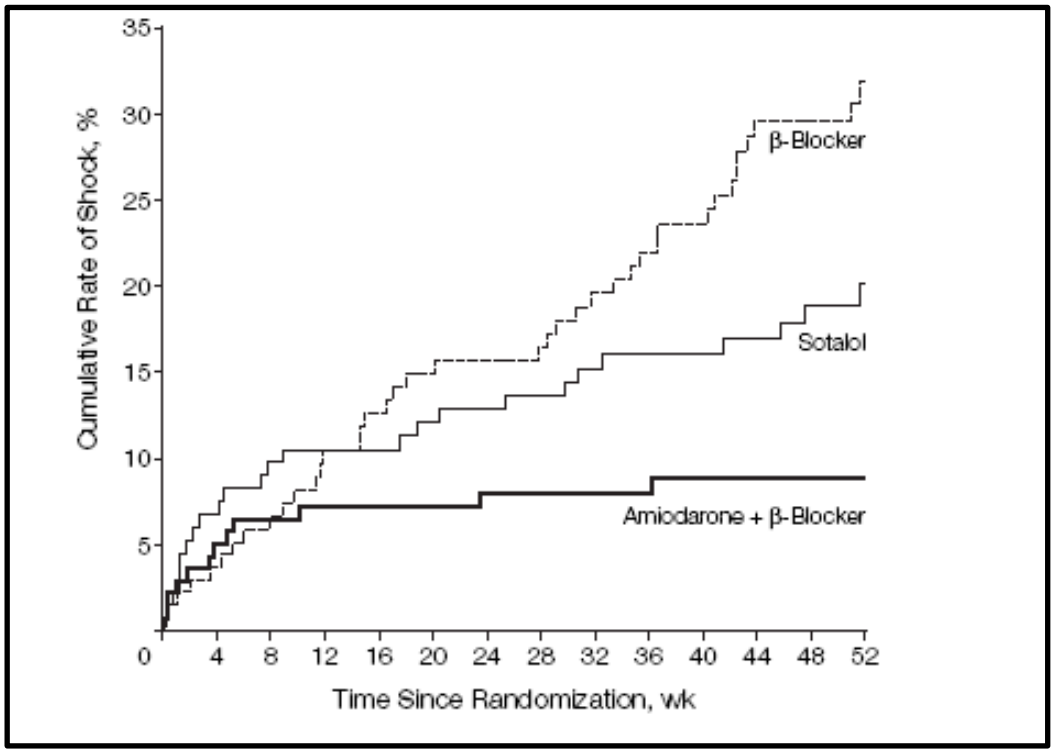
Β' ΠΑΝΕΠΙΣΤΗΜΙΑΚΗ
ΚΑΡΔΙΟΛΟΓΙΚΗ ΚΛΙΝΙΚΗ
Α.Π.Θ.

ΙΠΠΟΚΡΑΤΕΙΟ
ΓΕΝΙΚΟ ΝΟΣΟΚΟΜΕΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ

The addition of oral amiodarone or beta-blocker replacement by sotalol should be considered in patients with CAD with recurrent, symptomatic SMVT, or ICD shocks for SMVT while on beta-blocker treatment.[318,581]	IIa	B
In patients with CAD and haemodynamically well-tolerated SMVT and LVEF ≥40%, catheter ablation in experienced centres should be considered as an alternative to ICD therapy, provided that established endpoints have been reached.[c,480,580]	IIa	C
ICD implantation should be considered in patients with a haemodynamically tolerated SMVT and an LVEF ≥40% if VT ablation fails, is not available, or is	IIa	C
Catheter ablation should be considered in patients with CAD and recurrent, symptomatic SMVT, or ICD shocks for SMVT despite beta-blockers or sotalol treatment.[471]	IIa	C
immediately after) ICD implantation to decrease subsequent VT burden and ICD shocks.[484,485,582,583]	IIb	B

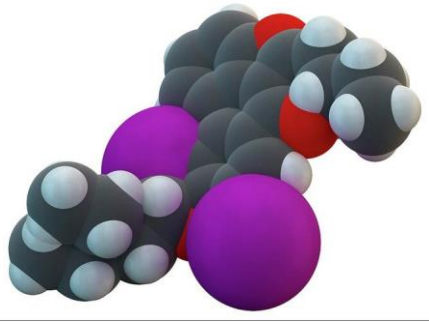
Comparison of β-Blockers, Amiodarone Plus β-Blockers, or Sotalol for Prevention of Shocks From Implantable Cardioverter Defibrillators

The OPTIC Study: A Randomized Trial



verywell health

The Strange History of Amiodarone



By Richard N. Fogoros, MD | Updated on May 07, 2022

Medically reviewed by Richard N. Fogoros, MD

Amiodarone (Cordarone, Pacerone) is the most effective, and certainly, the strangest, antiarrhythmic drug ever developed. (Here is a review of the unusual efficacy and the unusual side effects of amiodarone.) One of the strangest aspects of the drug is its history. It is a history that explains much about why, to this day, many of the more unusual features of the drug are poorly understood by

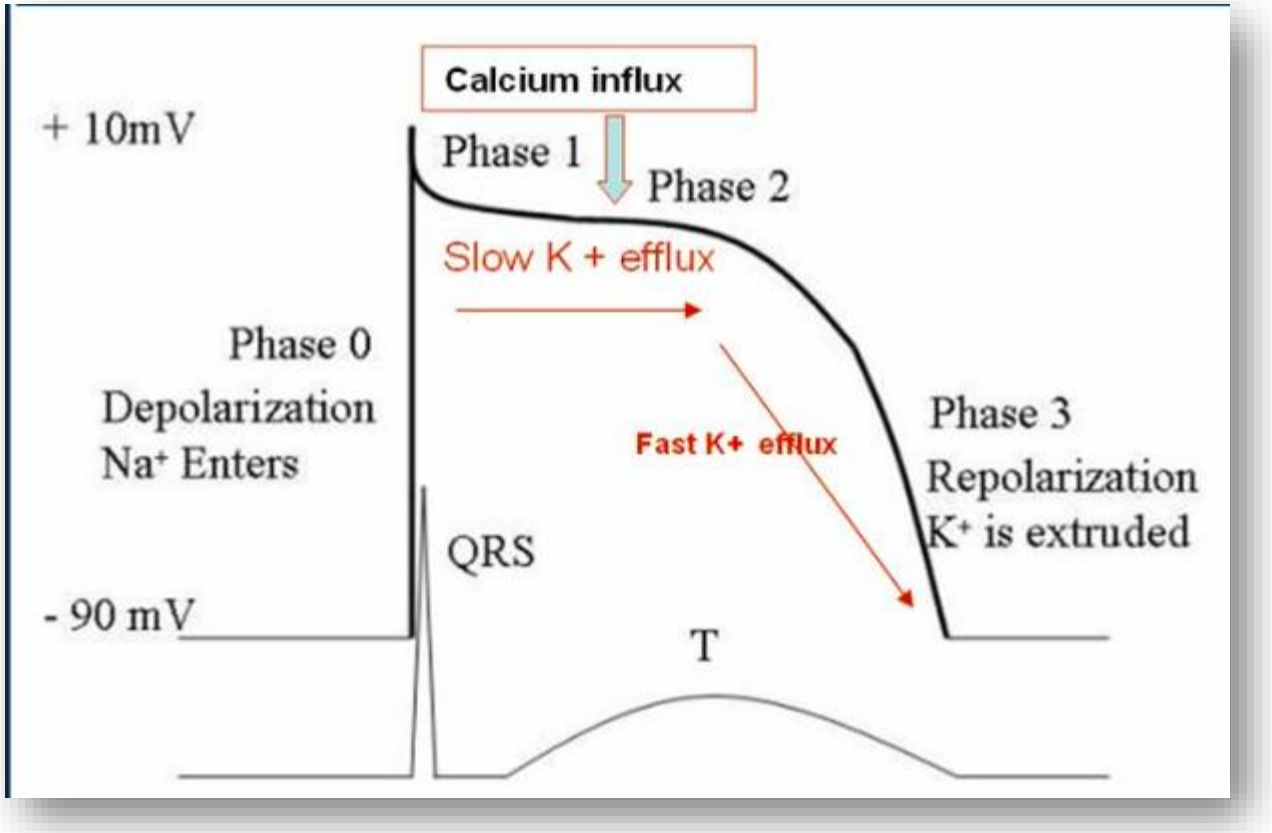
Amiodarone was developed by a Belgian company in 1961 as a drug for treating angina (chest discomfort related to coronary artery disease) and quickly became a popular anti-angina drug in Europe and South America. However, by the choice of the drug company (probably to avoid the unusually tough American regulatory environment), amiodarone was not offered for release in the United States.

