The evolving role of catheter ablation for the treatment of arrhythmia in the treatment of arrhythmias in ischaemic heart disease

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Clinical Scenarios

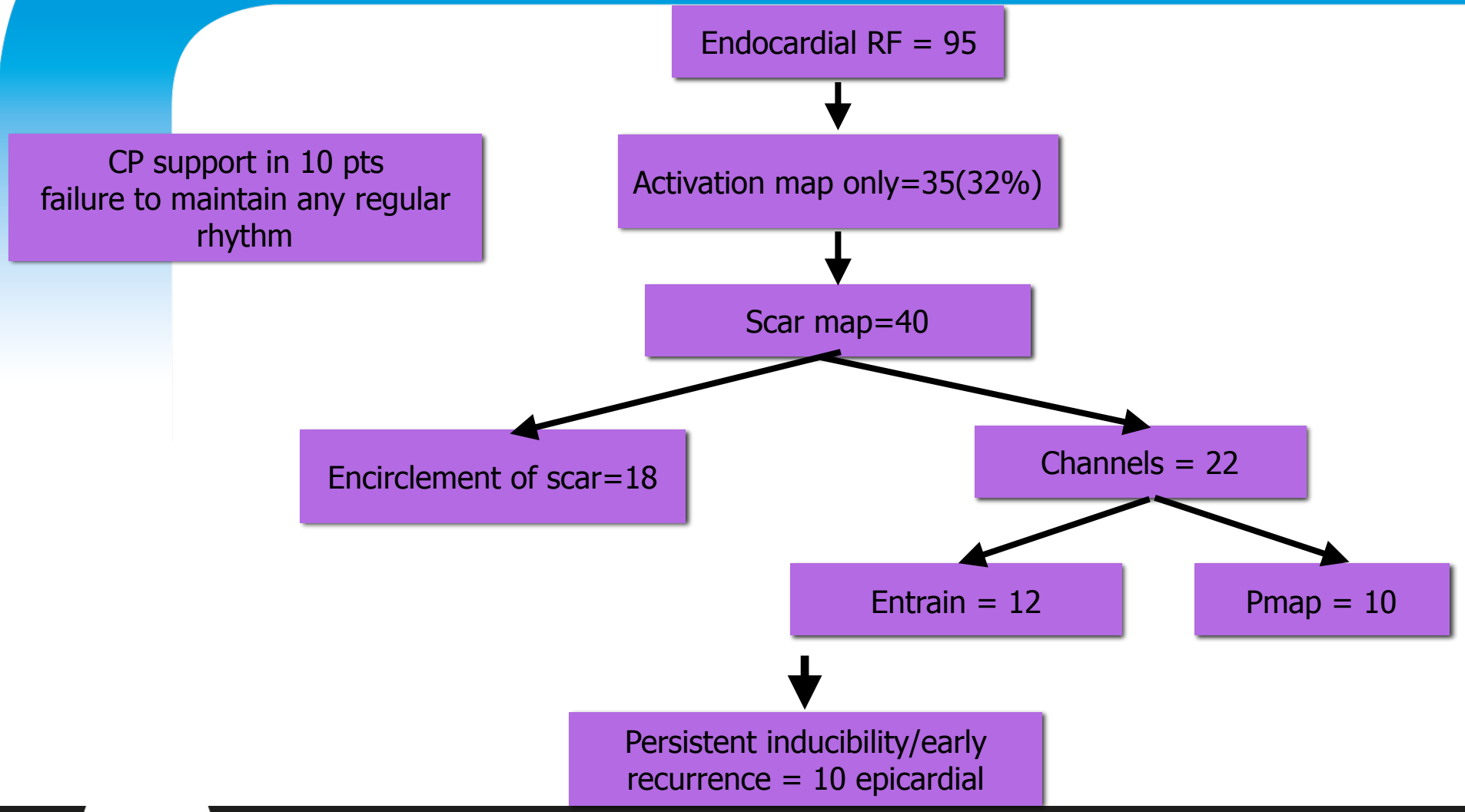
- VT storm
- Recurrent VT
- 2^0 prevention
- 1^0 prevention

VT ablation of E Storm

- 95 patients
- VT induced with 600,500,400
- Proc 260 mins
- Success - no inducibility
- Partial - non-clinical inducibility
- Failure - clinical induciblity
- FU - 22 (1-43) mths
- procedures 12 pts x2 (success 50%), 6 pts x3 (success 0%)

