In Ischemic VT, Catheter Ablation is as Important as AAD and AICD

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Ischemic VT

- Sustained ventricular tachycardia in patients with prior MI
- Usually some degree of LV dysfunction
- Significant contributor to morbidity and mortality
- Mechanism - Reentry related to myocardial scar

Ischemic VT treatment options

- Revascularization
- Anti-arrhythmic drugs
- AICD implant (to prevent sudden death)
- Catheter ablation

Management scenarios

- First presentation with VT
- Recurrent VT after AAD and ICD
- VT storm

Patient with first episode of VT

- ICD indicated (Secondary prevention)
- AVID / CIDS / CASH

Why is ICD not sufficient ?

- Shocks are painful and decrease QOL
- Associated with increased mortality (1)
- Recurrent VT may itself result in sudden death despite ICD

Sweeney et al. Differences in effects of electrical therapy type for ventricular arrhythmias on mortality in implantable cardioverter-defibrillator patients. Heart Rhythm 2010;7:353–360

Prevention of recurrences

- Antiarrhythmic drugs alone
- Ablation alone
- Antiarrhythmic drugs + ablation

Ablation for ischemic VT - Outcomes

- Well established and standardized procedure
- Success rate about 75%
- Reduced VT frequency in most others
- Major complications in 1%

Only ablation as first strategy - VTACH trial

Catheter ablation of stable ventricular tachycardia before defibrillator implantation in patients with coronary heart disease (VTACH): a multicentre randomised controlled trial

*Karl-Heinz Kuck, Anselm Schaumann, Lars Eckardt, Stephan Willems, Rodolfo Ventura, Etienne Delacrétaz, Heinz-Friedrich Pitschner, Josef Kautzner, Burghard Schumacher, Peter S Hansen, for the VTACH study group**

Summary

Background In patients with ventricular tachycardia (VT) and a history of myocardial infarction, intervention with an implantable cardioverter defibrillator (ICD) can prevent sudden cardiac death and thereby reduce total mortality. However, ICD shocks are painful and do not provide complete protection against sudden cardiac death. We assessed the potential benefit of catheter ablation before implantation of a cardioverter defibrillator.