After a few years a physician in Argentina, Dr. Mauricio Rosenbaum, noticed that amiodarone seemed to reduce cardiac arrhythmias in his patients with heart disease. He began using the drug extensively for heart rhythm disturbances and then began to publish his results, which were extraordinarily impressive. Clinicians from all over the world (except in the United States) quickly

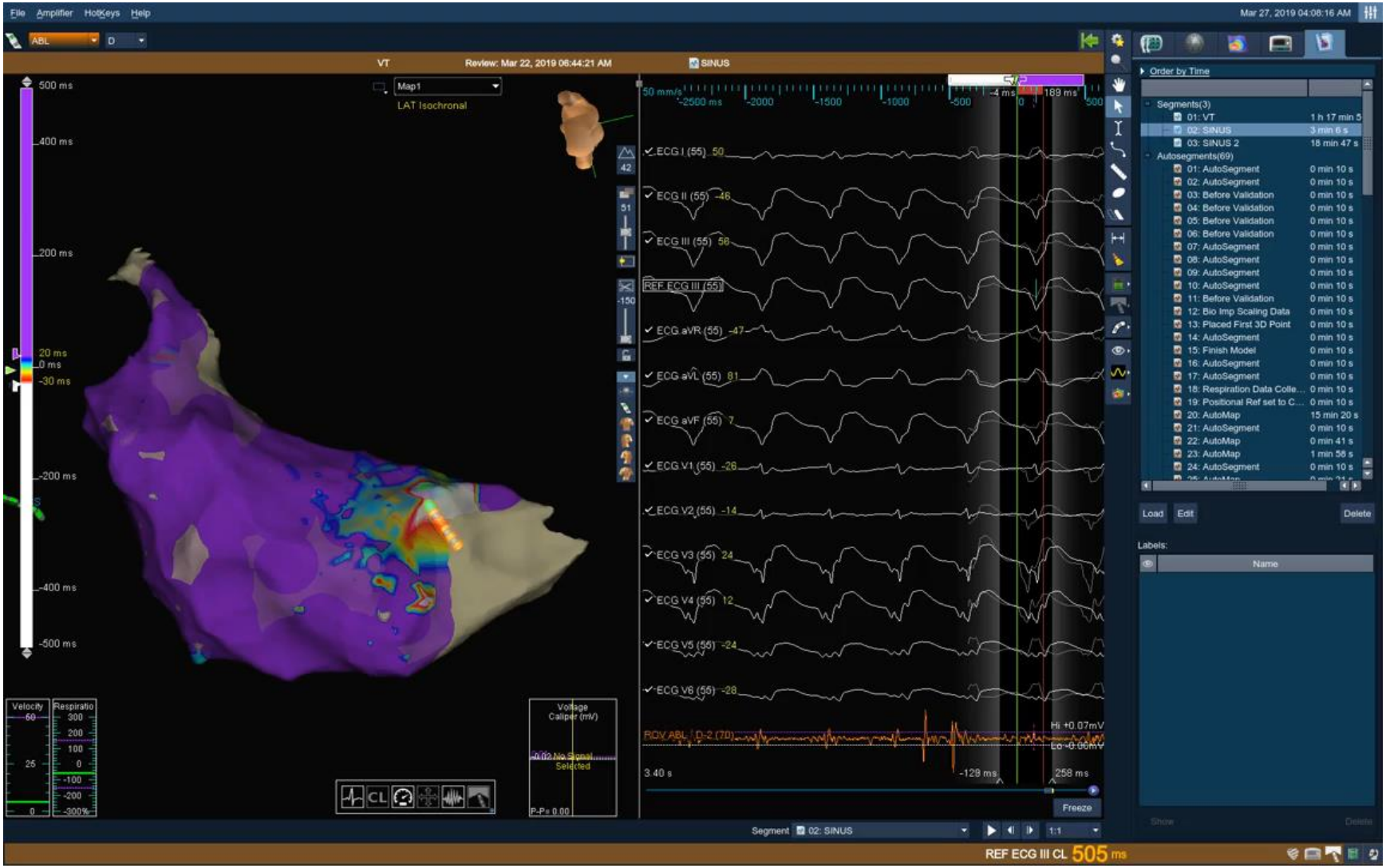
Use in America

Beginning in the late 1970s, American electrophysiologists (heart rhythm specialists) began to obtain amiodarone from Canada and Europe to use in their patients with life-threatening arrhythmias who did not respond to any other drugs. (The FDA sanctioned this activity on a compassionate-use basis.) The early word from Americans seemed to confirm what was being said all over the world —amiodarone was very safe and very effective.

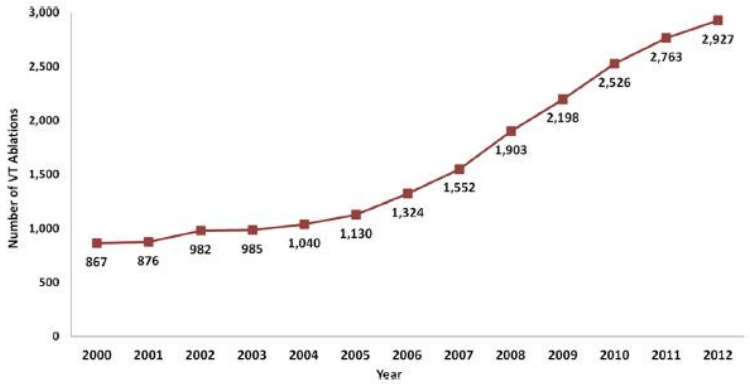
ΠΡΟΣΠΑΘΕΙΑ ΤΡΟΠΟΠΟΙΗΣΗΣ ΤΩΝ **ΛΕΙΤΟΥΡΓΙΚΩΝ** ΙΔΙΟΤΗΤΩΝ…

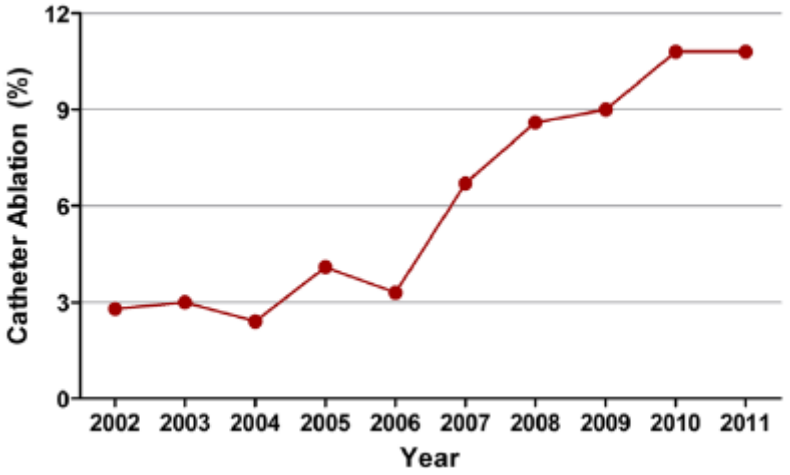


ΕΝΟΣ **ΔΟΜΙΚΟΥ** ΦΑΙΝΟΜΕΝΟΥ!

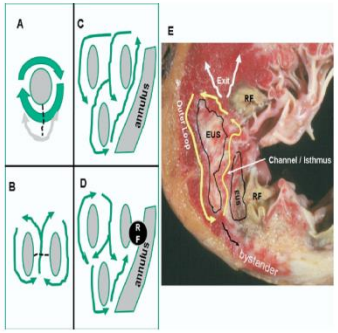


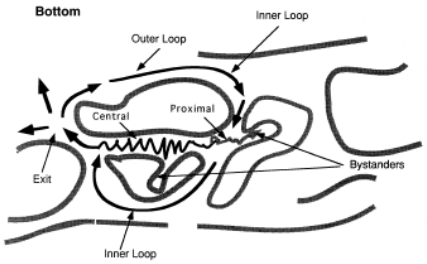
VT ABLATION

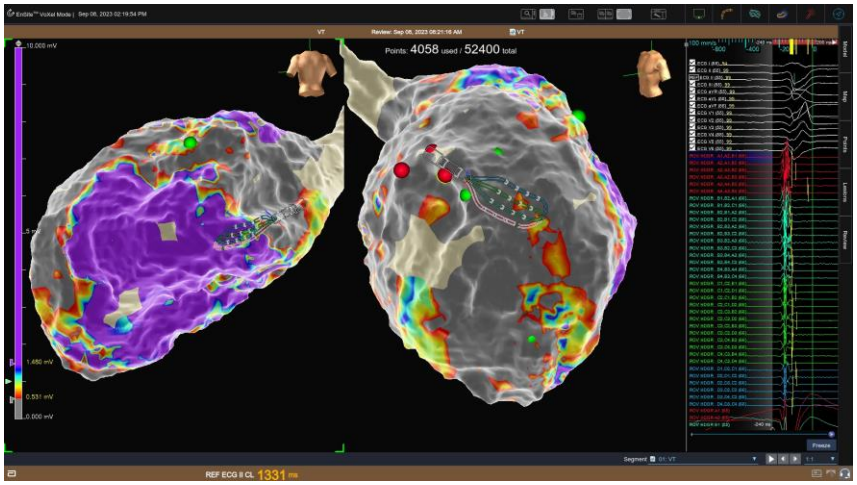

Number of VT Ablations
3,000
2,500
2,000
1,500
1,000
500
0
867
876
982
985
1,040
1,130
1,324
1,552
1,903
2,198
2,526
2,763
2,927
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year

