

Atrial Fibrillation Ablation: Stroke Prevention or Expensive Cardioversion?

T. Scott Wall, MD, FACC

Mountain West Cardiovascular Associates
Assistant Professor of Medicine (Adjunct),
University of Utah

Disclosures

- None

AF and Stroke Risk

CHADS ₂ Score	No. of Patients (n = 1733)	No. of Strokes (n = 94)	NRAF Crude Stroke Rate per 100 Patient-Years	NRAF Adjusted Stroke Rate, (95% CI)†
0	120	2	1.2	1.9 (1.2-3.0)
1	463	17	2.8	2.8 (2.0-3.8)
2	523	23	3.6	4.0 (3.1-5.1)
3	337	25	6.4	5.9 (4.6-7.3)
4	220	19	8.0	8.5 (6.3-11.1)
5	65	6	7.7	12.5 (8.2-17.5)
6	5	2	44.0	18.2 (10.5-27.4)

*CHADS₂ score is calculated by adding 1 point for each of the following conditions: recent congestive heart failure, hypertension, age at least 75 years, or diabetes mellitus and adding 2 points for having had a prior stroke or transient ischemic attack. CI indicates confidence interval.

†The adjusted stroke rate is the expected stroke rate per 100 patient-years from the exponential survival model, assuming that aspirin was not taken.

- CHADS₂ Scoring
- One point for each of the following
 - Recent CHF
 - Hypertension
 - Age ≥ 75 years
 - Diabetes mellitus
- Two points for each of the following
 - Prior stroke
 - Prior TIA

Table 3—AF Trials: Therapies Tested*

Study	Control	Full-Dose OAC, INR Range	Aspirin, mg/d	OAC Plus Aspirin	Low-Dose OAC
AFASAK 1 ¹²	Yes	2.8–4.2	75		
SPAF 1 ¹⁴	Yes	2.0–4.5†	325		
BAATAP ¹³	Yes	1.5–2.7†			
CAFA ¹⁶	Yes	2.0–3.0			
SPINAF ¹⁵	Yes	1.4–2.5†			
EAF ¹⁹	Yes	2.5–4.0	300		
SPAF II ²⁰		2.0–4.5	325		
SPAF III ²² (high risk)		2.0–3.0		325 mg aspirin plus warfarin (INR 1.2–1.5)	Warfarin, 1.25 mg
AFASAK 2 ³⁰		2.0–3.0	300	300 ASA plus warfarin, 1.25 mg	Warfarin, 1.25 mg
ESPS 2 ^{28,29†}	Yes		50		
SIFA ⁴²		2.0–3.5	400§		
LASAF ³¹	Yes		125; 62.5		
Pengo et al ⁴³		2.0–3.0			Warfarin, 1.25 mg
PATAF ³⁶		2.5–3.5	150		INR 1.1–1.6
Japanese study ¹⁹⁸		2.2–3.5			Warfarin, INR 1.5–2.1
FFAACs ⁴⁵		2.0–2.6		Fludione plus 100 mg ASA	
NASPEAF ⁴⁶					
Higher risk		2.0–3.0		Triflusal, 600 mg, plus acenocoumarol, INR 1.4–2.4	
Lower risk		2.0–3.0	Triflusal 600 mg	Triflusal, 600 mg, plus acenocoumarol, INR 1.25–2.0	
SPORTIF III ⁶⁰		2.0–3.0	Ximelagatran, 36 mg bid		
SPORTIF V ⁶¹		2.0–3.0	Ximelagatran, 36 mg bid		

*ASA = acetylsalicylic acid. See Table 2 for expansion of abbreviation.

†PTR-based target range; INR is estimated.

‡ESPS 2 also included two other treatment groups: (1) modified-release dipyridamole, 200 mg bid; (2) aspirin, 25 mg bid, plus modified-release dipyridamole, 200 mg bid.

§Indobufen, 200 mg bid (not aspirin).

||LASAF evaluated two doses of aspirin: 125 mg qd and 125 mg every other day.