Lancet 2010; 375: 31–40

See **Comment** page 4

*Members listed at end of paper

Hanseatisches Herzzentrum, Asklepios Klinik St Georg

VTACH trial

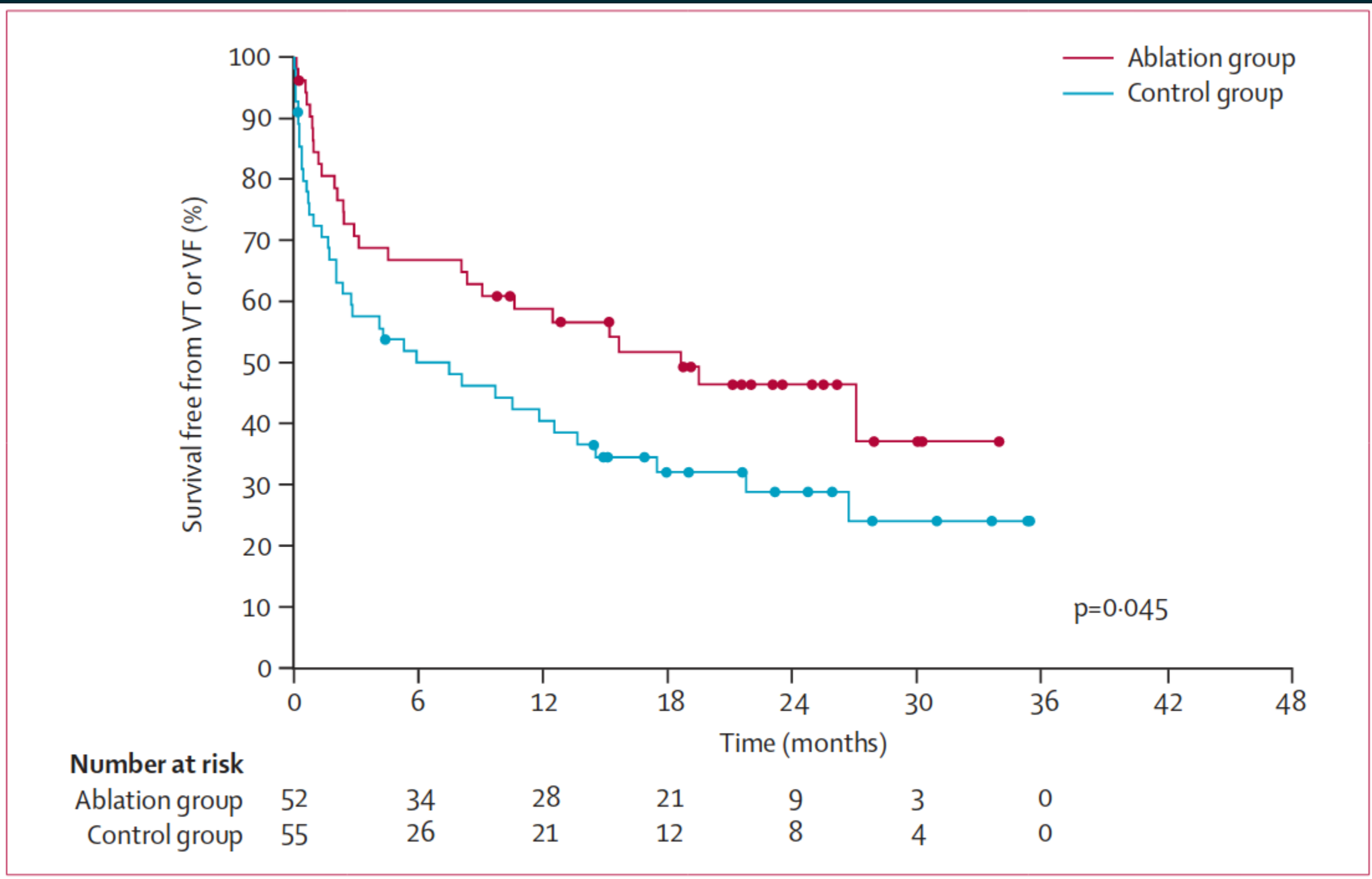
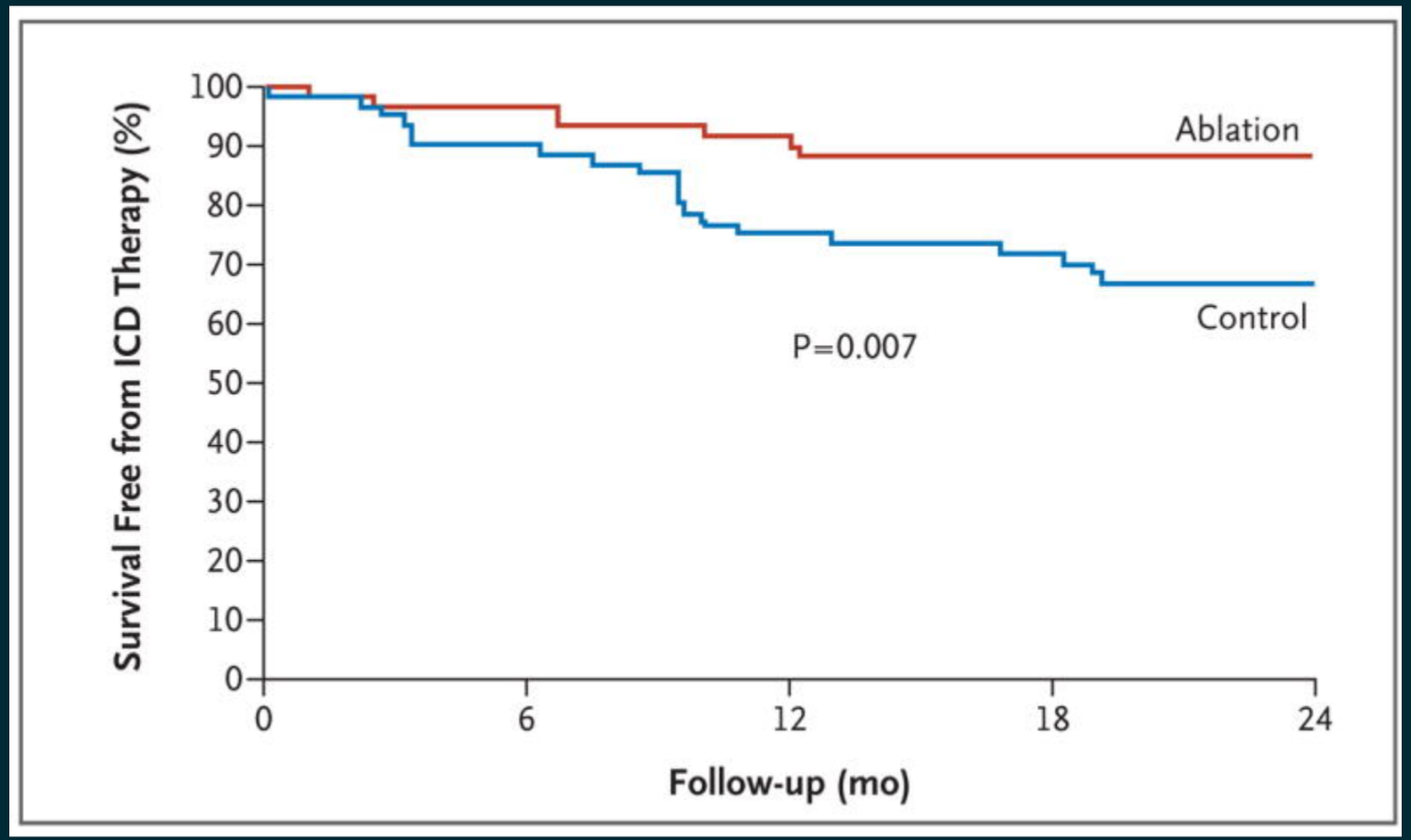


