고려대학교의료원
KOREA UNIVERSITY MEDICINE

In Patients with VT Storm: RF Ablation First!

VT Symposium 2019

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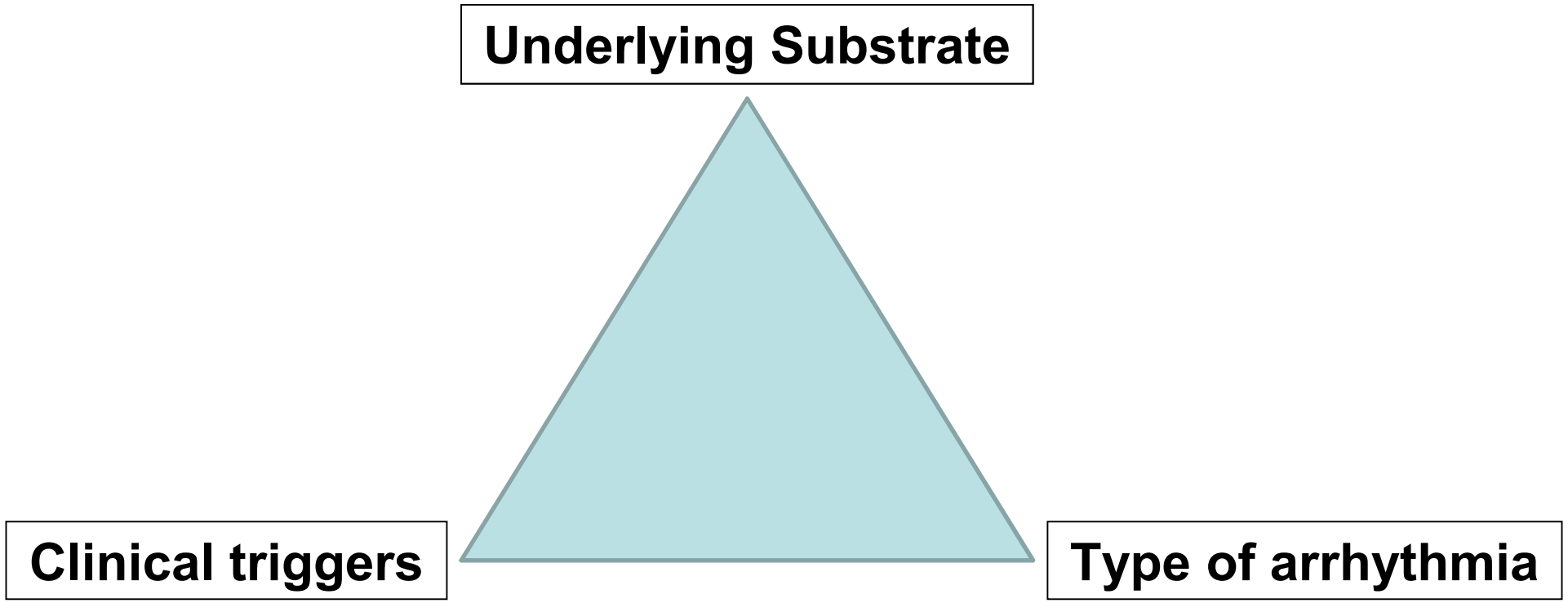
ENABLING
FUTURE MEDICINE

Diagnostic Evaluation

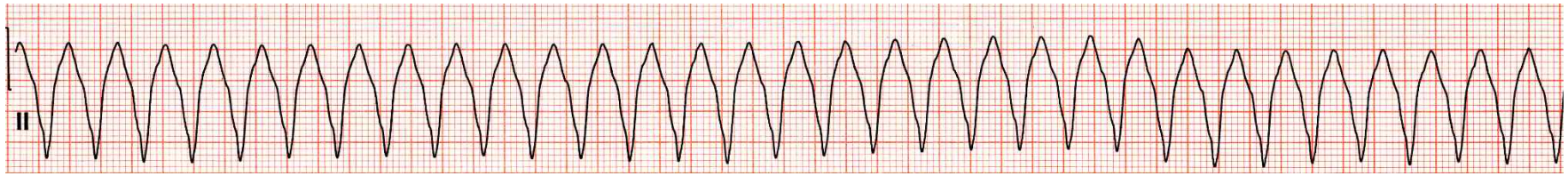


Underlying Substrate

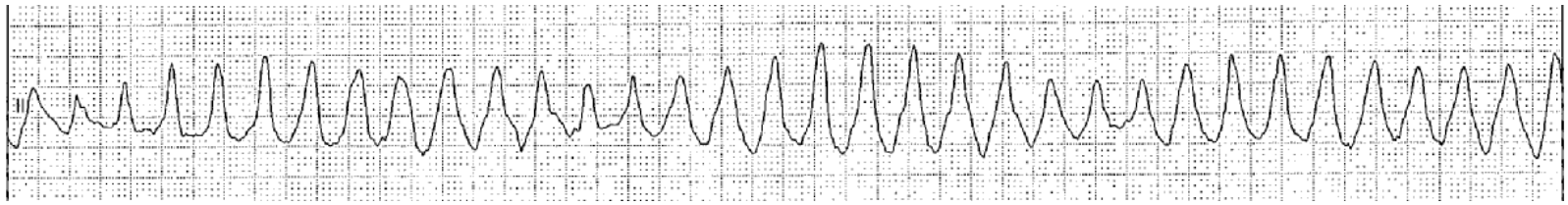
- **Structural heart disease**
  - Ischemic heart disease
  - Non-ischemic cardiomyopathy
  - Others (VHD, myocarditis, sarcoidosis, etc.)
- **Abnormal electrical substrate**
  - Brugada syndrome
  - Long QT syndrome
  - Early repolarization syndrome
  - Idiopathic VF
  - CPVT