Gage BF, et al, JAMA 2001; 285(22); 2864-70

Singer DE, et al, Chest 2004; 126:429-456

AF and Stroke Risk

- Low risk do fine with Aspirin
 - Stroke risk is only ~1%/year
- Hemorrhagic risk of aspirin is low
- High risk patients annual stroke risk 4.3-8.1%
 - Prior TIA or stroke
 - Age > 65-75 years
 - Diabetes, HTN, CHF

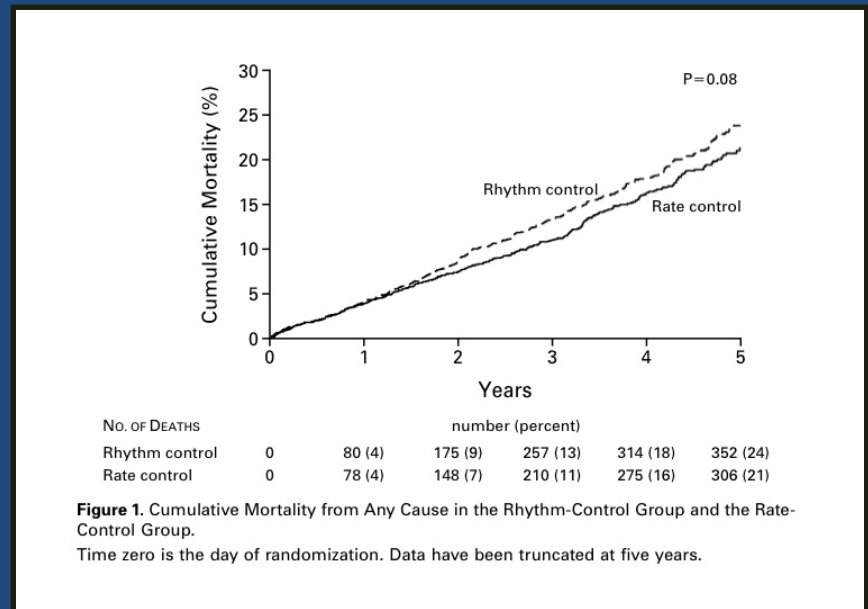
Hart RG, et al, Stroke 1999; 30:1223-29

SPAF Investigators, Ann Intern Med 1992; 116:1-5

Singer DE, et al, Chest 2004; 126:429-456

Rhythm Control and Stroke Prevention

- AFFIRM
 - 65 years or older
 - Other risk factors for stroke or death
 - This is a high risk AF population



Rhythm Control and Stroke Prevention

TABLE 3. ADVERSE EVENTS.*

EVENT	OVERALL (N=4060)	RATE-CONTROL GROUP (N=2027)	RHYTHM-CONTROL GROUP (N=2033)	P VALUE
	no. of patients (%)			
Primary end point (death)	666 (26.3)	310 (25.9)	356 (26.7)	0.08†
Secondary end point (composite of death, disabling stroke, disabling anoxic encephalopathy, major bleeding, and cardiac arrest)	861 (32.3)	416 (32.7)	445 (32.0)	0.33
Torsade de pointes	14 (0.5)	2 (0.2)‡	12 (0.8)	0.007
Sustained ventricular tachycardia	15 (0.6)	9 (0.7)	6 (0.6)	0.44

Central nervous system event

Total	211 (8.2)	105 (7.4)	106 (8.9)	0.93
Ischemic stroke§	157 (6.3)	77 (5.5)	80 (7.1)	0.79
After discontinuation of warfarin	69	25	44	
During warfarin but with INR <2.0	44	27	17	
Concurrent atrial fibrillation	67	42	25	
Primary intracerebral hemorrhage	34 (1.2)	18 (1.1)	16 (1.3)	0.73
Subdural or subarachnoid hemorrhage	24 (0.8)	11 (0.8)	13 (0.8)	0.68

Systemic embolism	16 (0.5)	9 (0.5)	7 (0.4)	0.62
Pulmonary embolism	8 (0.3)	2 (0.1)	6 (0.5)	0.16
Hospitalization after base line	2594 (76.6)	1220 (73.0)	1374 (80.1)	<0.001

*Percentages were derived from a Kaplan–Meier analysis. P values were derived from the log-rank statistic.