***Figure 2*: Kaplan-Meier curves for the primary endpoint**

Estimates for survival free from ventricular tachycardia (VT) or ventricular fibrillation (VF). Censored patients are indicated by dots. The p value was calculated by log-rank test.

SMASH VT - Similar results



Vivek Reddy et al. Prophylactic Catheter Ablation for the Prevention of Defibrillator Therapy. N Engl J Med 2007; 357:2657-2665

Ablation in addition to drugs

- AAD reasonable as first line instead of ablation
- Multiple studies on additional ablation in these patients
- Less VT recurrence with additional ablation vs drugs alone (1)
- Trend towards lesser mortality

Mallidi J, Nadkarni GN, Berger RD, et al. Meta-analysis of catheter ablation as an adjunct to medic al therapy for treatment of ventricular tachycardia in patients with structural heart disease. Heart Rhythm. 2011;8:503-10

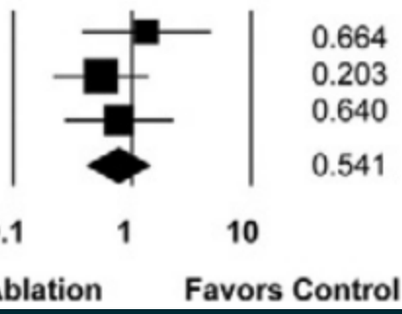
Metaanalysis

B

Study	No of VT recurrences / Total patients: Ablation	Control	Relative risk and 95% CI	p-Value	Weight %
Kuck et al, 2010	26 / 52	38 / 55	0.72 (0.52,1.00)	0.051	35.9
Reddy et al, 2007	8 / 64	21 / 64	0.38 (0.18,0.80)	0.010	20.4
Schreieck et al, 2004	9 / 19	12 / 20	0.79 (0.44,1.43)	0.435	11.4
Epstein et al, 1998	36 / 73	24 / 32	0.66 (0.48,0.89)	0.007	32.4
Overall (95% CI)			0.64 (0.52, 0.79)	0.000	

C

Study	Number of deaths / Number of patients: Ablation	Control	Relative risk and 95% CI	p-Value	Weight %
Kuck et al, 2010	5 / 52	4 / 55	1.32 (0.38, 4.66)	0.664	23.66
Reddy et al, 2007	6 / 64	11 / 64	0.55 (0.21,1.39)	0.203	43.13
Niwano et al, 2008	9 / 58	4 / 20	0.78 (0.27, 2.25)	0.640	33.21
Overall (95% CI)			0.76 (0.41, 1.38)	0.541	

