Cardiac Electrophysiology in 2025

Disclosures

- None

UPMC
LIFE CHANGING MEDICINE

Cardiac Device Update in 2014

Hanover Hospital

Cardiac Device Therapy in 2014

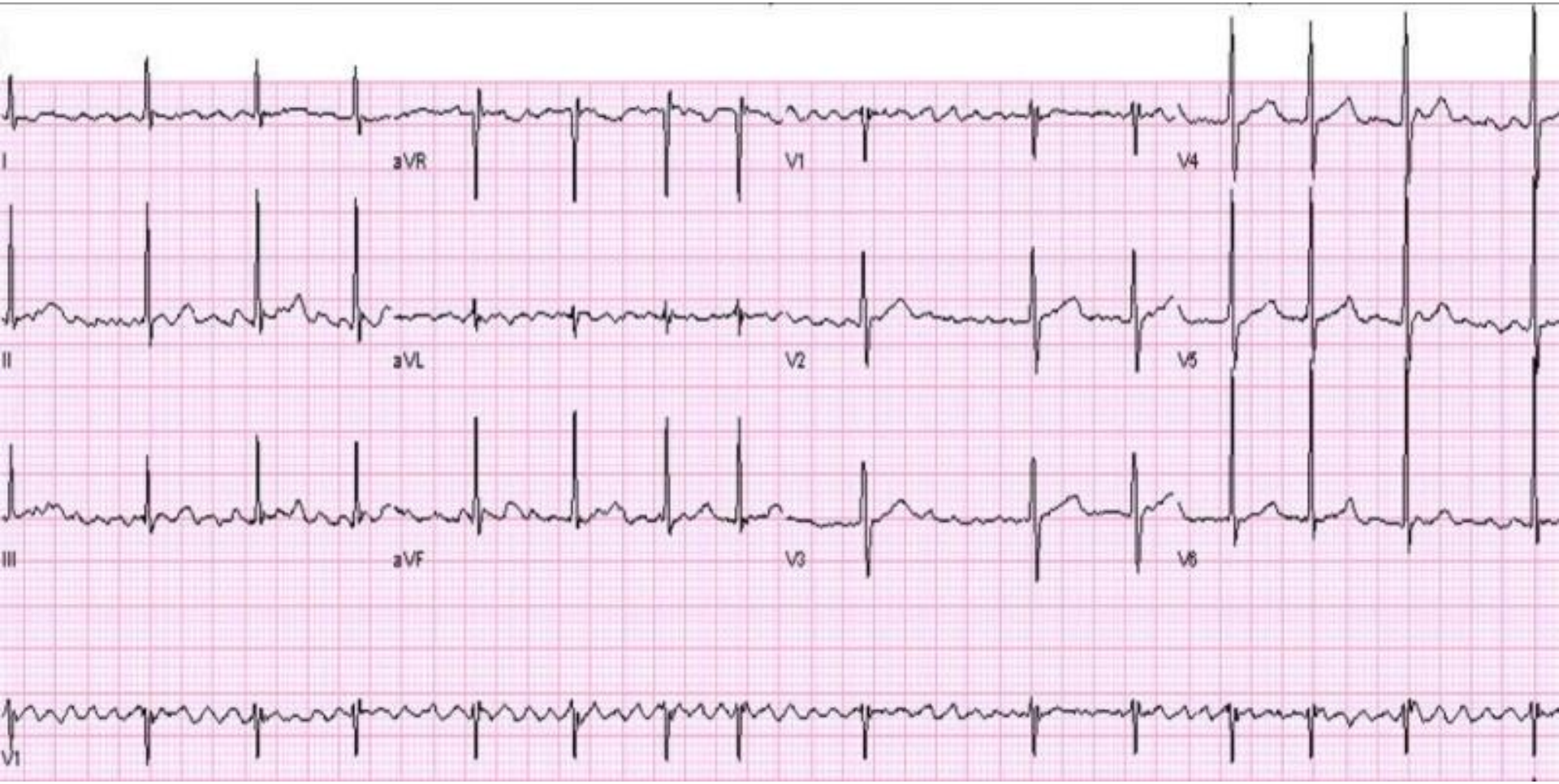
- Pacemakers/ Leadless pacemakers/conduction system pacing
- Implantable Loop Recorders/wearables
- Implantable Cardioverter Defibrillators (ICD)/ Subcutaneous ICD
- Biventricular ICD
- Ablation Procedures
- Left atrial appendage occlusion

