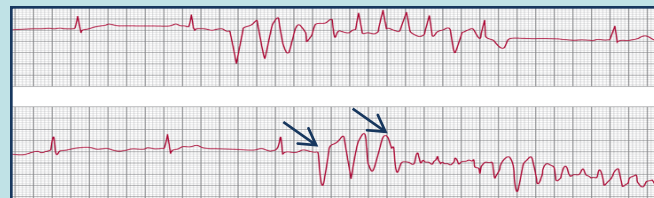




IX Congresso
Novas Fronteiras
em Medicina
Cardiovascular

22 a 24 de Fevereiro 2019

The Village Praia
D'El Rey - Óbidos



Ablação por cateter: Novas Fronteiras

Comentário

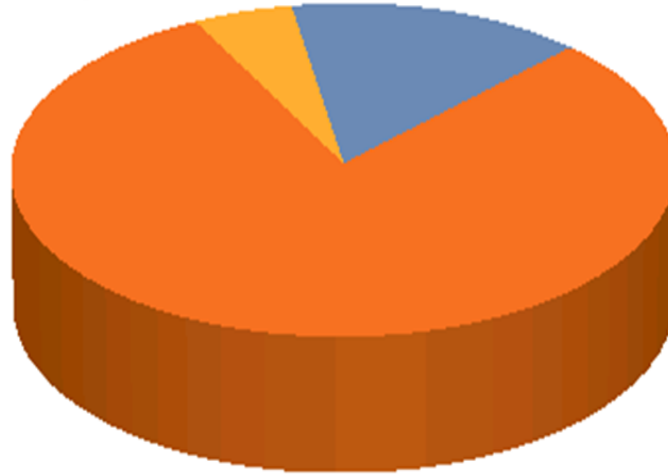
Que indicações e resultados da ablação
de TV na cardiopatia estrutural



Mário Oliveira, MD, PhD, FESC, FHRS, FACC, FEHRA
Hospital de Santa Marta
Hospital CUF Infante Santo
Faculdade de Medicina de Lisboa, Instituto de Fisiologia/CCUL

**Electromechanical
Dissociation 5%**

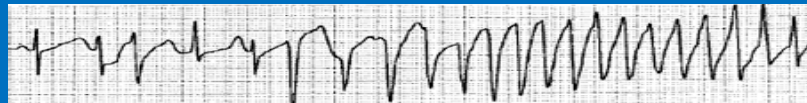
**Bradyarrhythmia
15-20%**



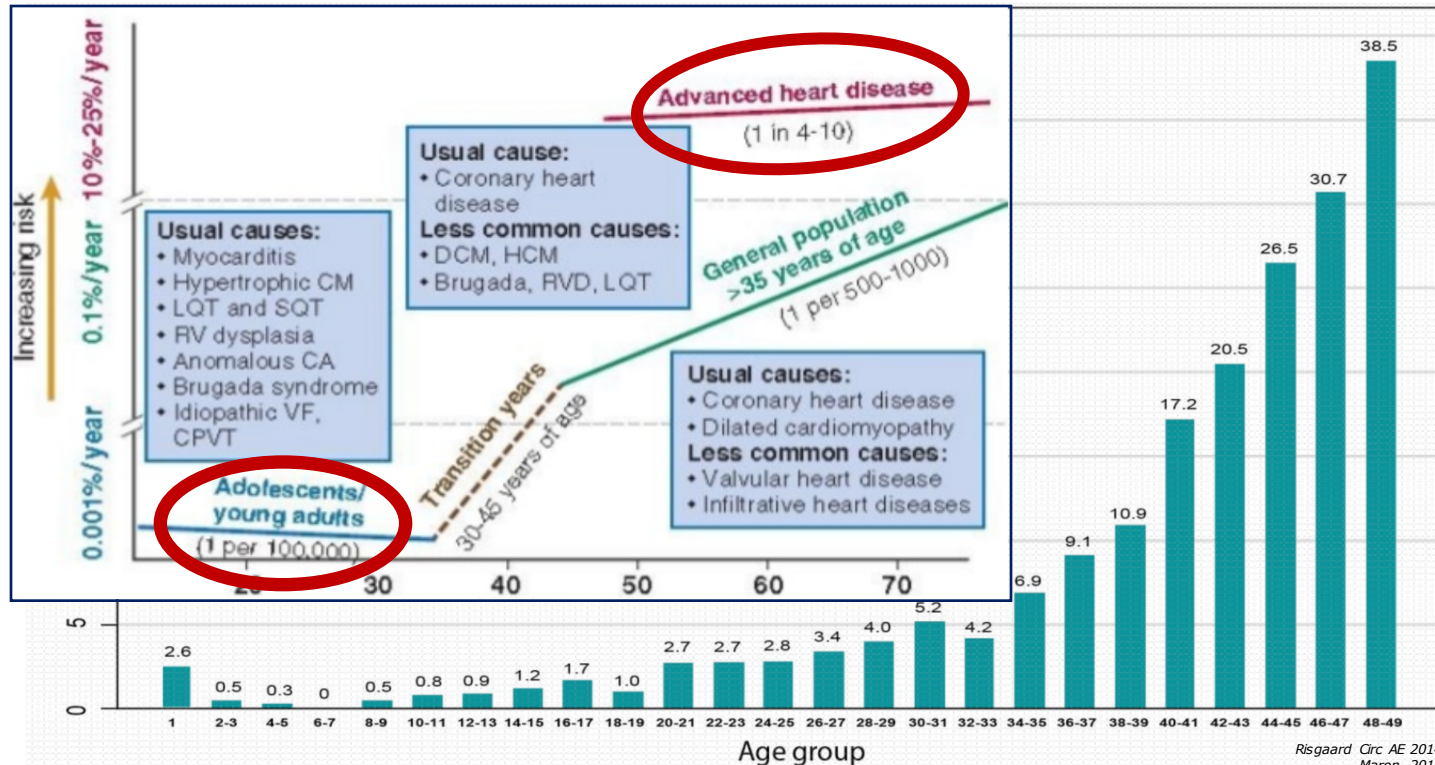
**Ventricular tachyarrhythmia (VT/VF)
75-80%**

Hulkuri H.N Engl J Med 2001

...but most of the sudden deaths are due to VT/VF!



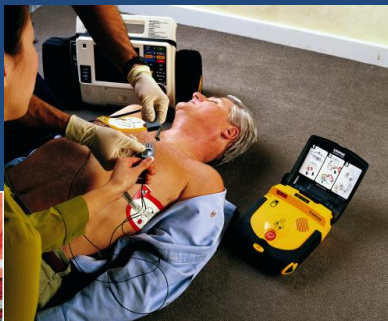
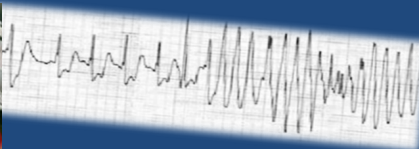
Morte Súbita → **>50% da mortalidade CV e 20% da mortalidade global!**



Risgaard Circ AE 2014
Maron, 2014
European Sudden Cardiac Arrest network: ESCAPE-NET, 2018

As doenças cardiovasculares representaram 29,4% da mortalidade em 2017

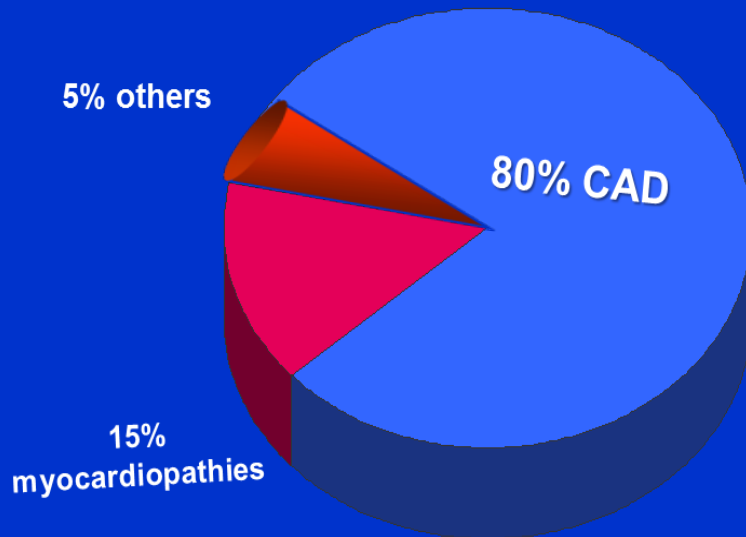
INE, 22/2/2019



Shocking collapse: Officials work frantically to try and save Hernandez's life earlier today



Sudden Death



Heikki et al. *N Engl J Med*, 2001
Deo R, Albert C. *Circulation* 2012

Ischemic heart disease is the predominant substrate associated with the development of VT.