†The P value in the case of death was based on the square root of the log-rank statistic, adjusted for 10 interim monitoring analyses.

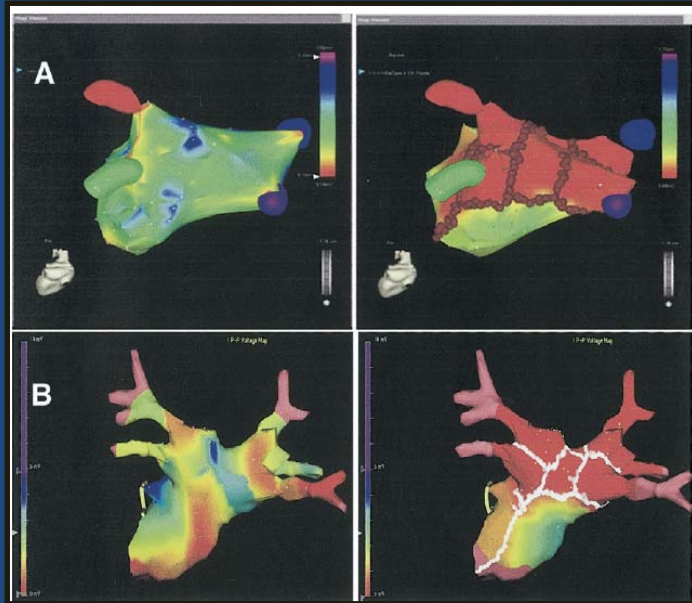
‡One patient had crossed over to the rhythm-control group and was taking quinidine, and one patient had torsade de pointes 72 hours after mitral-valve replacement.

§Information on warfarin therapy was missing for two patients in the rate-control group and three patients in the rhythm-control group. Information on the presence of atrial fibrillation with the event was missing for 16 patients in the rate-control group and 13 patients in the rhythm-control group.

AFFIRM Rhythm Control Criticisms

- Antiarrhythmic drugs have low efficacy of maintenance of NSR
 - Amiodarone, sotalol, dofetilide among the “best”
 - Efficacy in range of 5-35%
- Invasive treatments of AF were rare
 - 14 RF ablations, 4 maze procedures
- BUT...82.4% of rhythm control group was in NSR at 1 year

AF Ablation...Does it work?



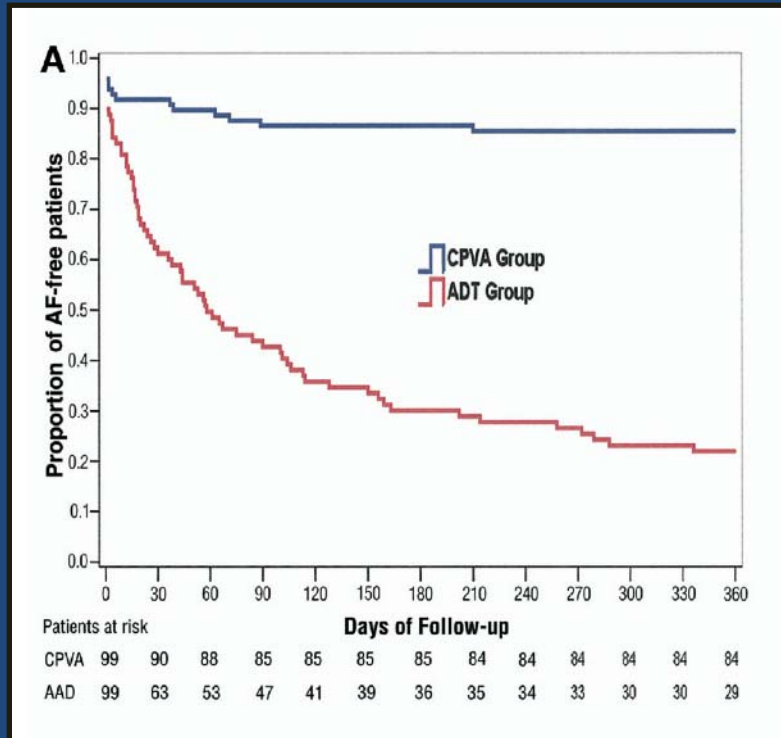
- Large single center
- 198 patients with Paroxysmal AF who had failed one AAD
- Randomly assigned to CPVA vs. maximized AAD

