The best in Science and Education:
ventricular Tachycardia

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EHRA 2019 LISBON PORTUGAL 17-19 MARCH

EHRA European Heart Rhythm Association

Conflict of Interests

NONE

Publications in EP Europace in Last 12 Months

- Articles in Press, accepted Manuscripts
- Published articles
  - Case Reports
  - Reviews
  - Original Articles

Arrhythmogenic
Right ventricular cardiomyopathy

Diagnostic and therapeutic strategies for arrhythmogenic right ventricular dysplasia/cardiomyopathy patient

Weijia Wang, Cynthia A. James, and Hugh Calkins*

Europace (2019) 21, 9–21 REVIEW

PVC count >1000 per day, T-wave inversion more than three leads, male sex, younger age at presentation, and proband status are **minor risk factors**.

The **strongest predictors** are prior cardiac arrest from VF and sustained VT. Other major risk factors include arrhythmogenic syncope, NSVT, and severe systolic dysfunctions of the RV, LV, or both ventricles

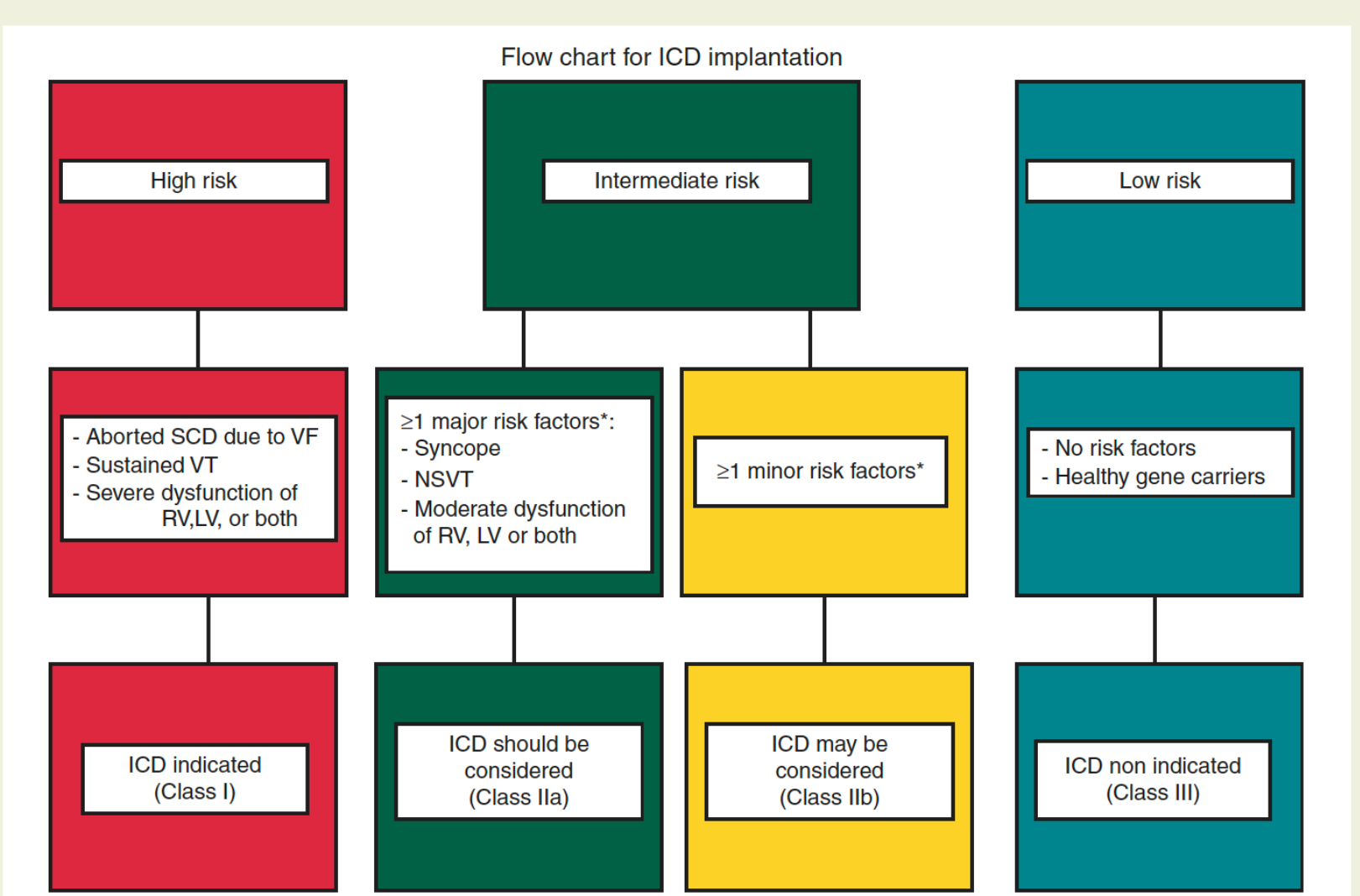


Figure 4 A flow chart of risk stratification and indications to ICD implantation in ARVD/C. From Corrado *et al.*[1] ARVD/C, arrhythmogenic right ventricular dysplasia/cardiomyopathy; ICD, implantable cardioverter-defibrillator; LV, left ventricle; RV, right ventricle; SCD, sudden cardiac death; VF, ventricular fibrillation; VT, ventricular tachycardia.

Electrocardiographic differentiation between ‘benign T-wave inversion’ and arrhythmogenic right ventricular cardiomyopathy

162 patients with definite diagnosis of ARVC and 129 young controls with anterior TWI.

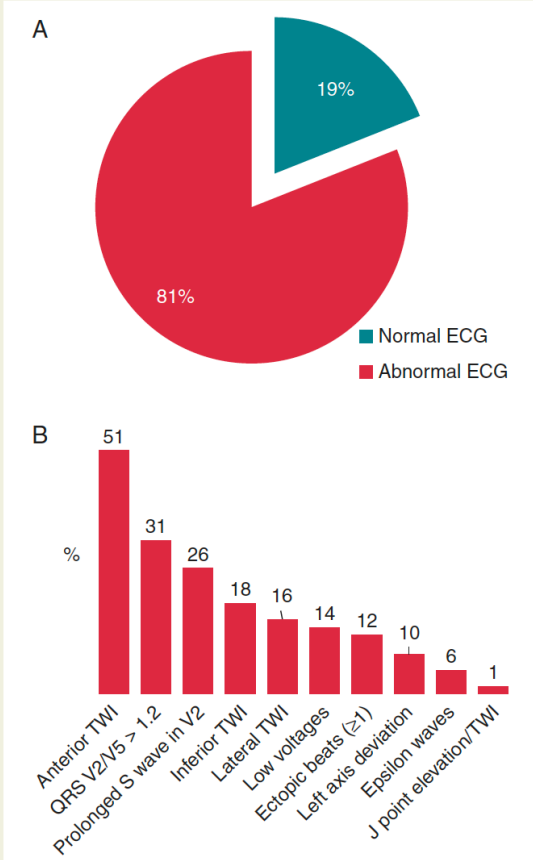
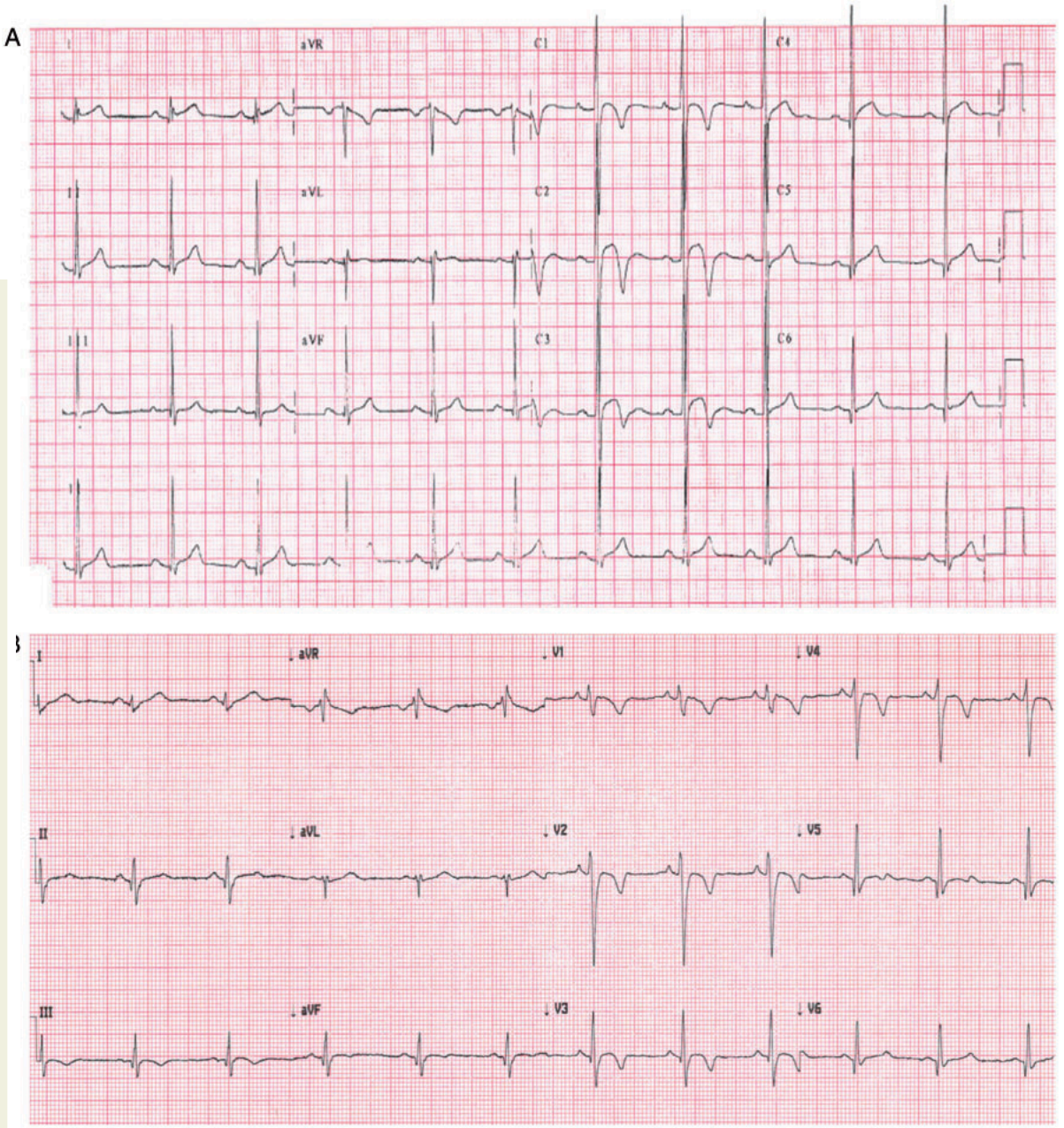


Figure 2 Prevalence of abnormal ECGs in a cohort of 162 patients with ARVC (*A*). Prevalence of ECG abnormalities in 162 patients with ARVC (*B*). ARVC, arrhythmogenic right ventricular cardiomyopathy; ECG, electrocardiogram; TWI, T-wave inversion.