But these arrhythmias occur in a variety of disorders:

- dilated cardiomyopathy
- valvular and congenital heart disease
- channelopathies

In a minority of pts, VT occurs in the absence of known heart disease.



Patients with depressed ventricular function are at risk of VT and SCD



Ventricular Tachycardia and Sudden Cardiac Death



***The mainstays of treatment for stable VT are the antiarrhythmic drugs**

- treat VT episodes
- reduce the incidence of ICD shocks
- improve QOL and reduce hospitalizations related to arrhythmias

***ICDs are currently recommended for the treatment of pts at risk for SCD due to VT**

***Catheter ablation of VT in ischaemic and non-ischaemic cardiomyopathy**

- Catheter ablation for VT decreases recurrences of VT and ICD shocks and has the potential to improve other outcomes such as mortality and QOL.

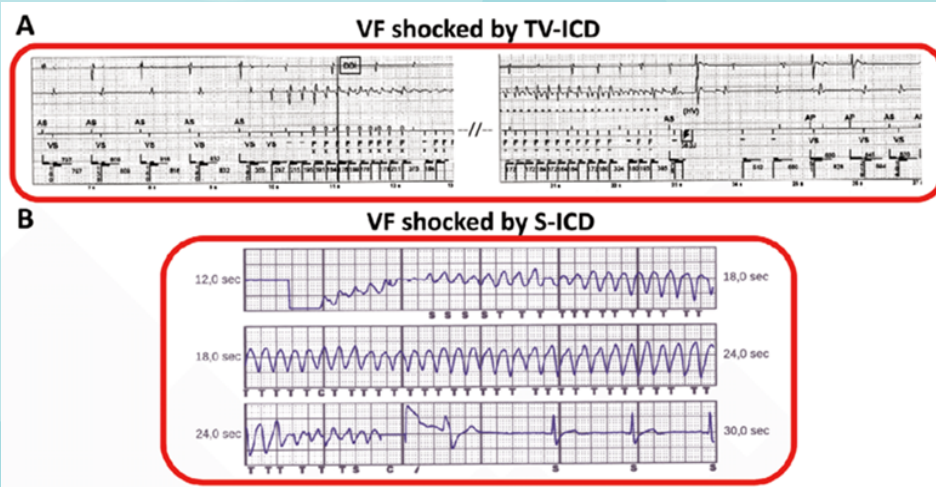
Ventricular Tachycardia in Structural Heart Disease

Adverse effects of AAD are related to cardiac and extracardiac toxicity ✂ PROARRHYTHMIA

Current AAD are limited by SUBOPTIMAL EFFICACY ✂ recurrent VT/VF , TOXICITY or intolerance ✂
discontinuation

✓ The only intervention demonstrated to improve survival in pts at risk of SCD from VT/VF is the ICD! ICD is indicated for secondary prevention and primary prevention.

Frequent episodes of VT/VF occur in a considerable number of pts with ICDs ✂ QOL and mortality.



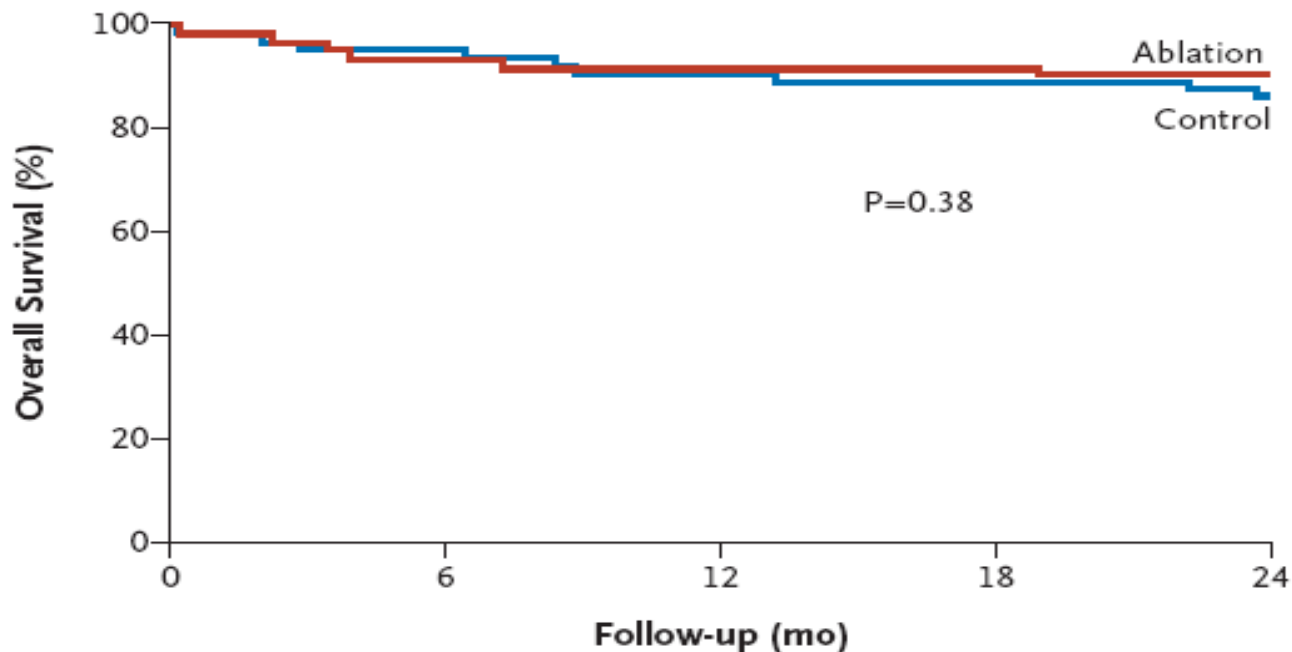
Limitations with the ICD as primary therapy for VT/VF

- »»» although the ICD terminates VT/VF it does not prevent them!
- »»» appropriate and inappropriate ICD shocks are associated with ↓QOL and mortality!
- »»» shocks cause psychological distress...
- »»» current selection criteria for ICD candidacy are imperfect.
- »»» the benefit of the ICD is not established in the early post-MI period.
- »»» less survival impact in non-ischemic DCM...



preventive ablation for VT/VF may result in a better prognosis in pts with an ICD...