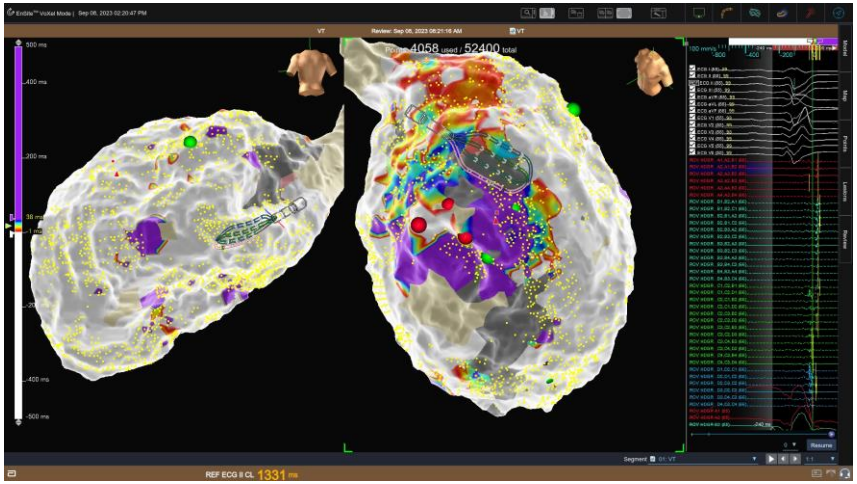

Catheter Ablation (%)
12
9
6
3
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Year

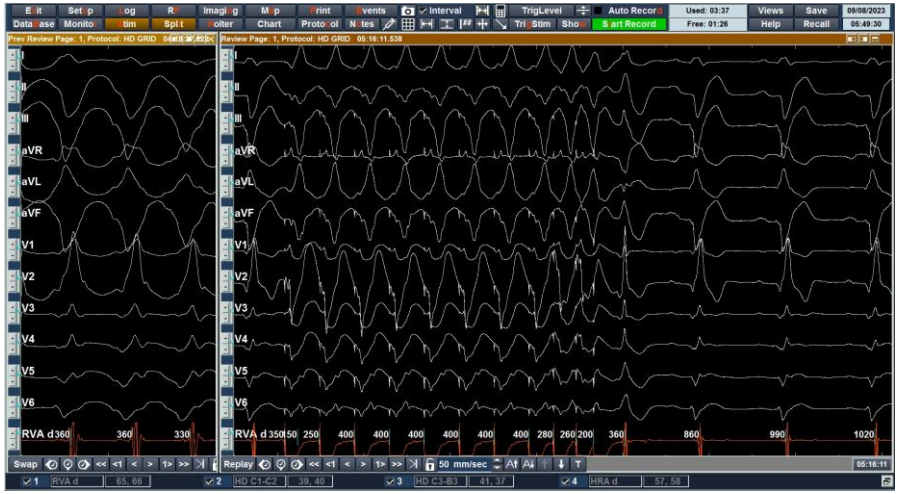
Χαρτογράφηση Υποστρώματος/Ιστικός χαρακτηρισμός











Substrate Modification ASH VT

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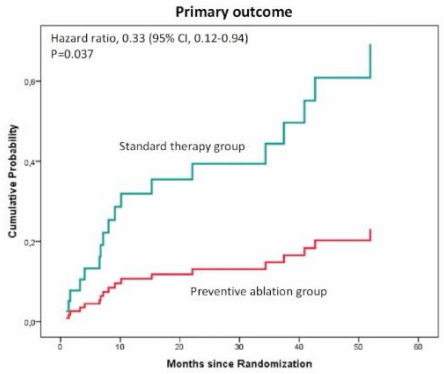
Prophylactic Catheter Ablation for the Prevention of Defibrillator Therapy

Vivek Y. Reddy, M.D., **Matthew R. Reynolds, M.D.**, **Petr Neuzil, M.D.Ph.D.**, **Allison W. Richardson, M.D.**, **Milos Taborsky, M.D., Ph.D.**, **Krit Jongnarangsin, M.D.**, **Stepan Kralovec**, **Lucie Sediva, M.D.**, **Jeremy N. Ruskin, M.D.**, and **Mark E. Josephson, M.D.**
From the Cardiac Arrhythmia Service, Massachusetts General Hospital, Boston (V.Y.R., K.J., J.N.R.); the Harvard–Thorn-dike Electrophysiology Institute and Ar-rhythmia Service, Beth Israel Deaconess Medical Center, Boston (M.R.R., A.W.R., M.E.J.); and the Cardiac Arrhythmia Service, Homolka Hospital, Prague, Czech Republic (P.N., M.T., S.K., L.S.)

CONCLUSIONS—In this randomized trial, prophylactic substrate-based catheter ablation reduced the incidence of ICD therapy in patients with a history of myocardial infarction who received ICDs for the secondary prevention of sudden death.

PREVENT VT

Results



PRIMARY and SECONDARY OUTCOMES

Outcome	Standard therapy group (N=30)	Preventive ablation group (N=30)	Hazard Ratio (95% CI)	P Value	
				Cox Regression	Log-Rank Test
Primary composite outcome - n (%)	**13 (43.3)**	**5 (16.7)**	**0.33 (0.12-0.94)**	**0.037**	**0.028**
Appropriate ICD therapy - n (%)	12 (40)	5 (16.7)	0.37 (0.13-1.05)	0.061	0.051
Unplanned hospital admission for symptomatic VAs - n (%)	9 (30)	0 (0)	n/a	n/a	0.001
Unplanned cardiac hospital admission (VAs / HF) - n (%)	16 (53.3)	4 (13.3)	0.21 (0.07-0.63)	0.006	0.002
Electrical storm - n (%)	6 (20)	0 (0)	n/a	n/a	0.01
Cardiovascular death - n (%)	8 (26.7)	4 (13.3)	0.41 (0.12-1.38)	0.151	0.139
Heart failure hospitalization - n (%)	10 (33.3)	4 (13.3)	0.36 (0.11-1.16)	0.087	0.074
Death from any cause - n (%)	12 (40)	8 (26.7)	0.55 (0.22-1.37)	0.200	0.194

MULTIVARIATE REGRESSION ANALAYSIS

Outcome	Hazard Ratio (95% CI)	P Value
Primary composite outcome	**0.32 (0.11-0.91)**	**0.032**
Appropriate ICD therapy	0.35 (0.12-1.02)	0.054
Unplanned cardiac hospital admission (VAs / HF)	**0.22 (0.07-0.68)**	**0.009**
Cardiovascular death	0.46 (0.14-1.57)	0.217
Heart failure hospitalization	0.37 (0.11-1.22)	0.103
Death from any cause	0.59 (0.24-1.49)	0.267

EHRA2024

Conclusions

- Preventive ablation of the IRA-CTO substrate at the time of primary prevention ICD implantation is associated with the reduced risk of appropriate ICD therapy or VA-related hospitalization.
- Study also highlights the importance of identifying high risk primary prevention ICM patients in whom ablation might prevent VAs and consequent debilitating ICD shocks, while outweighing the potential for procedural complications.
- The results of PREVENTIVE VT trial warrant future adequately powered studies that explore not only more efficient and safer catheter ablation technologies, but also newer imaging modalities to potentially establish VT ablation procedures as a primary prevention strategy.