Carbucicchio et al. Circulation 2008

VT ablation of E Storm



Carbucicchio et al. Circulation 2008

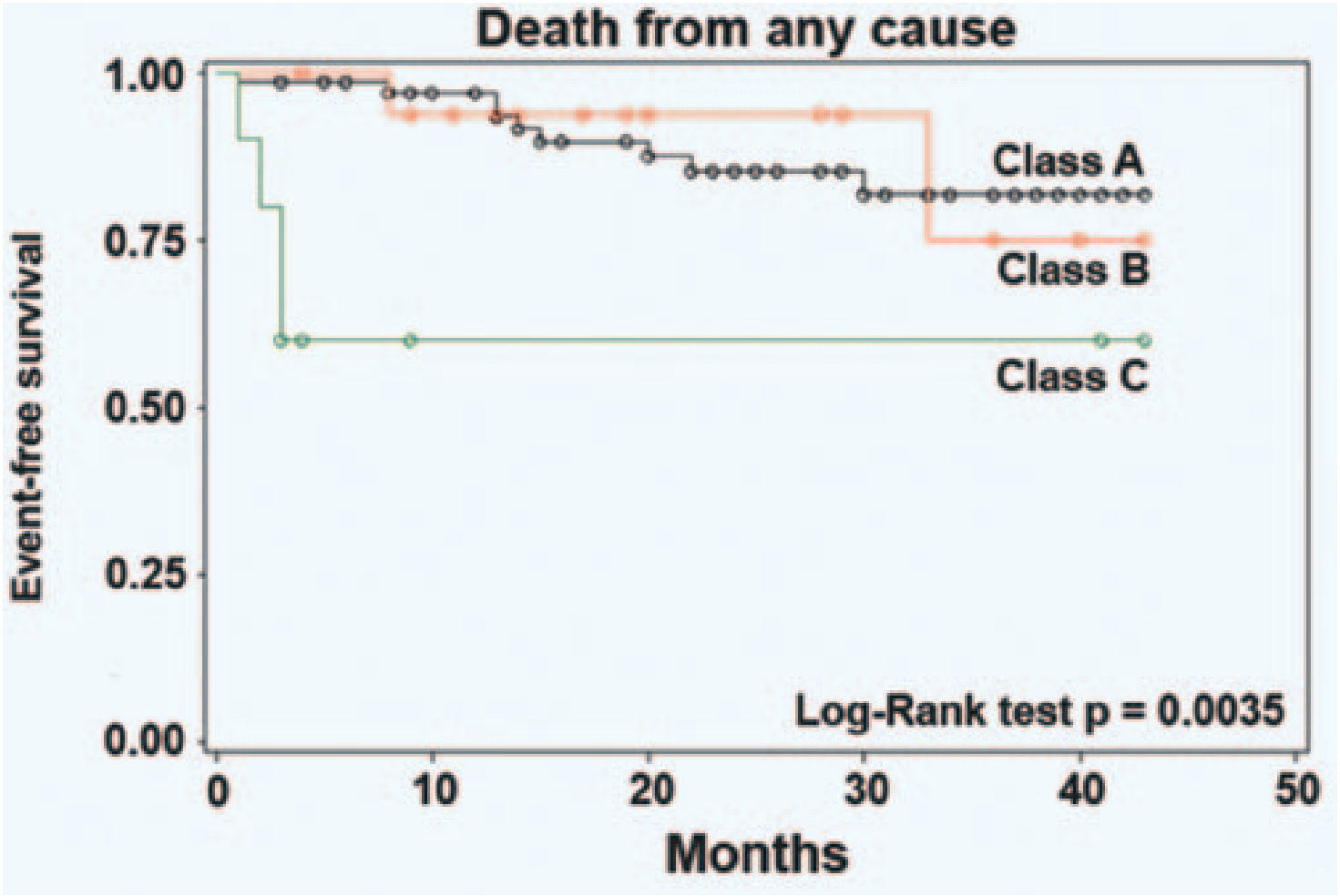
VT ablation of E Storm

- Prognosis according to outcome

	ES recurrence	VT recurrence	SCD	CDeath
Success (%)	0/68	11/68 (16)	0/68	6/68 (9)
Partial (%)	0/17	11/17 (65)	0/17	1/17 (6)
Faliure (%)	8/10 (80)	10/10	4/10 (40)	4/10 (40)

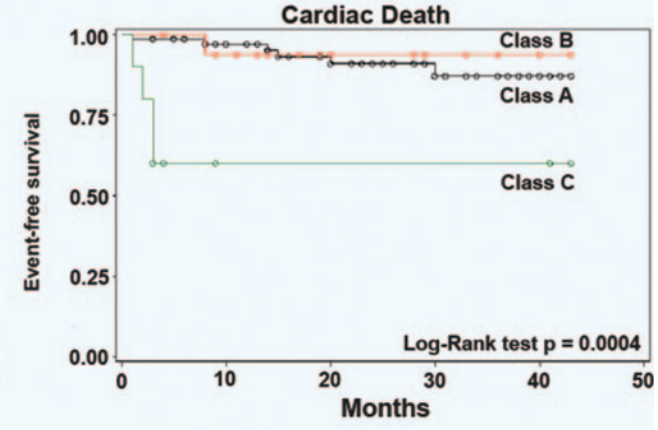
Carbucicchio et al. Circulation 2008

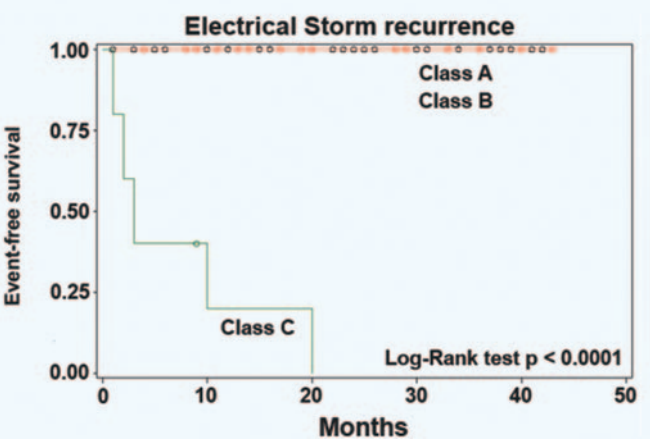
VT ablation of E Storm

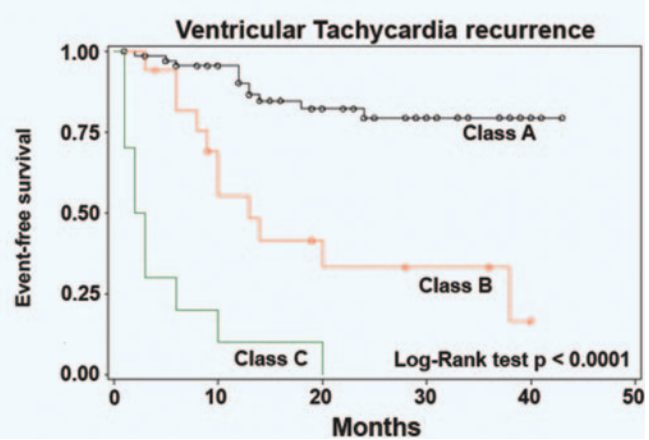


Carbucicchio et al. Circulation 2008

VT ablation of E Storm







Carbucicchio et al. Circulation 2008

VT Storm ablation

- Failure to ablate clinical VT associated with v poor outcome - particularly after multiple attempts
- Elimination of inducibility still associated with (9%) medium term mortality
- Palliative, complex and expensive procedure