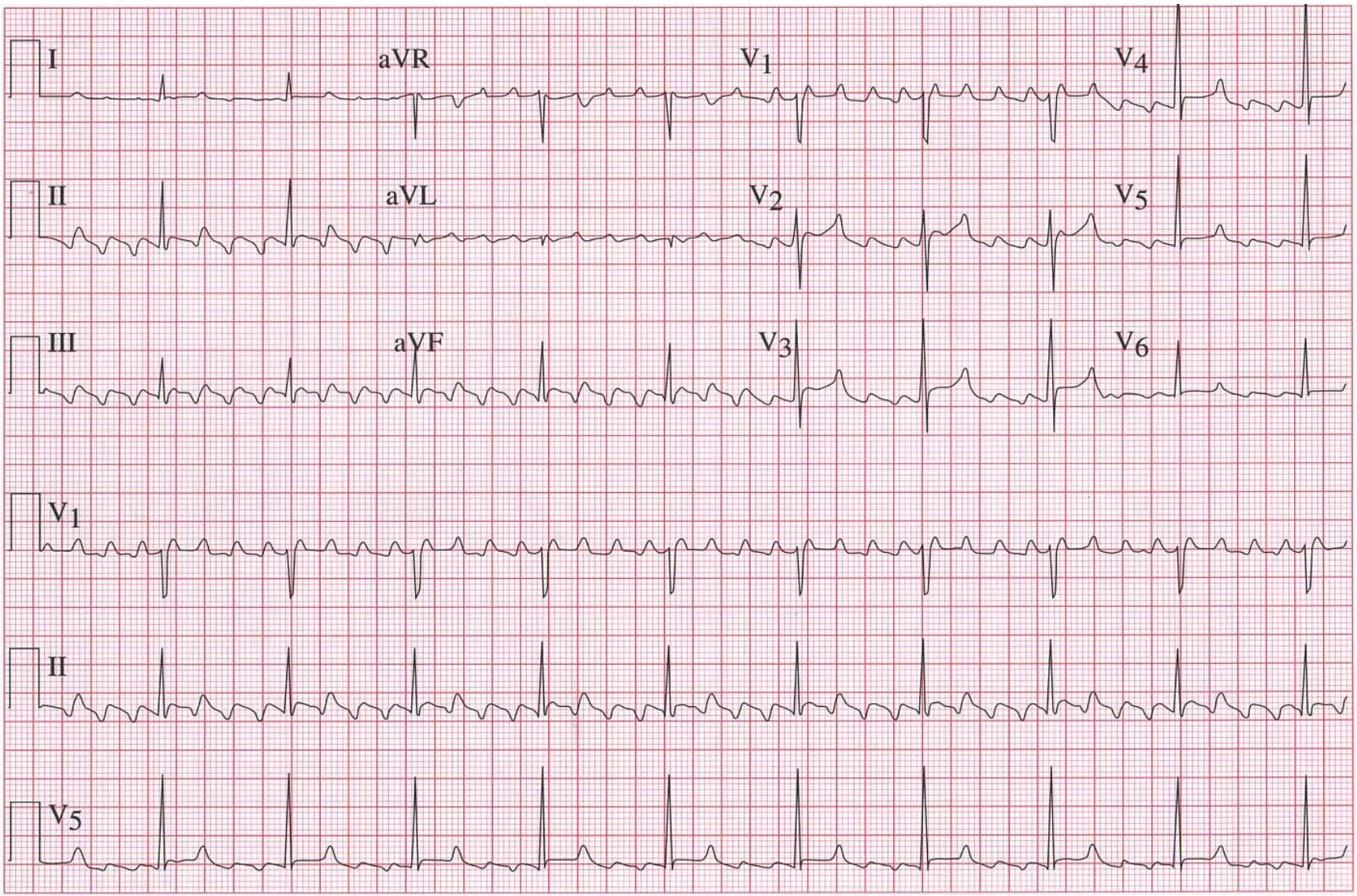
Objectives

- Provide a general overview as well as management strategy for atrial flutter and atrial fibrillation (AF)
- Discuss indications for catheter ablation as a potential treatment strategy for atrial flutter and atrial fibrillation
- Review Pathophysiology of atrial fibrillation
- Provide a brief overview of the ablation procedure
- Discuss complications of Ablations

Atrial Flutter

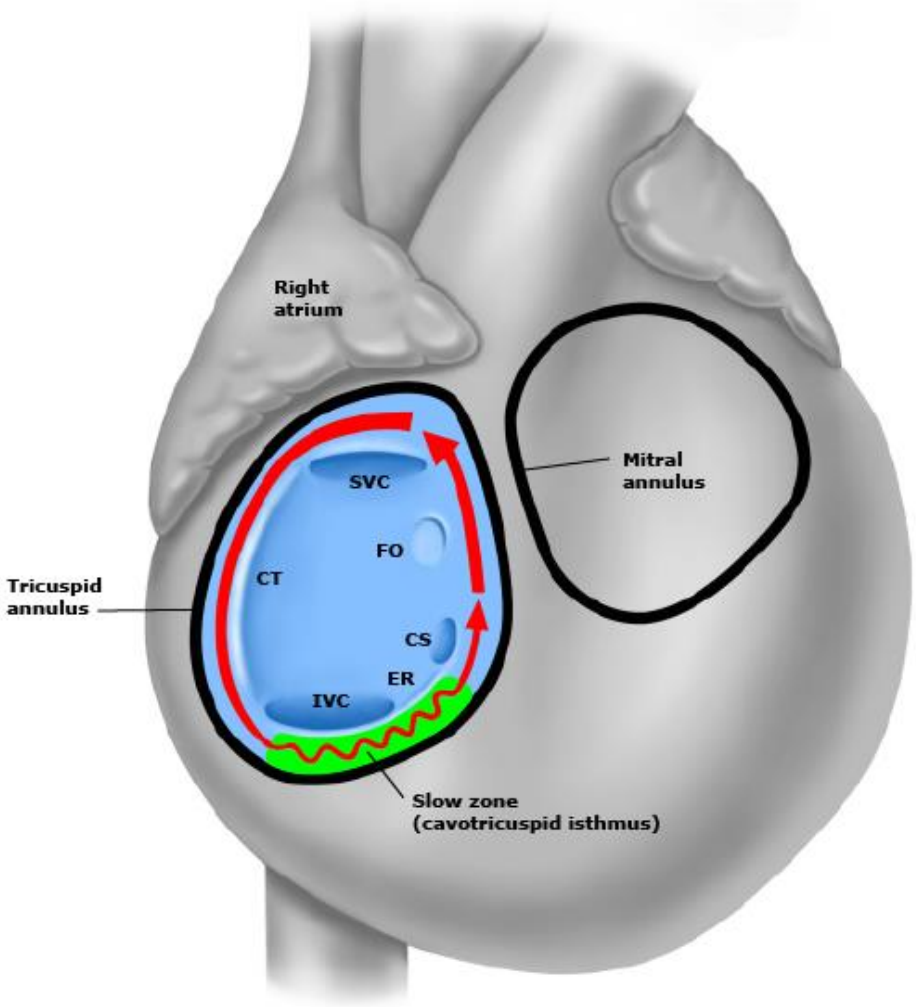
- Supraventricular tachycardia
  - Paroxysmal SVT
    - Atrial tachycardia
    - AVNRT
    - ORT
  - Atrial Fibrillation
  - Atrial Flutter
- First described in 1911
  - Jolly and Ritchie





