



38^{ème} CONGRÈS NATIONAL
DE CARDIOLOGIE
ET DE CHIRURGIE
CARDIO-VASCULAIRE

Joint au

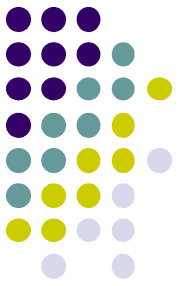
2^{ème} CONGRÈS
DES SOCIÉTÉS AFRICAINES
DE CARDIOLOGIE



Les cardiomyopathies rythmiques:

Pas si rares et curables ?

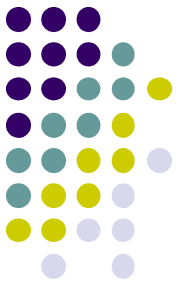
DR. WAEL AMARA
*Le Raincy-Montfermeil,
France*



Liens d'intérêt

- Honoraires : BMS, Pfizer, Bayer, Boehringer, MEDA, Servier, Medtronic, Biotronik, Abbott, Physiomed, Livanova, Boston Scientific
- Subventions de recherche : BMS, Boehringer

Tachycardia-Mediated Cardiomyopathy



- ▢ Form of dilated cardiomyopathy and heart failure induced by a persistent/chronic supraventricular or ventricular tachyarrhythmia
- ▢ The incidence and the patho-physiology remain unspecified
- ▢ Sometimes related to a previous cardiomyopathy, the diagnosis is always retrospective, but important because of the clinical and the significant haemodynamic improvement following the control of heart rate



PMC full text: [J Am Coll Cardiol. Author manuscript; available in PMC 2016 Oct 13.](#)

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doi: [10.1016/j.jacc.2015.08.038](https://doi.org/10.1016/j.jacc.2015.08.038)

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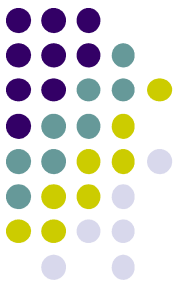
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Table 2

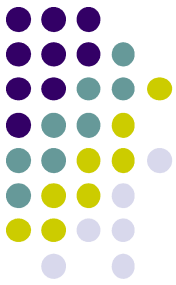
An Example of the Clinical Course of AIC When the Culprit Arrhythmia was Not Eliminated: A 54-Year-Old Male With AF and LVEF of 30%

Time (months)	LVEF %	Intervention
0	30	Diuretics, ACE inhibitors, TEE, cardioversion
1	47	
6	52	AIC diagnosed
14	-	Recurrent AF per patient. Did not see a doctor
18	25	Cardioverted. Started on sotalol, but discontinued due to ↑ QTc interval. Amiodarone started
23	50	
35	20	Admitted with heart failure. Recurrent AF with rapid rates. Underwent AF ablation. Amiodarone continued
40	55	
43	40	Left atrial flutter with ventricular rate of 110 beats/min. Underwent perimitral LA flutter ablation
53	52	
63	53	Sinus rhythm. Taking amiodarone (200 mg daily), beta-blockers, ACE inhibitor, warfarin

ACE = angiotensin-converting enzyme; AF = atrial fibrillation; AIC = arrhythmia-induced cardiomyopathy; LA = left atrial; LVEF = left ventricular ejection fraction; TEE = transesophageal echocardiography.



- **Atrial fibrillation is present in 10% to 50% of patients with HF**
- Many patients with cardiomyopathy and AF have worsening symptoms and ventricular function due solely to **poorly-controlled ventricular rates** (*Am J Cardiol.* 2003 Mar 20; 91(6A):2D-8D.)
- In 2 studies of adult patients with **focal atrial tachycardia (AT)**, **the incidence of AIC was 8.3% to 10%** (*J Am Coll Cardiol.* 2009 May 12; 53(19):1791-7. *J Cardiovasc Electrophysiol.* 2014 Sep; 25(9):953-7.)
- In a **pediatric** multicenter study of atrial ectopic tachycardia (AET), **28% had AIC** (*Circ Arrhythm Electrophysiol.* 2014 Aug; 7(4):664-70.)
- The incidence of **AIC was 9% to 34% in patients with frequent premature ventricular complexes (PVCs) and/or nonsustained ventricular tachycardia** referred for electrophysiological evaluation (*Pacing Clin Electrophysiol.* 2012 Apr; 35(4):465-70.)



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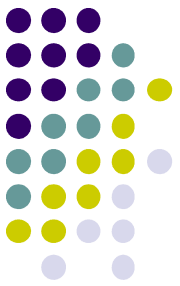
JACC Vol. 6, No. 5
November 1985:1172-3