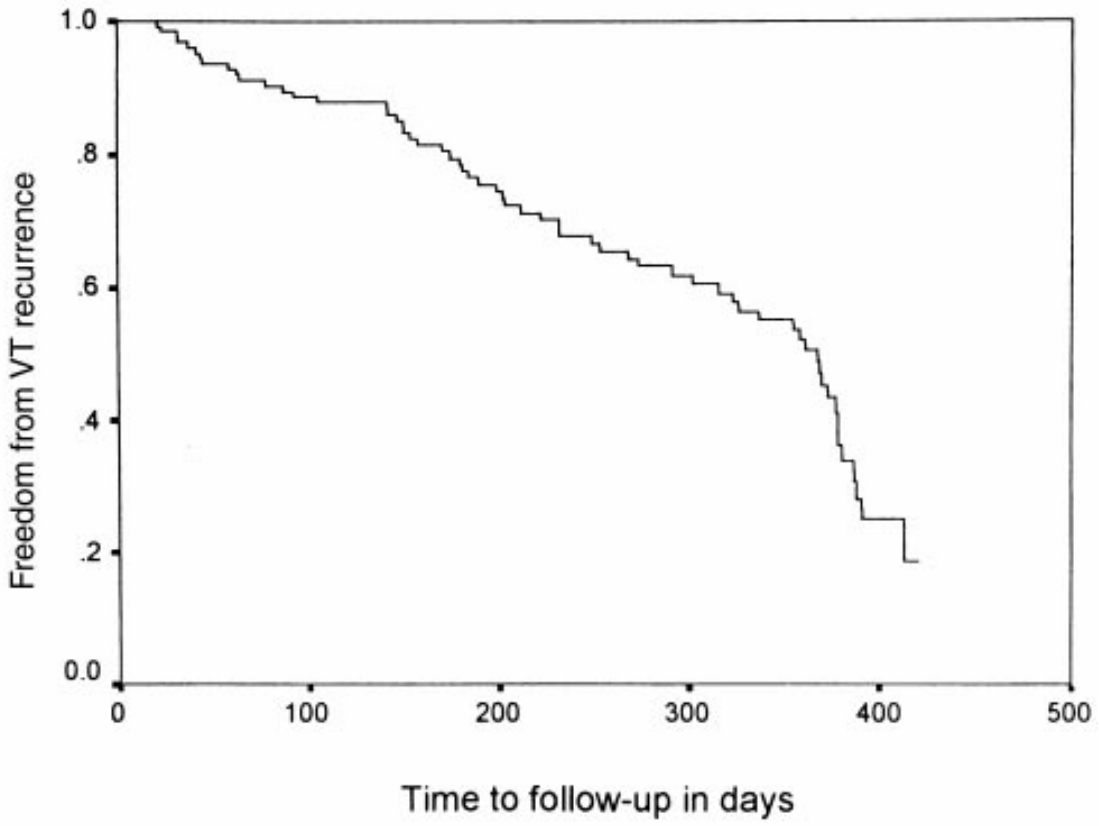
Recurrent VT ablation

- 146 patients with >1 haemodynamically tolerated VT in last 2 months
- non randomised
- EF 31%
- EP sim 3 extras at 2 sites
- Success - no mappable VT 75%
- No VT inducible 41%

Calkins et al. JACC 2000

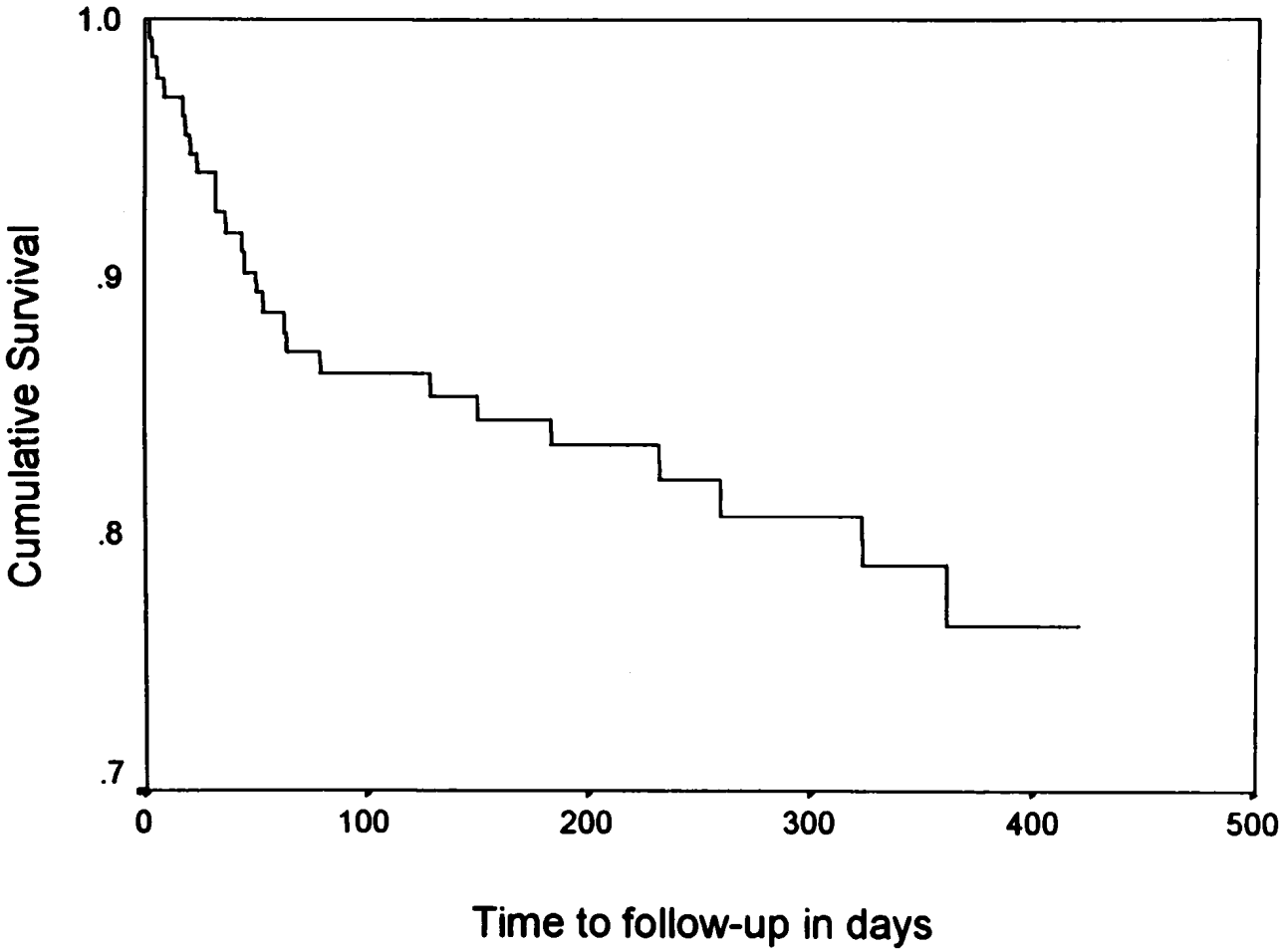
Recurrent VT ablation

- 8% major comps
- 3% death



Calkins et al. JACC 2000

Recurrent VT ablation



Calkins et al. JACC 2000

Recurrent VT ablation

- 231 patients with >4 VT in last 6 months
- non randomised FU 6 months
- EF 25%
- EP sim 3 extras at 2 sites
- Success - no monomorphic VT 49%
- Partial 32%
- 7.3% major comps
- 3% death (within 7 days)
- Recurrence 51%