EHRA2024

ESC European Society of Cardiology Europace (2018) 20, 104–115 doi:10.1093/europace/eux109

CLINICAL RESEARCH
Cardiac electrophysiology

Long-term outcomes of different ablation strategies for ventricular tachycardia in patients with structural heart disease: systematic review and meta-analysis

David F. Briceño[1], Jorge Romero[1], Pedro A. Villablanca[1], Alejandra Londoño[1], Juan C. Diaz[1], Ilir Maraj[1], Syeda Atiqa Batul[1], Nidhi Madan[1], Jignesh Patel[1], Anand Jagannath[1], Sanghamitra Mohanty[2], Prasant Mohanty[2], Carola Gianni[2], Domenico Della Rocca[2], Ahlam Sabri[1], Soo G. Kim[1], Andrea Natale[2,3,4,5,6,7,8,9], and Luigi Di Biase[1,2,3,9]*

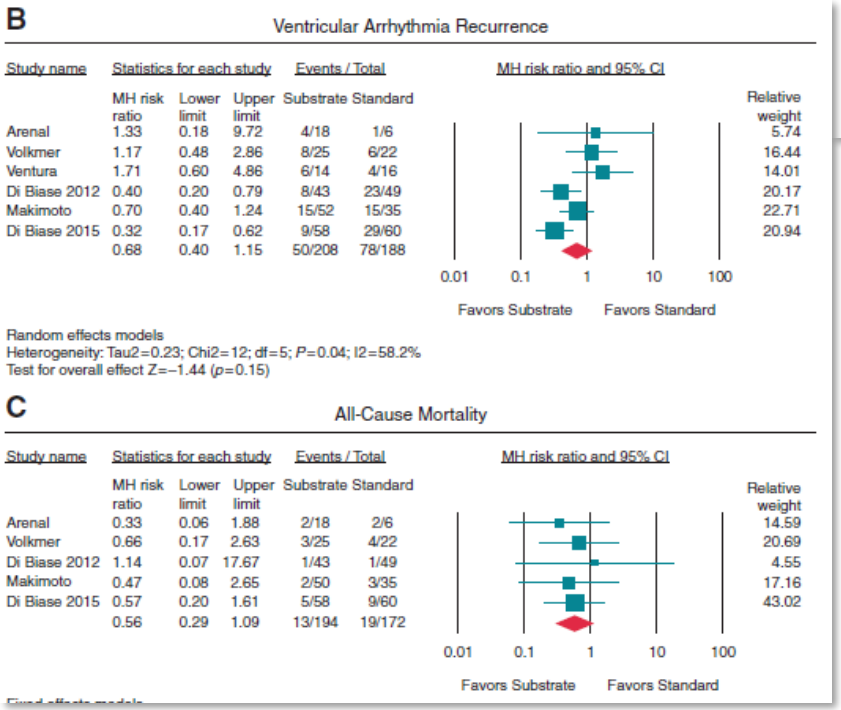


Table 3 Procedural end points of the different substrate modification strategies

Study	Year	Substrate technique	Procedural end point
Jais[5]	2012	LAVA	Elimination of all sharp high-frequency ventricular potentials, occurring anytime during or after the far-field ventricular electrogram in sinus rhythm or before the far-field ventricular electrogram during VT
Vergara[7]	2012	Late potentials	Complete abolition of all late potentials
Tilz[13]	2014	Substrate isolation	Isolation of the entire substrate and defined as (i) lack of fractionated, double or late potentials inside the encircled area 20 min post-ablation, (ii) non-capture of the LV during pacing with maximal output at multiple sites within the encircled area, and (iii) after a maximum of 40 RF applications
Berruezo[9]	2015	Scar dechanneling	Elimination of all identified CCs at the CC entrance during sinus rhythm
Tzou[12]	2015	Core isolation	Failure to capture the ventricle with pacing from inside the lesion set (exit block) that conforms the isolated core
Jamil-Copley[14]	2015	RMCC	Ablation overlapping all RMCCs
Gokoglan[15]	2016	Scar homogenization	Empirical elimination of all abnormal electrograms throughout the entire scar

CC, conducting channel; LAVAs, local abnormal ventricular activities; LV, left ventricle; RF, radiofrequency; RMCCs, ripple mapping conduction channels; VT, ventricular tachycardia.

VANISH TRIAL

The NEW ENGLAND JOURNAL of MEDICINE

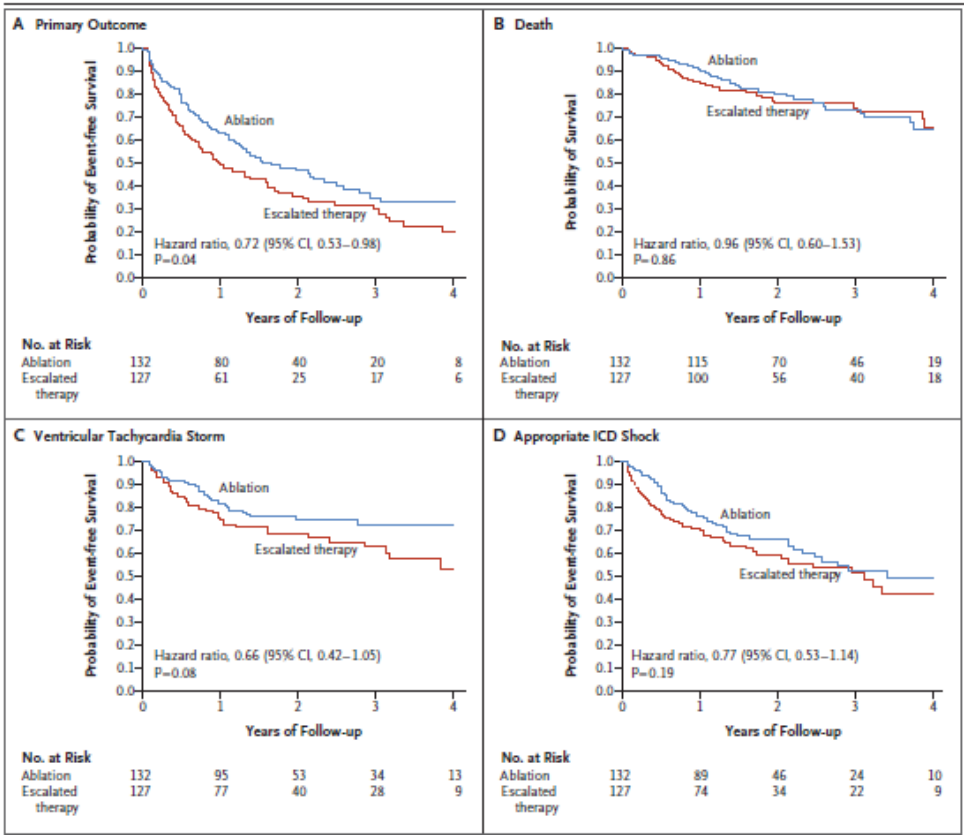
ESTABLISHED IN 1812 JULY 14, 2016 VOL. 375 NO. 2

Ventricular Tachycardia Ablation versus Escalation of Antiarrhythmic Drugs

John L. Sapp, M.D., George A. Wells, Ph.D., Ratika Parkash, M.D., William G. Stevenson, M.D., Louis Blier, M.D., Jean-Francois Sarrazin, M.D., Bernard Thibault, M.D., Lena Rivard, M.D., Lorne Gula, M.D., Peter Leong-Sit, M.D., Vidal Essebag, M.D., Ph.D., Pablo B. Nery, M.D., Stanley K. Tung, M.D., Jean-Marc Raymond, M.D., Laurence D. Sterns, M.D., George D. Veenhuyzen, M.D., Jeff S. Healey, M.D., Damian Redfearn, M.D., Jean-Francois Roux, M.D., and Anthony S.L. Tang, M.D.

CONCLUSIONS

In patients with ischemic cardiomyopathy and an ICD who had ventricular tachycardia despite antiarrhythmic drug therapy, there was a significantly lower rate of the composite primary outcome of death, ventricular tachycardia storm, or appropriate ICD shock among patients undergoing catheter ablation than among those receiving an escalation in antiarrhythmic drug therapy. (Funded by the Canadian Institutes of Health Research and others; VANISH ClinicalTrials.gov number, NCT00905853.)



In relatively high-risk patients with ICM experiencing recurrent VT despite treatment with AADs, **catheter ablation is superior to escalation of AADs** in reducing the combined outcome of **death, VT storm, or ICD shocks** after 30 days.

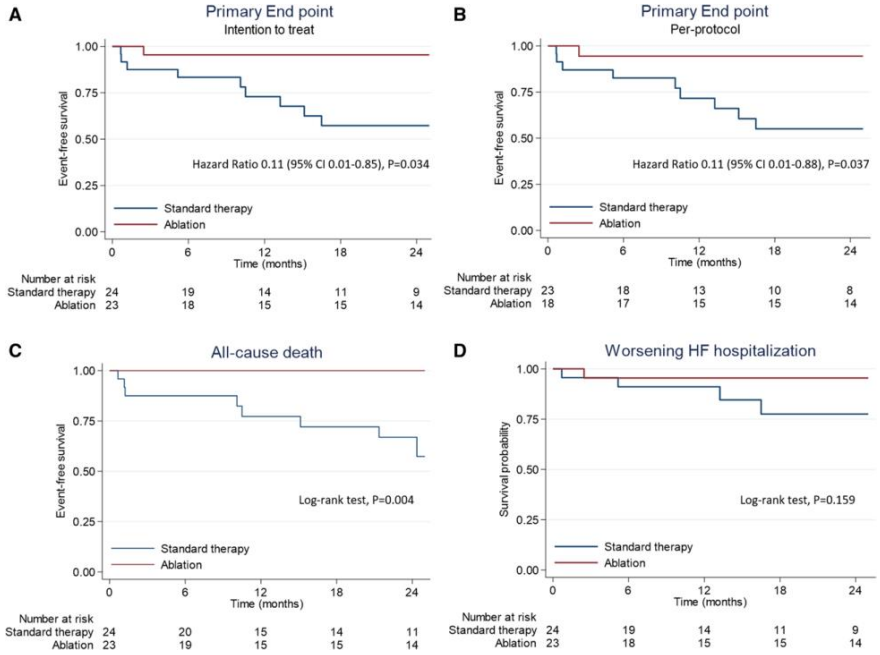
In addition, catheter ablation is less likely to cause treatment-attributed adverse events compared with escalation of AAD therapy. (1.5- 2.3% procedural complications with no mortality) compared to escalated AAD therapy(1.6% death with up to 7.8% treatment-related complications).