Gherardo Finocchiaro et al. Europace (2019) 21, 332–338

Circulating microRNAs in arrhythmogenic right ventricular cardiomyopathy with ventricular arrhythmia

Shinya Yamada[1,2†], Ya-Wen Hsiao[1†], Shih-Lin Chang[1,3*], Yenn-Jiang Lin[1,3], Li-Wei Lo[1,3], Fa-Po Chung[1,3], Shuo-Ju Chiang[4], Yu-Feng Hu[1,3], Ta-Chuan Tuan[1,3], Tze-Fan Chao[1,3], Jo-Nan Liao[1,3], Chin-Yu Lin[1], Yao-Ting Chang[1], Abigail Louise D. Te[1], Yung-Nan Tsai[1], and Shih-Ann Chen[1,3]

Europace (2018) 20, f37–f45 CLINICAL RESEARCH

MicroRNAs are small, non-coding RNAs approximately 22 nucleotides in length that **regulate the expression of target genes** through sequence-specific hybridization to the 3' untranslated region of messenger RNAs, **resulting in either blocking of translation or direct degradation of their target messenger RNAs.**

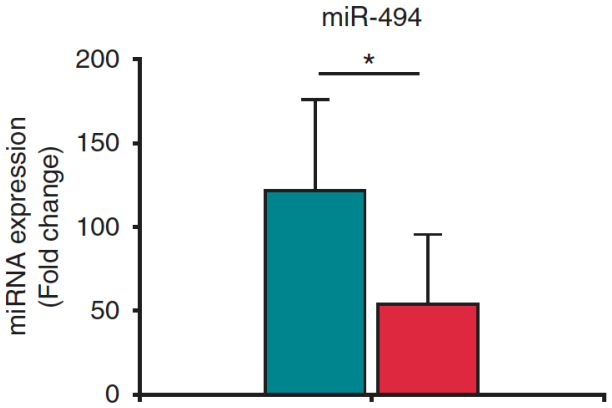
miR-494

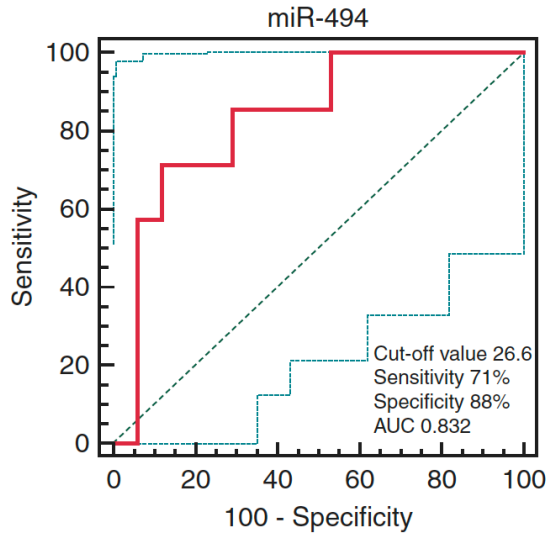
↓

increased expression of caspase 3

↓

Apoptotic Process





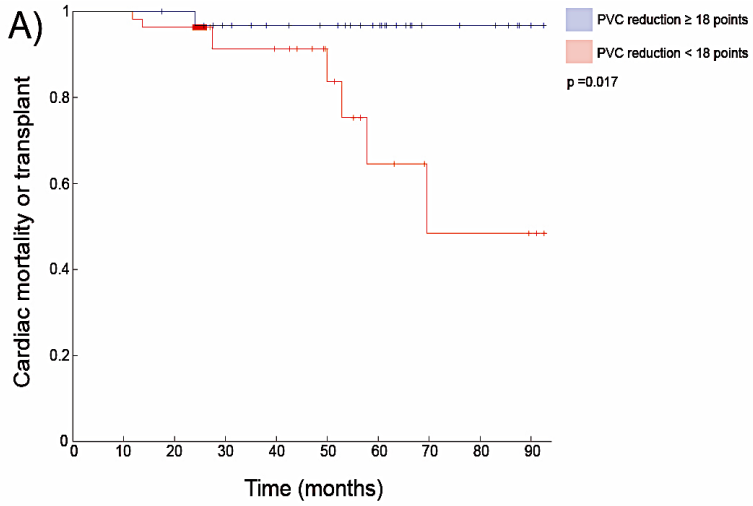
… have demonstrated for the first time that plasma levels of miR-494 are significantly elevated in definite ARVC patients with VA.

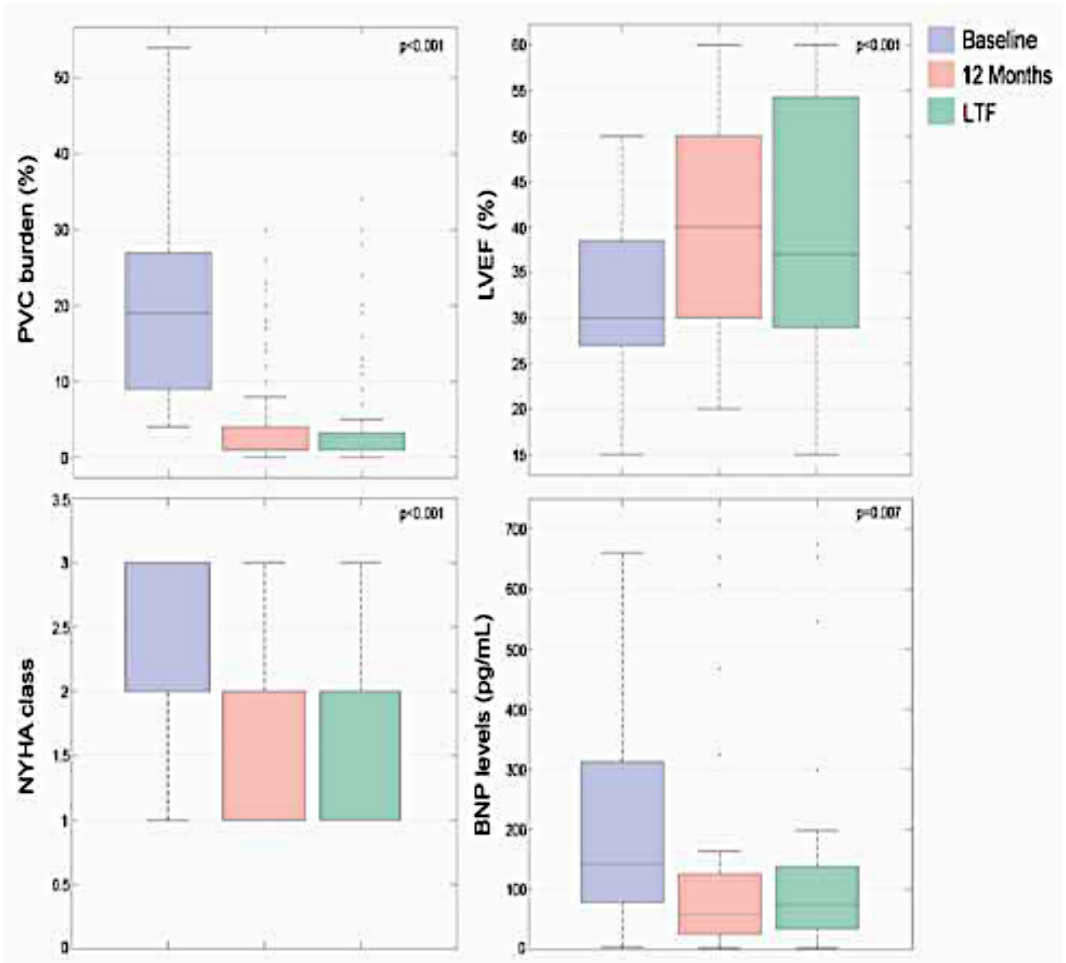
An increased plasma level of miR-494 was associated with recurrent VA after ablation in definite ARVC patients.

PVC Ablation

Mortality and Morbidity Reduction after Frequent PVC Ablation in Patients with LV Systolic Dysfunction*

Prospective multicenter study including 101 consecutive patients [56±12 years old, 62 (61%) men] with LV systolic dysfunction and frequent PVCs who underwent PVC ablation before November 2015. The last evaluation performed was considered the long-term follow-up (LTFUP) evaluation.