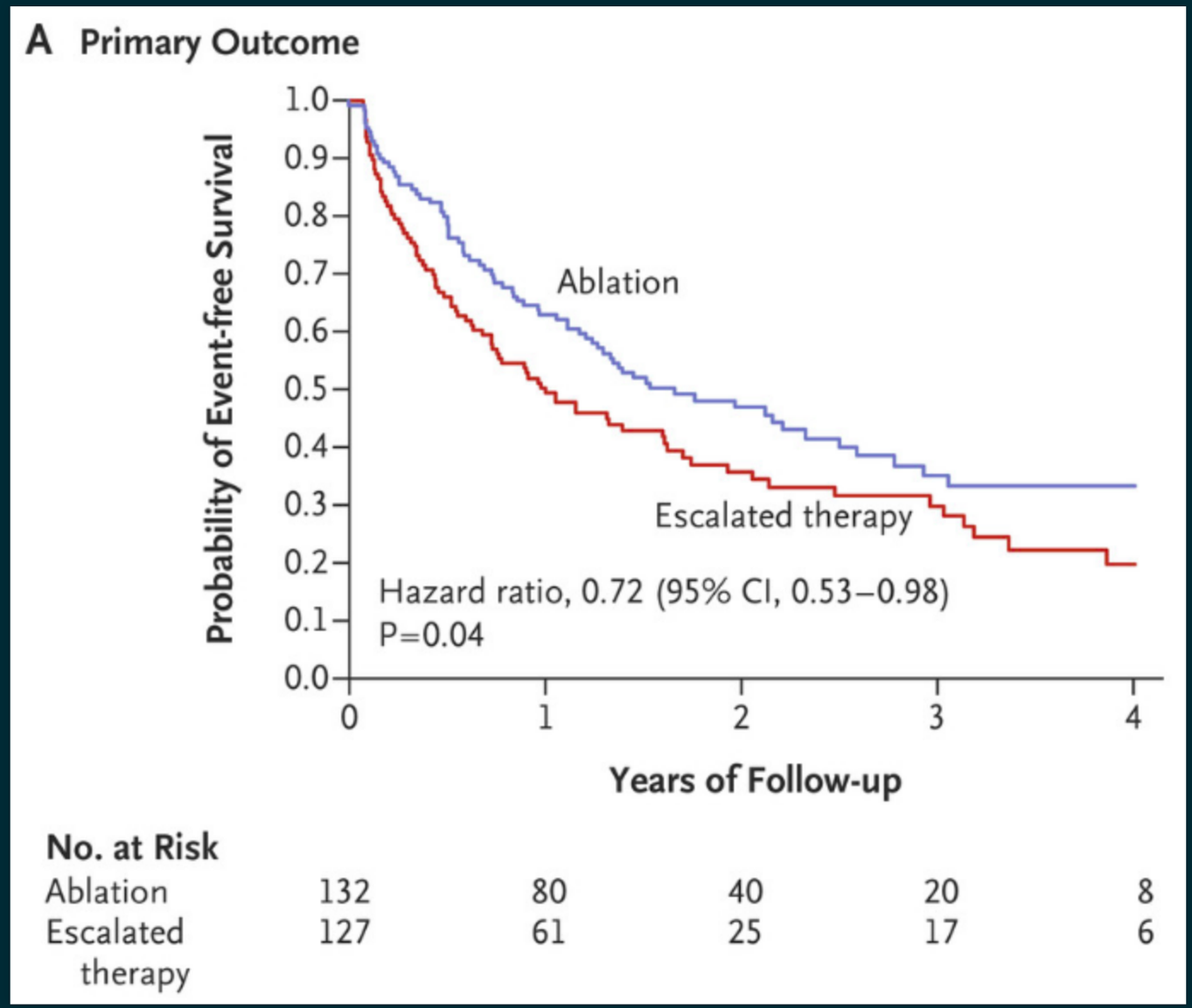


Recurrence on drugs - VANISH TRIAL

- Ischemic VT / ICD / VT recurrence on drugs
- Drug escalation or ablation ?
- Drug escalation
  - Not on amiodarone -> Amiodarone
  - Amiodarone < 300 mg / d -> 300 mg / d
  - Amiodarone 300 mg / d -> Mexilitene added

Sapp JL, Wells GA, Parkash R, et al. Ventricular tachycardia ablation versus escalation of antiarrhy thmic drugs. N Engl J Med. 2016;375:111-21