Circulation

ORIGINAL RESEARCH ARTICLE

Does Timing of Ventricular Tachycardia Ablation Affect Prognosis in Patients With an Implantable Cardioverter Defibrillator? Results From the Multicenter Randomized PARTITA Trial

RESULTS: Of the 517 patients enrolled in phase A, 154 (30%) had ventricular tachycardia, 56 (11%) received an appropriate shock over a median follow-up of 2.4 years (interquartile range, 1.4–4.4), and 47 of 56 (84%) agreed to participate in phase B. After 24.2 (8.5–24.4) months, the primary end point occurred in 1 of 23 (4%) patients in the ablation group and 10 of 24 (42%) patients in the control group (hazard ratio, 0.11 [95% CI, 0.01–0.85]; *P*=0.034). The results met the prespecified termination criterion of >99% Bayesian posterior probability of superiority of treatment over standard therapy. No deaths were observed in the ablation group versus 8 deaths (33%) in the control group (*P*=0.004); there was 1 worsening heart failure hospitalization in the ablation group (4%) versus 4 in the control group (17%; *P*=0.159). ICD shocks were less frequent in the ablation group (9%) than in the control group (42%; *P*=0.039).



Clinical Perspective

What Is New?

- Catheter ablation performed after the first implantable cardioverter defibrillator shock reduced the risk of death or worsening heart failure hospitalization.
- Antitachycardia pacing predicted the occurrence of appropriate implantable cardioverter defibrillator shocks.

What Are the Clinical Implications?

- Catheter ablation for ventricular tachycardia may be considered after the first implantable cardioverter defibrillator shock in patients with ischemic or nonischemic cardiomyopathy.
- Therapeutic strategies should aim at reducing the burden of antitachycardia pacing treatments.

CONCLUSIONS: Ventricular tachycardia ablation after first appropriate shock was associated with a reduced risk of the combined death or worsening heart failure hospitalization end point, lower mortality, and fewer ICD shocks. These findings provide support for considering ventricular tachycardia ablation after the first ICD shock.

Circulation. XXX;145:00–00. DOI: 10.1161/CIRCULATIONAHA.122.059598

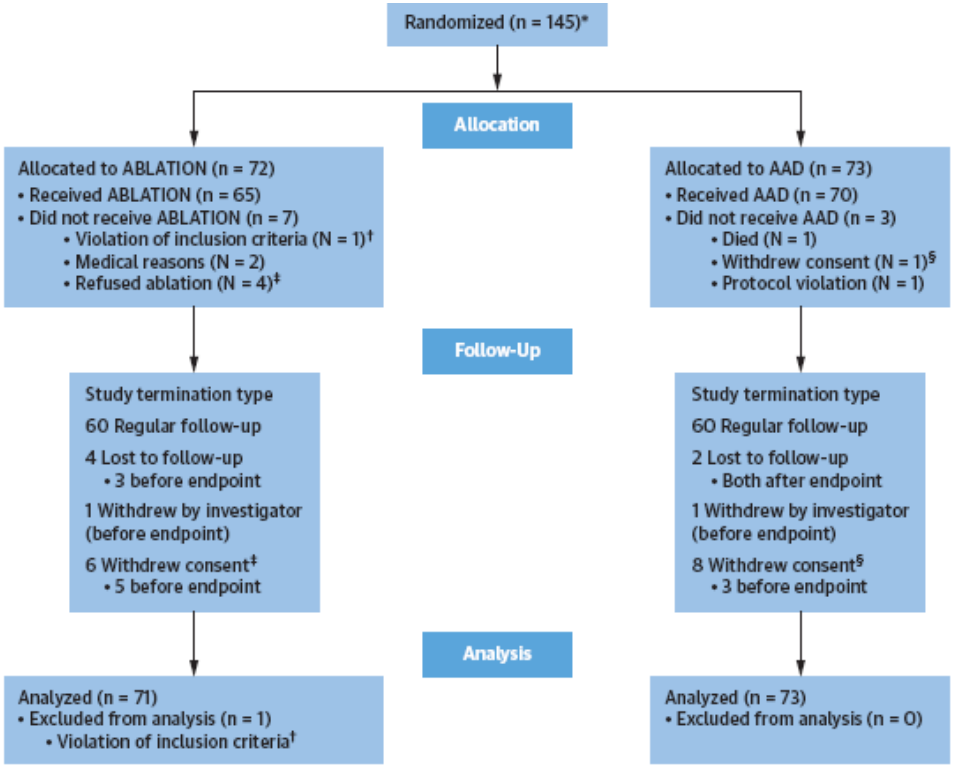
Table 1 Summary of studies evaluating different substrate ablation approaches for unstable VT

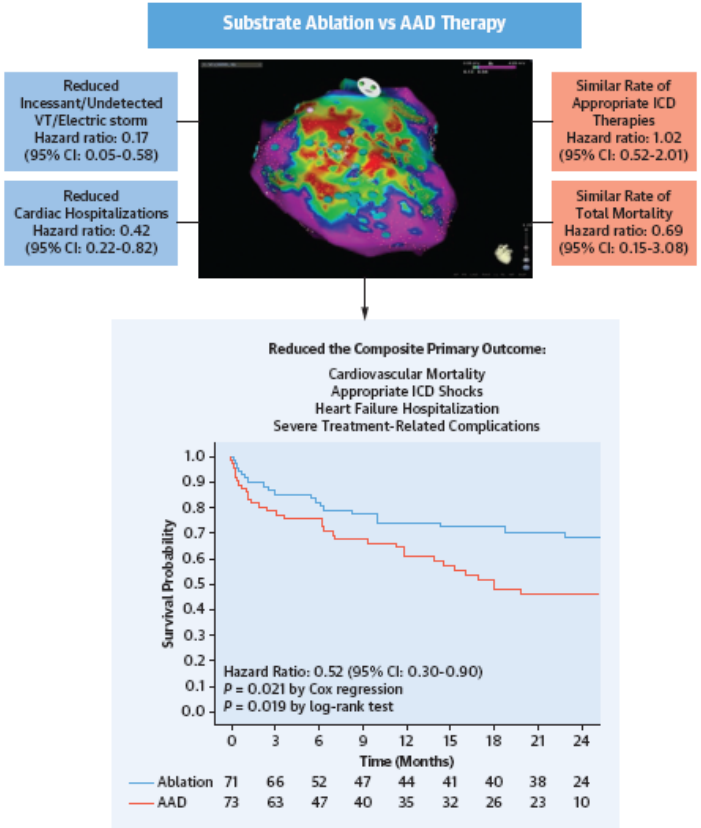
Study	Year	No. of patients	Type of substrate	LVEF (%)	End-point assessed (% achieved)	EPI mapping/ ablation	RF duration (lesions or min)	Follow-up (months)	VT recurrence	Complications
Linear ablation lesions										
Marchlinski et al[26]	2000	16	9 ICM, 7 NICM	32 ± 15	Noninducibility (47%)	No	59 ± 34 lesions	8 (3–36)	25%	1 stroke
Soejima et al[47]	2001	40	ICM	29 ± 10	Noninducibility (58%)	No	21 ± 10 lesions	12 ± 6	47%	4 (iliac artery dissection, femoral artery pseudoaneurysm, embolism to lower leg, retroperitoneal hematoma)
Reddy et al[1]	2007	64	ICM		Noninducibility (76%)	No	NR	31 ± 8	12%	3 (pericardial effusion, CHF, DVT)
Ablation of late potentials										
Arenal et al[9]	2003	24	21 ICM, 2 NICM, 1 ToF	30 ± 9	Elimination of LPs related to the VT and noninducibility (88%)	No	11 ± 8 lesions	9 ± 4	21%	None
Vollmer et al[19]	2006	25	ICM	30 ± 8	Elimination of LPs and noninducibility (81%)	No	14 ± 6 lesions	26 ± 14	29%	NR
Nogami et al[16]	2008	18	ARVC	NR	Change of LPs* (67%)	No	17 ± 10 lesions	61 ± 38	33%	NR
Garcia et al[14]	2009	13	ARVC	NR	Elimination of LPs and noninducibility (85%)	Yes	35 ± 26 lesions ENDO 37 ± 21 lesions EPI	18 ± 13	33%	None
Bai et al[11]	2011	26	ARVC	53 ± 10	Elimination of LPs and noninducibility (100%)	Yes	26 ± 14 min	39 ± 4	15%	1 groin hematoma
Vergara et al[18]	2012	50	36 ICM, 14 NICM	32 ± 9 ICM; 36 ± 10 NICM	Elimination of LPs (84%)	Yes	NR	13 ± 4	20%	NR
Arenal et al[10]	2013	59	ICM	30 ± 11	Elimination of LPs (78%)	No	11 ± 5 min	39 ± 21	42%	No major
Ablation of LAVA										
Jais et al[15]	2012	70	56 ICM, 14 NICM	35 ± 10	Elimination of LAVA (70%)	Yes	23 ± 11 min	22 (14–27)	32%	1 cardiac tamponade, 1 RV perforation
Scar homogenization										
Di Biase et al[13]	2012	43	ICM	24 ± 8	Elimination of any abnormal potential ± failure to capture (NR)	Yes	74 ± 21 min	21 (19–25)	19%	1 groin hematoma
Ablation of interconnected channels (scar dechanneling)										
Berruezo et al[12]	2012	11	ARVC	55 ± 7	Elimination of LP channels (NR)	Yes	6.3 (4–8.7) lesions	11 (6–24)	9%	1 RV puncture during epicardial access
Tung et al[17]	2013	21	15 ICM, 2 NICM, 2 ARVC, 1 sarcoid, 1 noncompaction, 1 Chagas	25 (25–30)	Change or elimination of LPs ± failure to capture ± impedance drop > 10 Ω plus noninducibility (84%)	Yes	7 (4–14) lesions	11 (6–18)	14%	NR
Berruezo et al[21]	2015	101	75 ICM, 26 NICM	36 ± 13	Elimination of LP channels (84%)	Yes	28 ± 16 min	24	20%	7 (2 tamponade, 2 CHB, 2 pericardial effusion, 1 TIA, 1 PN palsy)
Core isolation of critical substrate elements										
Tzou et al[20]	2015	44	32 ICM, 12 NICM	31 ± 13	Isolation with exit block (84%)	Yes	111 ± 91 lesions	18 ± 9	14%	2 (1 arterial pseudoaneurysm, 1 transient hypotension)