EDITORIALS

Tachycardia and Cardiomyopathy: The Chicken-Egg Dilemma Revisited*

JOHN J. GALLAGHER, MD, FACC

Charlotte, North Carolina

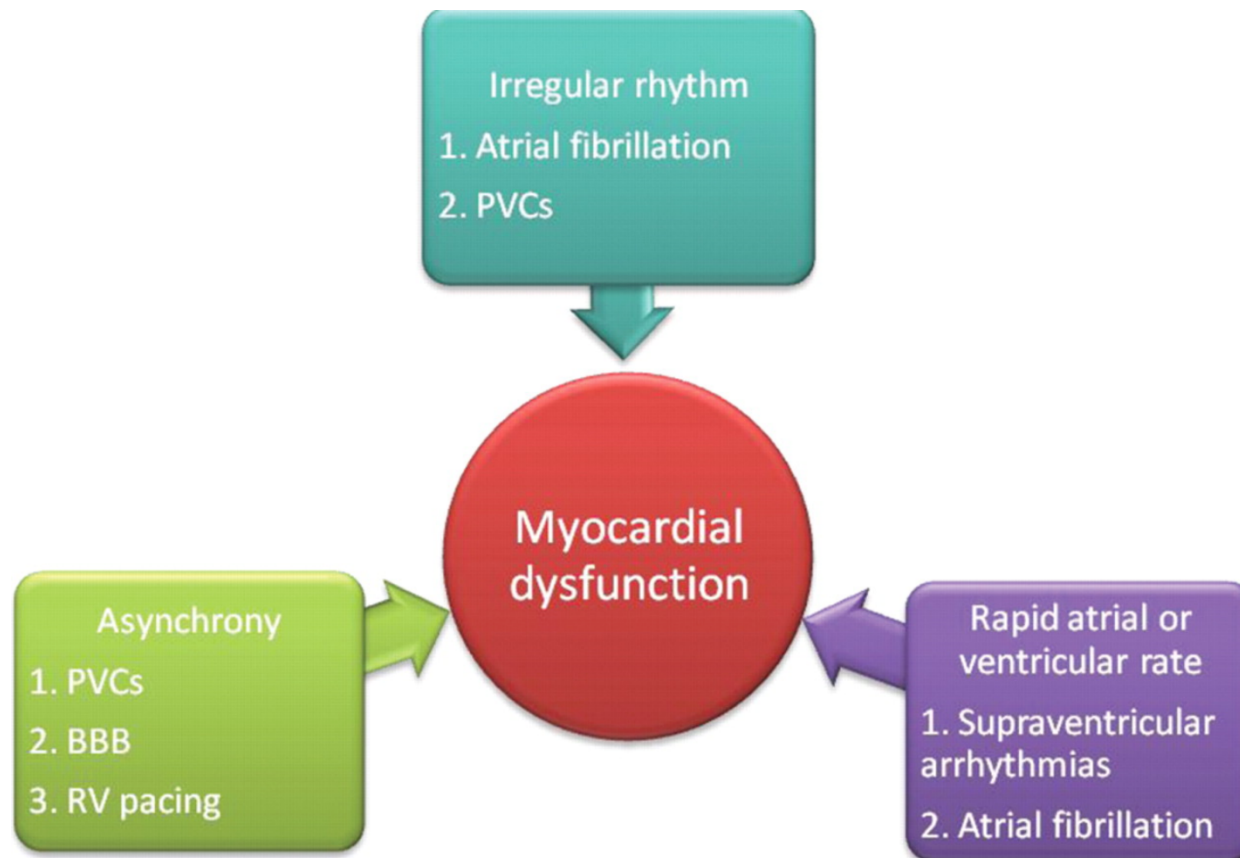
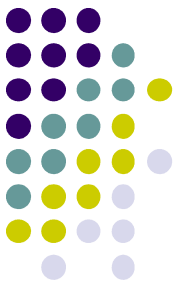


Arrhythmia-induced cardiomyopathies: the riddle of the chicken and the egg still unanswered? FREE

Emmanuel N. Simantirakis, Emmanuel P. Koutalas, Panos E. Vardas ✉

EP Europace, Volume 14, Issue 4, 1 April 2012, Pages 466–473,

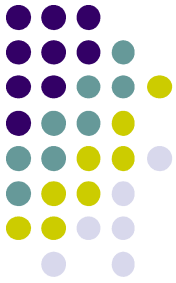
<https://doi.org/10.1093/europace/eur348>



From: Arrhythmia-induced cardiomyopathies: the riddle of the chicken and the egg still unanswered?

Europace. 2011;14(4):466-473. doi:10.1093/europace/eur348

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Original Article

Tachycardia-Related Cardiomyopathy: A Common Cause of Ventricular Dysfunction in Patients With Atrial Fibrillation Referred for Atrioventricular Ablation

Margaret M. Redfield MD ^{a, 2}, G. Neal Kay MD ^b, Louise S. Jenkins RN, PhD ^c, Marcus Mianulli MS ^d, D. Nick Jensen DVM ^d, Kenneth A. Ellenbogen MD ^e, FOR THE APT INVESTIGATORS

- 63 patients with systolic dysfunction
- 48 had at least 1 adequate follow-up echocardiographic study
- 16 (25%) of the 63 had marked improvement in the ejection fraction (mean \pm SD change, 27.18 percentage points) to a value higher than 45% after ablation.

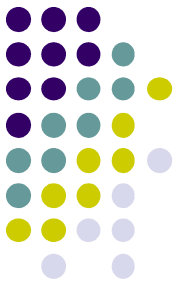


Table 1

Reproduced with permission from Gopinathannair R et al, JACC 2015 (reference # 1).