Prophylactic Catheter Ablation for the Prevention of ICD Therapy



Ventricular Tachycardia Ablation in Addition to Implantable Defibrillators in Coronary Heart Disease (VTACH)

**Pts with stable VT, previous AMI and LVEF $\leq 50\%$*

24-mo event-free survival estimates	Ablation, n=52 (%)	Control, n=55 (%)	Hazard ratio (95% CI)
VT recurrence	46.6	28.8	0.61 (0.37–0.99)
Hospital admission for cardiac reasons	67.4	45.4	0.55 (0.30–0.99)
VT storm	75.0	69.7	0.73 (0.36–1.50)
Syncope	96.2	85.4	0.36 (0.07–1.81)
Death	91.5	91.4	1.32 (0.35–4.94)
appropriate shocks/pt	0.6	3.4	p=0.018

Catheter ablation of stable VT prior to implanting an ICD prolongs the time to recurrence of VT in pts with prior MI and reduced LVEF (18.6 months vs. 5.9 months)

Impact of Substrate Modification by Catheter Ablation on ICD Interventions in Pts With Unstable Ventricular Arrhythmias and CAD

n=111(ablation and ICD vs. ICD alone)

- Pace mapping $\pm$ entrainment mapping $\pm$ substrate modification
- Time to first recurrence of VT/VF
- Follow-up: 2.3 ± 1.1 years
- No difference in time to first recurrence of VT/VF between groups...
- >50% reduction in the number of ICD therapies...

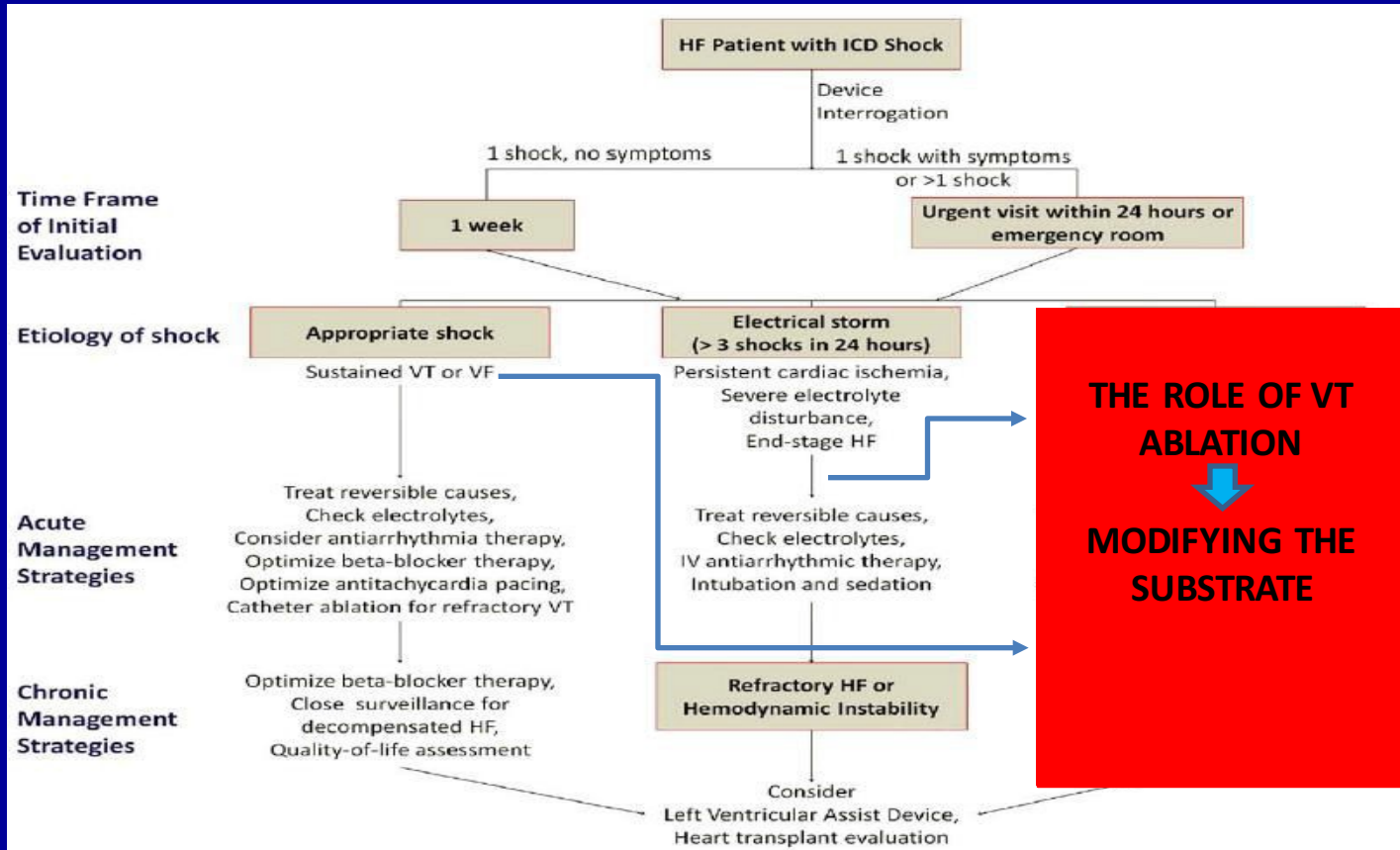
Kuck et al. (SMS), 2017

Patients with ICM and ICDs who have VT

- n=259
- randomised to ablation or escalated drug therapy
- Activation mapping. All induced VTs targeted for ablation.
If unstable VT or VF  substrate-based approach used for ablation
- Follow-up: 27.9 ± 17.1 months
- **Lower rate of the composite primary outcome of death, VT storm or appropriate ICD shock in pts undergoing catheter ablation vs. escalated drug therapy.**

Sapp et al. (VANISH), 2016

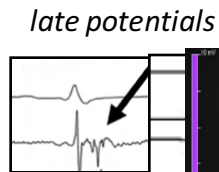
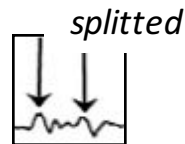
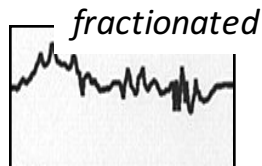
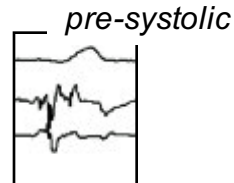
General management of patients with ICD shocks



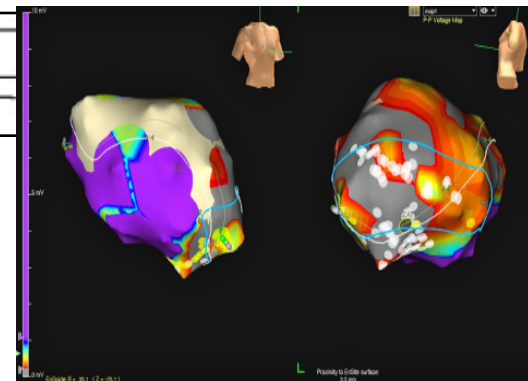
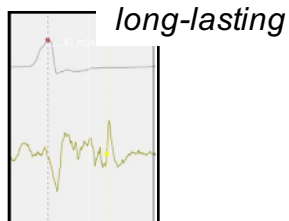
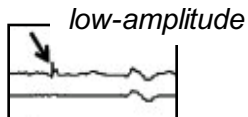
VT ABLATION – MODIFY THE SUBSTRATE

What is Substrate Modification ?