Stevenson et al. Circulation 2008

Recurrent VT ablation

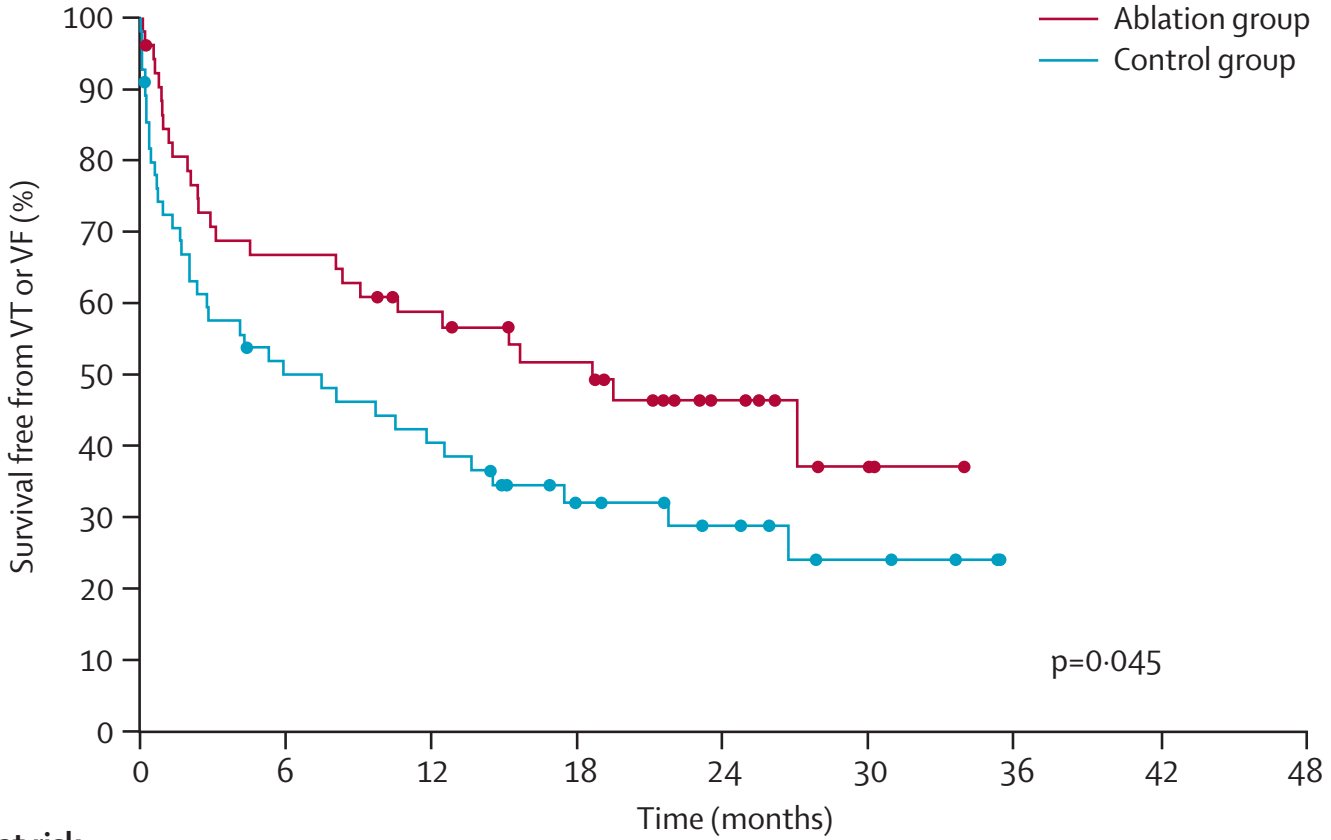
- Even in best hands expect 50% recurrence rate
- Mortality high
- Procedures complex, long and have risk
- 24 hour/7 day working increasing

2º prevention VT ablation

- n = 107 patients with VT
- Randomised to VT ablation + ICD or ICD alone
- 22 month FU
- 75% betablocker use
- EF 34%
- Clinical induced in 78 pts
- Ablation - 45/52 pts had ablation
- Control - 12 (21%) pts x over to ablation