Atrial Flutter

- Mechanism described in 1970s



Case study

- 57y old male with PMH of HTN who presents with new onset atrial flutter with a ventricular rate of 87bpm. What would you do long-term for this gentleman?
  - Leave him in atrial flutter since he is rate controlled
  - Cardioversion
  - Antiarrhythmic drug
  - Ablation

Drug Therapy vs Ablation for Atrial Flutter

- 61 patients who presented with symptomatic atrial flutter for the second time

	Antiarrhythmic drug therapy**	RF ablation
Atrial Flutter Recurrence	**93%**	**6%**
Sinus rhythm at f/u (mean 22 month)	**36%**	**80%**
Rehospitalized	**63%**	**22%**

** AAD included sotalol, amiodarone, flecainide, procainamide, propafenone

Natale JACC 2000

Quality of Life (Drug Therapy)

Table 3. Quality of Life and Symptoms Scores in the Drug Therapy Group

	Pretreatment	Posttreatment (6 mo)	Posttreatment (12 mo)	Overall p Value
Sense of well being	1.9 ± 0.4	2.0 ± 0.4	2.1 ± 0.3	NS
Function in daily life	2.1 ± 0.4	2.1 ± 0.3	2.3 ± 0.3	NS
Palpitation	3.2 ± 0.6*	2.0 ± 0.5	2.1 ± 0.7	< 0.05
SOB with exercise	3.4 ± 0.4	3.2 ± 0.4	3.0 ± 0.5	NS
Feeling weak	2.9 ± 0.3	3.0 ± 0.4	3.1 ± 0.4	NS
QOL total score	29 ± 3	28 ± 6	31 ± 5	NS

*$p < 0.001$. Pretreatment versus posttreatment 6 months and posttreatment 12 months. All other comparisons did not show statistical significance.

QOL = quality of life overall score; SOB = shortness of breath.

Quality of Life (Ablation)

Table 4. Quality of Life and Symptoms Scores in the Catheter Ablation Group

	Preablation	Postablation (6 mo)	Postablation (12 mo)	Overall p Value
Sense of well being	2.0 ± 0.3*	3.9 ± 0.3	3.8 ± 0.5	< 0.01
Function in daily life	2.3 ± 0.4*	3.8 ± 0.5	3.6 ± 0.6	< 0.01
Palpitation	3.1 ± 0.6*	1.0 ± 0.4	1.0 ± 0.5	< 0.01
SOB with exercise	3.0 ± 0.4*	1.0 ± 0.5	1.2 ± 0.3	< 0.01
Feeling weak	2.9 ± 0.5*	0.8 ± 0.4	0.8 ± 0.5	< 0.01
QOL total score	30 ± 4†	59 ± 7	57 ± 6	< 0.001

*$p < 0.001$. Preablation versus postablation 6 months and postablation 12 months. †$p < 0.0001$. Preablation versus postablation 6 months and postablation 12 months. Postablation 6 months versus postablation 12 months, p = NS.

QOL = quality of life overall score; SOB = shortness of breath.