Type of Arrhythmia

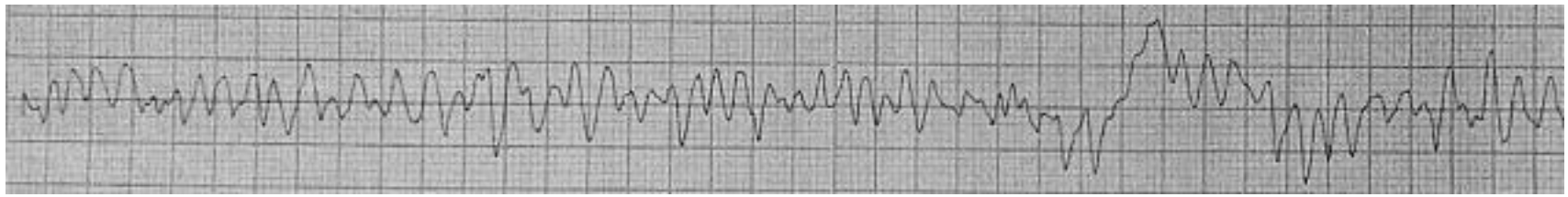
- **Monomorphic VT**



- **Polymorphic VT**



- **VF**



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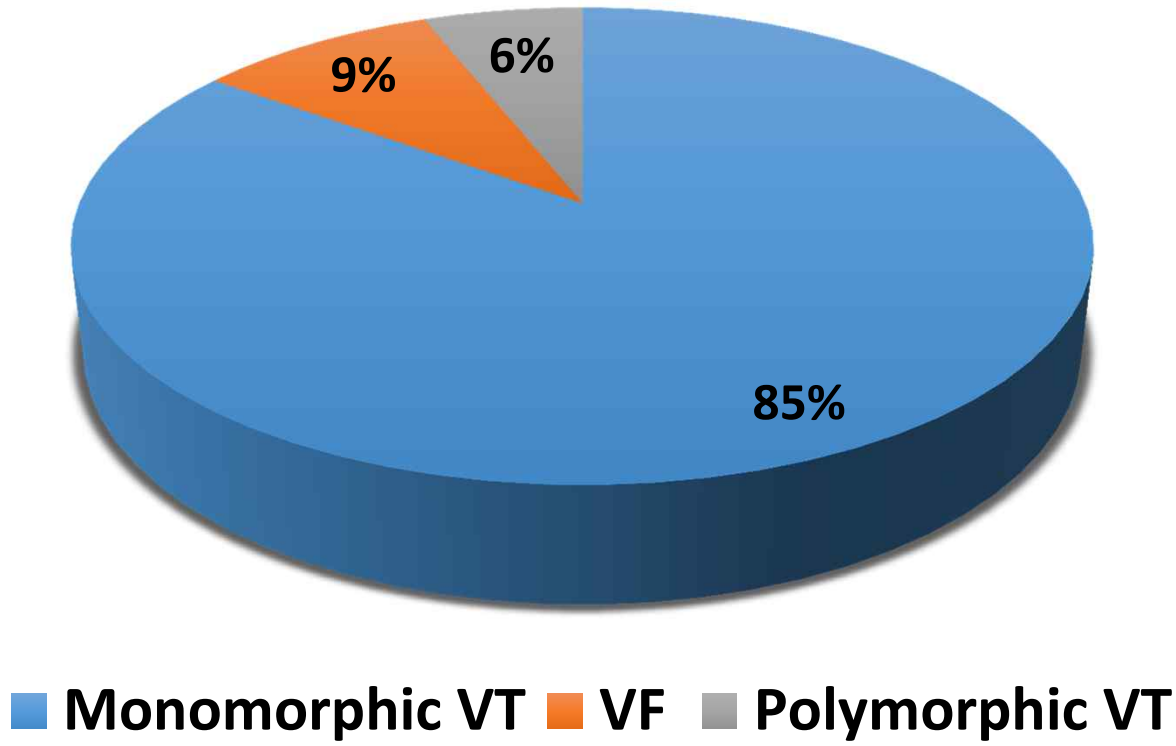
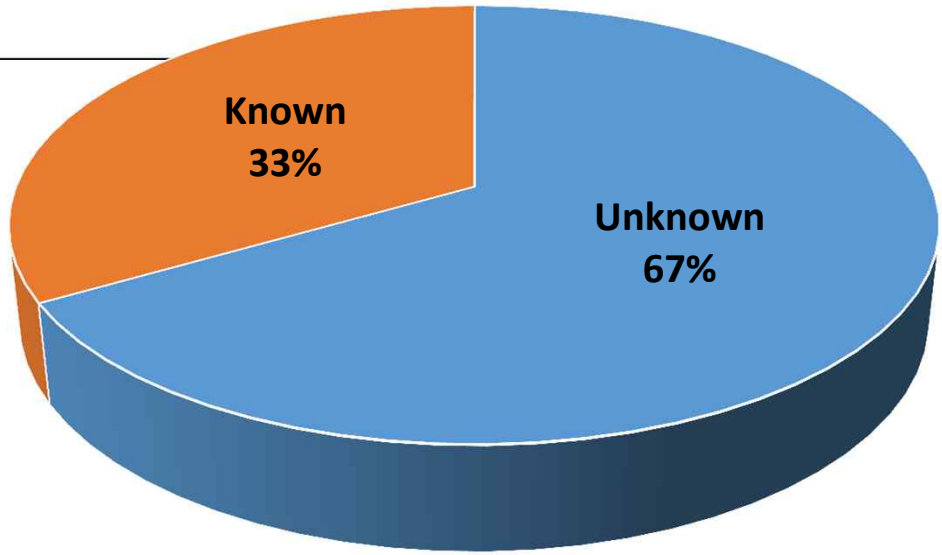


Expert Rev. Cardiovasc. Ther. 2011;9:1051–58

Clinical Triggers

- Decompensated heat failure (m/c)
- Acute coronary ischemia
- Electrolyte abnormalities
- Proarrhythmic drugs



Overview of Management

- Intensive care unit admission
- Device reprogramming
- Correct underlying problems (ischemia, electrolyte disturbances, pro-arrhythmic drugs)
- Beta-blockade
- Antiarrhythmic therapy
- Sedation, intubation/deep sedation
- Mechanical hemodynamic support (IABP)
- **Neuraxial modulation** (thoracic epidural anesthesia, cardiac sympathetic denervation)
- **Catheter ablation** (**any time it is feasible**)

2014 EHRA/HRS/APHRS Expert Consensus on Ventricular Arrhythmias

Four Clinical Scenarios

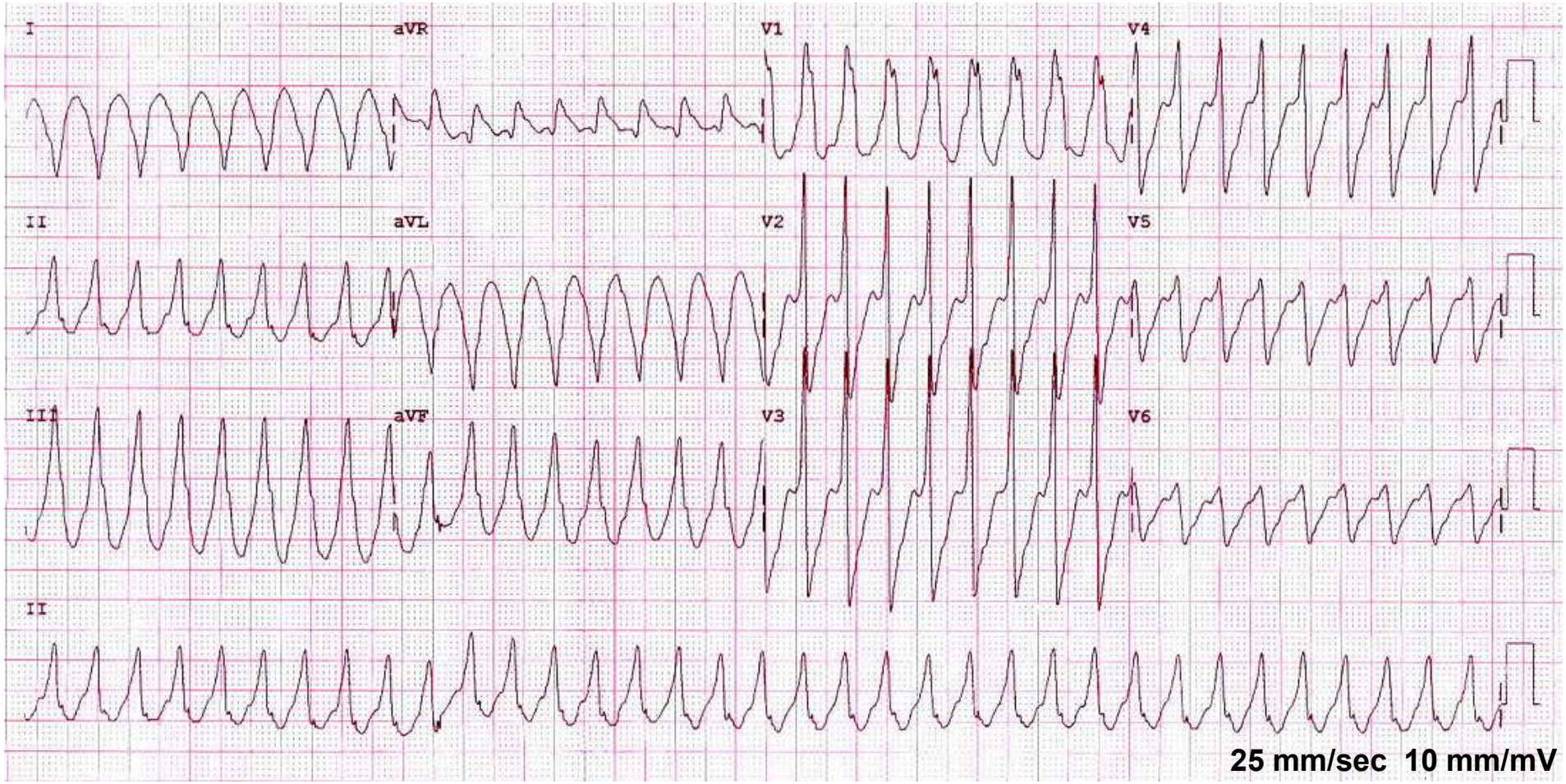
1. Monomorphic VT in structurally normal heart