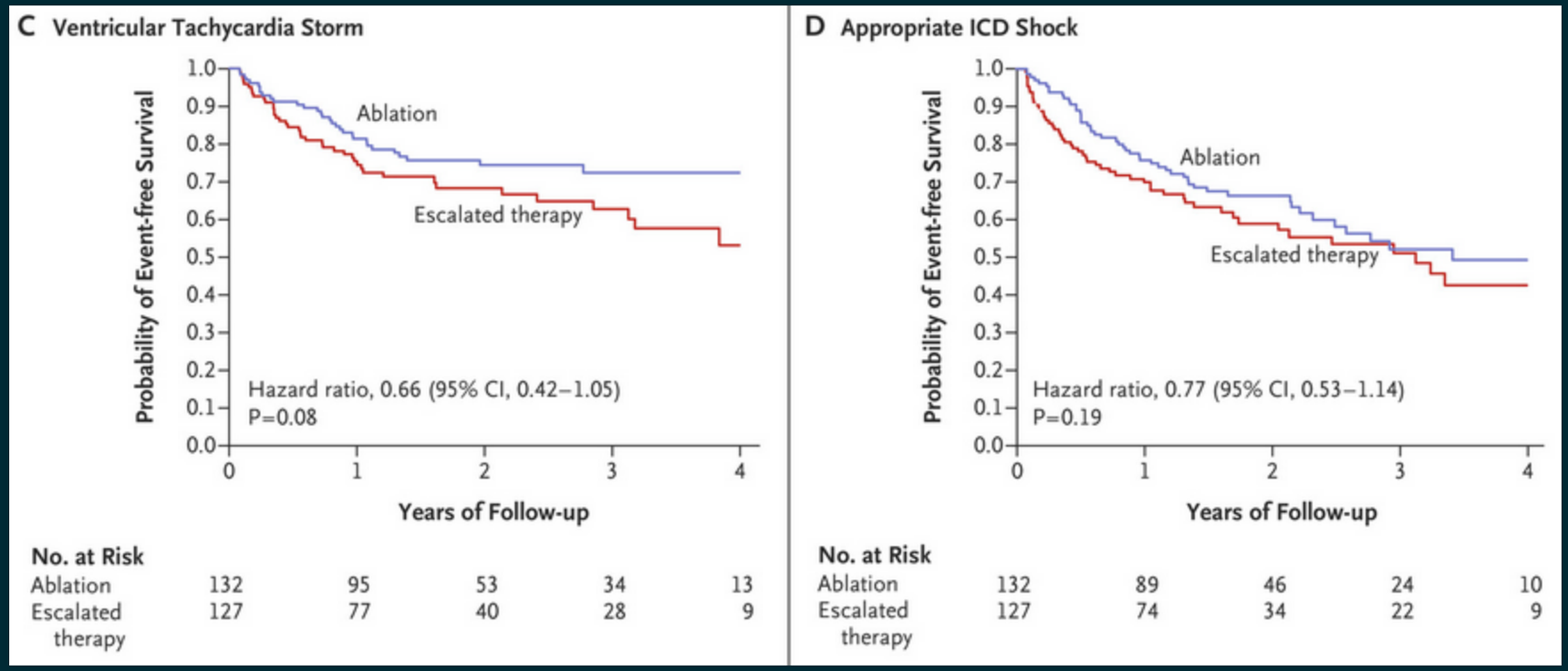
VANISH - Primary outcome - Death + VT storm + Appropriate shock



Sapp JL, Wells GA, Parkash R, et al. Ventricular tachycardia ablation versus escalation of antiarrhy thmic drugs. N Engl J Med. 2016;375:111-21

Especially marked in patients on Amiodarone

VANISH - Outcomes



Sapp JL, Wells GA, Parkash R, et al. Ventricular tachycardia ablation versus escalation of antiarrhy thmic drugs. N Engl J Med. 2016;375:111-21

VT storm

- 3 or more arrhythmia episodes within a 24 hour period
- 10 - 20% of patients with an ICD
- Sympathetic blockade / AAD
- Ablation useful as rescue strategy

Schreieck J et al. Rescue ablation of electrical storm in patients with ischemic cardiomyopathy: a potential-guided ablation approach by modifying substrate of intractable, unmappable ventricular tachycardias. Heart Rhythm 2005; 2: 10-4

Summary

- ICD is indicated in all patients with sustained VT after previous MI
- ICD is not intended to treat VT
- AAD useful for arrhythmia suppression, limited by
  - Incomplete effectiveness
  - Pro-arrhythmic effects
  - Long term toxicity
- Catheter ablation safe and effective, therefore plays a significant role in
  - AAD failure
  - Avoid AAD
  - Help taper and stop AAD