* Berruezo A et al. Accepted manuscript

Multielectrode vs. Point-by-Point Mapping

Multielectrode vs. point-by-point mapping for ventricular tachycardia substrate ablation: a randomized study

Juan Acosta, Diego Penela, David Andreu, Mario Cabrera, Alicia Carlosena, Francesca Vassanelli, Francisco Alarcón, David Soto-Iglesias, Viatcheslav Korshunov, Roger Borras, Markus Linhart, Mikel Martínez, Juan Fernández-Armenta, Lluis Mont, and Antonio Berruezo*

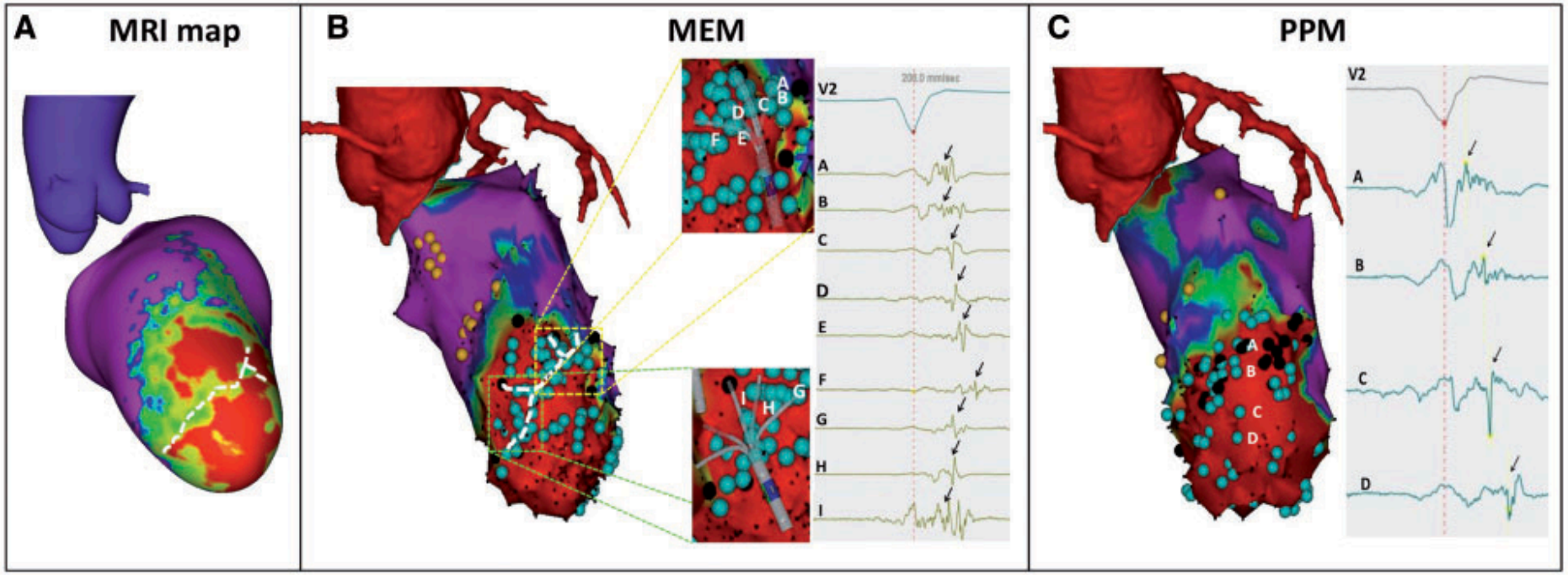
20 consecutive ischemic patients undergoing VT substrate ablation were randomized to either group A [n = 10; PPM → MEM] or group B [n = 10; substrate mapping performed by MEM → PPM].

Substrate **mapping time was similar** P = 0.222.

No differences were observed in the number of LPs identified within the scar, P = 0.965.

No differences were observed in **VT inducibility after procedure**.