2. Polymorphic VT/VF in structurally normal heart

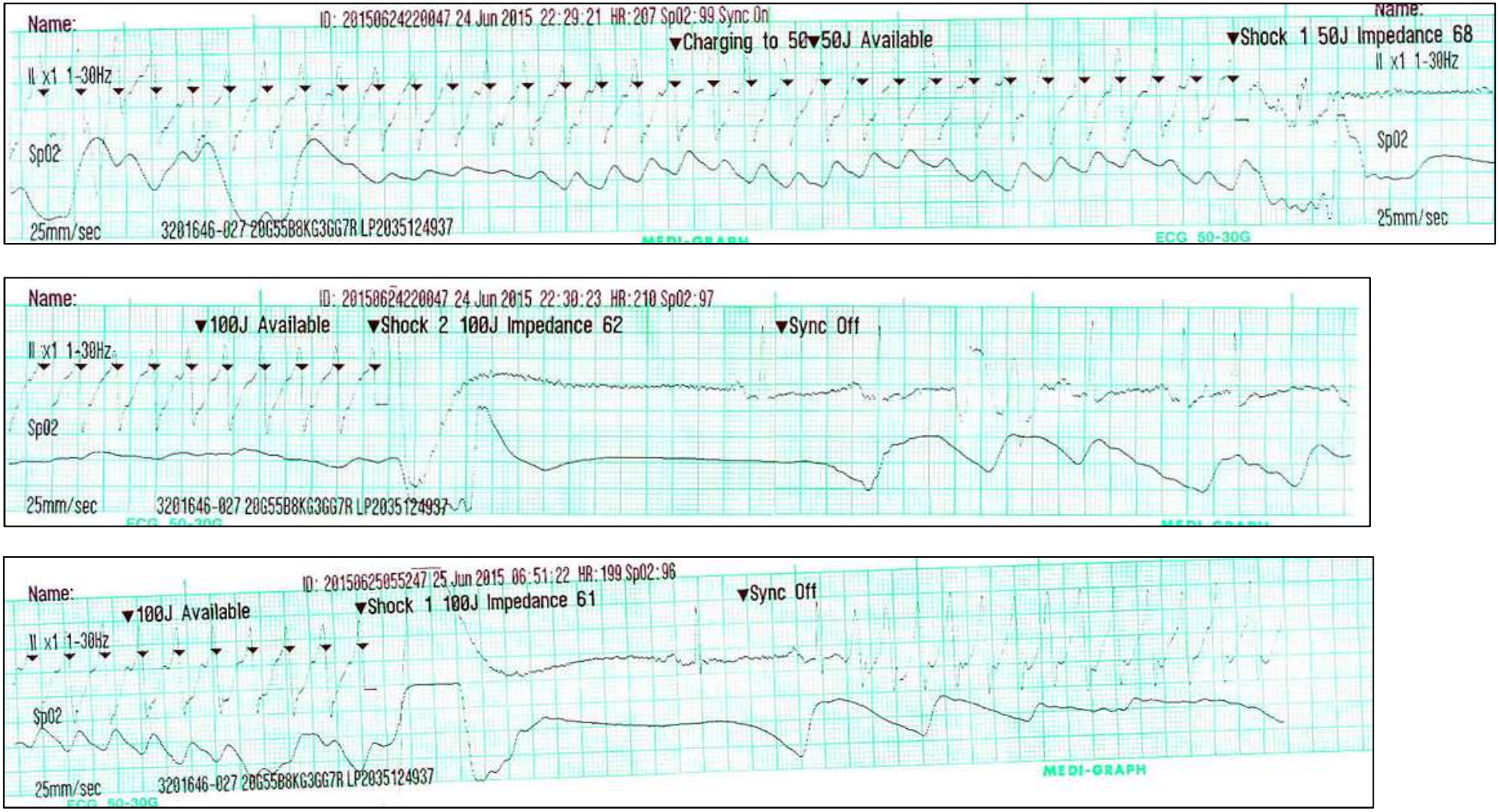
3. Monomorphic VT in structural heart disease

4. Polymorphic VT/VF in structural heart disease

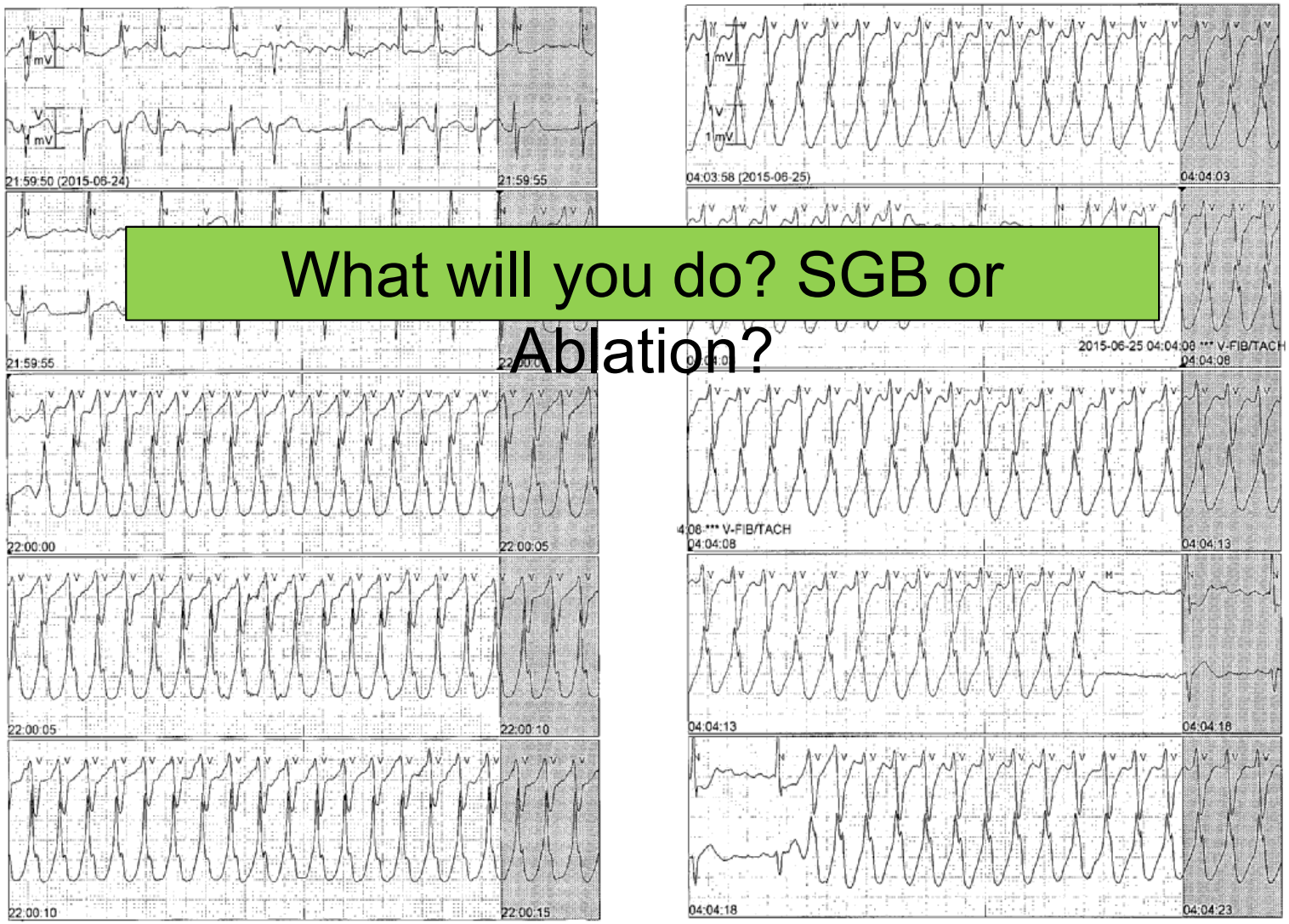
- **M/65, Palpitation with dyspnea, EF 57.5%, minimal CAD**