Amio vs Ablation first line therapy

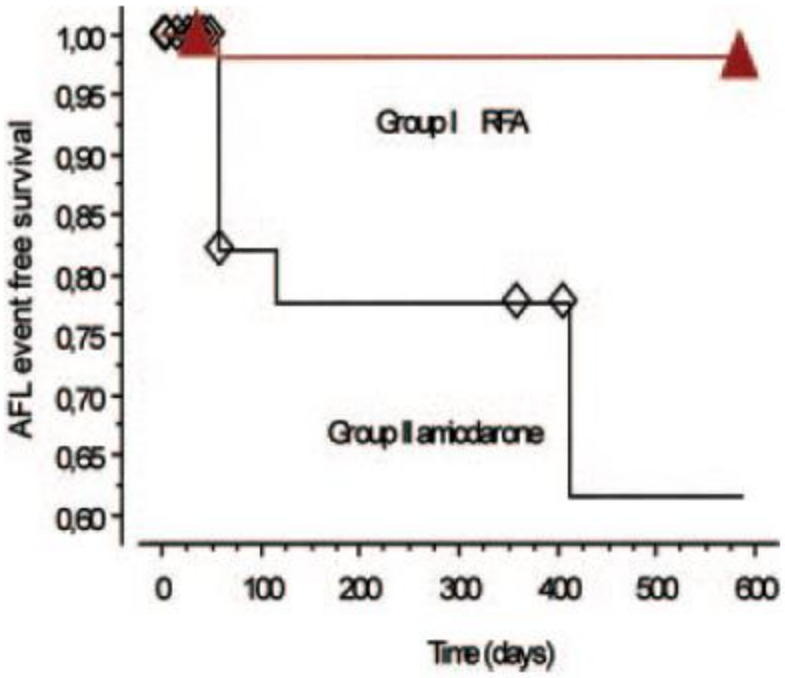
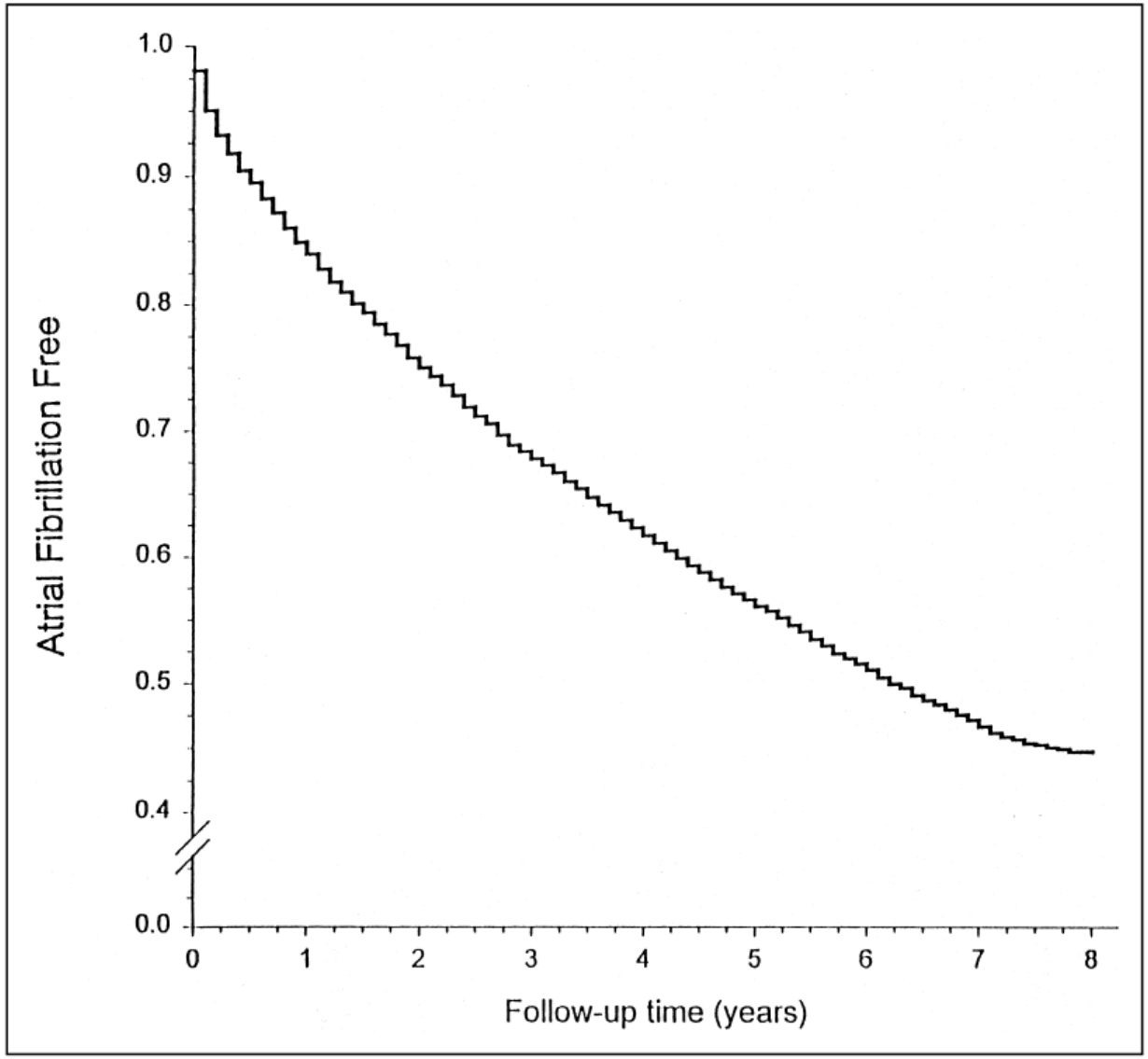