1. catheter elimination of all abnormal potentials during sinus rhythm



local abnormal ventricular activity (LAVA)

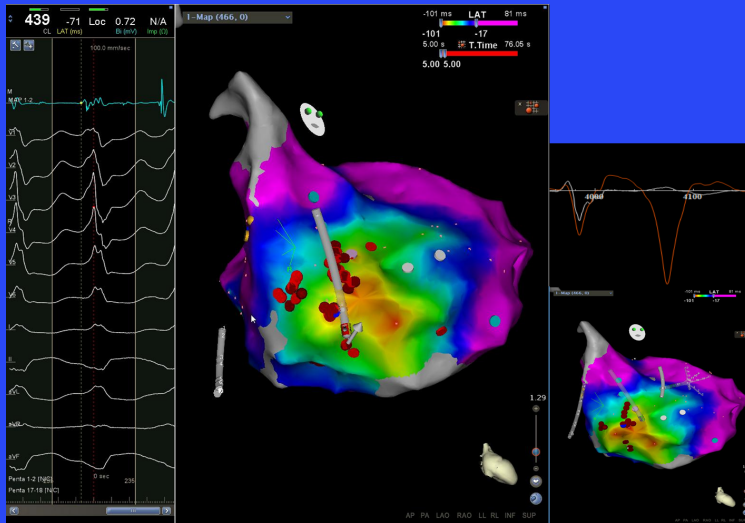


2. linear ablation based on the findings of scar areas and proximity to anatomic obstacles
3. frequently combined with pace-mapping techniques
4. testing VT inducibility

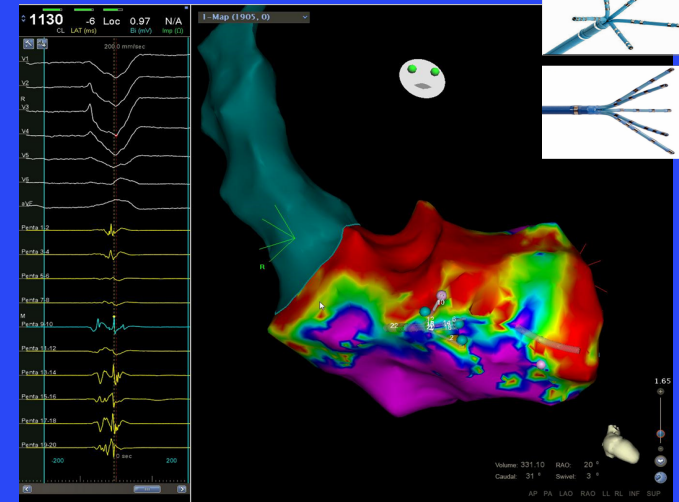
Substrate modification in patients with severe left ventricular dysfunction and frequent appropriate ICD shocks

Oliveira M, et al., *Prêmio Medtronic 2015, RPC 2016*

- 18 pts (64±13 yrs, LVEF 27.5±7%)
- Non-inducibility was achieved in 65%
- 3 cases → VF induced in post-ablation testing
- 3 cases → VT inducibility not performed due to hemodynamic deterioration
- 1st year follow-up - 71% remained free of VT



Duration - 130±50 mn
X-ray time - 16±12 mn
RF time - 23±11 mn



Continuous Mapping can collect up to 6000 points per map

QUICK ACCURATE MAPPING

Significant developments in ablation and mapping technologies

- 3D-electroanatomic mapping

>> NEW PLATFORMS >> HIGHER ACCURACY

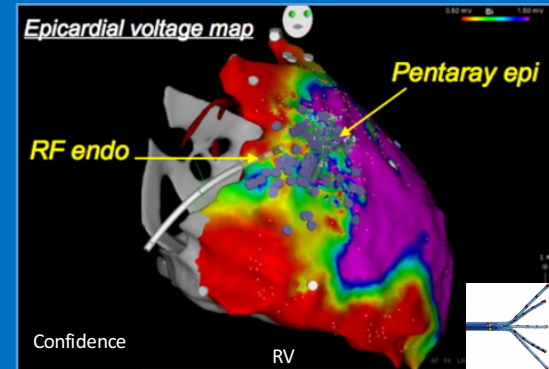
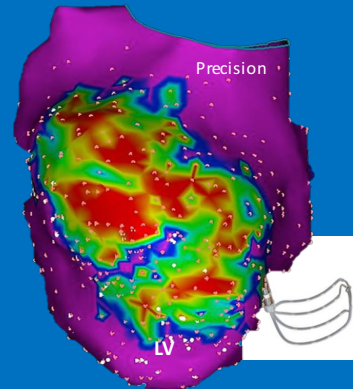
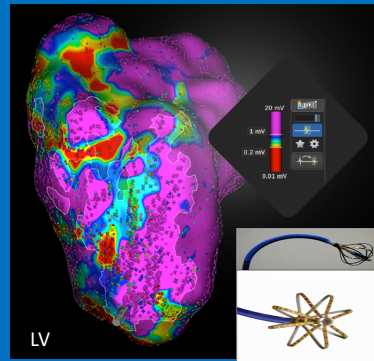
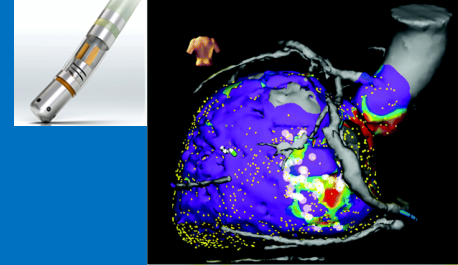
- Multimodality imaging