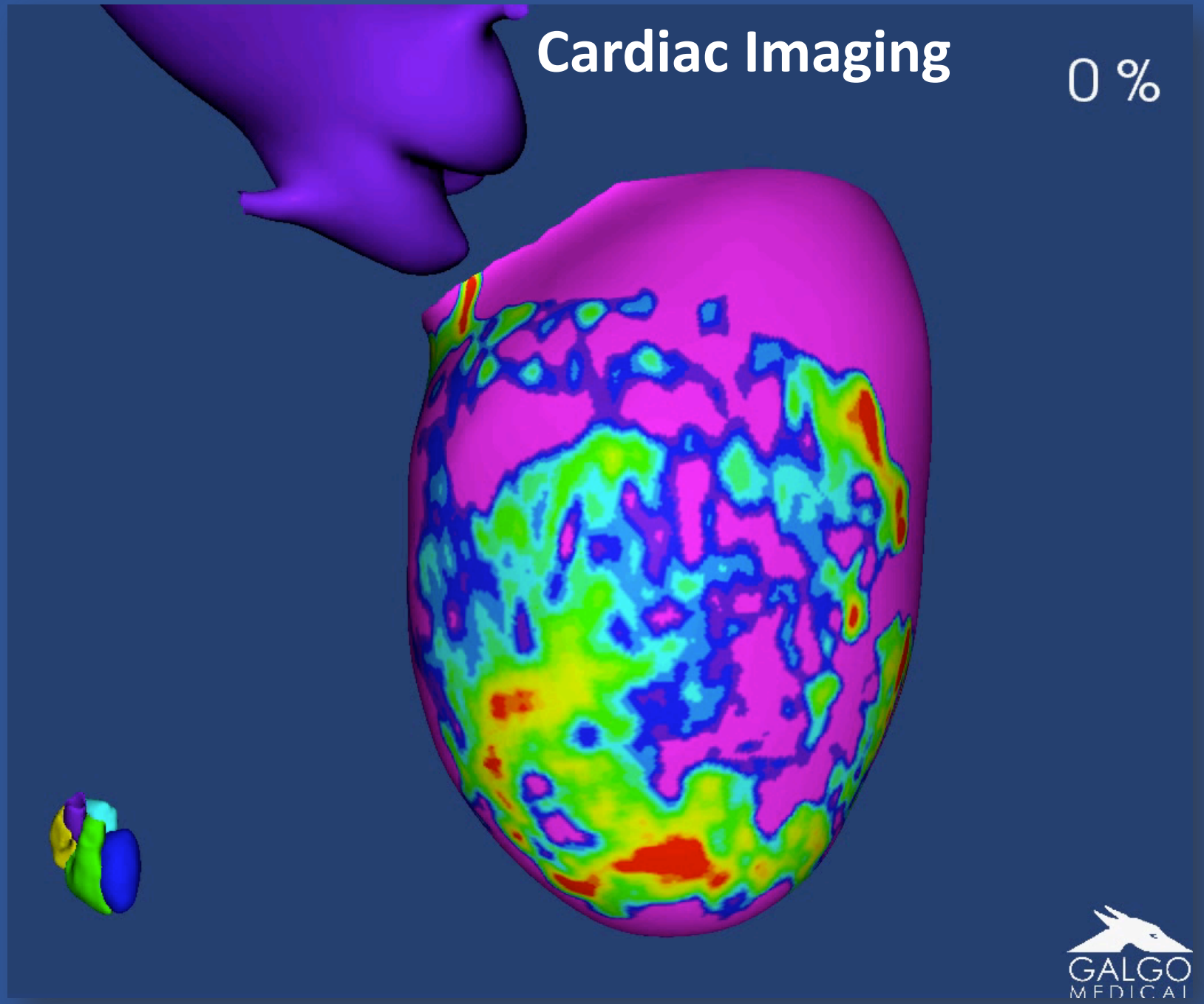
Shorter RF Time, and lower FF/LP Ration



Europace (2018) 20, 512–519 CLINICAL RESEARCH

Cardiac Imaging

Cardiac Imaging

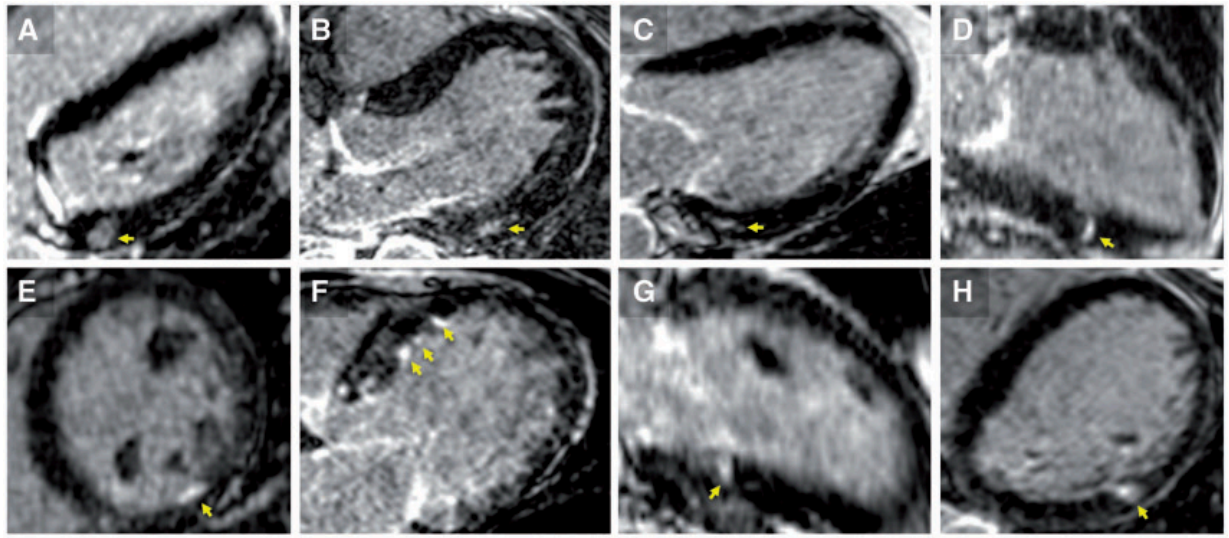


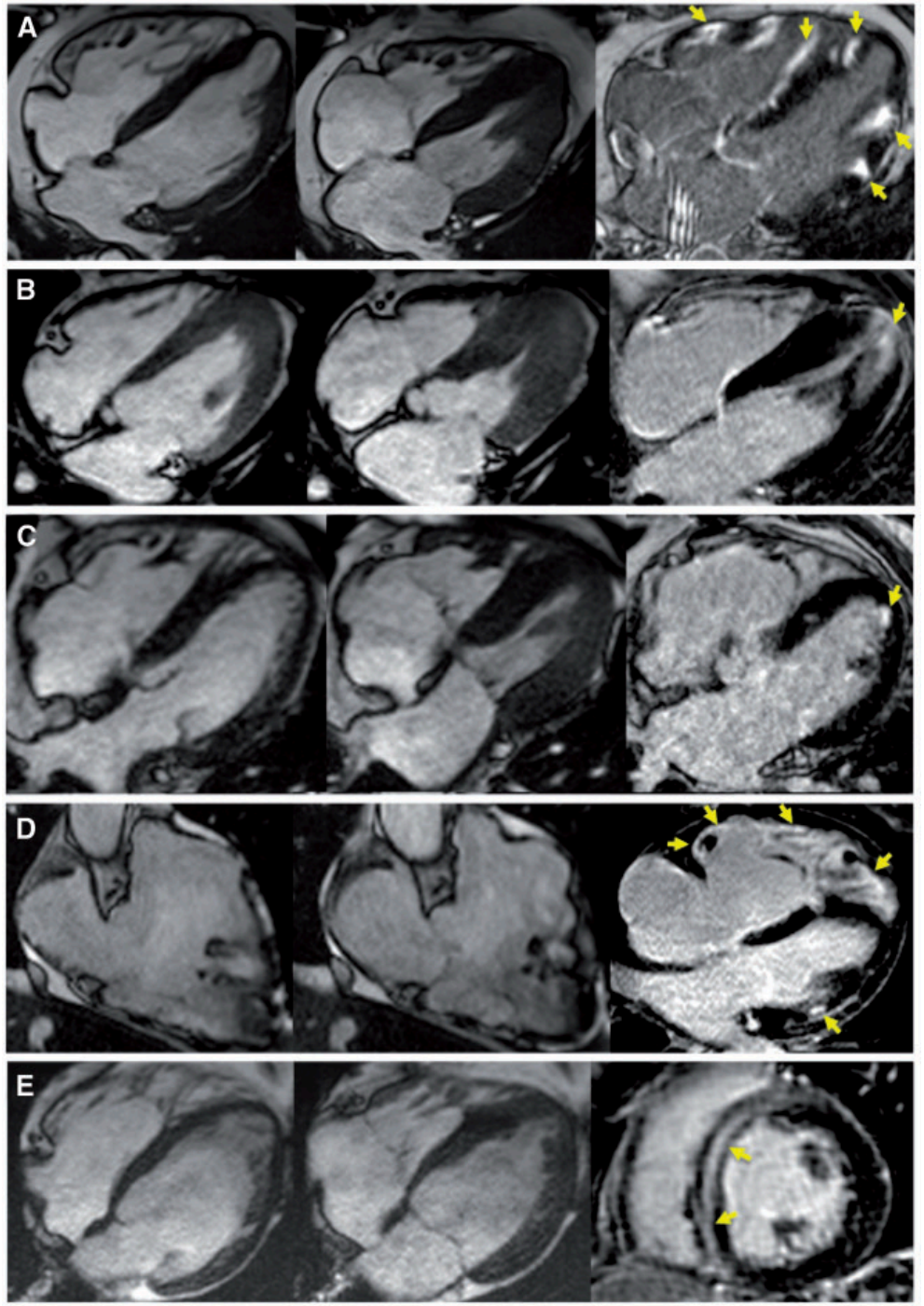
High-resolution three-dimensional late gadolinium-enhanced cardiac magnetic resonance imaging to identify the underlying substrate of ventricular arrhythmia

Alexia Hennig[1], Marjorie Salel[1], Frederic Sacher[2,3], Claudia Camaioni[1], Soumaya Sridi[1], Arnaud Denis[2,3], Michel Montaudon[1,3], François Laurent[1,3], Pierre Jais[2,3], and Hubert Cochet[1,3]*

Europace (2018) 20, f179–f191 CLINICAL RESEARCH

In patients with **no prior history of SHD, and negative diagnostic workup** including **TTE and coronary angiography** with VT, VF, or SCD, the diagnostic yield of CMR is high, leading to a diagnostic change in over 40% of these.