AV=atrioventricular

Causes of Arrhythmia-Induced Cardiomyopathy

Supraventricular

Atrial fibrillation

Atrial flutter

Atrial tachycardia

AV nodal re-entrant tachycardia

AV re-entrant tachycardia

Permanent junctional reciprocating tachycardia

Junctional ectopic tachycardia

Ventricular

Idopathic ventricular tachycardia

Fascicular tachycardia

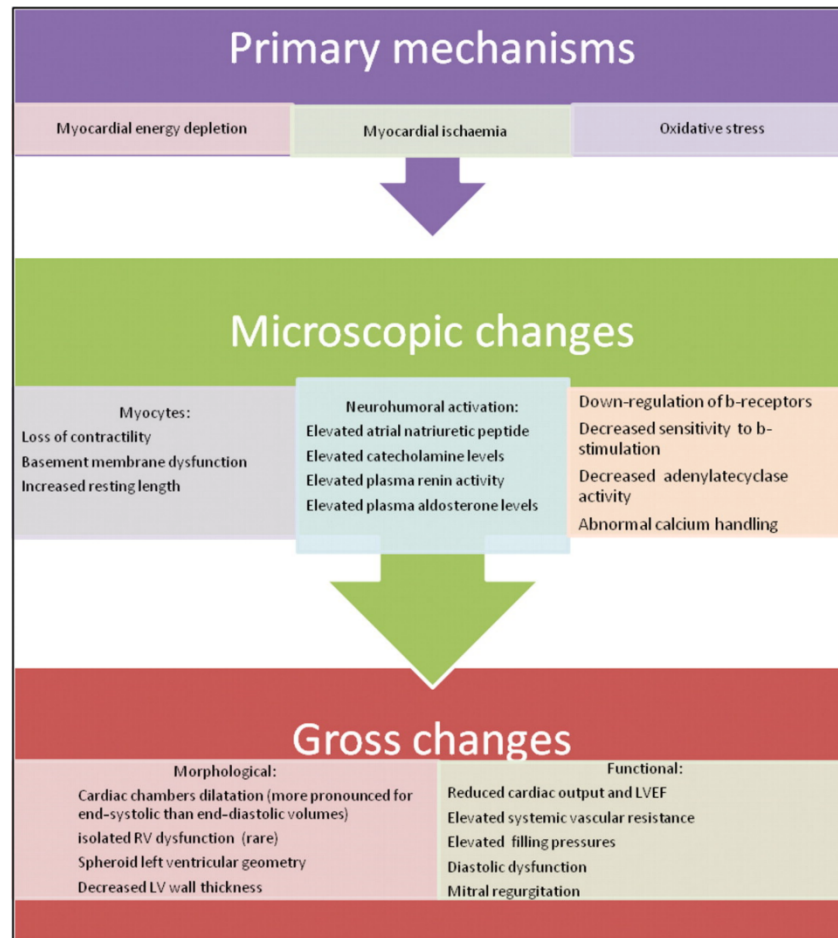
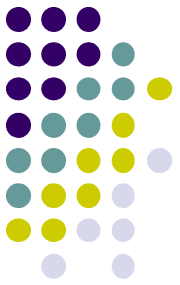
Ectopy

Frequent premature ventricular contractions

Frequent premature atrial contractions

Pacing

Persistent rapid atrial abd/or ventricular pacing



From: Arrhythmia-induced cardiomyopathies: the riddle of the chicken and the egg still unanswered?