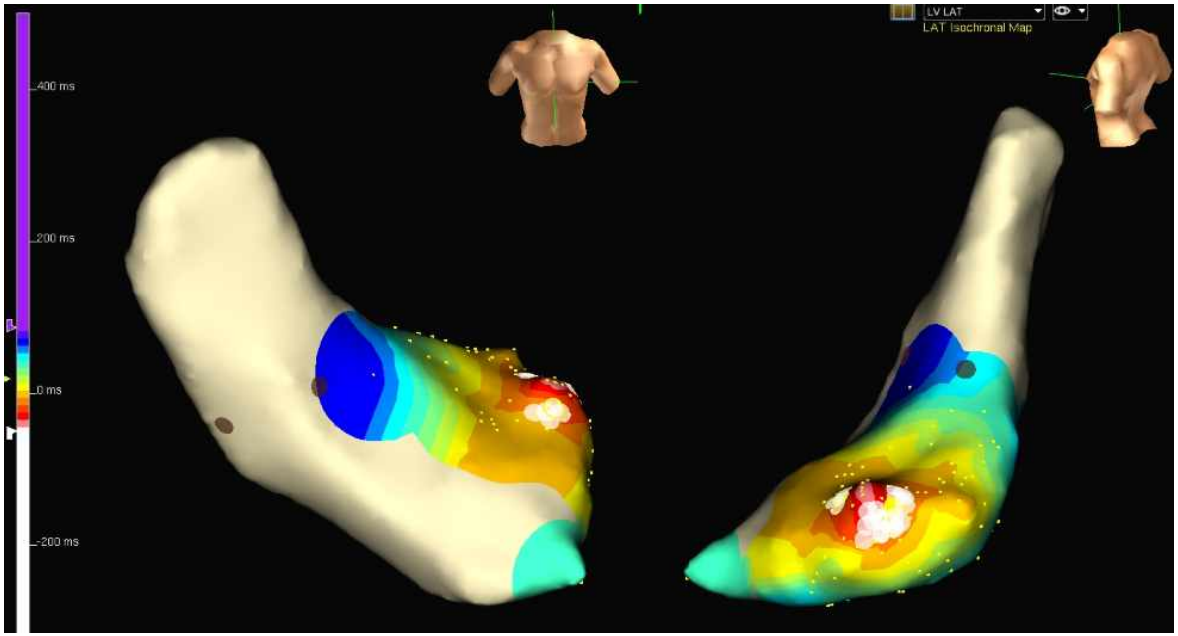
- **Amiodarone infusion and repeated CV**

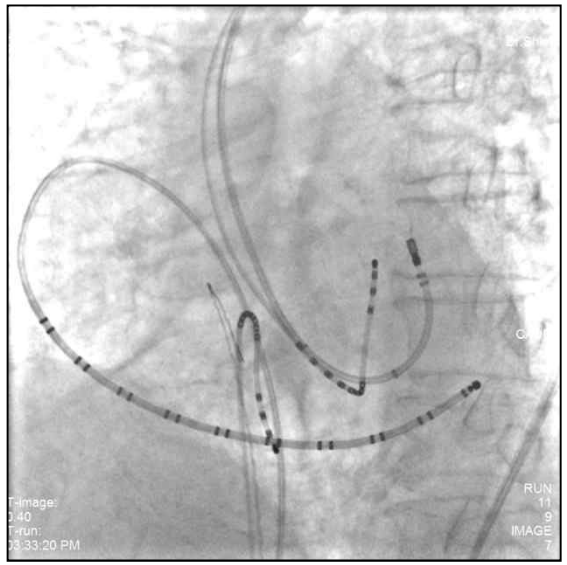


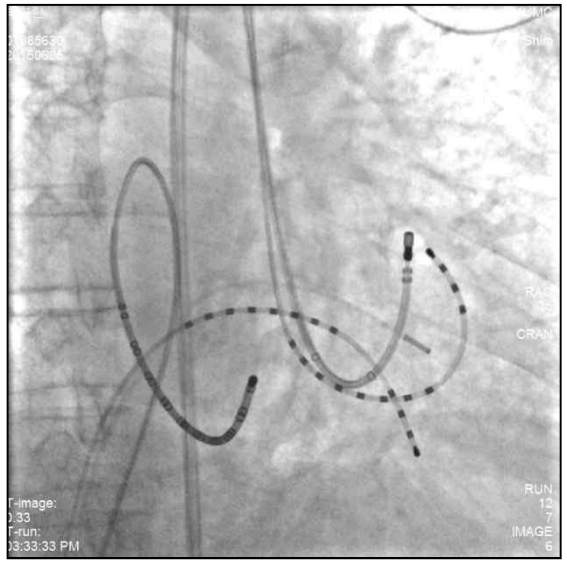
- **Refractory to amiodarone and repeated CV**