CT and MRI

- multielectrode mapping >> very high-resolution propagation maps

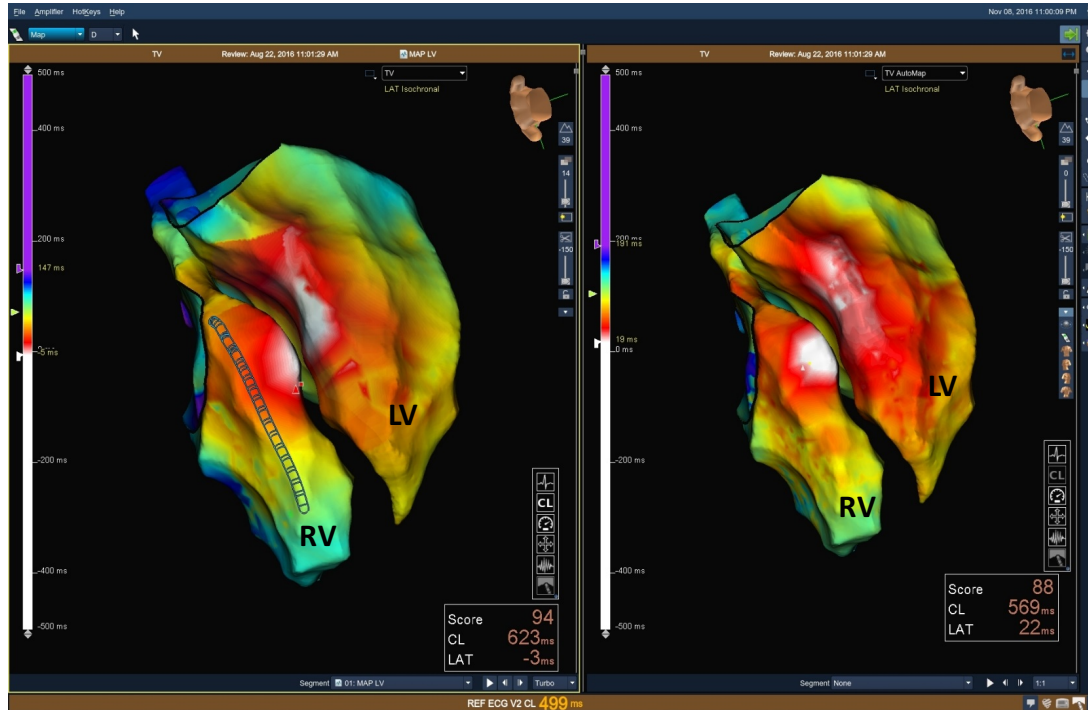
- epicardial mapping/ablation

- large-tip irrigated catheters with “contact-force” (and indexes) information



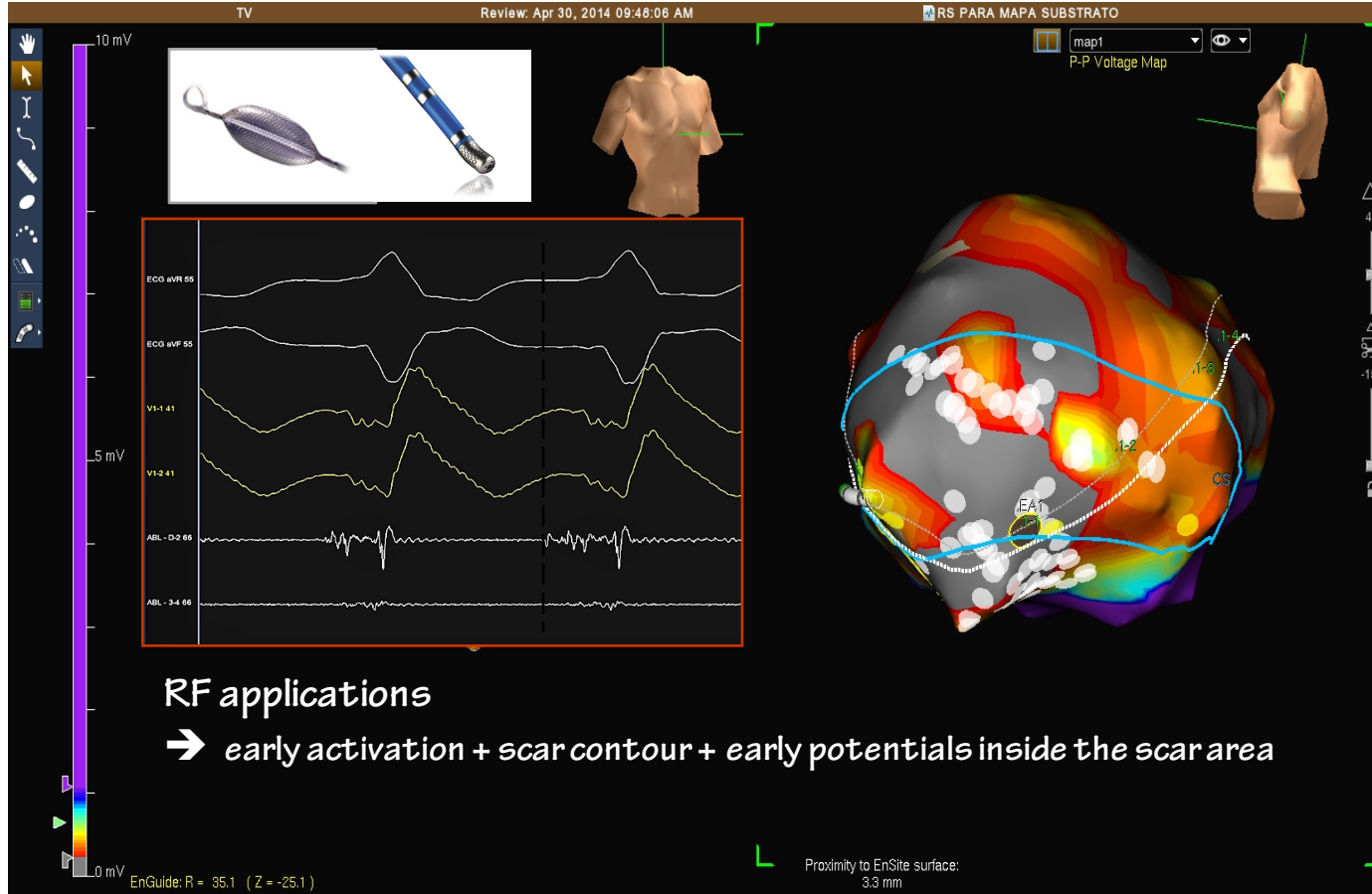
VT Ablation

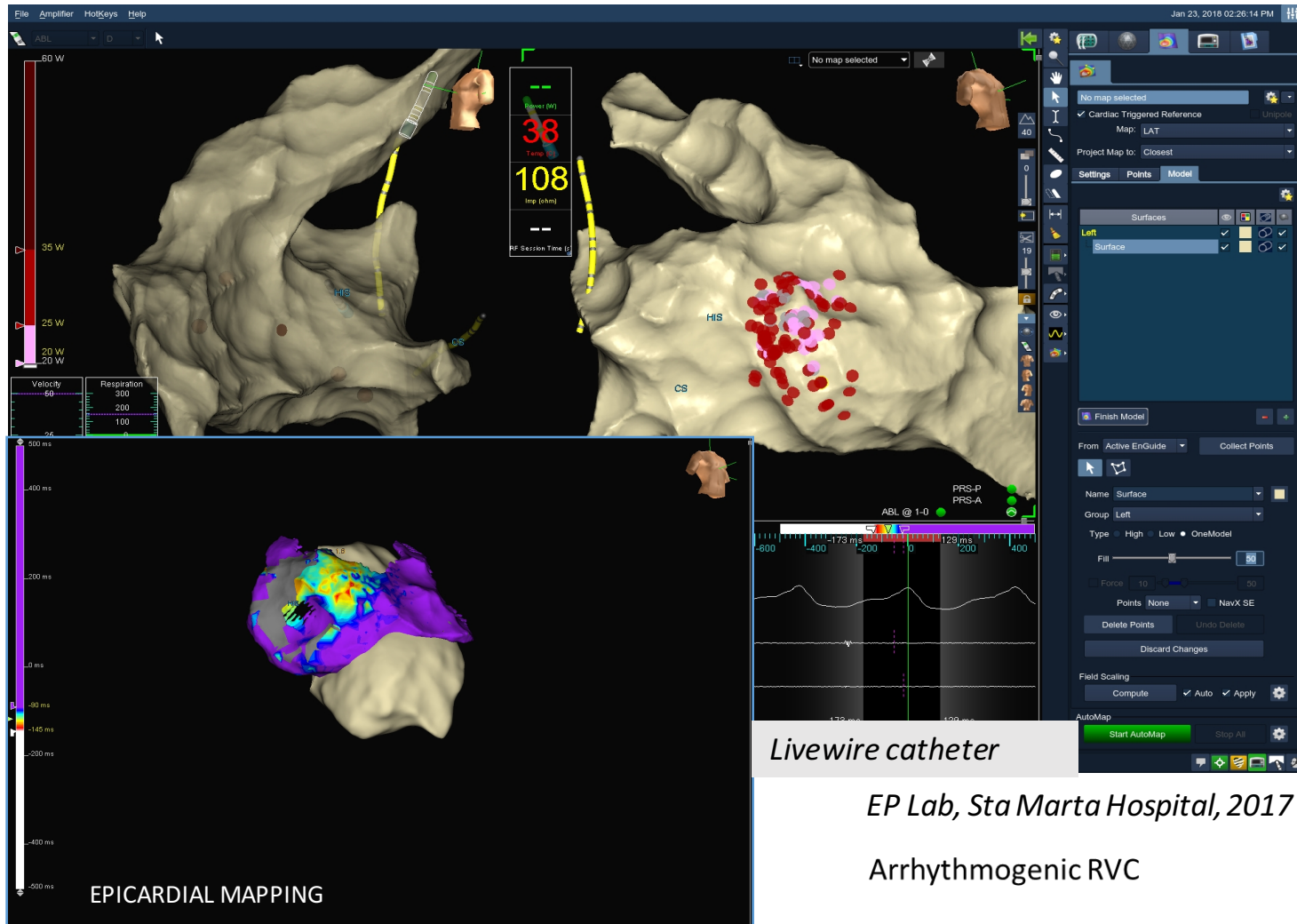
- MAPPING - Manual vs. AutoMap



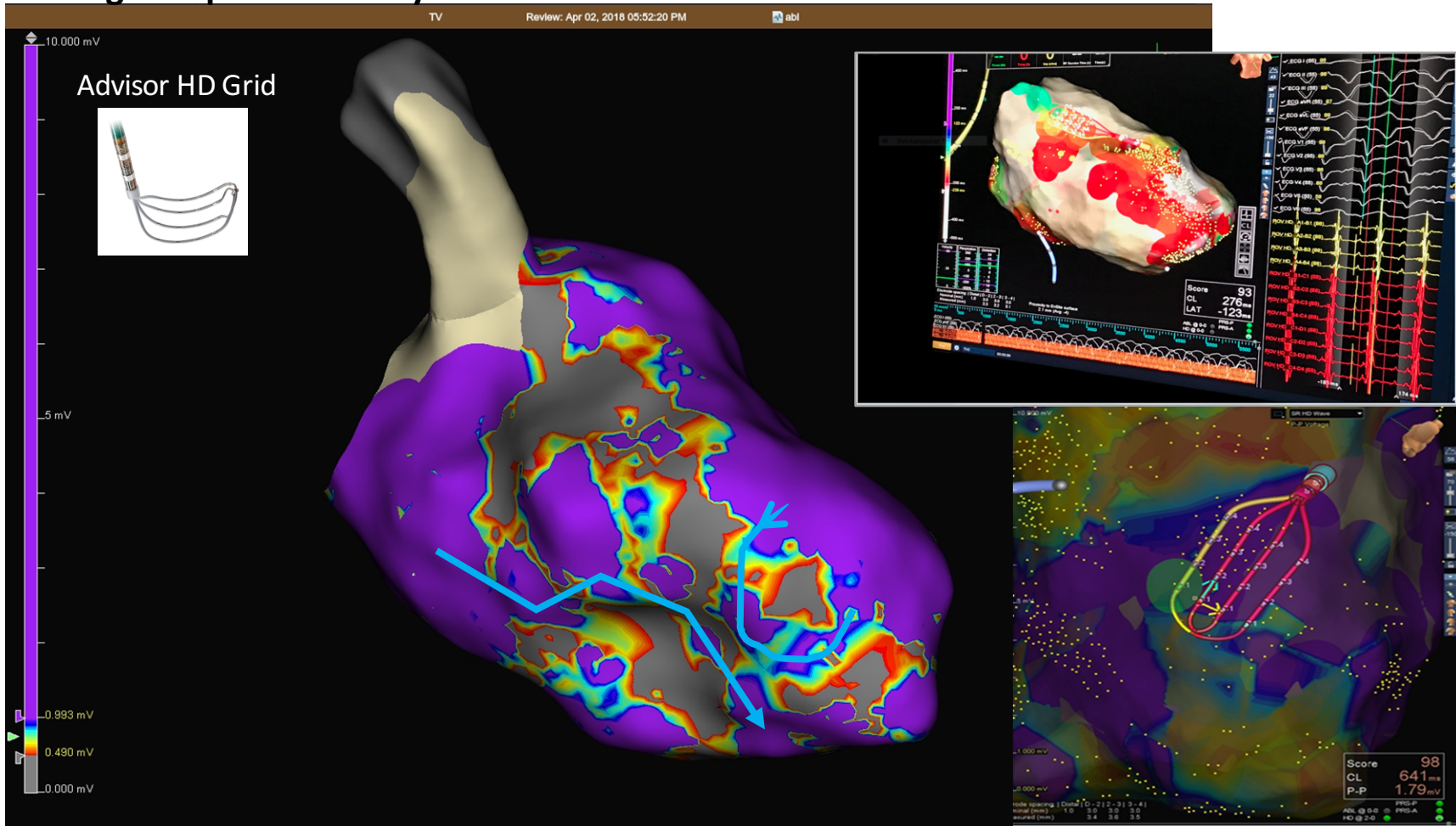