Table 2. Patient Characteristics

Characteristic	CPVA (n = 99)	ADT Group (n = 99)	p Value
Age (yrs)	55 ± 10	57 ± 10	0.24
Gender (M/F)	69/30	64/35	0.54
AF episode/month	6 ± 4	6 ± 6	0.81
Duration of AF (yrs)	6 ± 4	6 ± 6	0.81
LA diameter (mm)	40 ± 6	38 ± 6	0.25
Diabetes	5.1%	4%	1.00
Hypercholesterolemia	17%	21%	0.59
Hypertension	56%	57%	1.00
LVEF (%)	60 ± 8	61 ± 6	0.49
Structural heart disease			
Coronary artery disease	2%	2%	
Valvular heart disease	3%	1%	0.22
Congenital heart disease	2%	1%	
No. of previously ineffective antiarrhythmic drugs	2 ± 1	2 ± 1	0.63

CPVA = circumferential pulmonary vein ablation; LVEF = left ventricular ejection fraction; other abbreviations as in table 1.

Does it work for paroxysmal AF?



- No serious complications in ablation group
 - 1 TIA
 - 1 pericardial effusion
 - Rare repeat ablations
- 23 patients with serious adverse effects of AAD
 - Proarrhythmia
 - Thyroid dysfunction
 - “sexual impairment” with sotalol

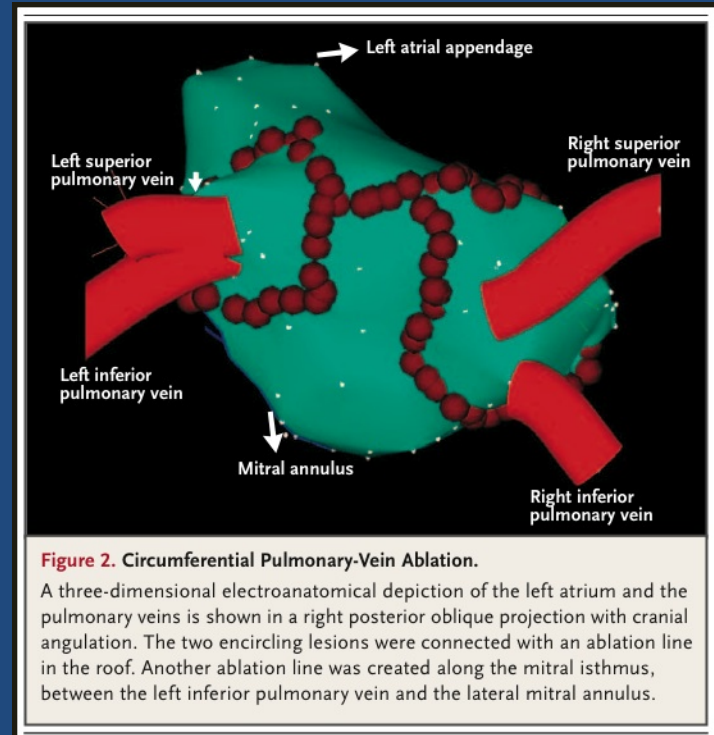
Does it work for chronic AF?