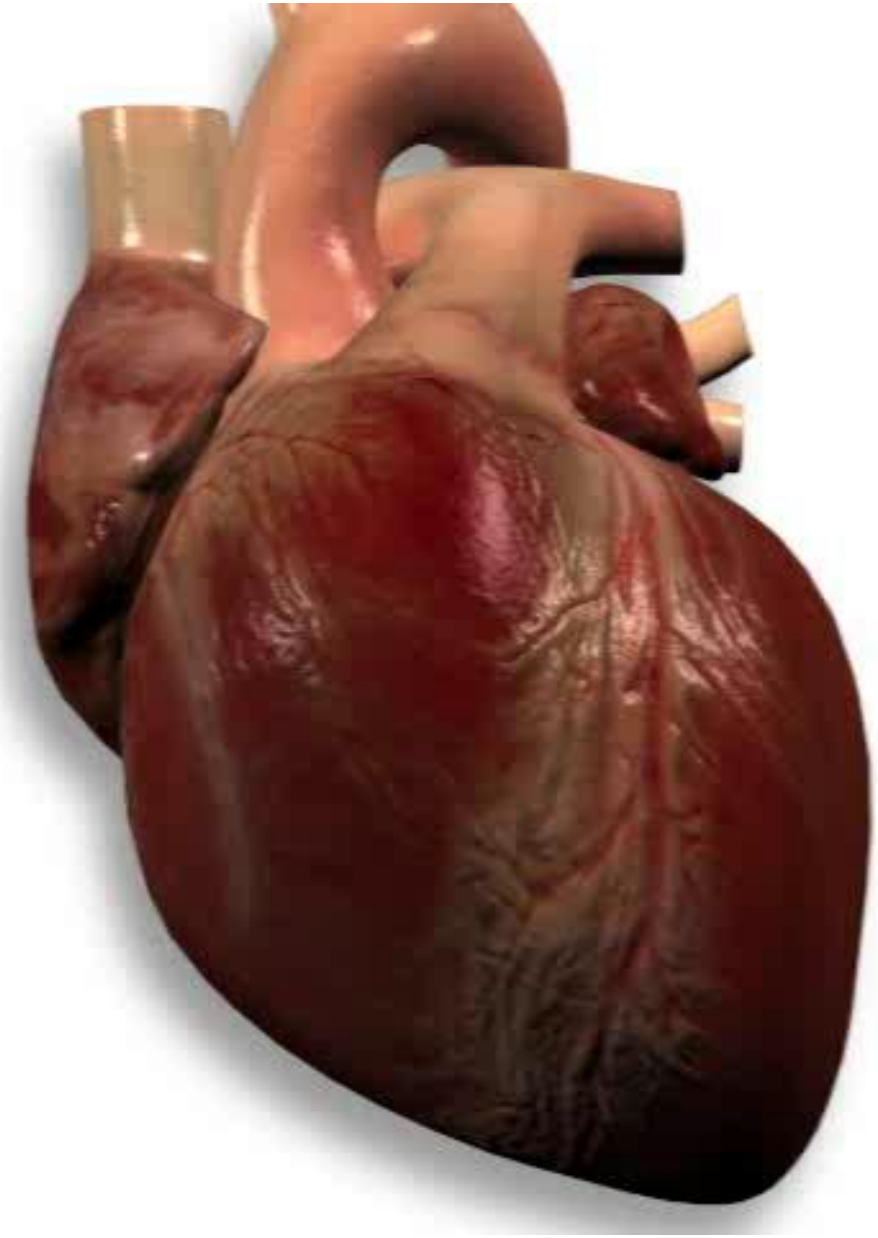
Figure 1. Kaplan-Meier estimates of the percentage of patients remaining free of recurrence of AFL in the RFA (red triangles) and amiodarone (white diamonds) groups.