Europace. 2011;14(4):466-473. doi:10.1093/europace/eur348

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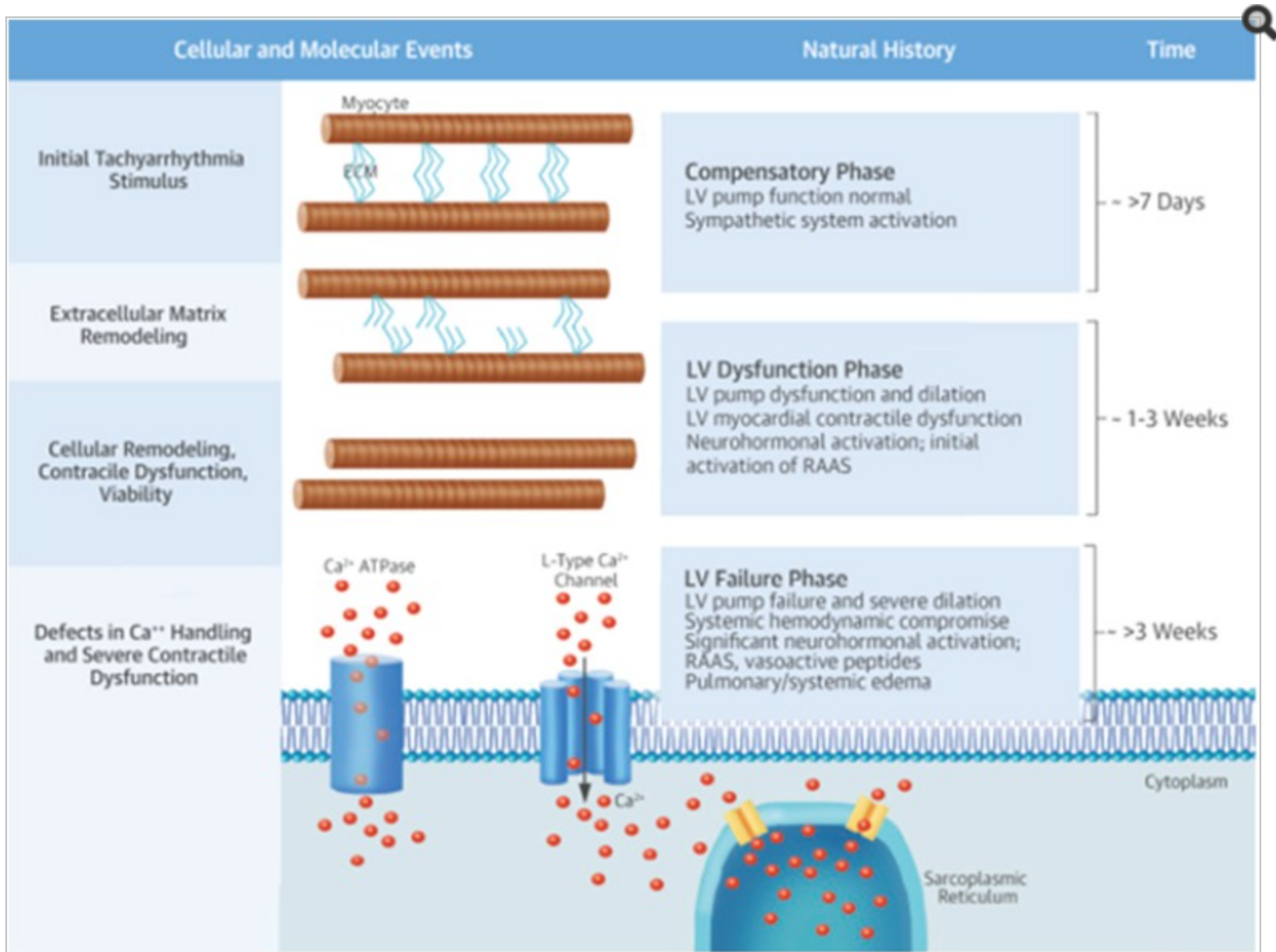
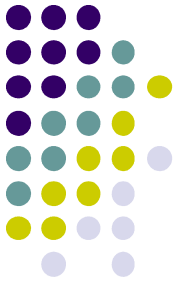


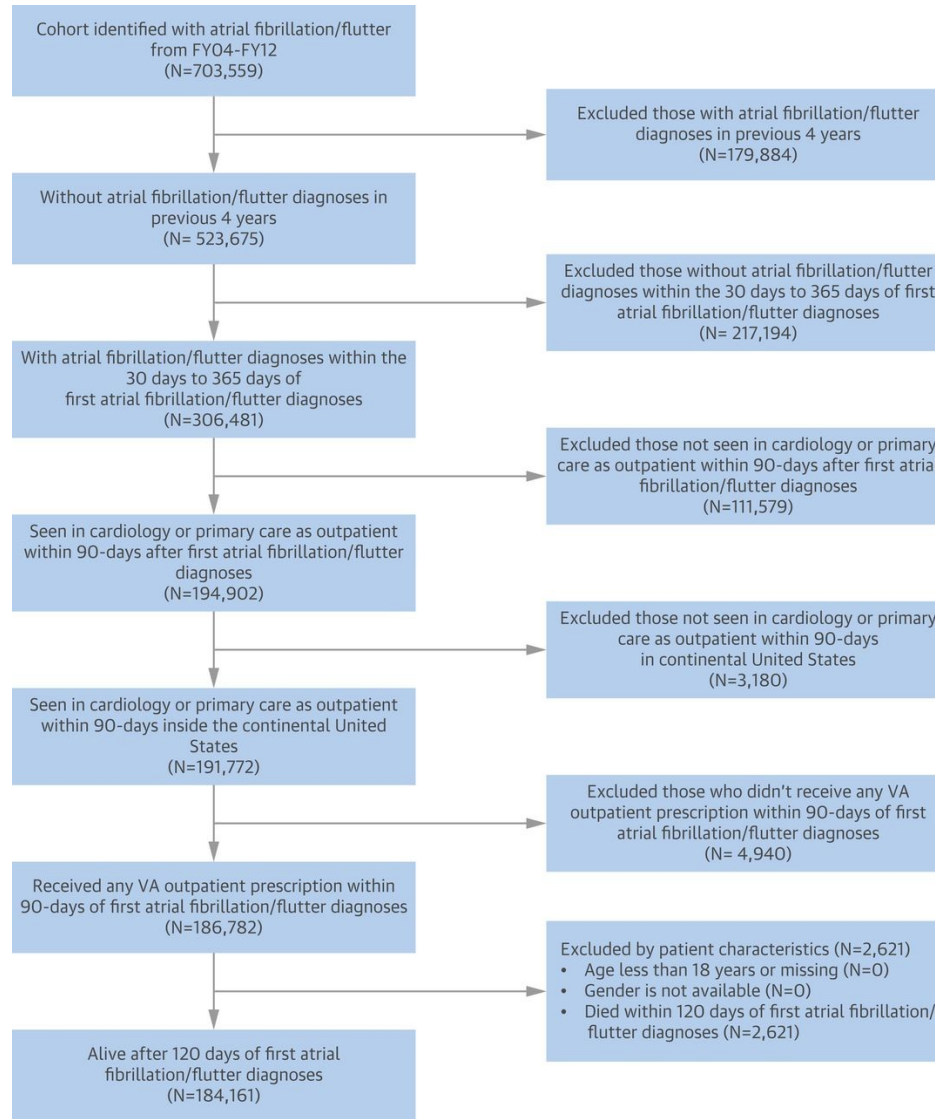
Figure explaining pathophysiology of arrhythmia-induced cardiomyopathy (AIC). It shows the time course of events that happen in response to rapid pacing in animals. Defects at level of ECM and cellular remodeling, along with defects in handling of calcium by cells and neurohormonal activation ultimately leads to left ventricular dysfunction and heart failure. Reproduced with permission from Gopinathannair R et al, JACC 2015 (reference # 1).