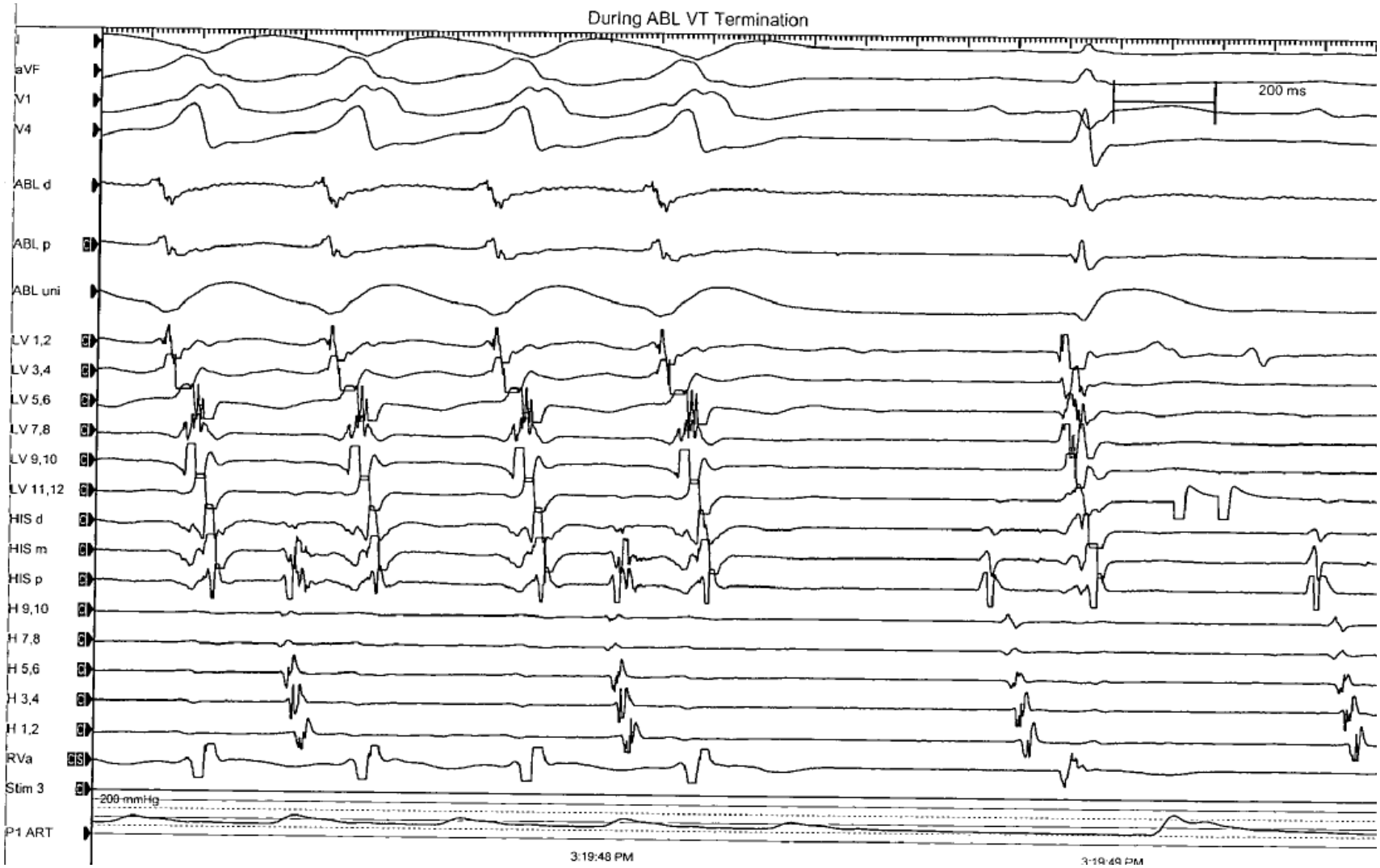
- **Catheter ablation**



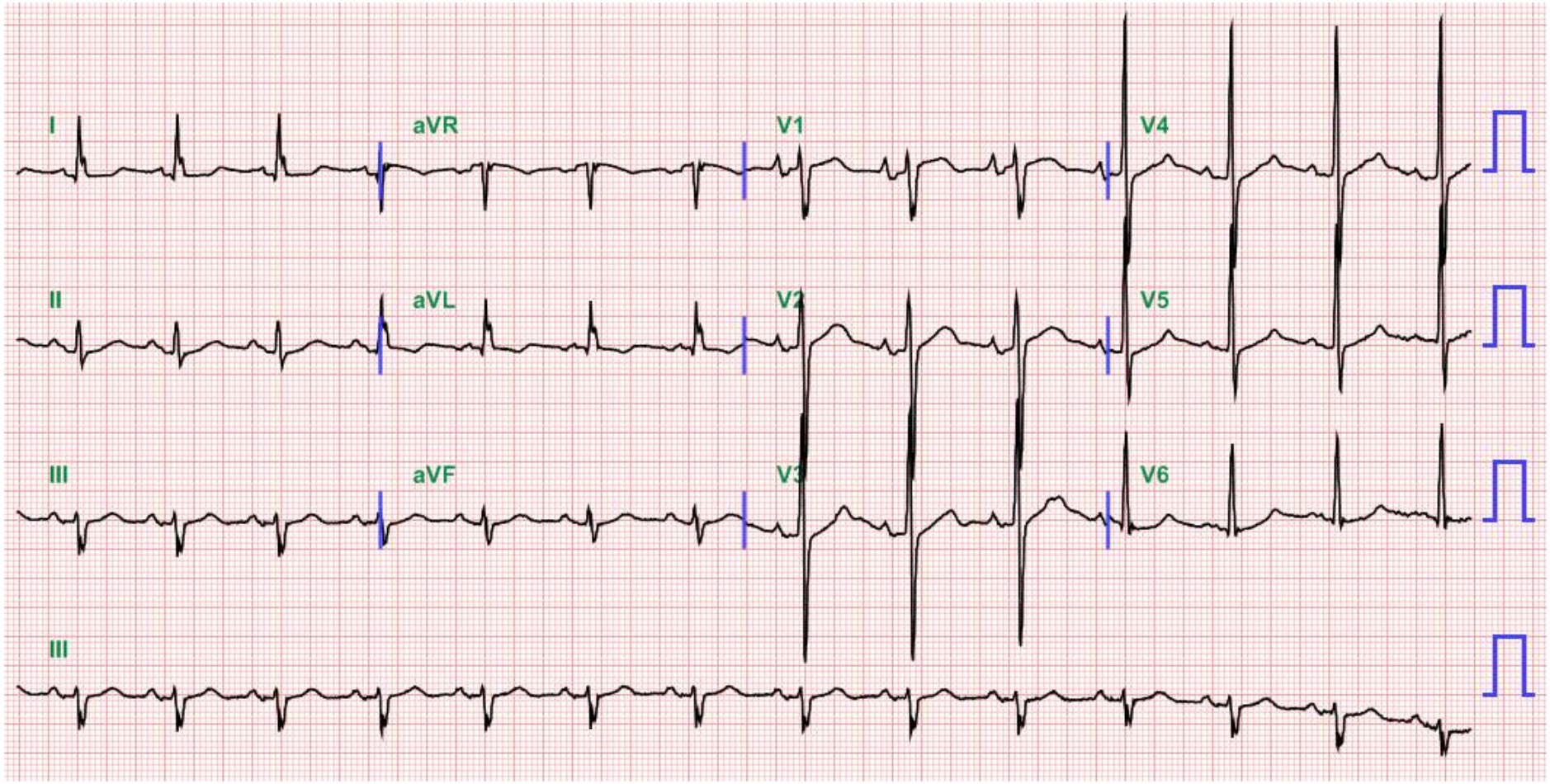




Termination during ablation

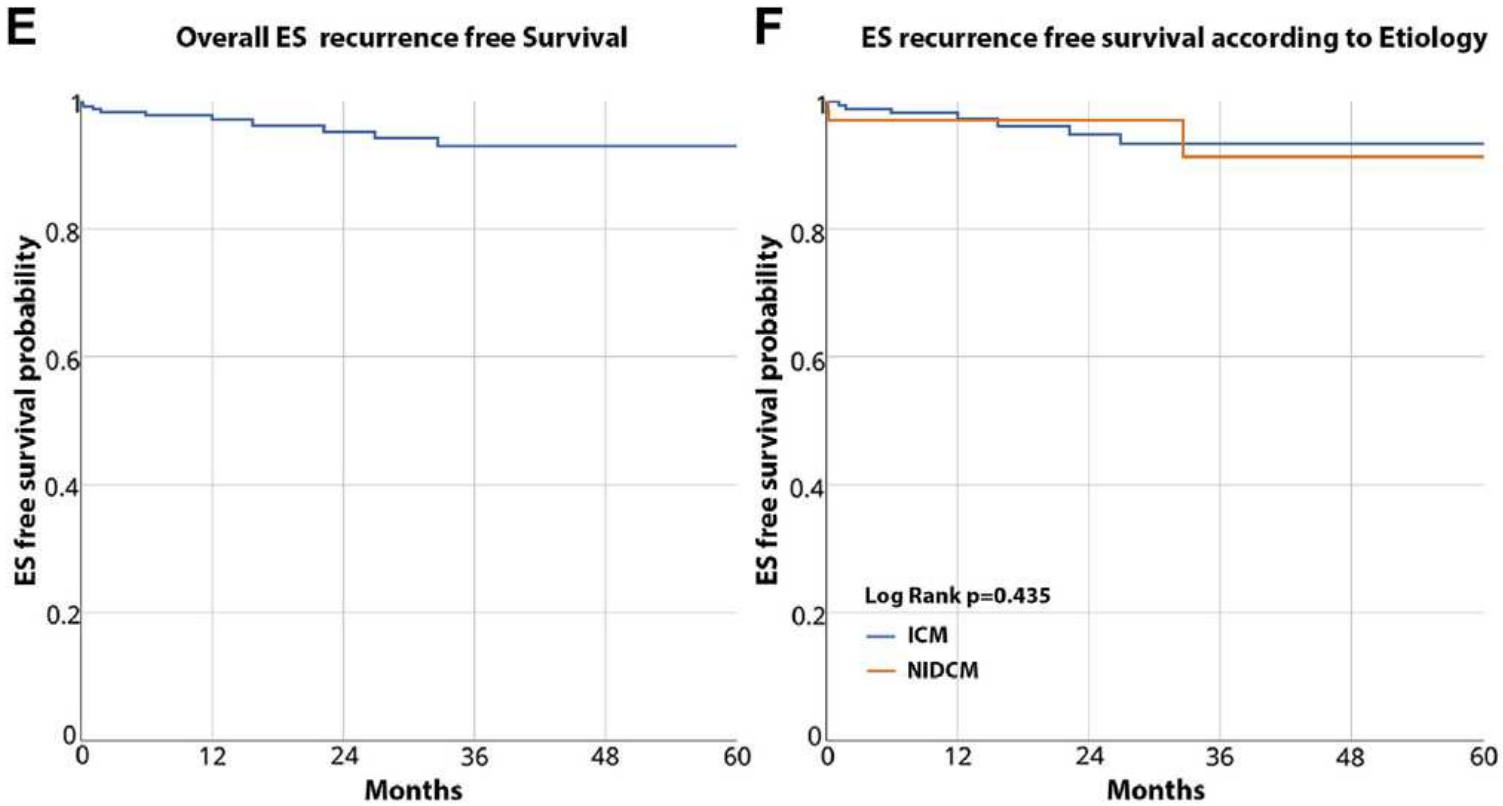


- **After ablation**



Catheter Ablation in Electrical Storm

- 267 consecutive patients with NIDCM (n=71) and ICM (n=196)
- Elimination of ES in 95% of cases
- Achievement of complete VT control at long-term follow-up in most patients.