- Amiodarone had a 30% recurrence rate of AFl compared to 4% in the RFA group

DaCosta Circ 2006



Biblo Am J Cardiol 2001



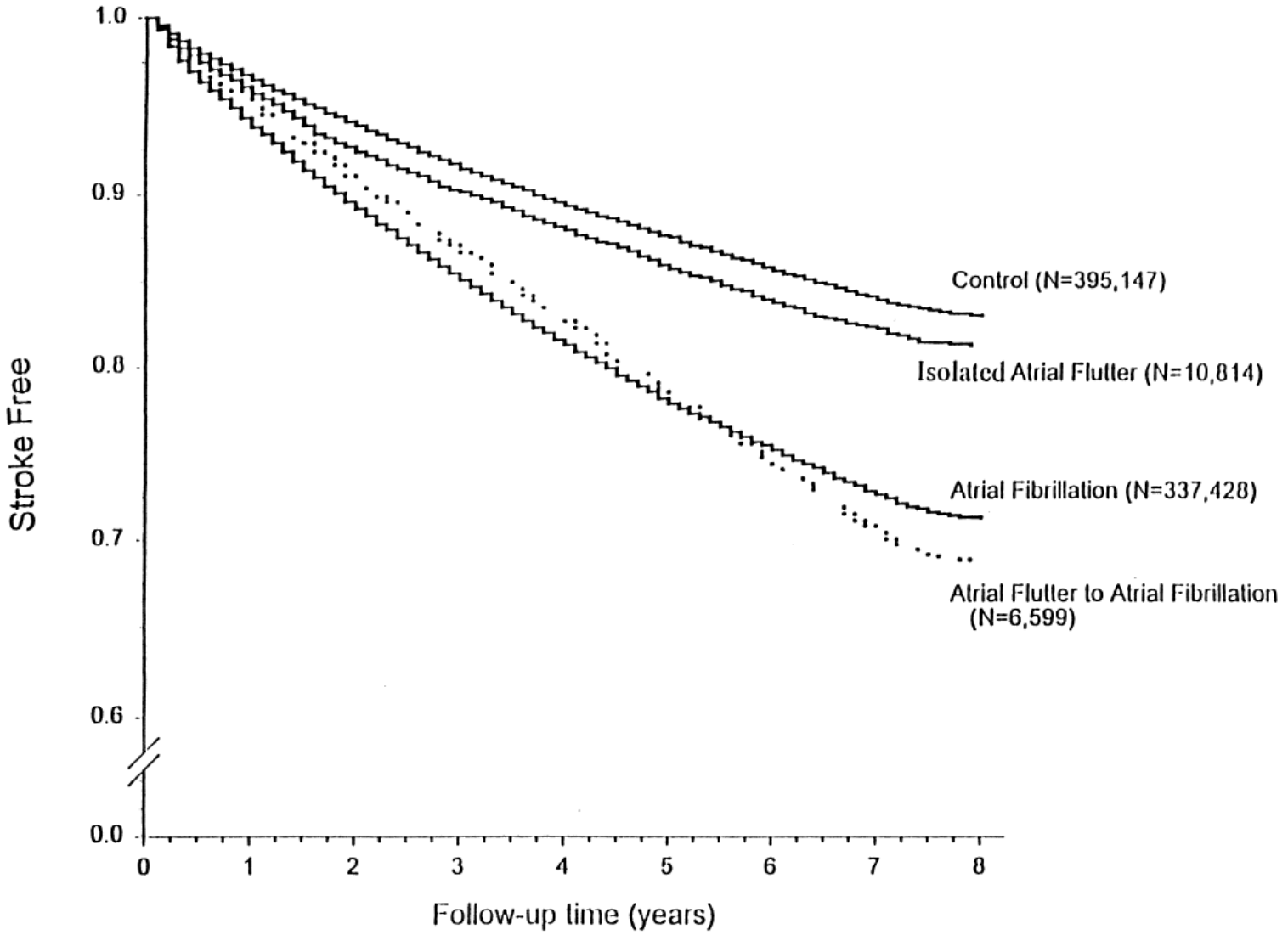
Procedural Complications

- <1% chance of AV block
- Rare
  - VT
  - Occlusion of RCA
  - Perforation
  - IVC narrowing

ACC AHA guidelines

- CLASS I recommendation for ablation
  - Atrial flutter with ANY of the following
    - Recurrent
    - Poorly tolerated
    - Occurs with AADs
- CLASS IIa recommendation for ablation
  - First episode of well tolerated Atrial Flutter

Anticoagulation



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Questions?