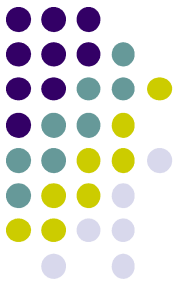


Treating Specialty and Outcomes in Newly Diagnosed Atrial Fibrillation

From the TREAT-AF Study

Alexander C. Perino, Jun Fan, Susan K. Schmitt, Mariam Askari, Daniel W. Kaiser, Abhishek Deshmukh, Paul A. Heidenreich, Christopher Swan, Sanjiv M. Narayan, Paul J. Wang and Mintu P. Turakhia





CENTRAL ILLUSTRATION: Cardiology Care in Newly Diagnosed AF

A. Cardiology Care to Outcomes

Outcomes

Stroke

Overall Mortality

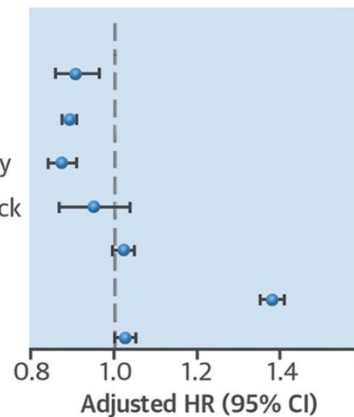
Cardiovascular Mortality

Transient Ischemic Attack

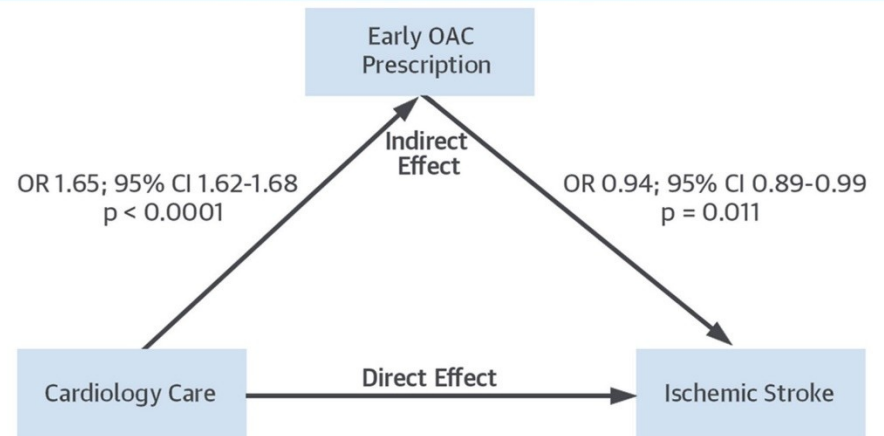
Heart Failure

AF/SVT

Myocardial Infarction



B. Stroke Mediation Analysis



Perino, A.C. et al. J Am Coll Cardiol. 2017;70(1):78-86.

Effects of sinus rhythm maintenance on left heart function after electrical cardioversion of atrial fibrillation: implications for tachycardia-induced cardiomyopathy.

Zimmermann AJ¹, Bossard M², Aeschbacher S¹, Schoen T¹, Voellmin G¹, Suter Y³, Lehmann A¹, Hochgruber T¹, Pumpol K¹, Sticherling C³, Kühne M³, Conen D¹, Kaufmann BA⁴.

- ▣ 73 patients (77% male, 66 ± 11 years)
- ▣ ECV resulted in an immediate increase in LVEF (from 43 [interquartile range (IQR), 33-50%] to 48 [IQR, 40-53%]; P < 0.0001)
- ▣ In patients with AF relapse, LVEF returned to values comparable to pre-ECV (n = 18) (44 [IQR, 32-51]%; P = 0.03).
- ▣ Only patients who remained in SR showed an increase in atrial emptying fraction after 4-6 weeks (n = 51; to 37 [IQR, 26-48]%; P < 0.0001 vs post-ECV).

Efficacy and effects on cardiac function of radiofrequency catheter ablation vs. direct current cardioversion of persistent atrial fibrillation with left ventricular systolic dysfunction

[Maojing Wang](#),¹ [Shanglang Cai](#),¹ [Wei Ding](#),² [Yujie Deng](#),¹ and [Qing Zhao](#)^{1,*}

Nanette H. Bishopric, Editor

From July 2013 to October 2014 97 consecutive single-center patients with persistent AF and symptomatic heart failure (left ventricular ejection fraction (LVEF) <50%) underwent

- DCC followed by amiodarone (n = 40)
- or circumferential pulmonary vein isolation (PVI; n = 57) according to patient's preference were recruited in the study.