Livewire Catheter

HYBRID CONTACT-NON CONTACT MAPPING IN VT ABLATION





Voltage Map in Sinus Rhythm – Ischemic Heart Disease – ICD – VT Storm

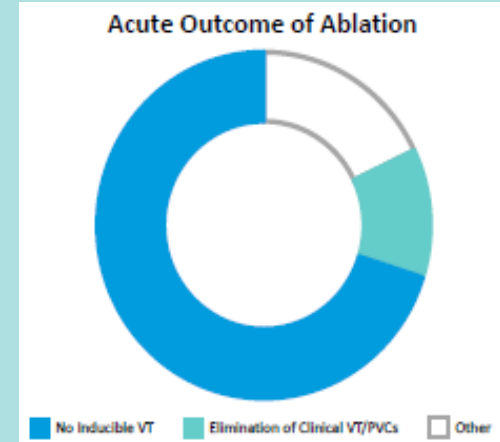
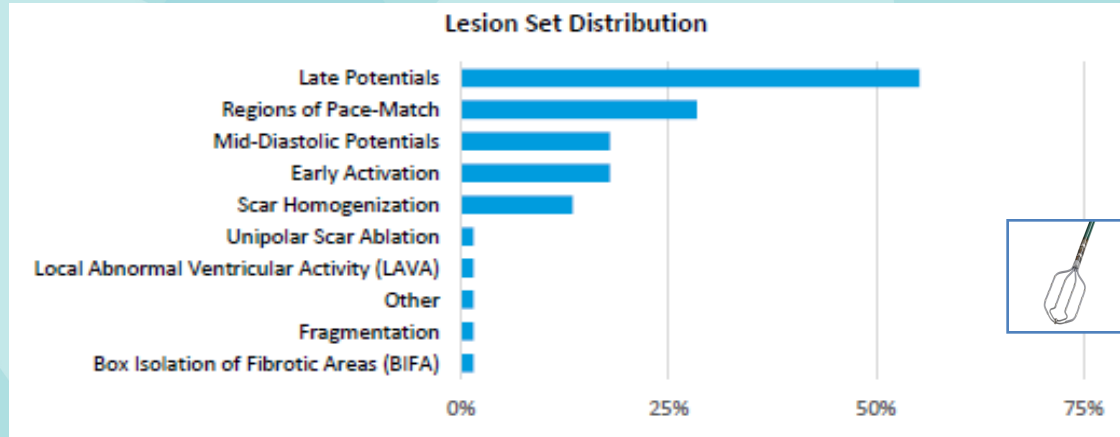


Acute Outcomes Associated with Mapping Ventricular Tachycardia in Non-Ischemic Cardiomyopathy Patients Using a High-Density Grid-Style Catheter