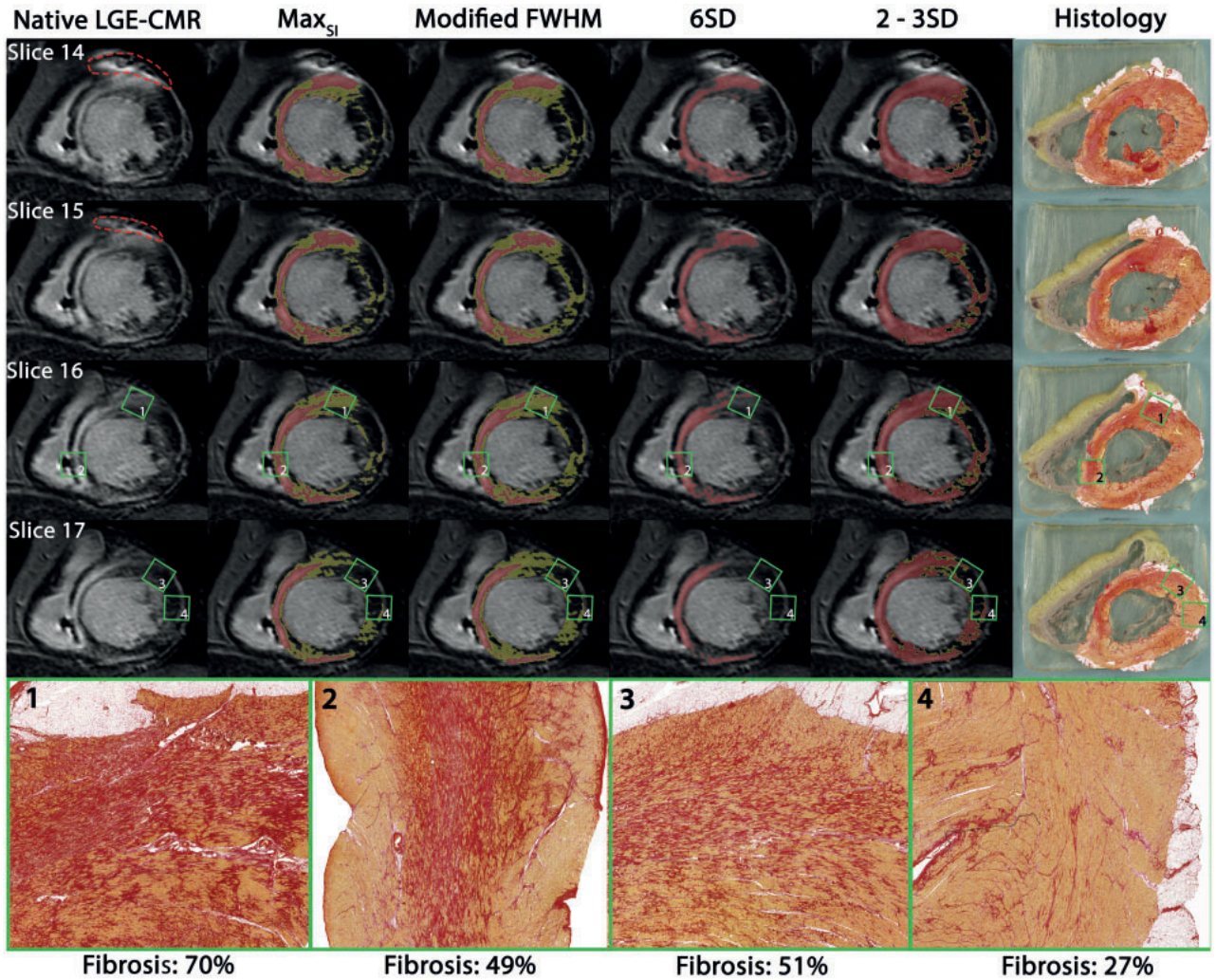
REVIEW

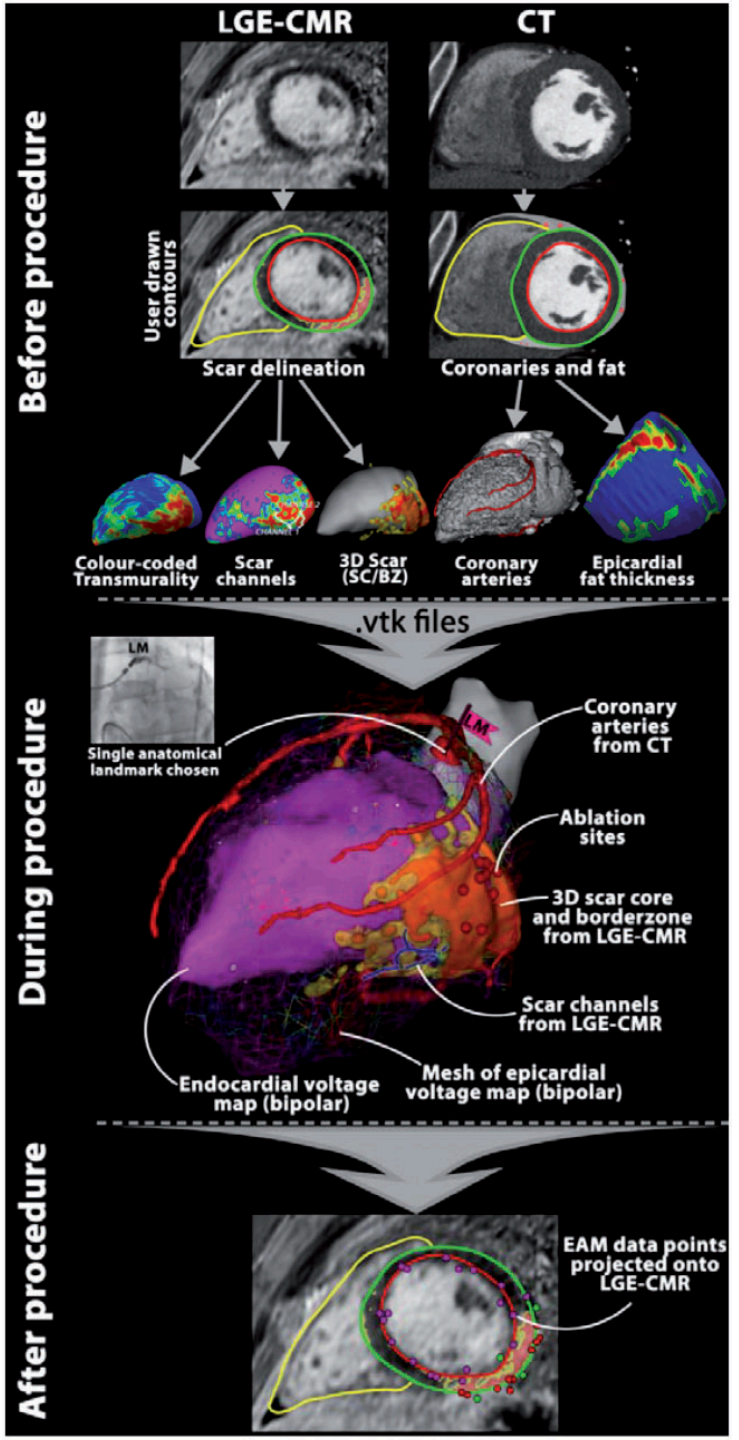
Advancement in cardiac imaging for treatment of ventricular arrhythmias in structural heart disease

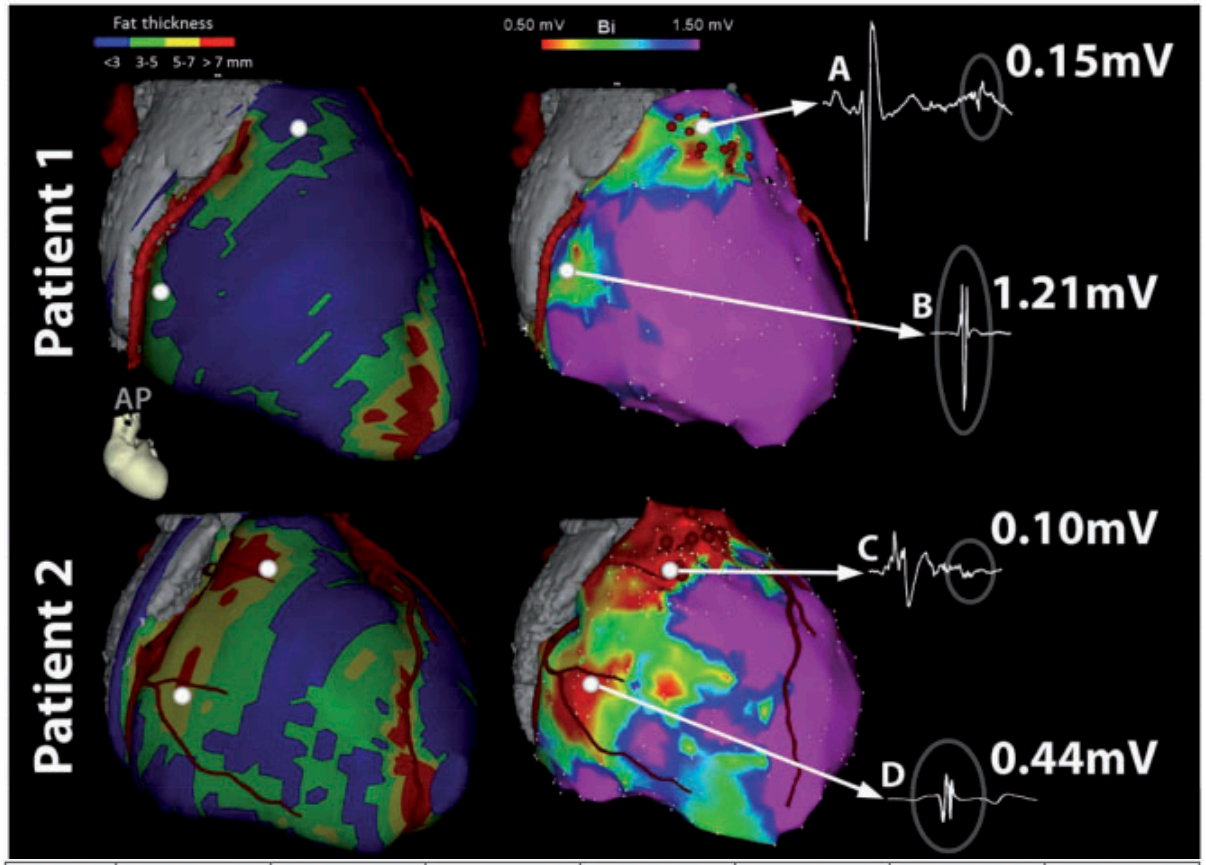
Marek Sramko†, Jarieke C. Hoogendoorn†, Claire A. Glashan, and Katja Zeppenfeld*

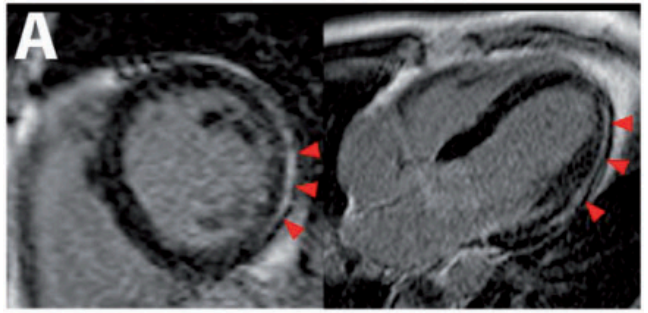
Department of Cardiology, Leiden University Medical Center, Albinusdreef 2, 2333 ZA, Leiden, The Netherlands

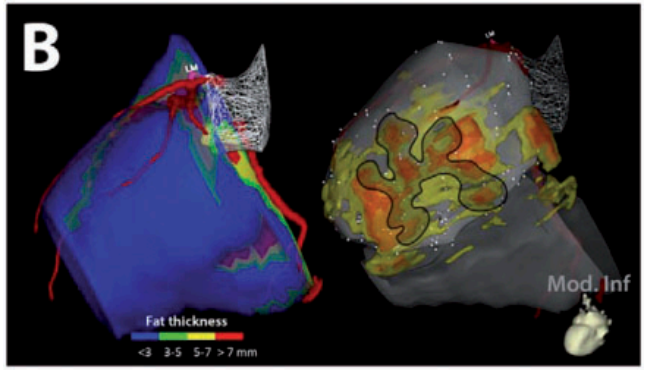
Europace (2019) 21, 383–403

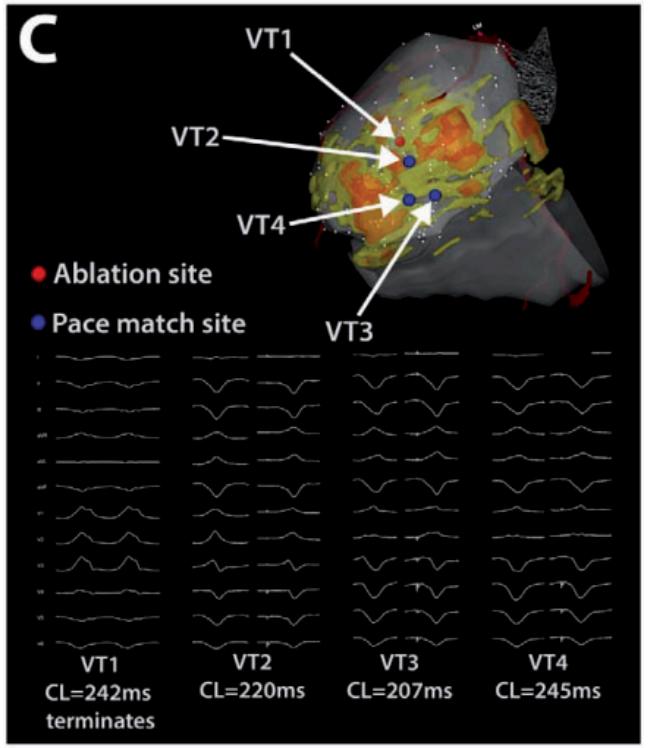












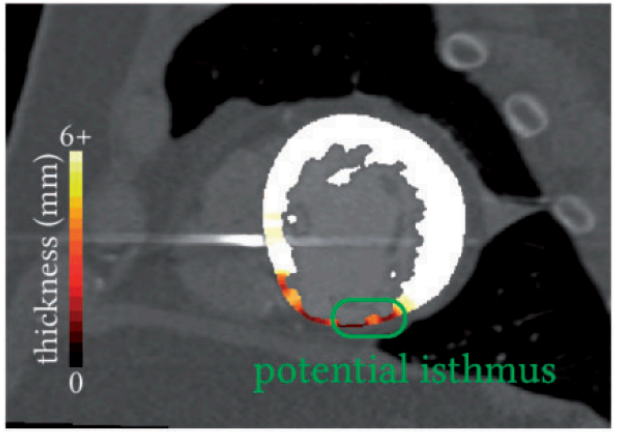
Aetiology	Histology of scar	Imaging of scar validated by histology			EAVM of scar validated by histology	Comparison between EAVM of scar and imaging			Histology of substrate[a]	Imaging of substrate[a] validated by histology	Detection of substrate[a] by imaging		
		CMR	CT	ICE		CMR	CT	ICE			CMR	CT	ICE
ICM													
ARVC													
HCM													
DCM													
Cardiac sarcoidosis													
Postmyocarditis													
LMNA-mutation													