JIPMER Protocol

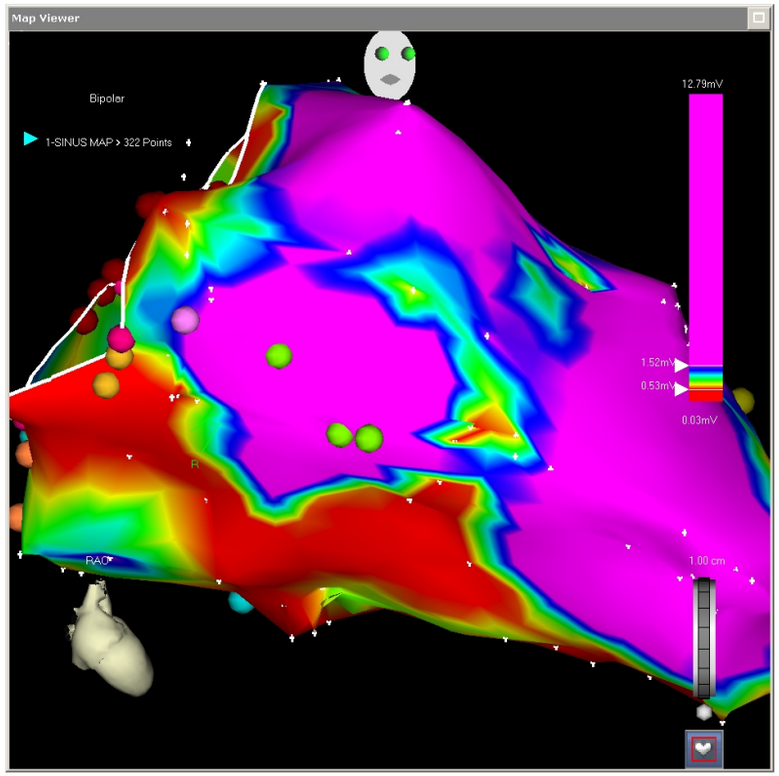
- First presentation with VT
  - AICD
  - Amiodarone 200 mg OD + beta blockers
  - Consider ablation in case of recurrent episodes
- Recurrence on Amiodarone
  - Catheter ablation

JIPMER experience

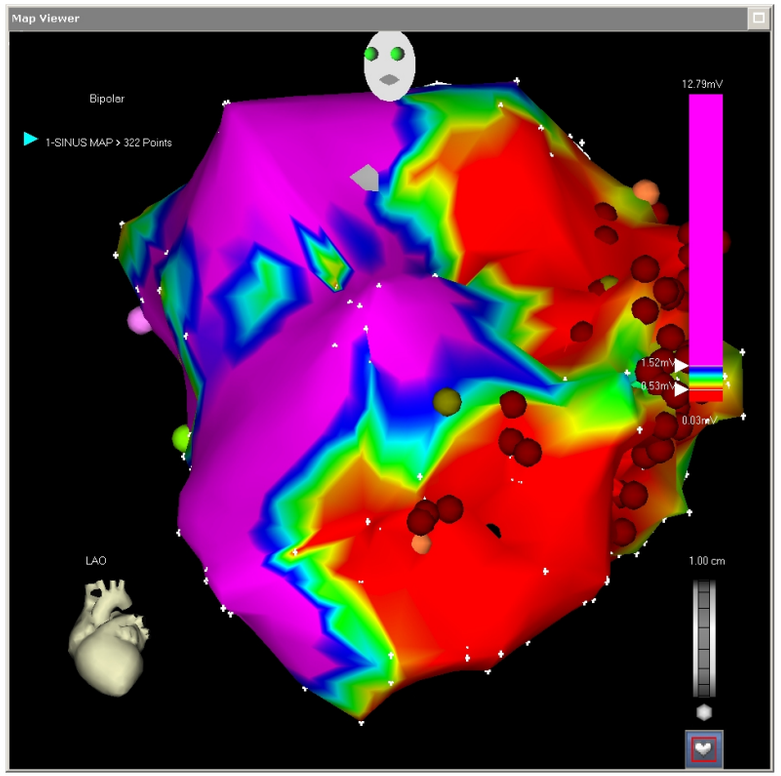
- Jan 2010 to Mar 2018
- RF ablation for Previous MI with sustained VT - 49 patients
- Successful first ablation - 44, partial success in 3
- Procedural complications - Nil
- Recurrence - 7 patients

Illustrative case

Voltage map - RAO



Voltage map LAO



Timeline