Table 2. Characteristics of the Patients.*

Characteristic	Control (N = 69)	Circumferential Pulmonary-Vein Ablation (N = 77)
Age (yr)	58±8	55±9†
Sex (no. of patients)		
Male	62	67
Female	7	10
Duration of atrial fibrillation (yr)	4±4	5±4
Left atrial diameter (mm)	45±5	45±6
Left ventricular ejection fraction (%)	56±7	55±7
Structural heart disease (no. of patients)	6	6
Nonischemic cardiomyopathy	1	2
Coronary artery disease	4	3
Valvular heart disease	0	1
Congenital heart disease	1	0
No. of previously ineffective anti-arrhythmic drugs	2.1±1.2	2.0±1.2
No. of prior cardioversions	1.7±1.0	2.2±1.7

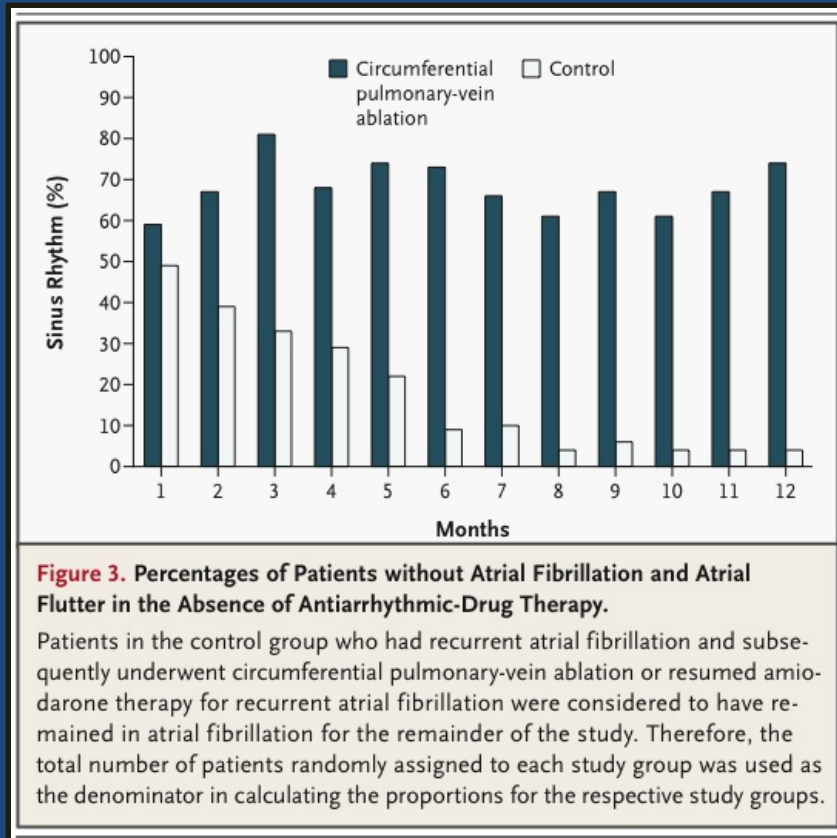
* Plus-minus values are means ±SD.

† P=0.03.



- 146 patients with chronic AF
- Randomly assigned to amiodarone or ablation

Does it work for chronic AF?



- No serious complications in either group
- One pneumonia death “several months after” CPVA
- Symptom severity scores improved with successful maintenance of sinus rhythm

Does it work?...the rest of the anecdotes

- AF ablation success rate probably approaches 75-85%
- 25-30% of patients require AAD to prevent recurrence
- 25-30% of patients require repeat procedures
- Not without serious and fatal complications
 - 1% stroke risk
 - 1-2% cardiac tamponade risk
 - 0.1% atrio-esophageal fistula risk
- Lower risk AF comes with higher success rates (and vice versa)

CABANA Trial and the Future of AF Ablation

- Catheter Ablation versus ANtiarrhythmic drug therapy for Atrial fibrillation (CABANA)
- Trial designed to test wheter LA ablation more effectively reduces total mortality than current rate- or rhythm control drugs
- Higher risk patients
 - >65 years of age, or
 - <65 with risk thromboembolic risk factors
- Randomization is to drugs vs. ablation (+/- stopping anticoagulation)

Conclusions

- AF ablation is probably an effective means of improving maintenance of sinus rhythm in symptomatic patients
- Symptom control should be focus at this time
- AF ablation is not a stroke-prevention strategy at this time and probably should NOT alter appropriate anticoagulation recommendations based on patient risk