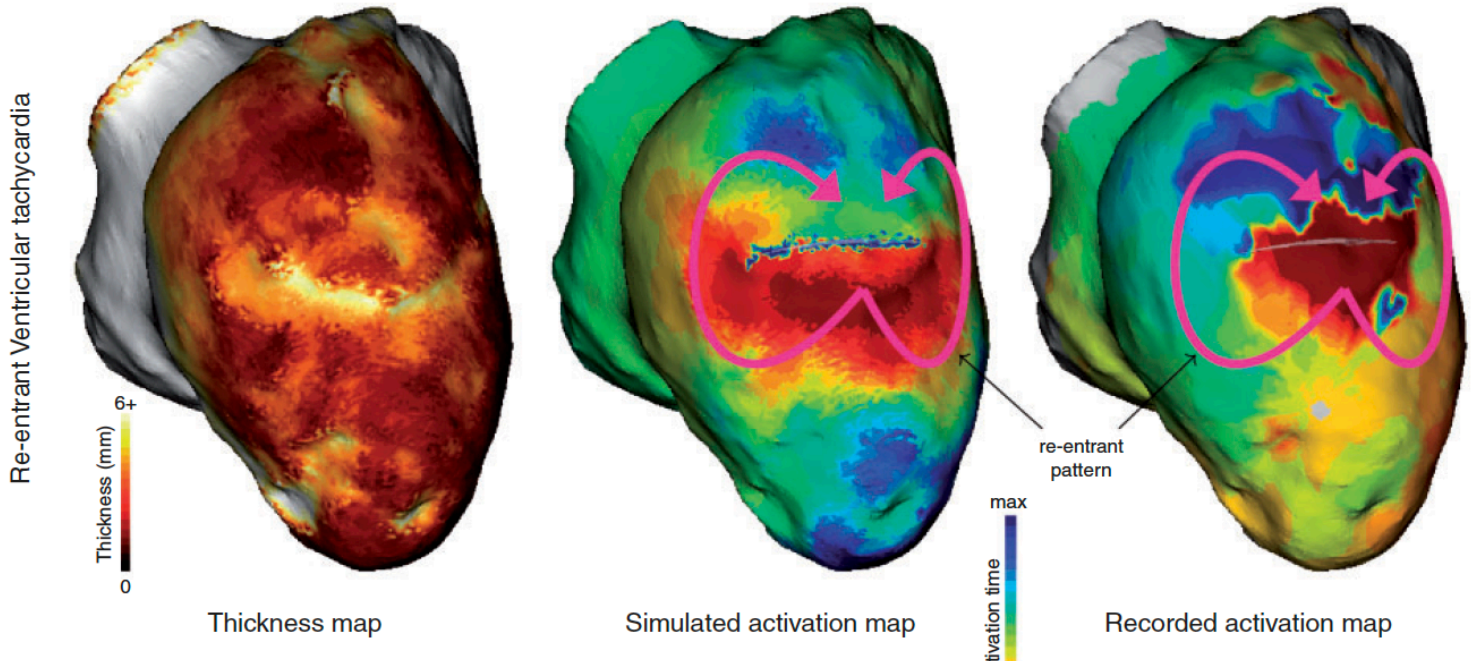
Human studies (n>10) | Human studies (n≤10) | Animal studies | No data available

Europace (2019) 21, 383–403

Fast personalized electrophysiological models from computed tomography images for ventricular tachycardia ablation planning

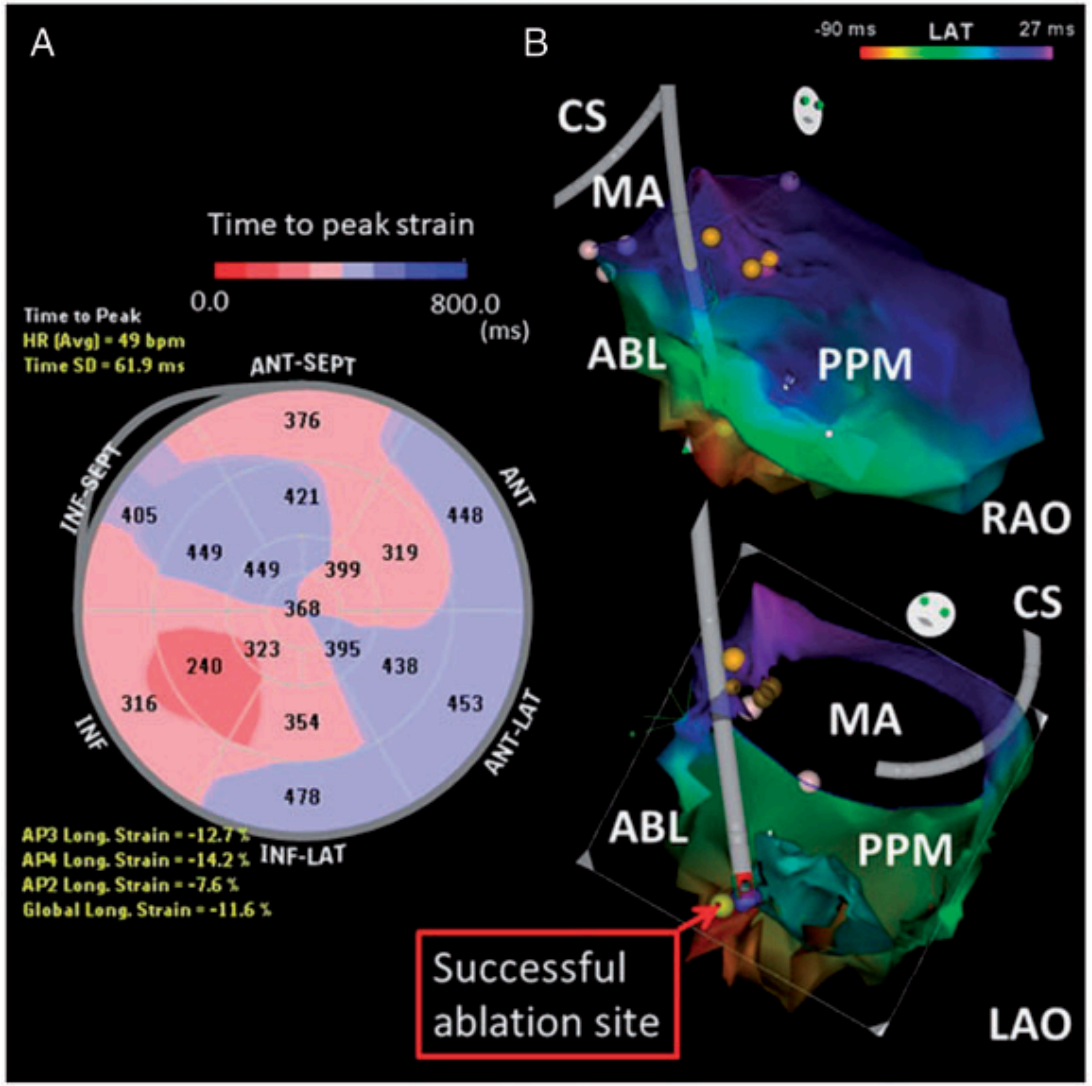
The authors aim at building such a pipeline from computed tomography (CT) images to personalized cardiac electrophysiology (EP) model.





Nicolas Cedilnik et al. Europace (2019) In Press.