Kuck et al. Lancet 2010

2º prevention VT ablation



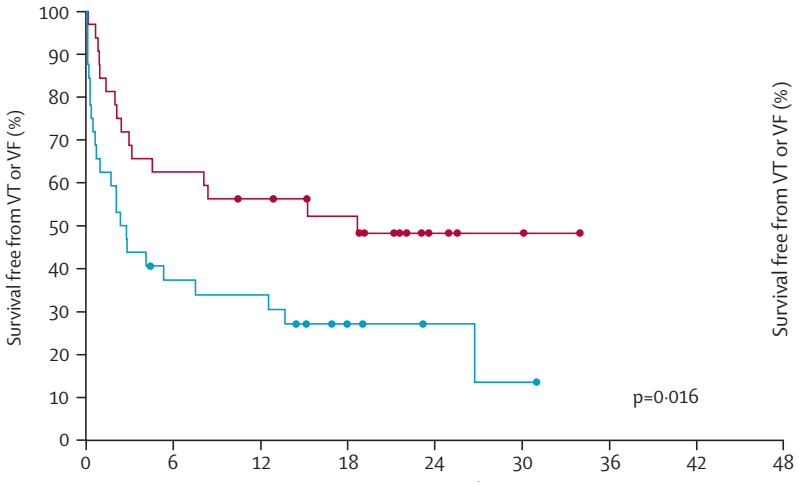
Number at risk

Ablation group	52	34	28	21	9	3	0
Control group	55	26	21	12	8	4	0

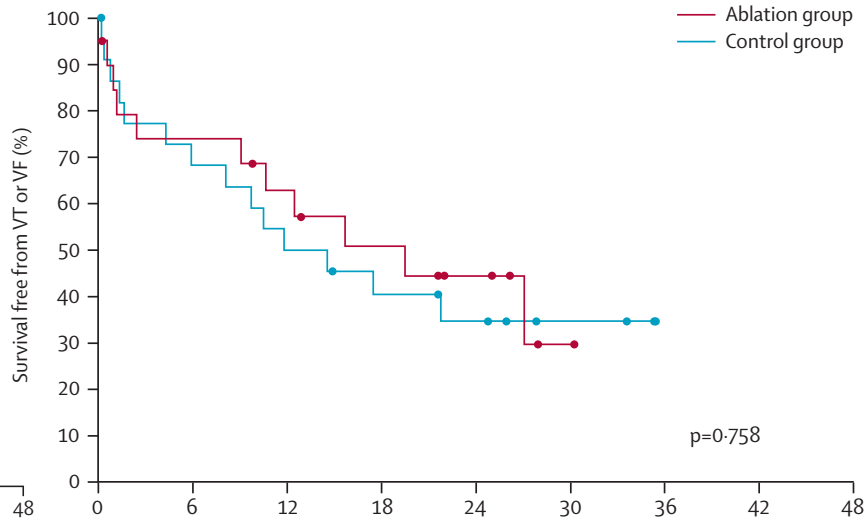
Kuck et al. Lancet 2010

2º prevention VT ablation

EF>30%



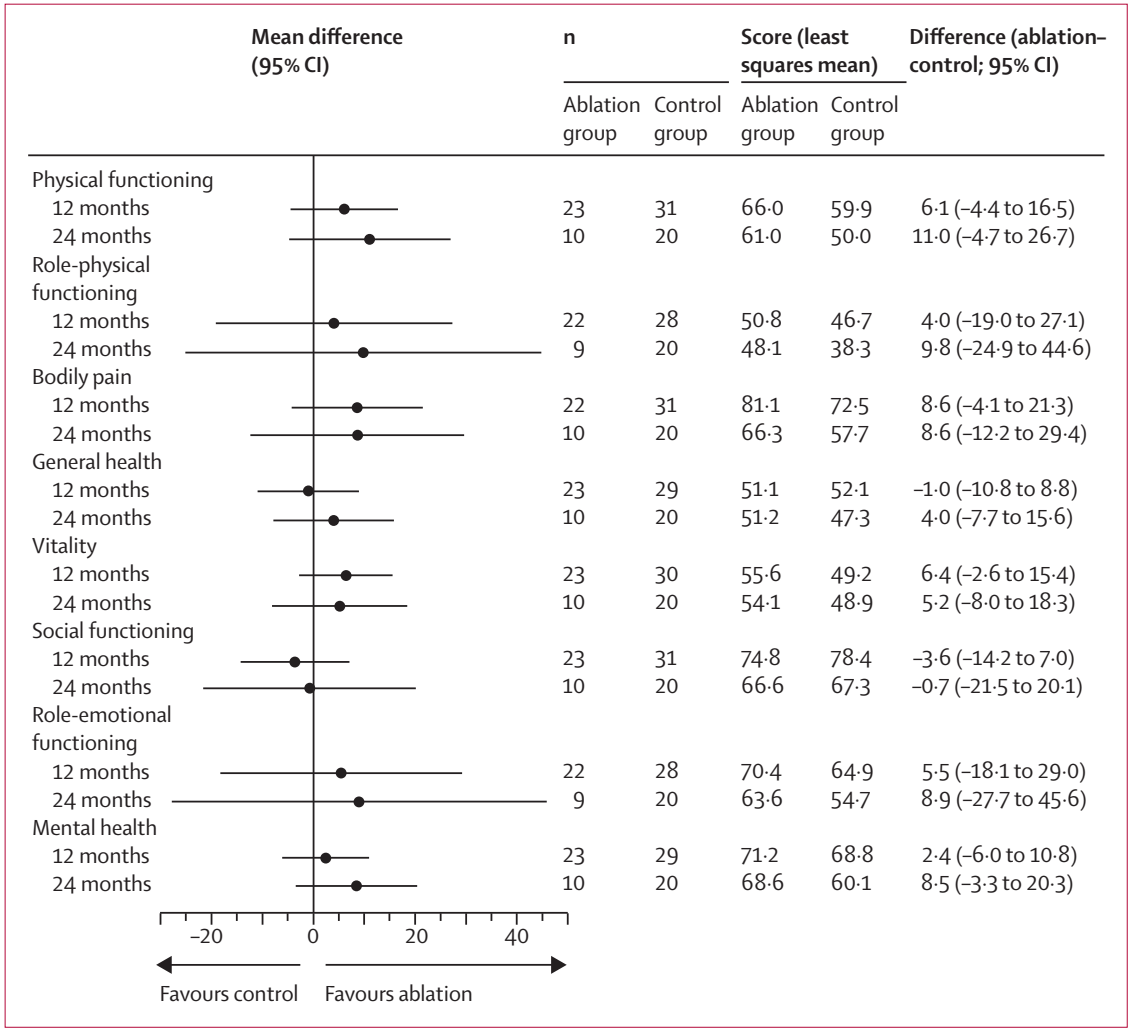
EF<30%



Kuck et al. Lancet 2010

2º prevention VT ablation

- no↑ QOL
- Mortality 9.5% vs 8.6%



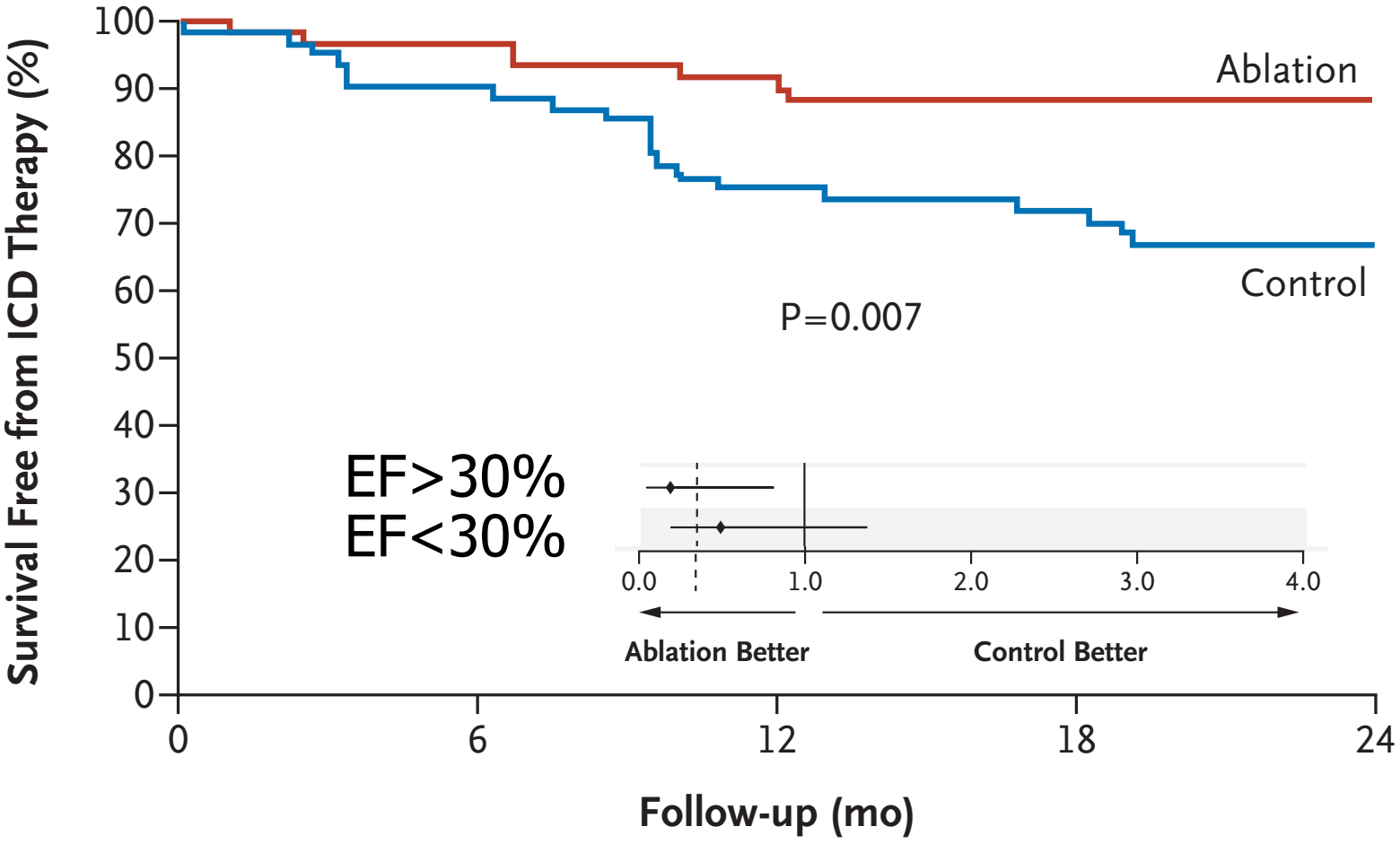
Kuck et al. Lancet 2010

2º prevention VT ablation