SURVIVE VT

Substrate Ablation vs Antiarrhythmic Drug Therapy for Symptomatic Ventricular Tachycardia

Ángel Arenal, MD, PhD,[a,b] Pablo Ávila, MD,[a,b,c] Javier Jiménez-Candil, MD, PhD,[b,c] Luis Tercedor, MD,[d] David Calvo, MD, PhD,[e] Fernando Arribas, MD, PhD,[f] Javier Fernández-Portales, MD, PhD,[g] José Luis Merino, MD, PhD,[h] Antonio Hernández-Madrid, MD, PhD,[i] Francisco J. Fernández-Avilés, MD, PhD,[a,b] Antonio Berruezo, MD, PhD[j]





JACC VOL. 79, NO. 15, 2022

Substrate Ablation vs Antiarrhythmic Drug Therapy for Symptomatic Ventricular Tachycardia

Ángel Arenal, MD, PhD,[a,b] Pablo Ávila, MD,[a,b,e] Javier Jiménez-Candil, MD, PhD,[b,c] Luis Tercedor, MD,[d] David Calvo, MD, PhD,[e] Fernando Arribas, MD, PhD,[f] Javier Fernández-Portales, MD, PhD,[g] José Luis Merino, MD, PhD,[h] Antonio Hernández-Madrid, MD, PhD,[i] Francisco J. Fernández-Avilés, MD, PhD,[a,b] Antonio Berruezo, MD, PhD[j]

In patients with ischemic heart disease and symptomatic VT, this trial has shown that a substrate-based catheter ablation procedure was associated with a significantly lower rate of the composite endpoint of appropriate ICD shocks, cardiovascular death, hospitalization for worsening heart failure, and severe treatment-related severe adverse events in comparison to AAD. We also found that there was a significant benefit in hospitalization for cardiovascular causes.

	2-Year (95% CI) KM Event-Free Survival Estimates		
	Ablation (n = 71)	AAD (n = 73)	Log-Rank *P* Value
Composite primary endpoint	68.5 (57.8-81.1)	46.2 (35.1-60.8)	0.019
Primary endpoint components			
Cardiovascular mortality	94.3 (88.2-100)	95.3 (90.3-100)	0.930
Appropriate ICD shocks	80.3 (70.8-91.0)	77.4 (67.1-89.2)	0.750
Hear failure hospitalization	86.6 (78.3-95.8)	77.6 (67.4-89.3)	0.190
Severe treatment-related complications	89.5 (82.4-97.2)	67.0 (56.1-79.8)	0.003
Other outcomes			
Total mortality	94.3 (88.2-100)	92.9 (86.2-100)	0.622
Appropriate ICD therapies	72.3 (61.9-84.5)	72.7 (61.9-85.3)	0.950
Appropriate ATP	88.6 (80.9-96.9)	80.0 (70.3-91.0)	0.179
Any documented VT[a]	71.2 (60.7-83.5)	64.8 (53.6-78.5)	0.470
Hospitalization for VA[a]	92.1 (85.7-99.1)	65.8 (54.4-79.5)	<0.001
Cardiac hospitalization	79.6 (70.2-90.3)	55.9 (44.4-70.2)	0.008
Incessant/undetected VT/ electric storm[a]	95.2 (90.0-100)	75.5 (65.3-87.4)	0.002
VT storm[a]	96.6 (92.1-100)	92.3 (85.9-99.1)	0.234
Slow undetected VT[a]	97.1 (93.3-100)	82.8 (73.5-93.3)	0.014
Inappropriate ICD therapies	96.7 (92.3-100)	92.8 (86.2-99.9)	0.350
Inappropriate ICD shocks	96.7 (92.3-100)	92.8 (86.2-99.9)	0.350
Inappropriate ATP	96.7 (92.3-100)	98.0 (94.2-100)	0.613

Substrate Ablation vs Antiarrhythmic Drug Therapy for Symptomatic Ventricular Tachycardia

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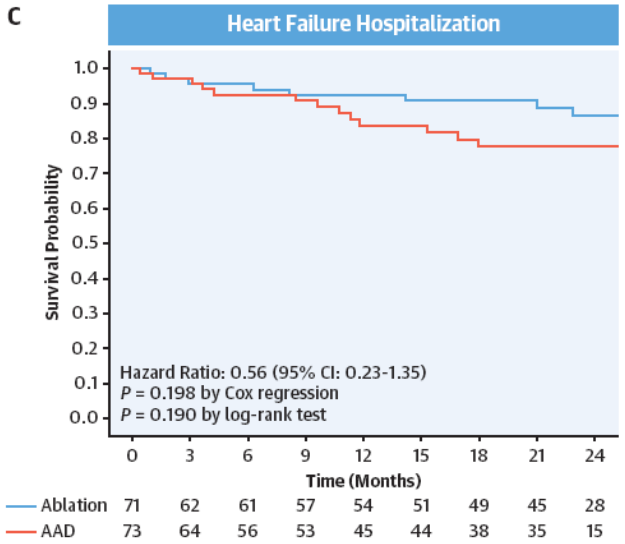
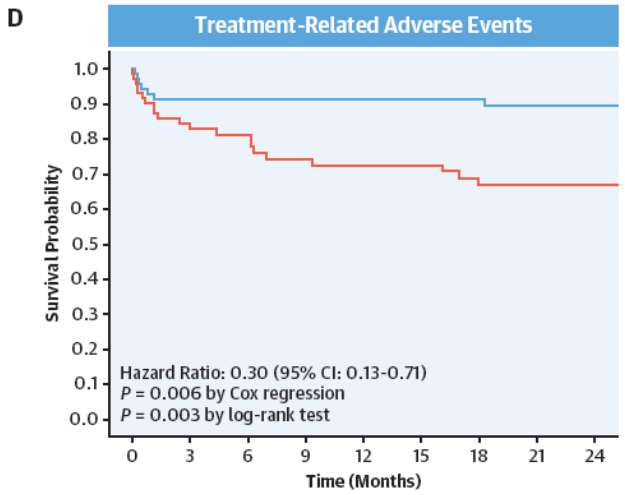
TABLE 5 Detailed Treatment-Related Adverse Events