Clinical impact of speckle tracking echocardiography for detecting the origin of posterior papillary-muscle ventricular arrhythmia



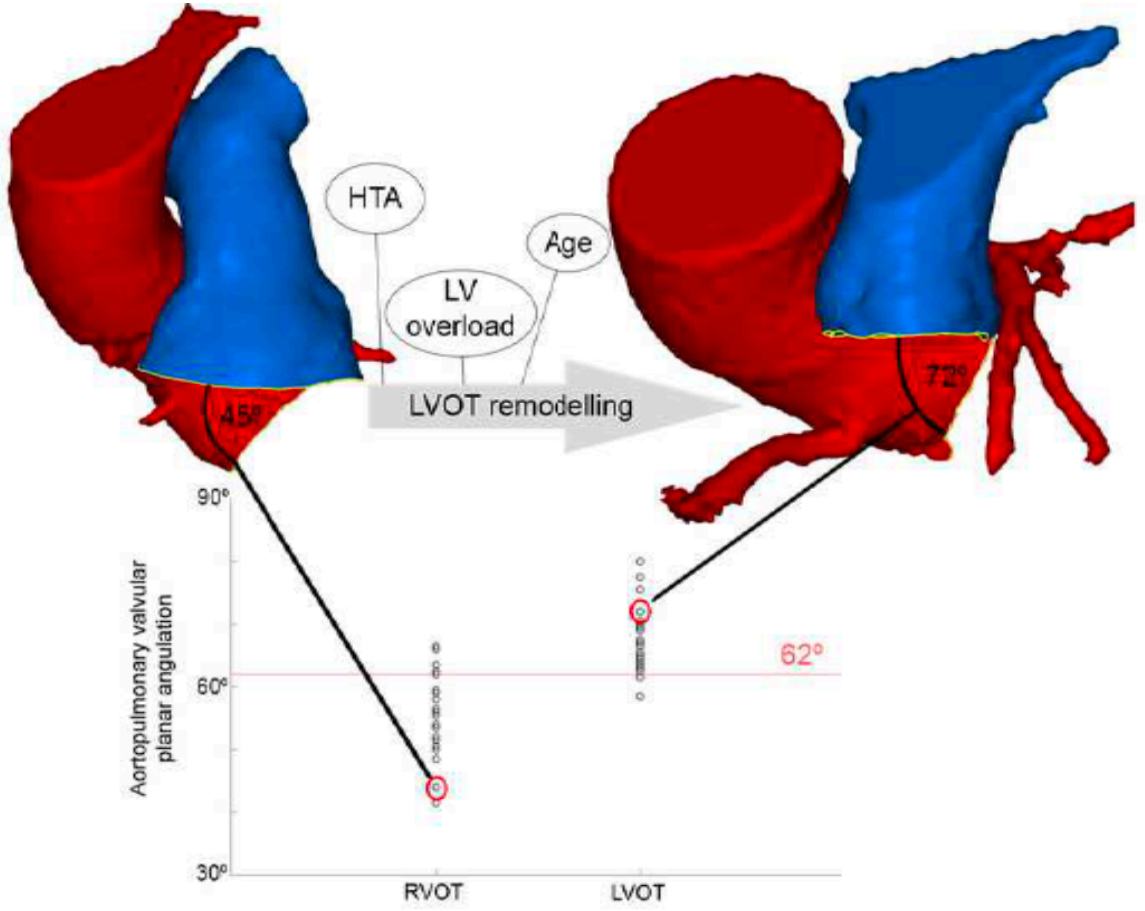
Speckle tracking echocardiography may be useful for identifying the origin and deciding clinical approaches before mapping and ablation procedure for PVCs originating from the PMs.

Case Express: 2019: doi:10.1093/europace/euy328

Prediction of PVC Origin in Left versus Right Ventricular Outflow Tract: A Novel Anatomical Imaging Approach*

Multivariable analysis showed that APVPA was an independent predictor of LVOT origin.

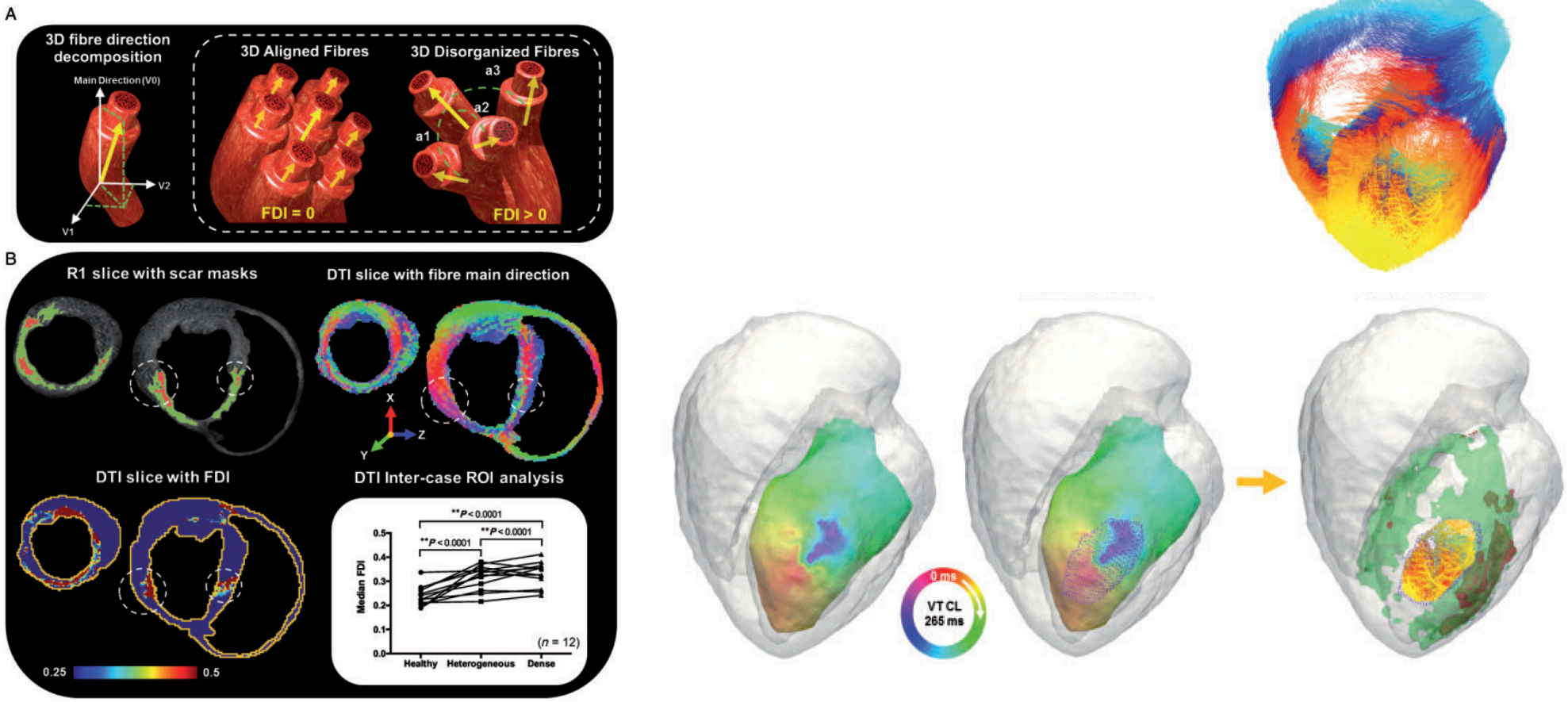
APVPA ≥62 degrees reached 94% sensitivity and 83% specificity (AUC 0.95) for predicting LVOT origin.



Measurement of aortopulmonary valvular planar angulation in a multidetector computed tomography 3D volume rendering technique reconstruction of both outflow tracts. The pulmonary valve annular plane was used as reference (value of zero degrees).

* Korshunov K et al. 2019: Accepted manuscript

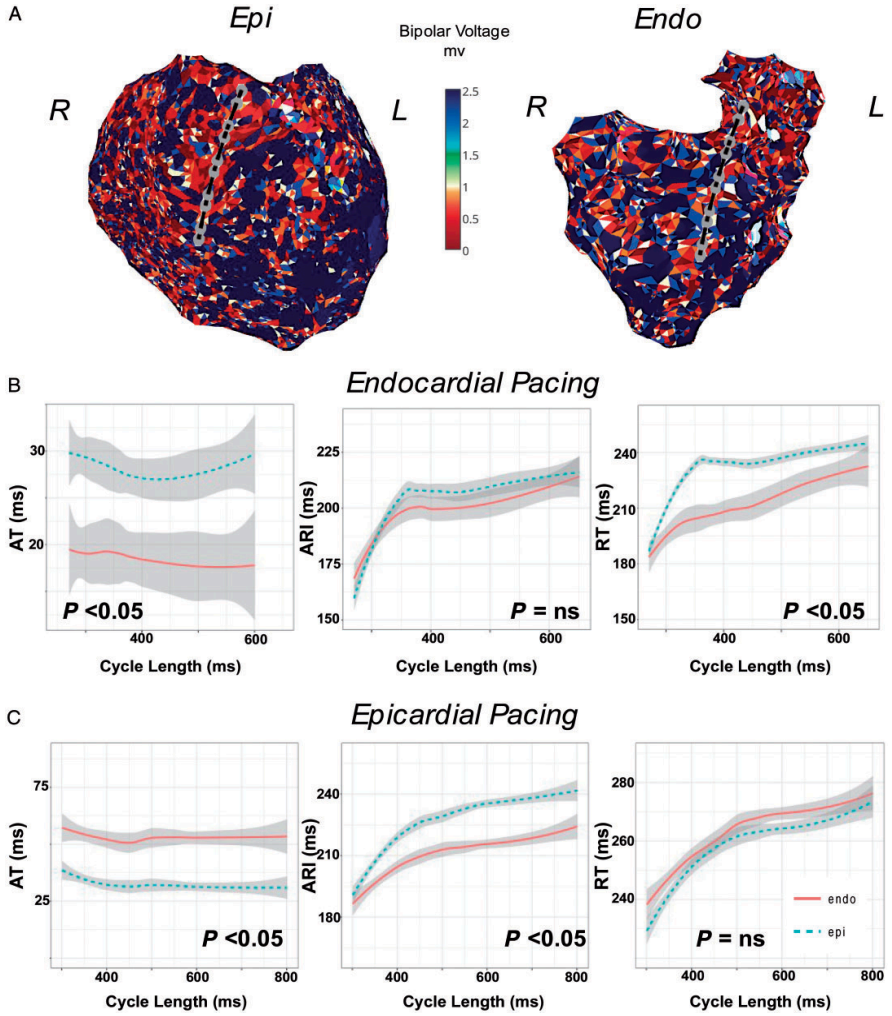
Three-dimensional cardiac fibre disorganization as a novel parameter for ventricular arrhythmia stratification after myocardial infarction



Myocardial infarction alters cardiac fiber organization with unknown consequences on ventricular arrhythmia. We used diffusion tensor imaging of three-dimensional cardiac fibers and scar reconstructions to identify the main parameters associated with ventricular tachycardia features after MI.