- n = 128 pts with VT and ICD
- Randomised to VT ablation or no therapy
- 22.5 month FU
- 92% betablocker use
- EF 33%
- Ablation outcomes not recorded - 3 major comps

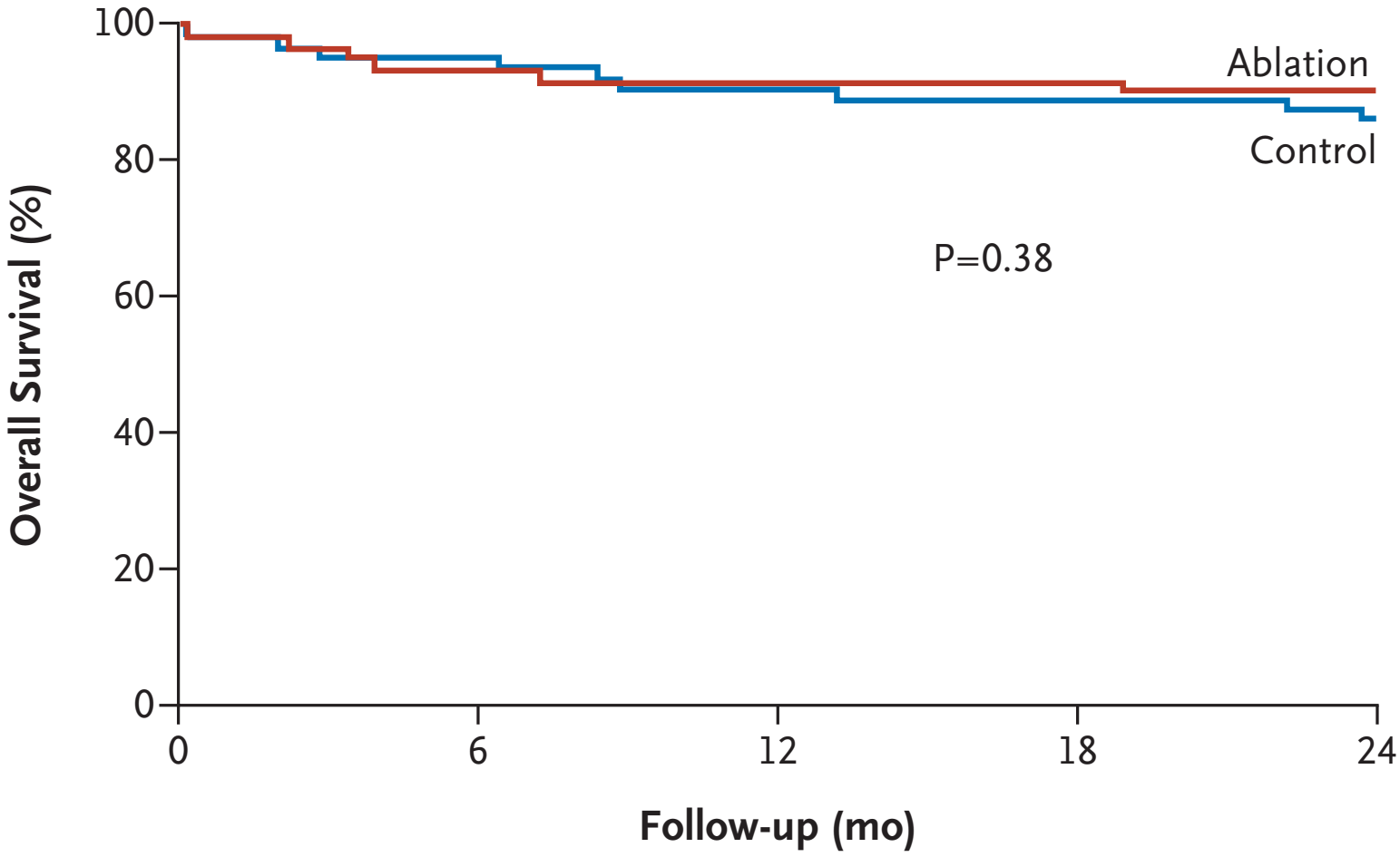
Reddy et al. NEJM 2007

2º prevention VT ablation



Reddy et al. NEJM 2007

2º prevention VT ablation



Reddy et al. NEJM 2007

2º prevention VT ablation

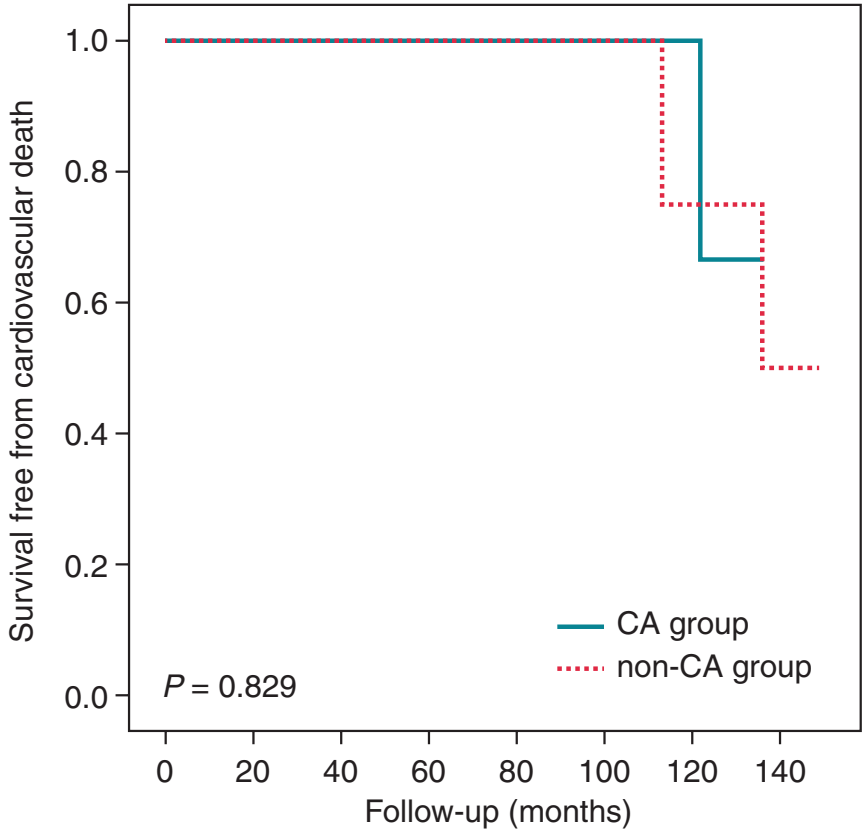
- Has a limited role
- Probably best applied to those with EF>30%
- Uncertain whether it will be cost effective