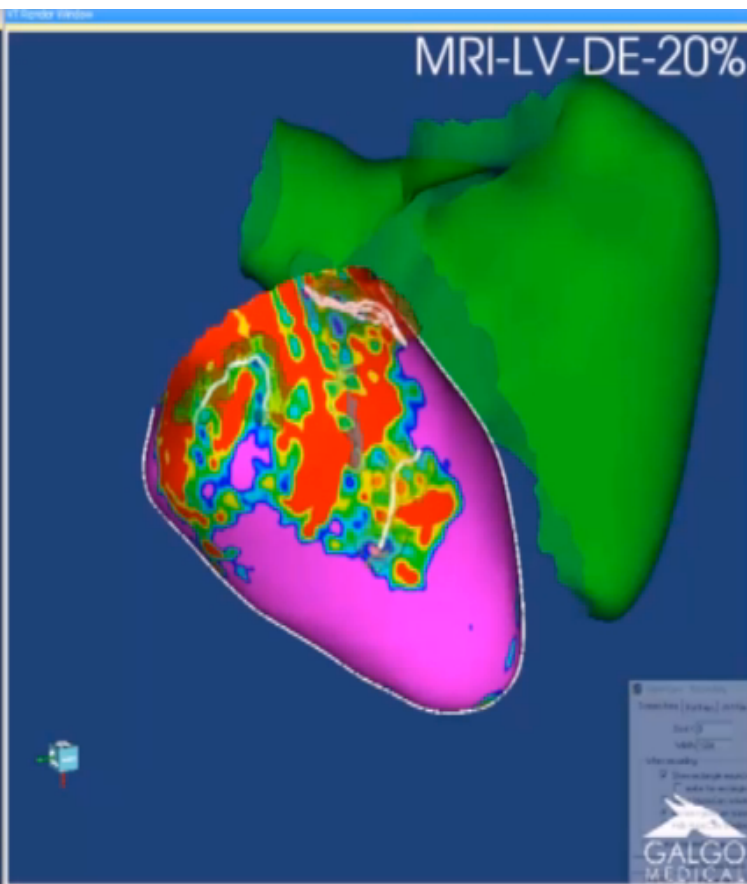
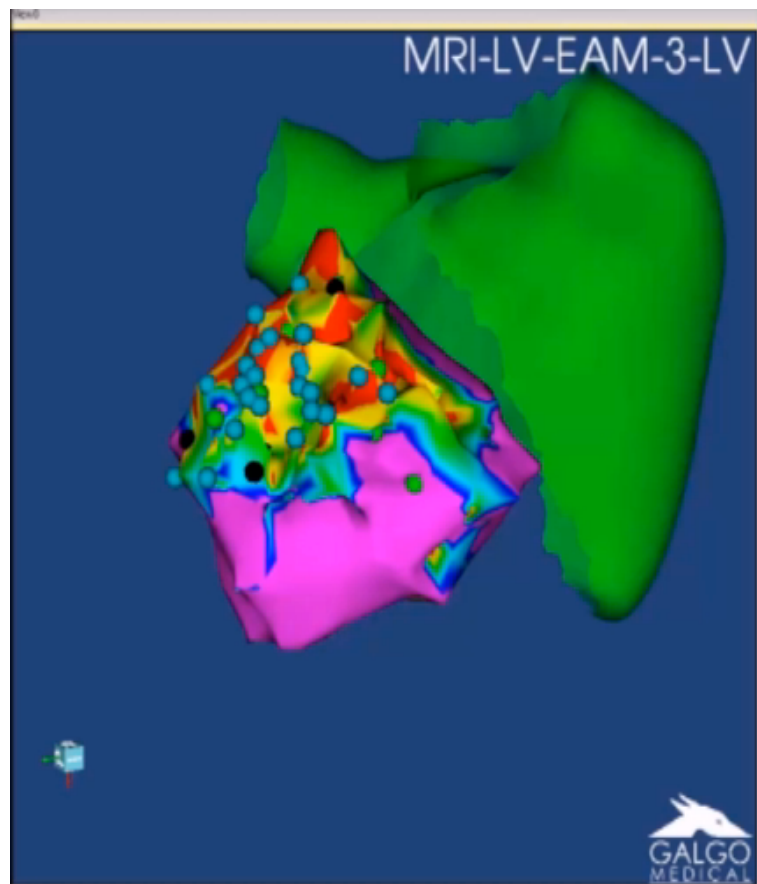
Paolo Della Bella, Filippo Cauti, Bertrand Pierre, Arian Sultan, Mario Oliveira, Ivo Roca-Luque, Jeronimo Rubio, Juan Sieira, Nicola Trevisi, Peter Gora, Ulrich Krause

EHRA Meeting 2019

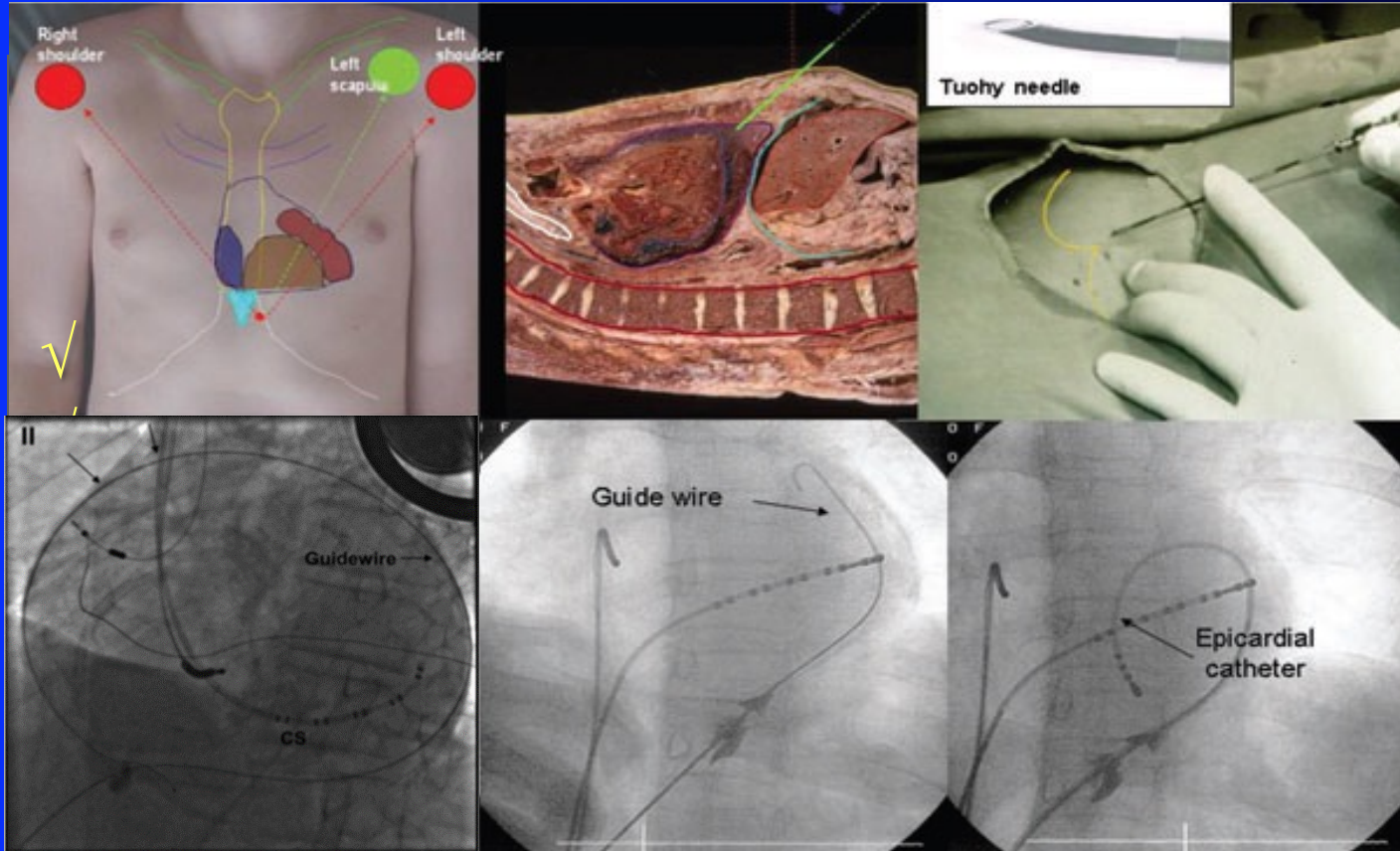
- Procedural data collected in 67 cases across European centers



- Use of high-density grid style mapping catheter resulted in rapid point collection in the ventricles.
- Ablation was commonly performed in the LV targeting late potentials.
- Mapping and ablation resulted in a high rate of acute success, with most cases reporting no inducible VT at the end of the procedure.