Muser D et al. J Am Coll Cardiol EP 2017;3:767–78

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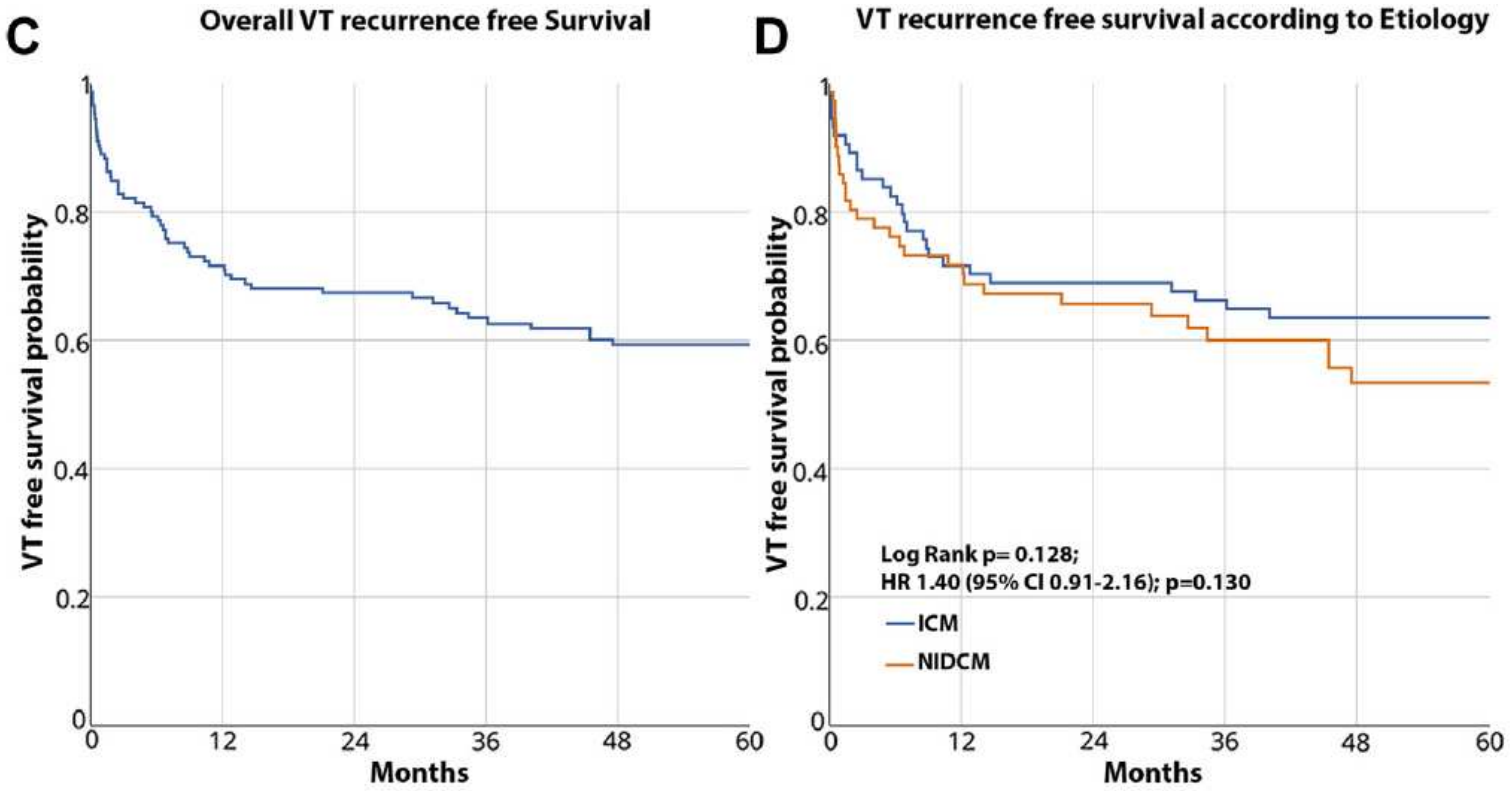

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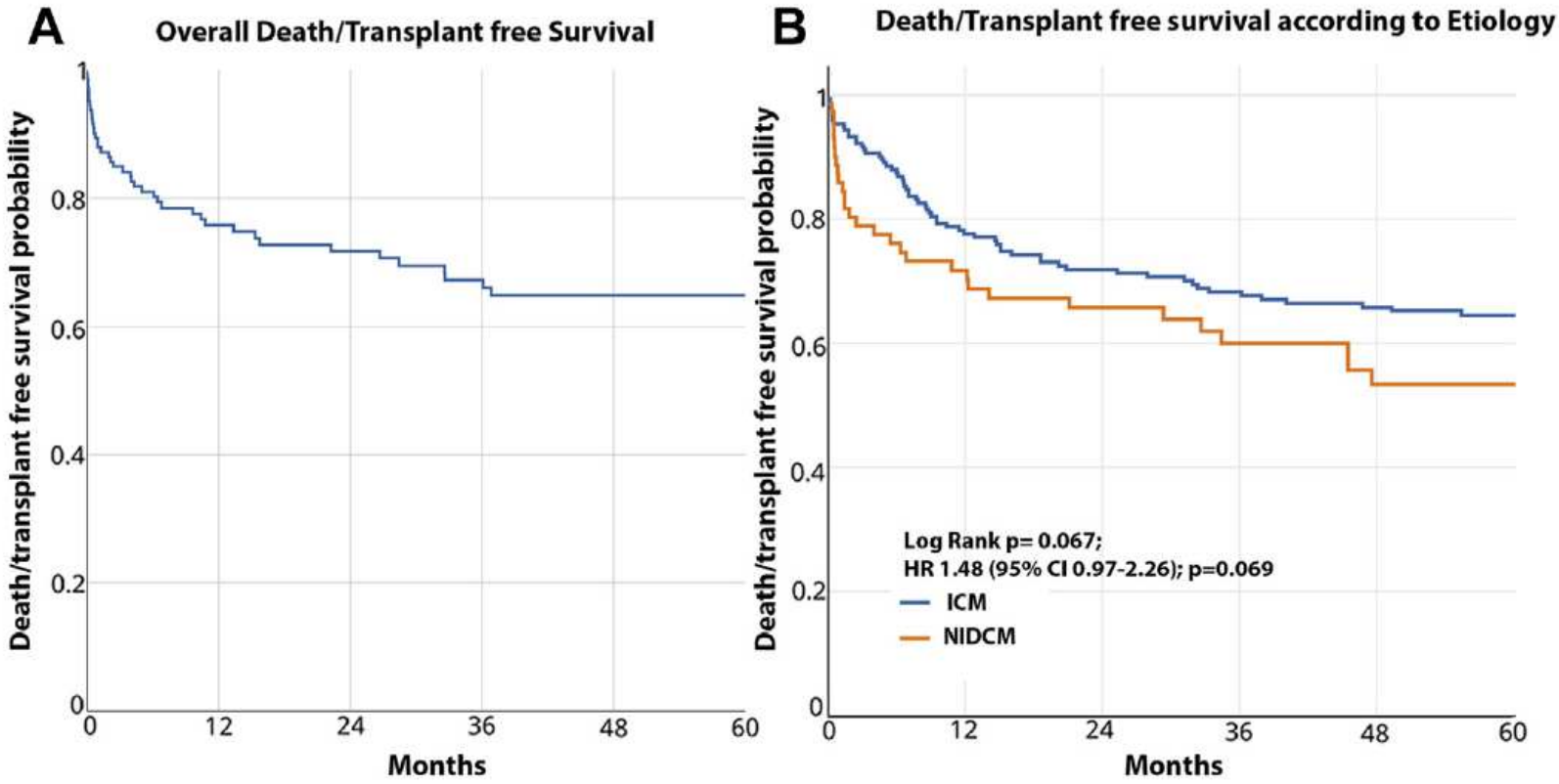