AAD Strategy No vs Ablation	Patient No	Adverse Event	Time After Randomization, mo	Action, Comments
AAD				
3	24	Sinus bradycardia	1	Hospitalization, beta-blocker withdrawal
3	25	Sinus bradycardia and renal failure	<1	Hospitalization, upgrade CRT
3	30	Dyspnea	1	Amiodarone discontinuation
1	35	Slow VT (VTCL: 410 ms)	5	Hospitalization, ablation
1	36	Slow VT (VTCL: 380 ms)	7	Hospitalization, ablation
1	40	Bradycardia/intolerance	3	Amiodarone discontinuation
		Slow VT (VTCL: 370 ms)	4	Hospitalization, ablation
3	43	Hypothyroidism	7	Amiodarone discontinuation
1	58	Slow VT (VTCL: 400 ms)	17	Hospitalization, ablation
1	68	Hyperthyroidism	2	Amiodarone discontinuation
2	75	Slow VT (470)	9	Hospitalization, ablation
2	76	Slow VT (VTCL: 380 ms)	1	Hospitalization
3	80	Pulmonary toxicity	2	Amiodarone discontinuation, resolution
3	87	Incessant VT (VTCL: 400 ms)	1	Hospitalization, ablation
1	93	Incessant VT	1	Hospitalization
1	101	Slow VT (VTCL: 440 ms)	1	Hospitalization, ablation
		Pulmonary toxicity	7	Amiodarone discontinuation
3	104	Slow VT (VTCL: 370 ms)	5	Hospitalization, ablation
3	106	Slow VT (VTCL: 390 ms)	17	Hospitalization, ablation
2	128	Incessant VT	2	Hospitalization, ablation
3	133	Slow VT (VTCL: 470 ms)	1	Hospitalization, ablation
3	134	Incessant VT (VTCL: 420 ms)	7	Hospitalization
1	140	Incessant VT (VTCL: 380 ms)	1	Hospitalization
Ablation				
	21	Stroke	<1	Prolonged hospitalization, resolution
		Pseudoaneurysm	<1	Surgery, resolution
	44	Stroke	1	Hospitalization, resolution
	63	Cardiogenic shock	1	Hospitalization, resolution
	96	Incessant VT	1	Hospitalization/ablation
	97	Pericardial effusion	1	Pericardial drainage, resolution
	102	Incessant VT	1	Hospitalization, resolution
	143	Acute pulmonary edema	<1	Prolonged hospitalization, resolution

VTCL = ventricular tachycardia cycle length; other abbreviations as in Tables 1 and 2.





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Letters

Slow Ventricular Tachycardia on Amiodarone

An Adverse Complication or an Efficacy Outcome

slow and hemodynamically tolerated, VT recurrences did occur but were mostly nonfatal.

Following the availability of ICD therapy, amiodarone's use (for shock reduction) continues. However, expectedly, again, the VT recurrences are often slowed—enhancing pace-termination but sometimes necessitating device reprogramming for VT recognition.

Secondary prevention of SCD and treatment of VAs		
ICD implantation is recommended in patients without ongoing ischaemia with documented VF or haemodynamically not-tolerated VT occurring later than 48 h after MI.[349–351]	I	A
In patients with CAD and recurrent, symptomatic SMVT, or ICD shocks for SMVT despite chronic amiodarone therapy, catheter ablation is recommended in preference to escalating AAD therapy.[471]	I	B
The addition of oral amiodarone or beta-blocker replacement by sotalol should be considered in patients with CAD with recurrent, symptomatic SMVT, or ICD shocks for SMVT while on beta-blocker treatment.[318,581]	IIa	B
In patients with CAD and haemodynamically well-tolerated SMVT and LVEF ≥40%, catheter ablation in experienced centres should be considered as an alternative to ICD therapy, provided that established endpoints have been reached.[c,480,580]	IIa	C
ICD implantation should be considered in patients with a haemodynamically tolerated SMVT and an LVEF ≥40% if VT ablation fails, is not available, or is not desired.	IIa	C
Catheter ablation should be considered in patients with CAD and recurrent, symptomatic SMVT, or ICD shocks for SMVT despite beta-blockers or sotalol treatment.[471]	IIa	C
In patients with CAD eligible for ICD implantation, catheter ablation may be considered just before (or immediately after) ICD implantation to decrease subsequent VT burden and ICD shocks.[484,485,582,583]	IIb	B

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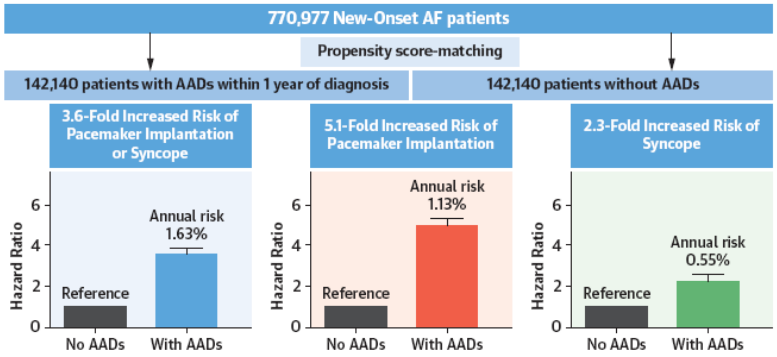
ORIGINAL RESEARCH

Association of Antiarrhythmic Drug Therapy With Syncope and Pacemaker Implantation in Patients With Atrial Fibrillation

CENTRAL ILLUSTRATION Adverse Effects of Antiarrhythmic Drugs



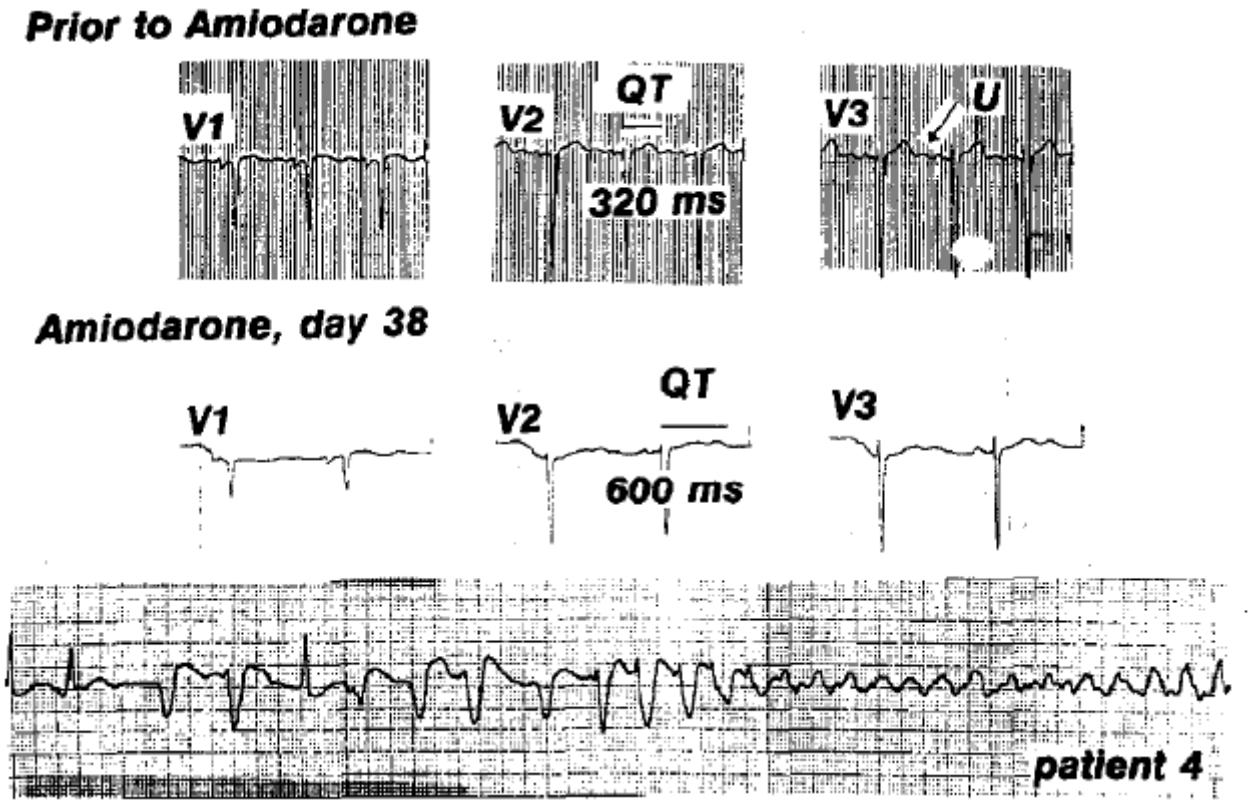
Kim YG, et al. J Am Coll Cardiol. 2024;83(11):1027-1038.