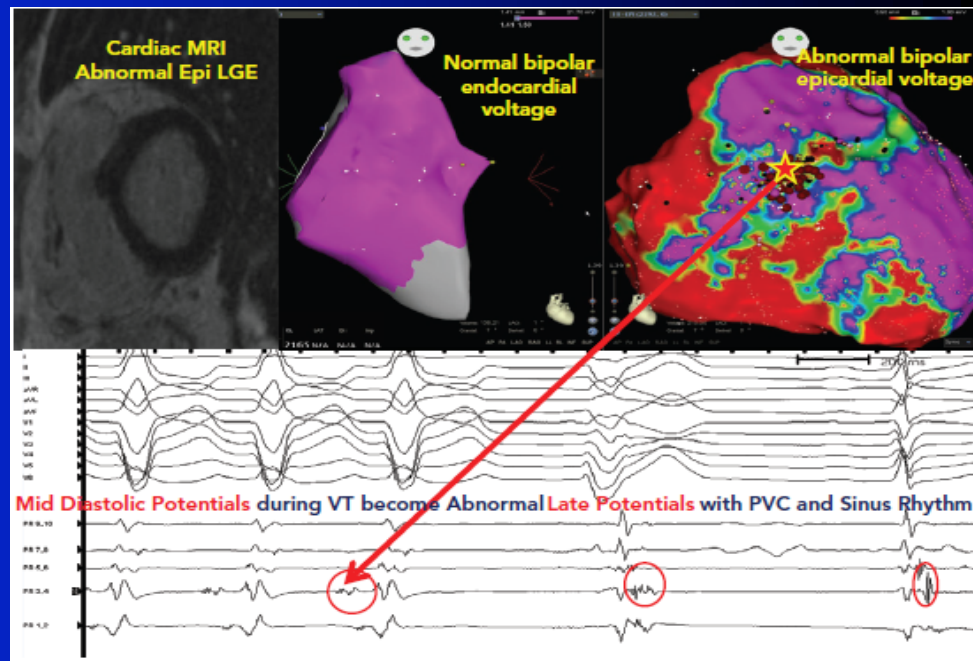
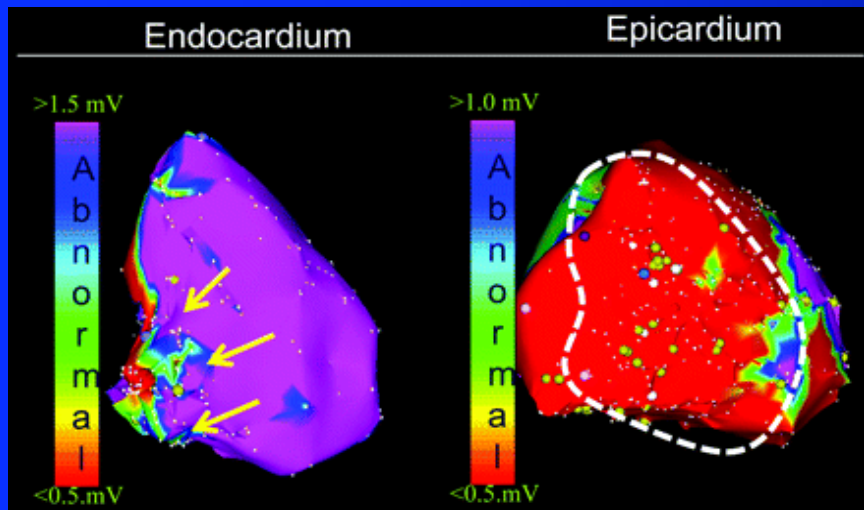


Epicardial Ablation May Be an Effective Alternative Treatment for VT



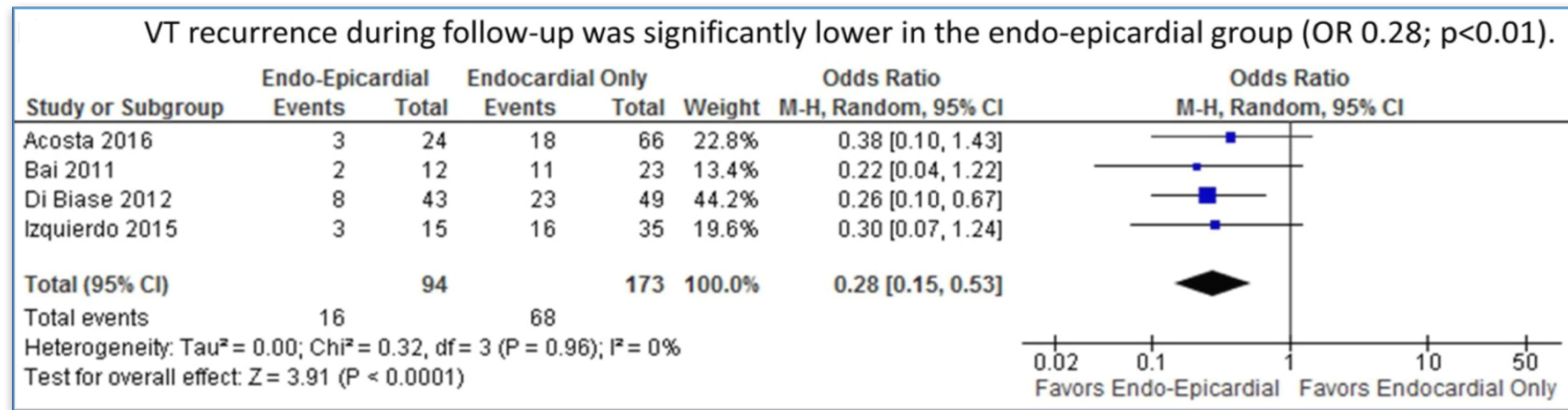
In Non-Ischemic Cardiomyopathy:

- ✓ The substrate for VT typically surrounds the aortic and mitral valve region and extends apically.
- ✓ Frequently, the substrate may be solely or predominantly intramural or epicardial.
- ✓ Because of the frequent presence of an epicardial substrate, some experienced operators use a simultaneous endocardial/epicardial mapping



ENDO-EPICARDIAL VERSUS ENDOCARDIAL-ONLY APPROACH FOR FIRST VENTRICULAR TACHYCARDIA ABLATION: A SYSTEMATIC REVIEW AND META-ANALYSIS OF SAFETY AND EFFICACY OUTCOMES

Rhanderson Cardoso, Gilson Fernandes, Guilherme Nasi, Joao Braghiroli, Andre D'Avila; ACC 2017



- 4 studies, 267 pts (endo-epicardial group - 94), 85% men with ischemic substrates (87%).
- Inducible VT after ablation was not significantly different between both groups.
- Groin hematoma, phrenic nerve palsy, and strokes were not significantly different between groups. There was a trend towards increased cardiac tamponade in the endo-epicardial group (5% vs. 0.8%; OR 6.3; $p = 0.07$).
- During 1-3 year follow-up, mortality was not different between groups ($p = 0.16$).
- VT recurrence and repeat ablations (OR 0.22; $p < 0.01$) were lower in the endo-epicardial group.

Em doentes com cardiopatia estrutural e arritmias ventriculares recomenda-se a ablação por cateter nas seguintes situações:



- 1) TV mantida monomórfica apesar da terapêutica AA, ou quando os AA não são tolerados.**
- 2) controlo de TV recorrente, incessante ou tempestade arritmica (quando não atribuível a causa reversível).**
- 3) TV mantida de ramo-a-ramo.**
- 4) EV frequente, TV não mantida ou mantida na presença de disfunção sistólica ventricular.**
- 5) TV polimórfica, recorrente ou FV refractária à terapêutica AA, secundária a EV “trigger” susceptível de ablação.**

CONCLUDING REMARKS



- **THE PROGNOSTIC IMPACT OF VT/VF REPRESENTS ONE OF THE IMPORTANT CHALLENGES IN HEALTH CARE DUE TO THE INCREASED RISK OF SCD (usually in pts with structural heart disease).**
- **CATHETER ABLATION IS AN USEFUL OPTION TO CONTROL RECURRENT VT (AAD limited by decreased efficacy and significant side effects, catheter ablation offers a superior antiarrhythmic endpoint to ICDs at low risk).**
- **YET, VT ABLATION REPRESENTS A SMALL PERCENTAGE OF ALL INTERVENTIONS ("limited" success in SHD, comorbidities, duration/complexity/complications of the procedure, post-ablation mortality stills high in SHD).**
- **EPICARDIAL ABLATION MAY BE AN EFFECTIVE ALTERNATIVE TREATMENT (endocardial failure or contraindication, heart diseases associated with epicardial substrate)**
...SELECTED PTS AT EXPERIENCED CENTERS
- **NEW ADVANCES IN 3D PLATFORMS USING INNOVATIVE TOOLS MAY CONTRIBUTE TO IMPROVE VT MAPPING/ABLATION SUCCESS AND SAFE.**