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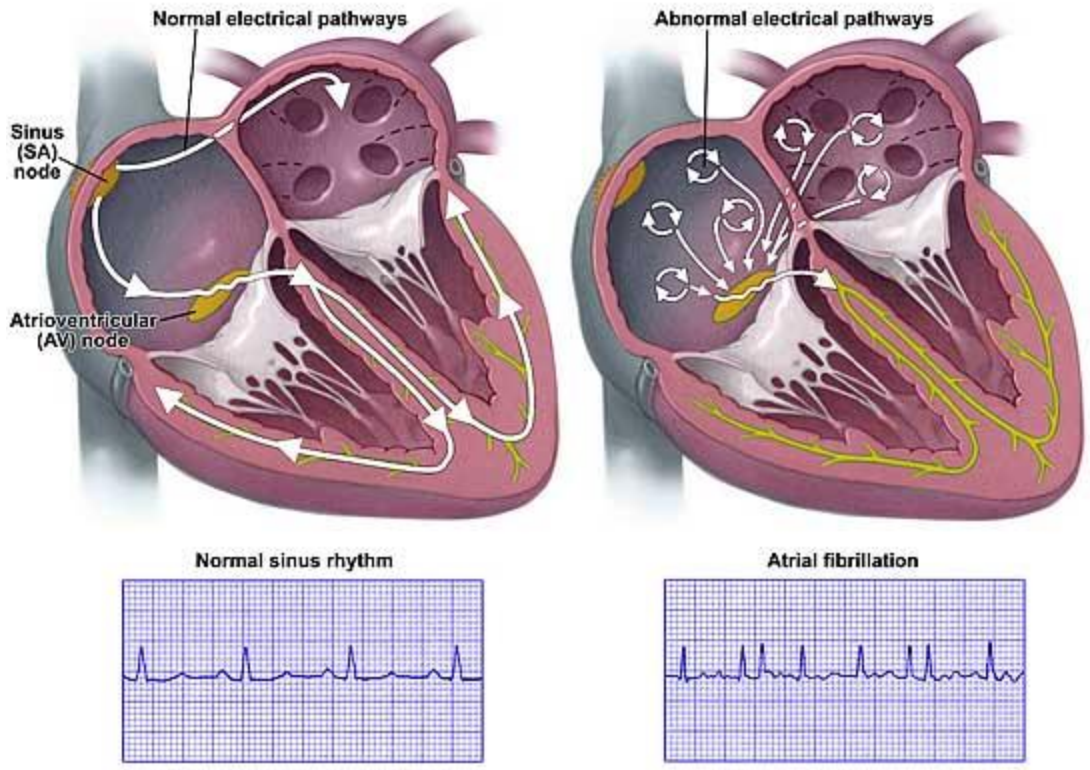
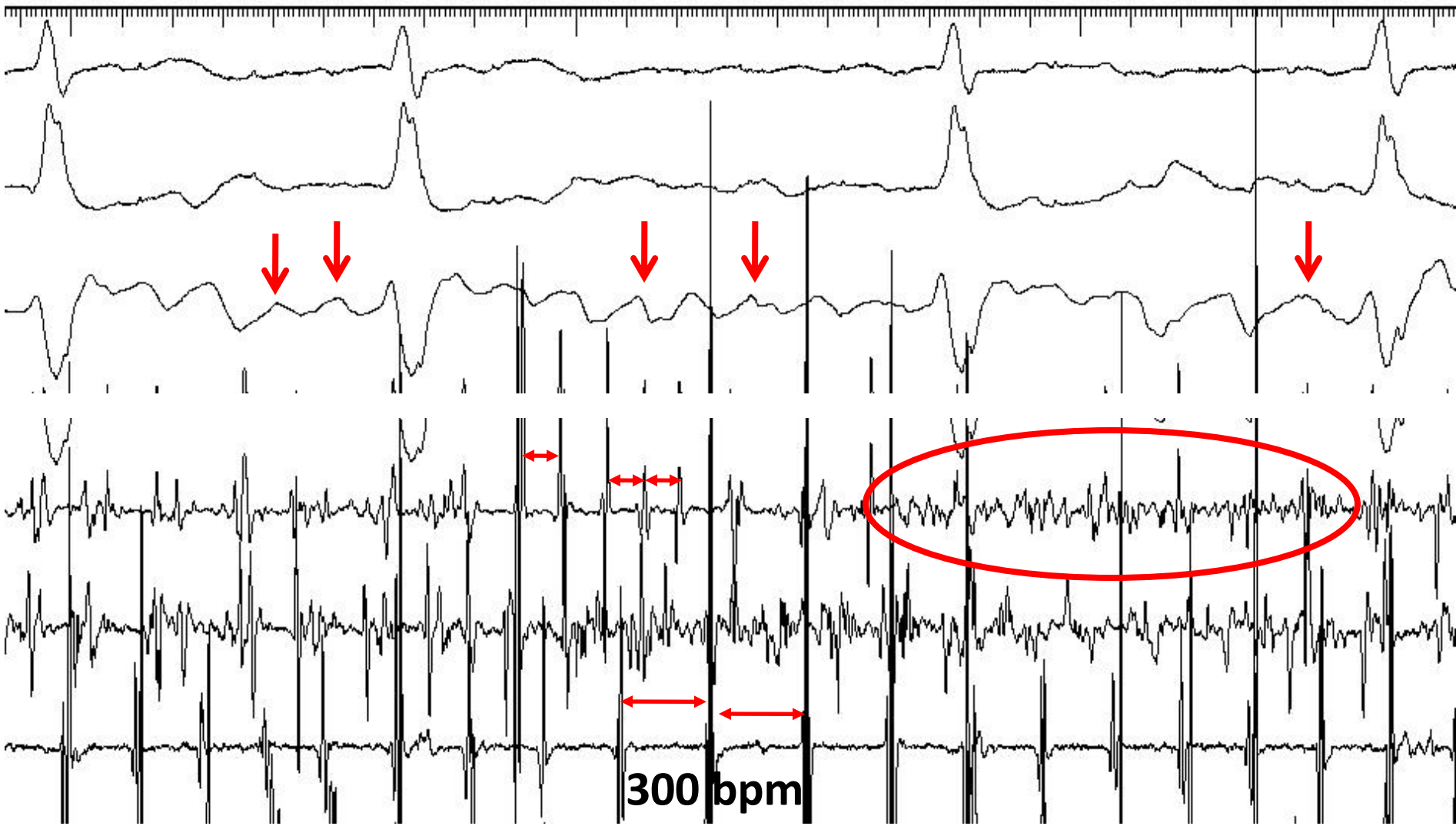
Atrial Fibrillation



What is AF?