Early treatment of new-onset atrial fibrillation (AF) with antiarrhythmic drugs (AADs) can be associated with increased risk of pacemaker implantation or syncope.

throughout various subgroups. Both amiodarone and nonamiodarone AADs were associated with increased risk of pacemaker implantation or syncope. However, Class IC AADs showed relatively lower risk of pacemaker implantation or syncope compared with amiodarone, which is a finding similar with a prior study that compared those drugs but with different outcome endpoints.[18]

Amiodarone and Torsades de Pointes in Patients With Advanced Heart Failure

Holly R. Middlekauff, MD, William G. Stevenson, MD,
Leslie A. Saxon, MD, and Lynne W. Stevenson, MD



THE AMERICAN JOURNAL OF CARDIOLOGY@ VOL. 76 SEPTEMBER 1, 1995

Effect of AADs on all-cause mortality

Data on all-cause mortality were retrievable from all the AADs trials.[5-12] During an average follow-up of 15±6 months, death occurred in a total of 82/1,487 (5.5%) patients in the AAD group compared to 39/781 (5%) patients receiving standard medical therapy. Pooled analysis showed no significant impact of AAD therapy on all-cause mortality compared

(I^2=32%, *P*=0.195), and results were confirmed after the exclusion of each study in turn. However, subgroup analysis appraising the impact of different AADs on all-cause mortality showed a significant increase in mortality associated with amiodarone use (OR=3.36 [95% CI 1.36 to 8.30], *P*=0.009), while sotalol (OR=1.05 [95% CI 0.57 to 1.95], *P*=0.871),

appear to have a significant impact on all-cause mortality compared to standard medical therapy.

Santangeli P, *Heart Rhythm. 2016;13:1552–1559*.

ESC European Society of Cardiology
European Heart Journal (2020) 00, 1–126
doi:10.1093/eurheartj/ehaa612

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)

Recommendations for rhythm control/catheter ablation of AF			
AF catheter ablation after drug therapy failure			
AF catheter ablation for PVI is recommended for rhythm control after one failed or intolerant class I or III AAD, to improve symptoms of AF recurrences in patients with: • Paroxysmal AF, or • Persistent AF without major risk factors for AF recurrence, or • Persistent AF with major risk factors for AF recurrence.	I	Catheter or surgical ablation should be considered in patients with symptomatic persistent or long-standing persistent AF refractory to AAD therapy to improve symptoms, considering patient choice, benefit and risk, supported by an AF Heart Team.	IIa

Recommendations for long-term antiarrhythmic drugs			
Amiodarone is recommended for long-term rhythm control in all AF patients, including those with HFrEF. However, owing to its extracardiac toxicity, other AADs should be considered first whenever possible.	I	Amiodarone is more effective in preventing AF recurrences than other AAD, but extracardiac toxic effects are common and increase with time. For this reason, other AAD should be considered first.	IIa

Recommendations for long-term AADs	
In AF patients treated with sotalol, close monitoring of QT interval, serum potassium levels, CrCl, and other proarrhythmia risk factors is recommended.	I
In AF patients treated with flecainide for long-term rhythm control, concomitant use of an atrioventricular nodal-blocking drug (if tolerated) should be considered.	IIa
Sotalol may be considered for long-term rhythm control in patients with normal LV function or with ischaemic heart disease if close monitoring of QT interval, serum potassium levels, CrCl, and other proarrhythmia risk factors is provided.	IIb

Europace (2009) **11**, 402–404
doi:10.1093/europace/eup042

EDITO

Alternatives to amiodarone: search for the Holy Grail

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This editorial refers to 'A preliminary assessment of the effects of ATI-2042 in subjects with paroxysmal atrial fibrillation using implanted pacemaker methodology' by A. Arya *et al.*, on page 458

Atrial fibrillation (AF) is the most common heart rhythm disturbance, effecting more than six million individuals in North America, Europe, and Japan. Atrial fibrillation is associated with increased morbidities, including thrombo-embolism, stroke, and decreased cardiac function. However, some patients experience debilitating symptoms and decreased quality of life for which elimination of the arrhythmia is an important goal. Although AF abla-

Amiodarone has been shown to be effective in preventi heart failure patients.[5] Only dofetilide has been shown a comparable efficacy profile in heart failure, but with risk of torsades de pointes.[6]

Unfortunately, amiodarone is also one of the most d AADs with a high incidence of side effects. In CTAF,[1] patients were forced to stop amiodarone because of adve tions, and over 5 years, it is estimated that >30% of pat be forced to stop the drug.[7] Common side effects thyroid disorders, photosensitivity, skin discoloratio corneal microdeposits. More concerning are other, less side effects which can cause severe morbidity and even m

Unfortunately, amiodarone is also one of the most dangerous AADs with a high incidence of side effects. In CTAF,[1] 18% of patients were forced to stop amiodarone because of adverse reactions, and over 5 years, it is estimated that >30% of patients will be forced to stop the drug.[7] Common side effects include thyroid disorders, photosensitivity, skin discoloration, and corneal microdeposits. More concerning are other, less common side effects which can cause severe morbidity and even mortality. These include neuropathies, pulmonary fibrosis, and liver dysfunction. Although the incidence of these side effects may be dose-dependent, amiodarone's extremely long half-life and large volume of distribution makes the incidence of side effects increase over time. Most concerning is that amiodarone may actually increase mortality, offsetting any benefit of maintaining sinus rhythm. In a substudy of the AFFIRM trial, for example, patients in sinus rhythm experienced improved mortality.[8] However, this benefit was in part offset by being on amiodarone, which was associated with an increased non-cardiac mortality (hazard ratio 1.49, $P = 0.0005$).[8] Increased non-cardiac mortality on amiodarone was also seen in the EMIAT and AVID trials, particularly cancer and pulmonary problems.[9,10]

The NEW ENGLAND JOURNAL of MEDICINE

CLINICAL THERAPEUTICS

Amiodarone for Atrial Fibrillation

Peter Zimetbaum, M.D.

Before choosing amiodarone for the treatment of atrial fibrillation, clinicians should consider other options. Rate control alone (i.e., the use of agents to maintain a slow ventricular response rate in atrial fibrillation) is often as effective as rhythm control in managing the symptoms of this arrhythmia, and it has been shown to be at

Clinical evidence of hypothyroidism occurs in up to 20% of patients taking amiodarone. It develops most often in patients with preexisting autoimmune thyroid disease and those living in areas replete with iodine (that is, they are not iodine-deficient).[26] Hypothyroidism is easily managed with levothyroxine and generally is not cause for discontinuing amiodarone.[12,26] Hyperthyroidism occurs in 3% of patients in areas where dietary iodine is sufficient but in 20% of patients in iodine-deficient areas. It can be difficult to recognize clinically because many of the typical adrenergically mediated signs are blocked by amiodarone. The recurrence of atrial fibrillation during maintenance amiodarone therapy should prompt an evaluation for amiodarone-induced hyperthyroidism. Management requires the assistance of an experienced endocrinologist and may require dis-

Table 1. Adverse Effects of Oral Amiodarone.

Adverse Effect	Incidence	Recommended Monitoring	Special Considerations
Cardiac		Baseline electrocardiogram at least once during loading period, especially if conduction disease is present; yearly thereafter	Consider reduction of loading dose in elderly patients and those with underlying sinoatrial or atrioventricular conduction disease; reduce dose or discontinue if QT interval exceeds 550 msec
Bradycardia	5%		
Prolonged QT interval	In most patients		
Torsades de pointes	<1%		
Hepatic	15%	Aspartate and alanine aminotransferase measurements at baseline and every 6 months thereafter	Avoid in patients with severe liver disease
Thyroid		Thyroid-function tests at baseline and two or three times a year thereafter	Avoid in presence of preexisting, nonfunctioning thyroid nodule; higher incidence of thyroid effects in patients with autoimmune thyroid disease
Hyperthyroidism	3%		
Hypothyroidism	20%		
Pulmonary	<3%	Pulmonary-function tests at baseline and if symptoms develop; chest radiograph at baseline and yearly thereafter	Discontinue amiodarone immediately if pulmonary effects suspected
Dermatologic	25–75%	Routine	Recommend use of sunscreen with a high sun protection factor
Neurologic	3–30%	Routine	Consider dose reduction
Ophthalmologic		Examination at baseline if there is underlying abnormality; examinations as needed thereafter	Avoid in presence of preexisting optic neuritis
Corneal deposits	100%		
Optic neuritis	<1%		

The cost of amiodarone is typically about $1.25 per tablet in the United States. In addition, the initial screening tests performed before treatment begins (chest radiography and tests of pulmonary, thyroid, and liver function) cost approximately $250, with a similar expense annually to screen for adverse effects.

IIODARONE – ADVERSE EFFECTS

- Photosensitive rashes
- Grey/blue discolouration of skin
- Thyroid abnormalities 2%
- Pulmonary fibrosis
- Corneal deposits
- CNS/GI disturbance
- Pro-arrhythmic effects (torsade de pointe)
- Heart block
- Nightmares 25%
- Abnormal LFT 20%
- Interacts with digoxin, warfarin ->
  (reduces clearance)