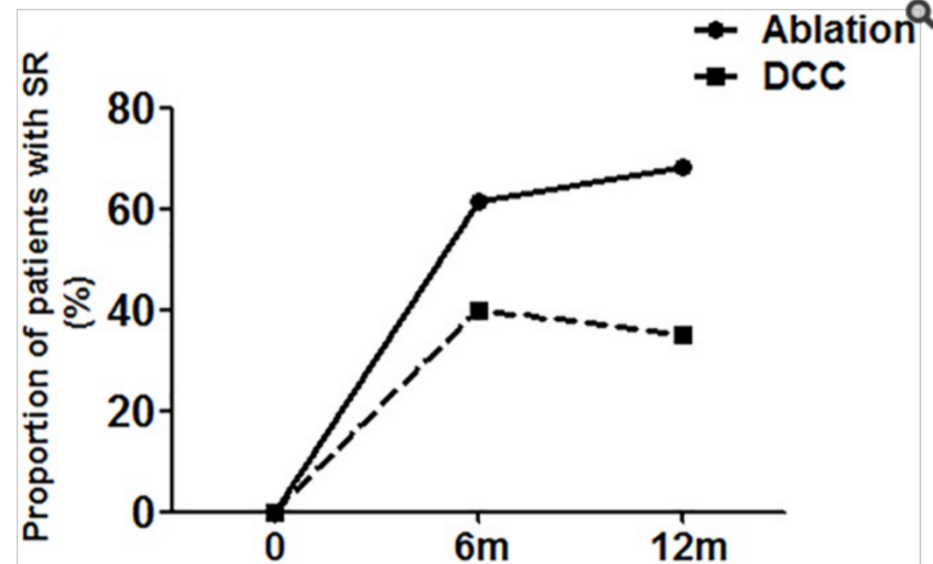
PMC full text: [PLoS One. 2017; 12\(3\): e0174510.](https://doi.org/10.1371/journal.pone.0174510)

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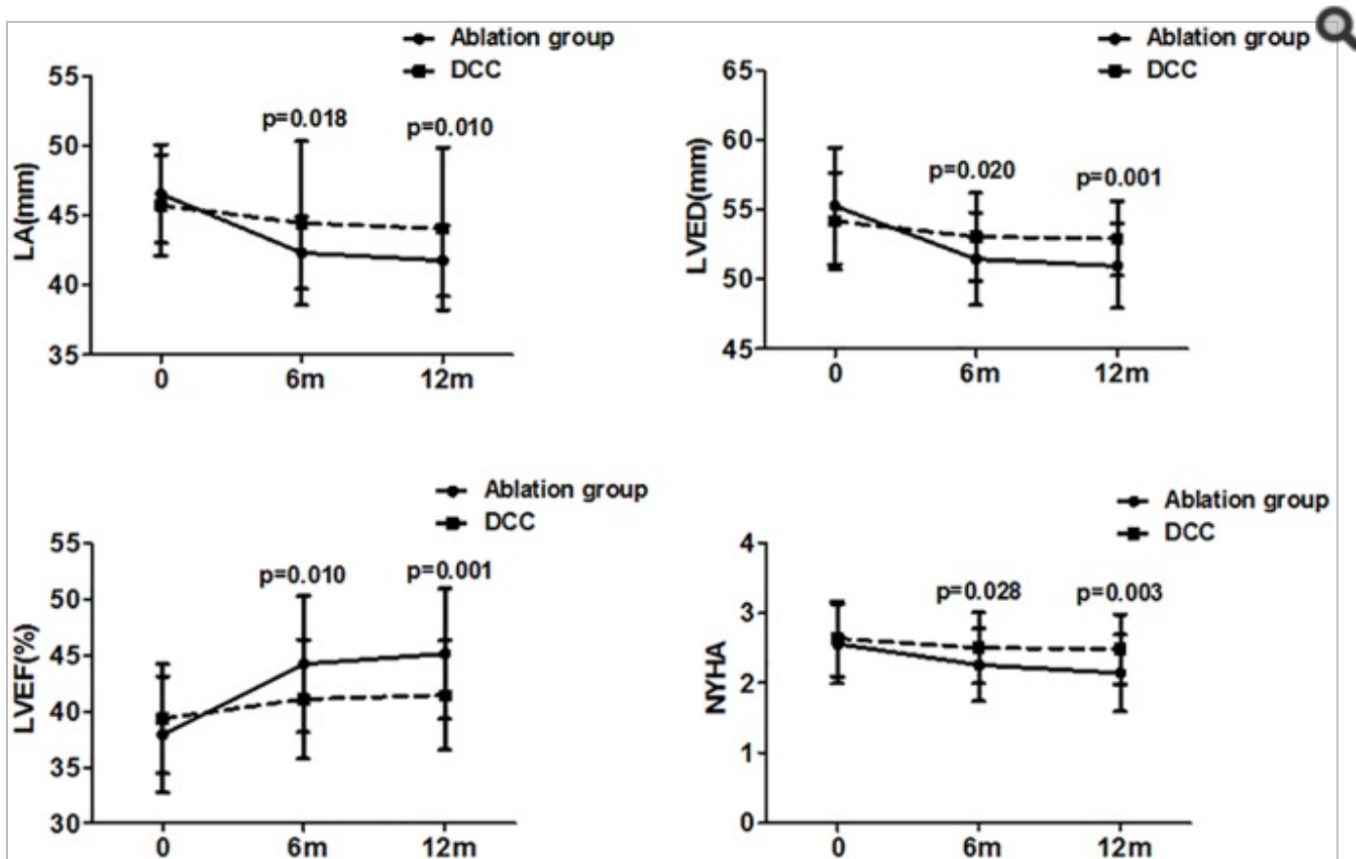
Fig 1