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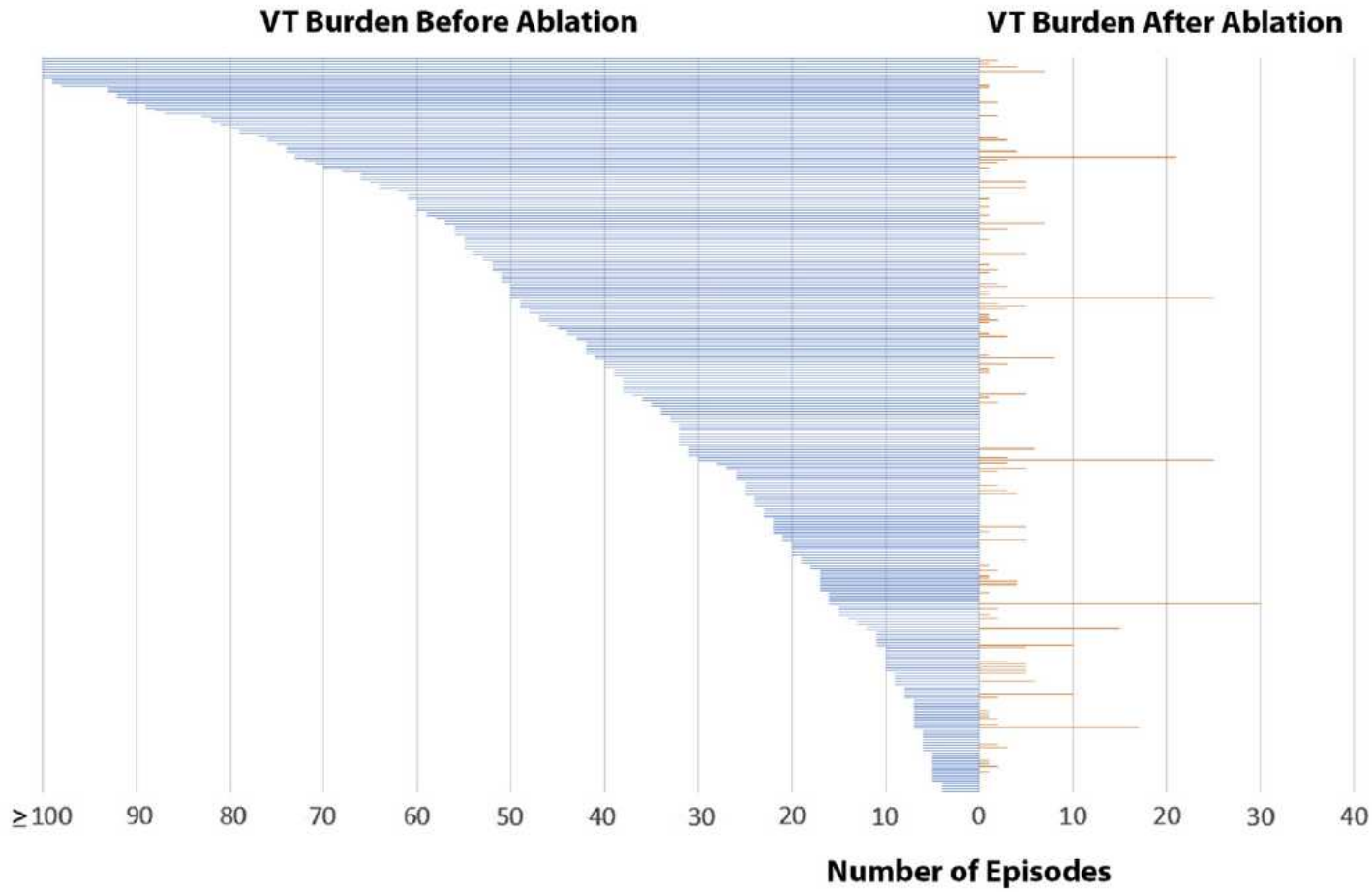

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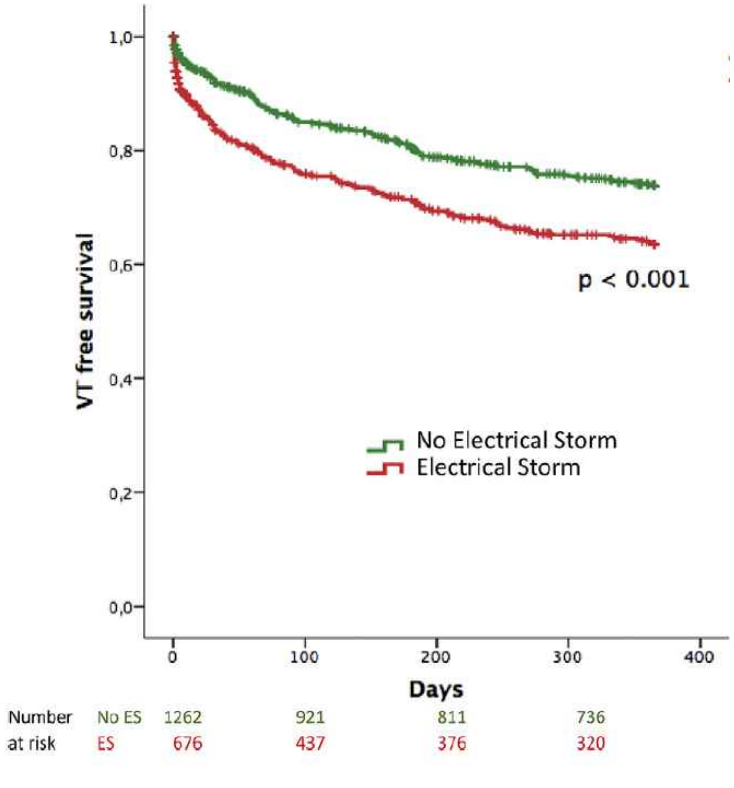
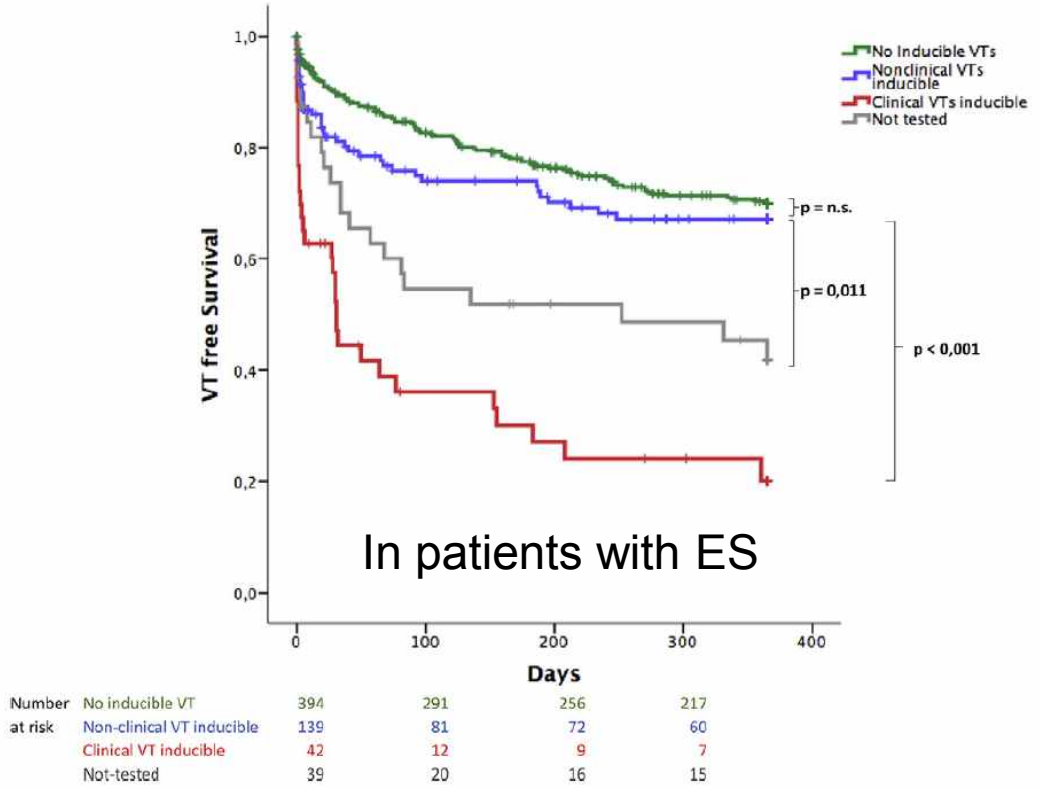
Catheter Ablation in Electrical Storm

- 1940 patients from 12 centers undergoing VT ablation were compared between patients with and without ES.
- 677 patients with ES (34.9%)