1º prevention VT ablation

- n = 66 patients with primary prevention ICD
- Retrospective cf VT ablation vs no VT ablation
- 50±38 months FU
- 65% betablocker use
- EF 32±11%
- Success 78%
- Partial 22%
- Fail 0%

Hayashi et al. Europace 2013

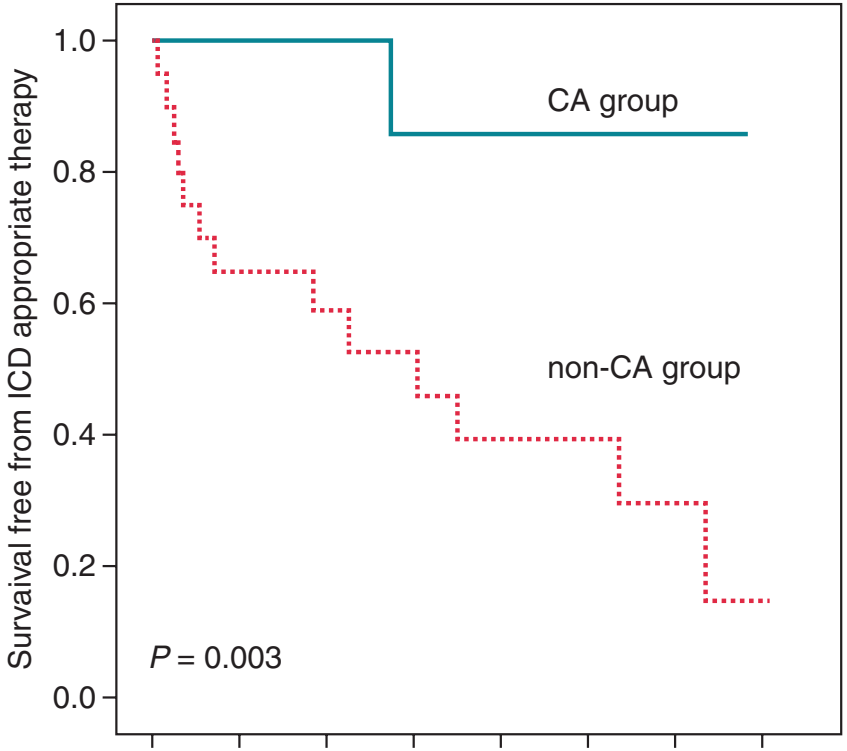
1º prevention VT ablation



Number at risk								
CA group	18	12	8	6	5	3	3	0
non-CA group	20	14	9	8	7	5	3	2

Hayashi et al. Europace 2013

1º prevention VT ablation



Number at risk

CA group	18	12	8	5	4	2	2	0
non-CA group	20	14	9	8	6	4	2	1

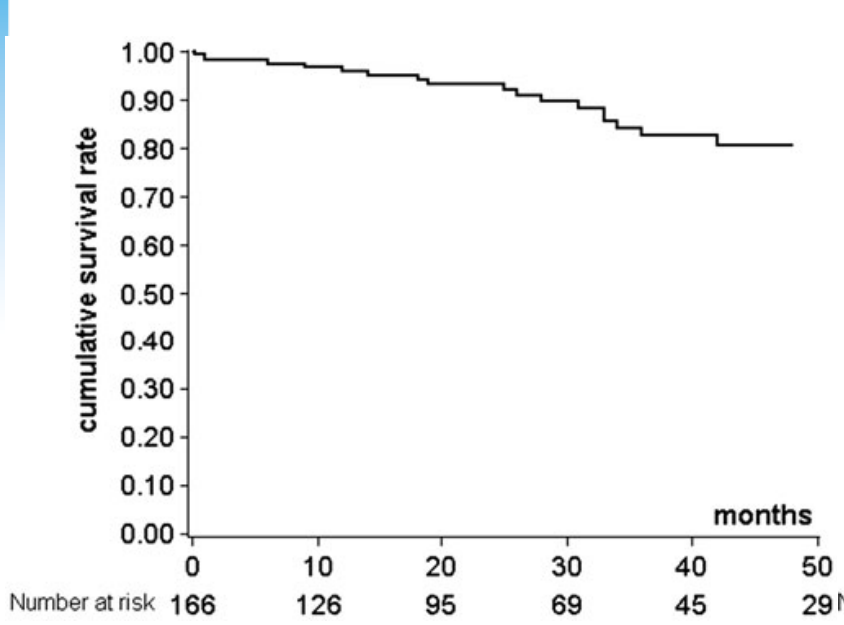
Hayashi et al. Europace 2013

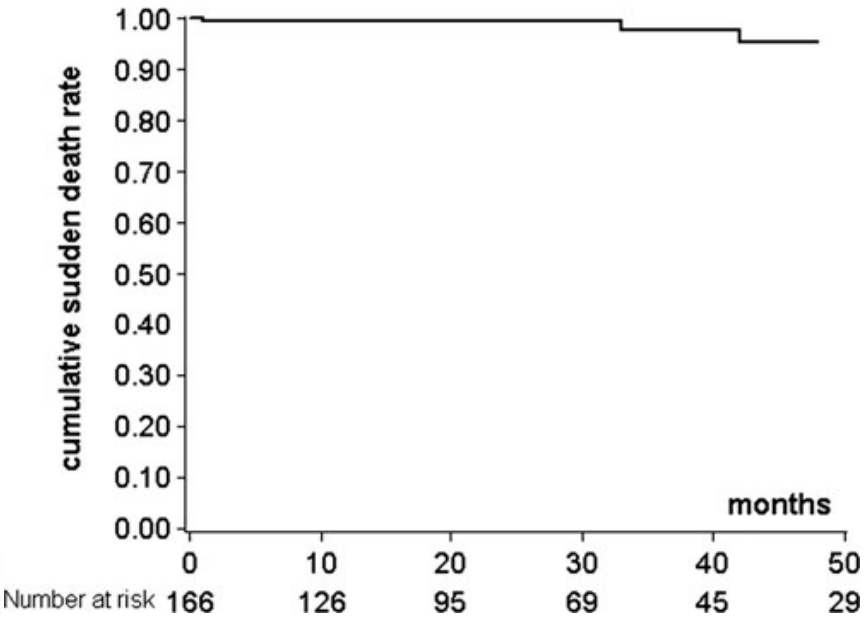
1º prevention VT ablation

- n = 166 patients with VT and EF>30%
- VT ablation and no ICD
- 32 months FU
- 51% betablocker use
- EF 50±10%
- Success 83%
- Partial 9%
- Fail 4%
- Unknown 5%