Comparison of proportion of patients with SR at 6 and 12 months between ablation and DCC groups.

DCC, direct current cardioversion.

Fig 2



Comparisons of LA, LVEDD, LVEF and NYHA at 6 and 12 months between study groups.

LA, left atrial; LVED, left ventricular end-diastolic; LVEF, left ventricular ejection fraction; AF, atrial fibrillation; NYHA, New York Heart Association.



**Catheter Ablation versus Standard
conventional Treatment in patients with LEft
ventricular dysfunction and Atrial Fibrillation**

The CASTLE-AF trial

**Nassir F. Marrouche and Johannes Brachmann,
on behalf the CASTLE AF Investigators**





CASTLE-AF

Rationale and Objective

- Study the effectiveness of catheter ablation of Atrial Fibrillation in patients with heart failure in improving hard primary endpoints of mortality and heart failure progression when compared to conventional standard treatment



CASTLE-AF

Inclusion Criteria

- **Symptomatic paroxysmal or persistent AF**
- **Failure or intolerance to ≥ 1 or unwillingness to take AAD**
- **LVEF $\leq 35\%$**
- **NYHA class \geq II**
- **ICD/CRTD with Home Monitoring™ capabilities already implanted due to primary or secondary prevention**



CASTLE-AF



CASTLE-AF

Primary Endpoint

- All-cause mortality
- Worsening heart failure admissions

Secondary Endpoints

- All-cause mortality
- Hospitalization due to worsening of heart failure
- Cerebrovascular accidents
- Cardiovascular mortality
- Unplanned hospitalization due to cardiovascular reason
- All-cause hospitalization
- Quality of Life: Minnesota Living with Heart Failure and EuroQoL EQ-5D
- Exercise tolerance (6 minutes walk test)
- Number of delivered ICD shocks, and ATPs (appropriate/inappropriate)
- LVEF
- Time to first ICD shock, and time to first ATP
- Number of device detected VT/VF
- AF burden: cumulative duration of AF episodes
- AF free interval: time to first AF recurrence after 3 months blanking period post ablation



Baseline Characteristics-CASTLE AF

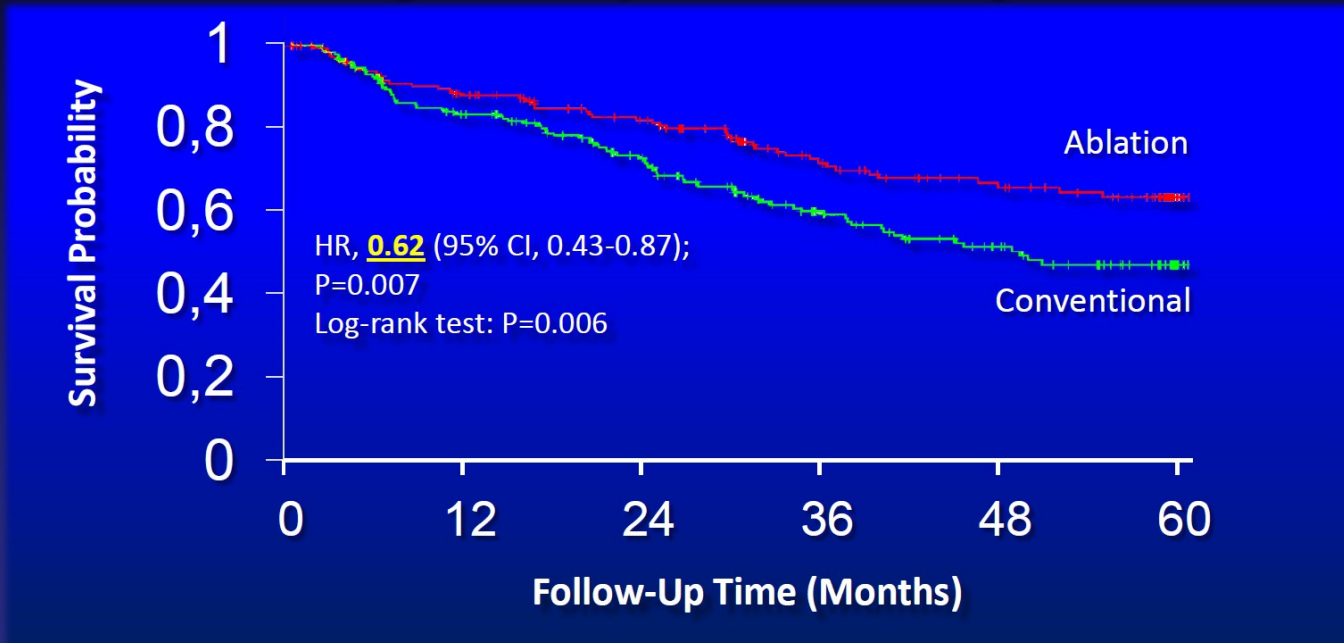
	Ablation group (179 patients)	Conventional group (184 patients)
†Age – years	64 (56-71)	64 (56-73.5)
New York Heart Association class		
I (%)	11	11
II (%)	58	61
III (%)	29	27
IV (%)	2	1
†Left ventricular ejection fraction – %	32.5 (25.0-38.0)	31.5 (27.0-37.0)
Current type of atrial fibrillation		
Paroxysmal (%)	30	35
Persistent (%)	41	35
Long-standing persistent (>1-year) (%)	28	30
§CRT-D implanted (%)	27	28
§ICD implanted (%)	73	72