Kaplan-Meier curves of survival free from VT recurrences





In patients with ES

Vergara P et al. Heart Rhythm 2018;15:48–55

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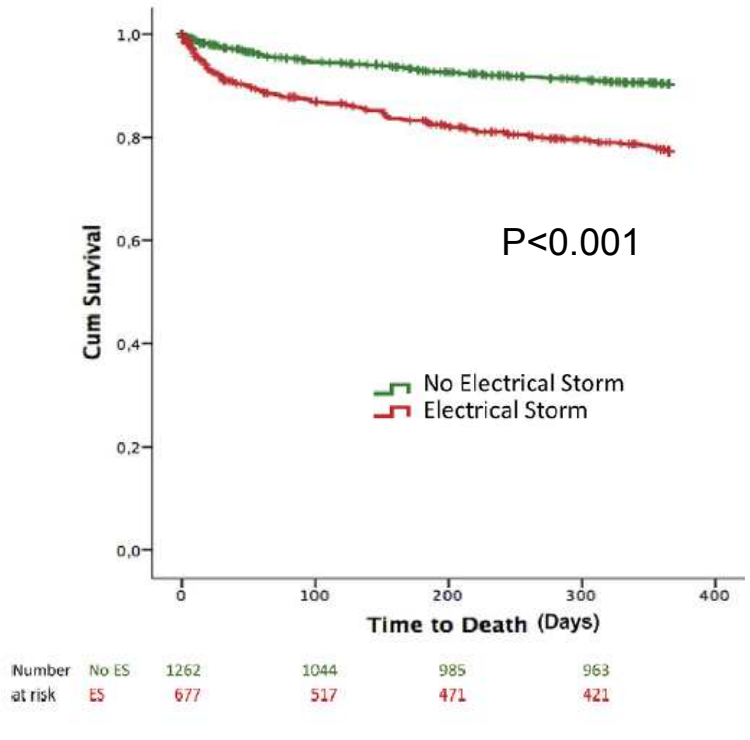
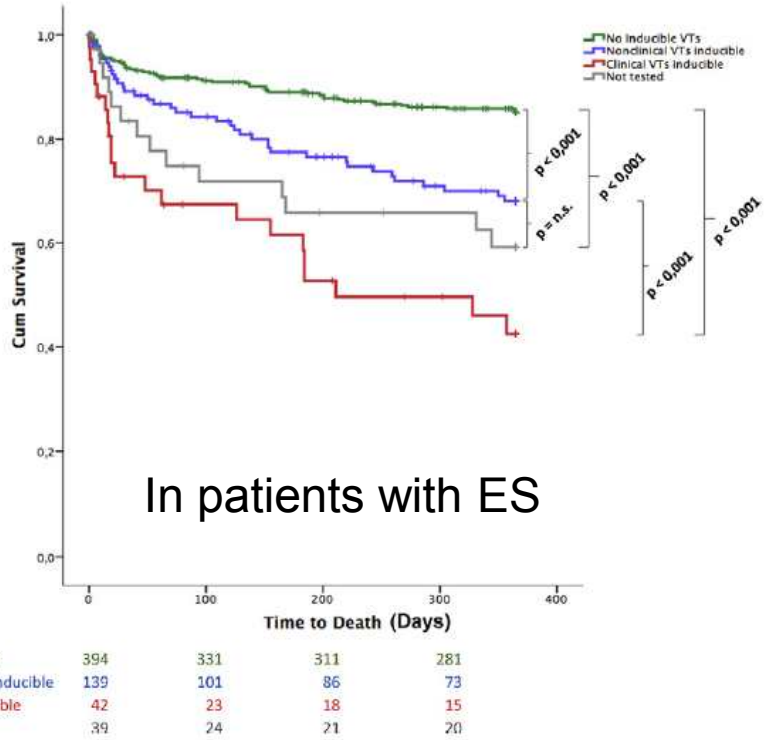
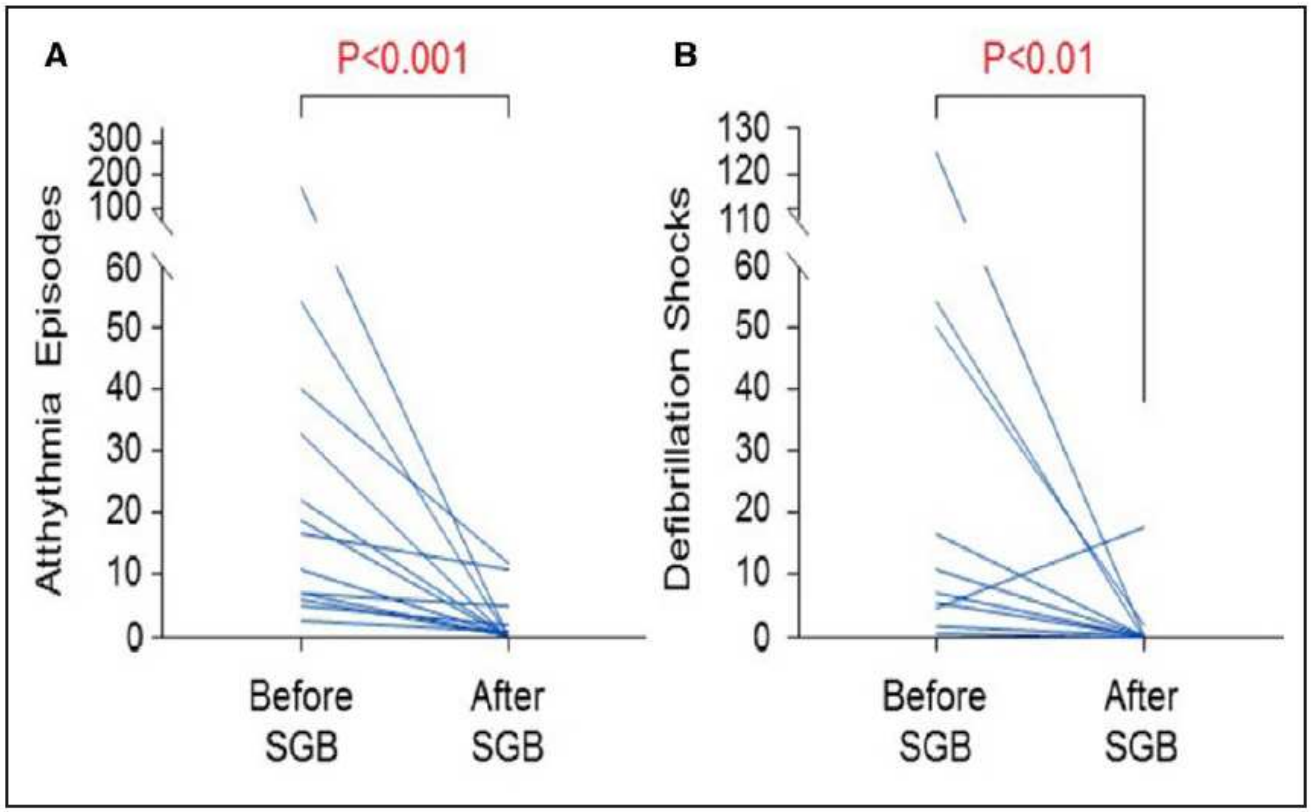




Vergara P et al. Heart Rhythm 2018;15:48–55

SGB in Electrical Storm

- 30 consecutive patients (age, 58±14 years; 73.3% men) who had undergone SGB for ES between 2013 and 2018 at Mayo Clinic
- VT storm 12 (40%), VT+VF storm 15 (50%), VF storm 3 (10%)
- **AMI 9 (30%), postop 10 (33%)**



Tian Y et al. Circ Arrhythm Electrophysiol. 2019;12:e007118

Evidence of SGB in Electrical Storm

- Only case series without control group (max N=30)
- Many confounding factors due to coexistent therapy
- No tool to evaluate completeness of SGB
- Operator dependent efficacy and safety

Validation in a prospective randomized trial is needed.

KUMC Experiences

- From May 2018 to July 2019, N=6

	Age	Sex	Underlying disease	Type of VA	Short term outcome	Catheter Ablation	Long term outcome
Patient 1	72	F	HCMP	MMVT	**Recur** next day	**Yes** 2 days later	Deceased 1m later
Patient 2	62	F	NICMP	MMVT	**Recur** 4 days later	**Yes** 6 days later	VT free for 15m
Patient 3	23	M	JWS	VF	**Recur** 16 days later	**Yes** 55 days later	VF recur 4m later
Patient 4	59	M	NICMP	MMVT	**Recur** next day	FU lost	FU lost
Patient 5	75	F	HFrEF, s/p AVR	MMVT	No recur	**Yes**, 6 days before SGB	VT free for 4m
Patient 6	89	F	NICMP	TdP	No recur	No (PM 2m later)	VT free for 3m

RFCA vs. SGB in Electrical Storm

	RFCA	SGB
Clinical setting	Chronic CMP	AMI, postop
Type of arrhythmia	Monomorphic VT	Polymorphic VT, VF
Recommendation	**Class I** (LOE B-R)* **Class IIa** (LOE B-NR)**	**Class IIb** (LOE C-LD)#

*: for ischemic CMP
**: for non-ischemic CMP
#: for cardiac sympathetic denervation, no recommendation for SGB yet

In Patients with VT Storm

Whenever it is feasible,

Catheter ablation should be first!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