Leon D et al. Europace (2019) In Press.

Prolonged action potential duration and dynamic transmural action potential duration heterogeneity underlie vulnerability to ventricular tachycardia in patients undergoing ventricular tachycardia ablation



Srinivasan NT et al. Europace (2019) In Press.

Conclusions

This is the first human study to demonstrate that regions of electrical scar within the myocardium have prolonged ARI. We demonstrate that ARI prolongation is related to scar pattern and influences DOR depending on the activation sequence. This has important implications when constructing clinically relevant computational models or designing novel therapeutic interventions. Additionally, we demonstrate an example of DOR at a site of fractionation and earliest VT activation. This may provide further insights into the mechanisms of VT initiation, but also new methods to better delineate the pro-arrhythmic substrate within the ventricle by rapidly mapping dynamic differences in ARI and RT as part of routine 3D substrate mapping.

Complications after VT Ablation

Risk score model for predicting complications in patients undergoing ventricular tachycardia ablation: insights from the National Inpatient Sample database

Table 3 Predictors of 'any complications' with assigned risk score

Risk score	Predictors	Beta coefficient	Odds ratio	95% confidence interval	*P*-value
5	Coagulopathy	1.07	2.9	2.40–3.51	<0.001
5	Chronic liver disease	0.93	2.52	1.69–3.75	<0.001
5	Chronic kidney disease and electrolyte abnormalities	0.96	2.62	2.35–2.92	<0.001
3	Emergency admission	0.38	1.46	1.29–1.64	<0.001
3	Cerebrovascular accident	0.7	2	1.27–3.15	0.003
2	Age>65 years	0.34	1.4	1.25–1.57	<0.001
2	Coronary artery disease	0.34	1.41	1.25–1.58	<0.001
1	Peripheral vascular disease	0.2	1.25	1.1–1.46	0.007
1	Female sex	0.23	1.26	1.11–1.42	<0.001
27	Total risk score				

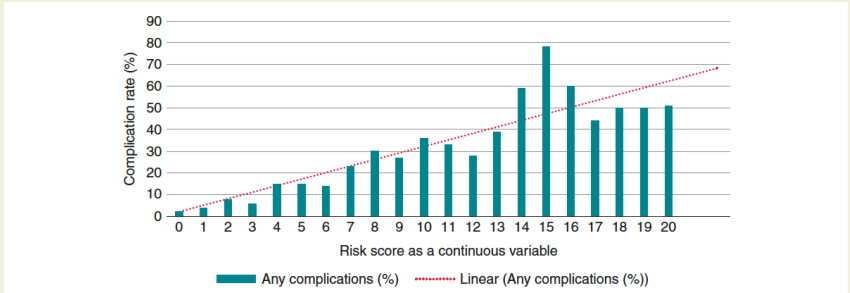


Figure 2 Rate of any complications based on risk score as a continuous variable in whole sample.

What's new?

- The rate of 'any complication' and 'in-hospital mortality' in patients undergoing radiofrequency ablation for ventricular tachycardia from randomly selected U.S. community hospitals and academic medical centres was 14.7% and 2.8%, respectively.
- Age ≥65 years, female gender, emergency admission, coronary artery disease, coagulopathy, chronic liver disease, chronic kidney disease, cerebrovascular accident, and peripheral vascular disease were the predictors of any complication in patients undergoing VT ablation on multivariate analysis.
- Patients with more comorbidities had significantly increased rates of vascular, cardiac, pulmonary, neurological complications, and in-hospital mortality compared with patients with less comorbidities.

Gunda S et al. Europace (2019) 21, 475–483

Bidirectional VT: ATS* or CPMV**

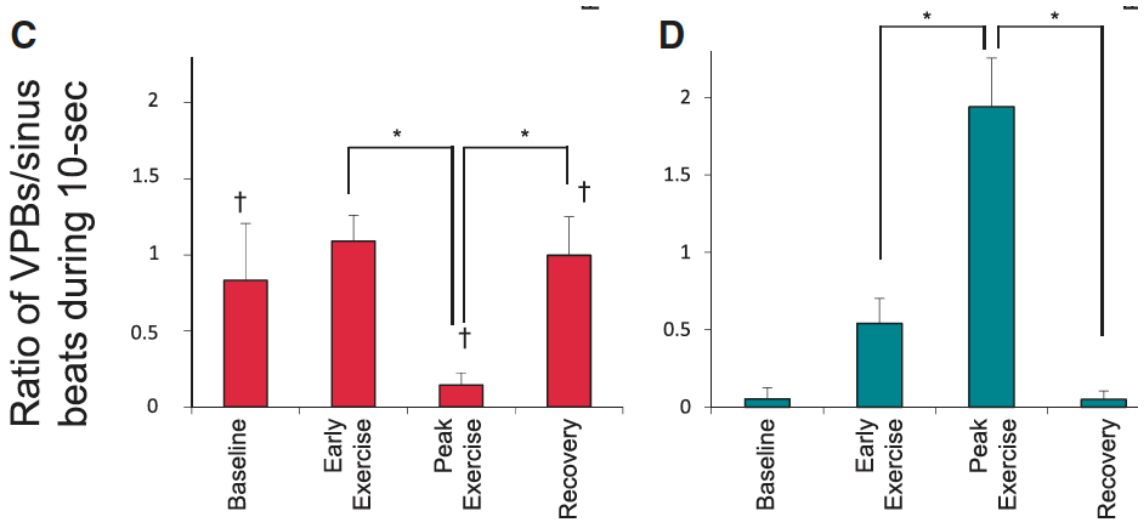
* Andersen-Tawil Syndrome
** Catecholaminergic Polymorphic VT

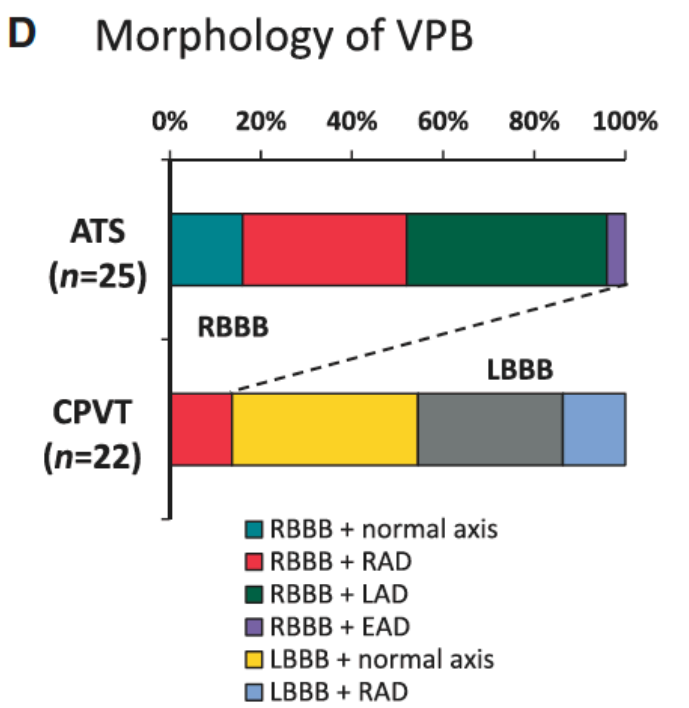
Different responses to exercise between Andersen–Tawil syndrome and catecholaminergic polymorphic ventricular tachycardia

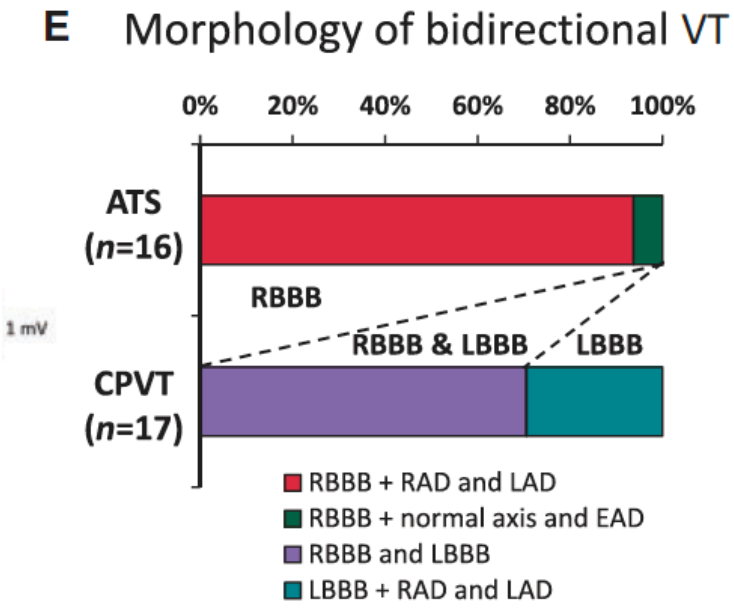
Yuko Y. Inoue[1†], Takeshi Aiba[1†], Hiro Kawata[1], Tomoko Sakaguchi[2], Wataru Mitsuma[3], Hiroshi Morita[4], Takashi Noda[1], Hiroshi Takaki[1], Keiko Toyohara[5], Yoshiaki Kanaya[6], Toshiyuki Itoi[7], Takeshi Mitsuhashi[8], Naokata Sumitomo[9], Yongkeun Cho[10], Satoshi Yasuda[1], Shiro Kamakura[1], Kengo Kusano[1], Yoshihiro Miyamoto[11], Minoru Horie[2], and Wataru Shimizu[1,12]*

Europace (2018) 20, 1675–1682 CLINICAL RESEARCH

26 ATS patients with KCNJ2 mutations from 22 families and 25 CPVT patients with RyR2 mutations from 22 families.








THANK
YOU!