CASTLE-AF

Results-CASTLE AF

Primary Composite Endpoint

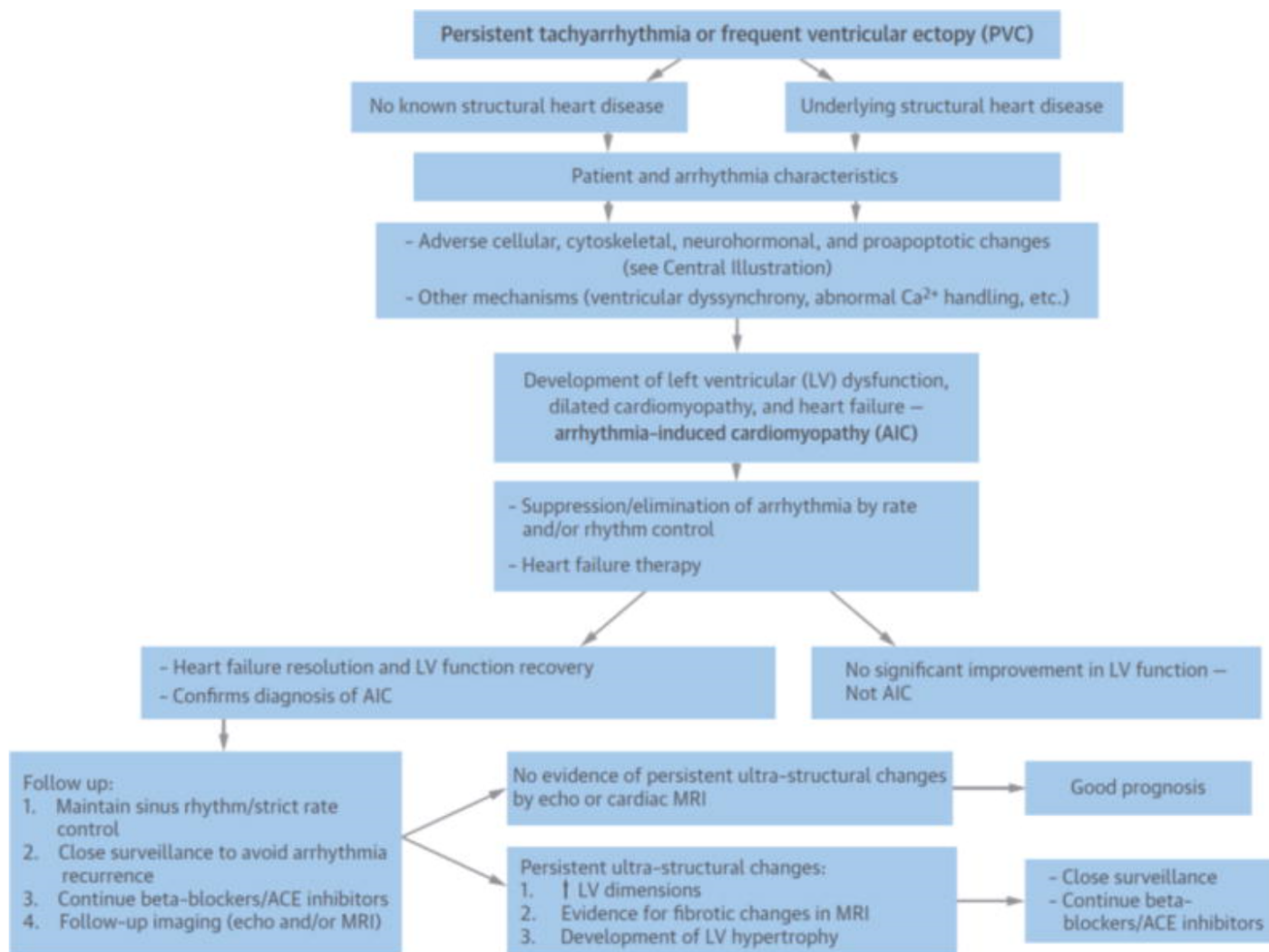


Patients at Risk

Ablation	179	141	114	76	58	22
Conventional	184	145	111	70	48	12



Figure 1



Overview of the Current Understanding of AIC, from Mechanisms to Management and Prognosis



**Merci pour
votre
attention**