Maury et al. EHJ 2014

1º prevention VT ablation





Maury et al. EHJ 2014

1º prevention VT ablation

All cause mortality	20/166 (12%)
Non-cardiac	8 (5%)
Non-SCD	8 (5%)
SCD	4 (2.4%)

Patients with SCD	1	2	3	4
DIsease	Valvular	IHD	IHD	IHD
Age	77	76	60	81
EF	65	50	50	43
Ablation	?	Success	Success	Partial

Maury et al. EHJ 2014

1º prevention VT ablation

- 20 pts had ICDs 9 without VT recurrence
  - 6 post ablation inducibility
  - 1 bivent
  - 2 at other centres
- Appropriate therapy
  - 78% if VT recurrence
  - 50% if no VT recurrence

Maury et al. EHJ 2014

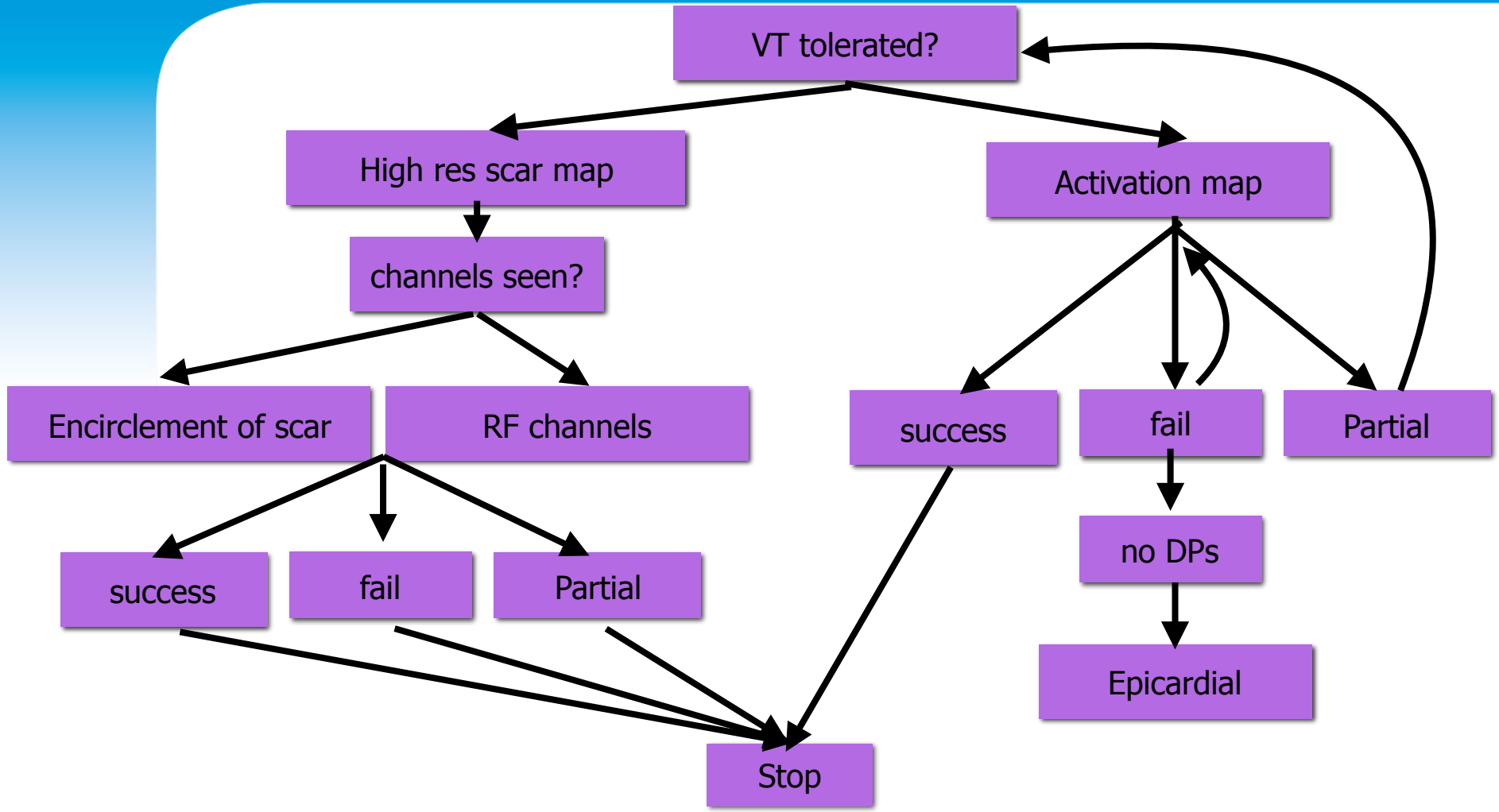
1º prevention VT ablation

- 1º prevention ablation not shown to be cost effective
- most pts do not have VT stim pre-ICD
- In setting of IHD the EF does not appear a good predictor of future SCD
- VT recurrence has low mortality
- ?VT ablation alone a reasonable strategy in stable VT and EF>30%

Practical aspects of VT ablation -1

- Start endocardial - TS approach
- Create point by point geometry (single electrode catheter)
- Simultaneous low resolution voltage map
- Localise catheter to area of interest
- Induce VT

Practical aspects of VT ablation - 2



Epicardial vs endocardial

- Pre-ablation ECG doesn't predict source
- Safe to go epicardial with heparin if endocardial fails

	ECG criteria?	Substrate criteria?	Either
Epicardial source	33%	33%	66%
Endocardial	29%	33%	62%

Page et al Europace 2012

Lessons to learn from AF ablation

- v large numbers/experience around the world
- v difficult to achieve end-point even in a thin chamber
- substrate ablation even harder
- In a thicker chamber (ventricle) where time to map is more limited this is even harder
- new technologies (force sensing and better mapping) may impact to some degree

Conclusions

- Role of VT ablation has not evolved
- The techniques and outcomes may have evolved
- Sole clear indication is palliation of recurrent VT
- Early intervention with a clear strategy and ability to complete the protocol is important to deliver reasonable outcomes
- Paucity of data describing outcomes and their trends