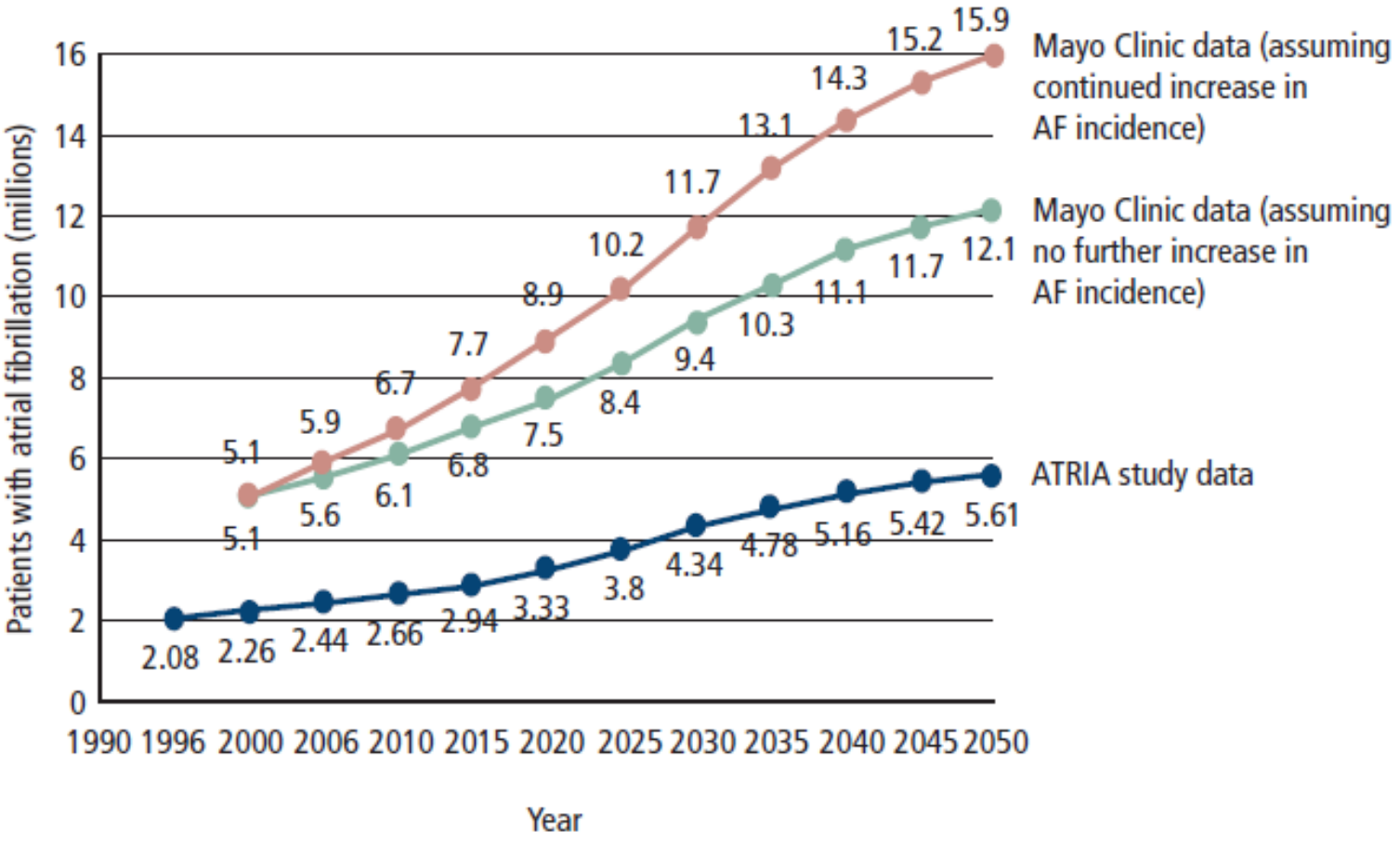
Definitions

- Paroxysmal AF
  - Episodes which spontaneously terminate within 7 days
- Persistent AF
  - Sustained for > 7 days;
  - Long-standing persistent (“chronic”)- > 1 year
- Permanent AF – defined as irreversible atrial fib

Epidemiology of AF

- Affects 10.5 million American
  - 5% of the adult populations
- 450,000 Hospital stays/year
- 5X greater risk of developing heart failure
- After age 40, lifetime risk for men is 26% and for women is 23%

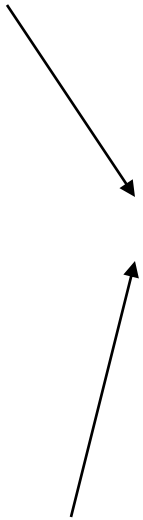
Epidemiology of AF



Miyasaka, Circ 2006

Physiologic Implications

- Loss of atrial mechanical function
  - Loss of AV synchrony
- Reduced coronary blood flow
- Atrial structural remodeling
  - dilatation
  - fibrosis
- LV dysfunction (tachycardia-related cardiomyopathy)
- Mitral regurgitation



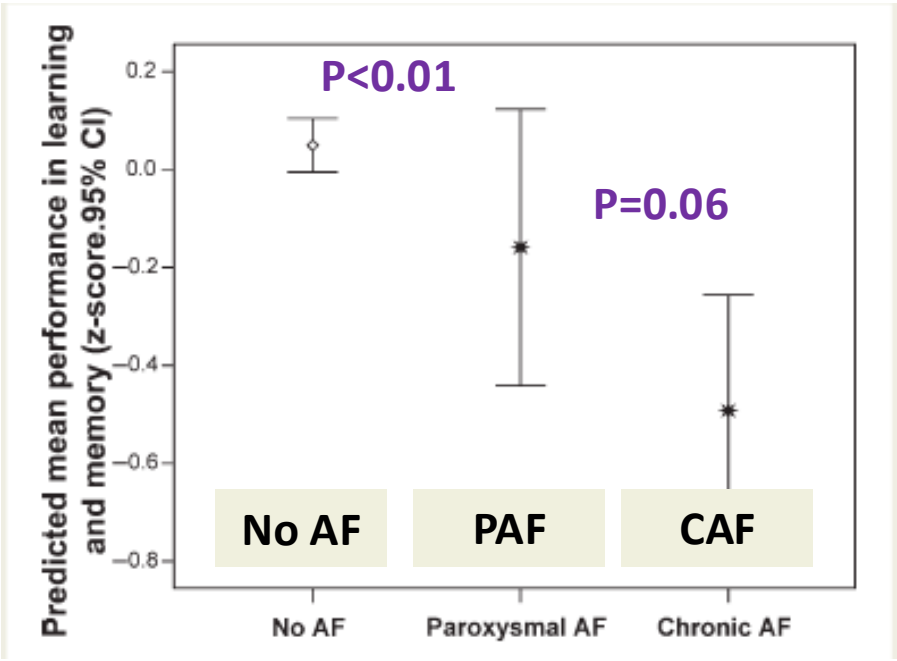
Symptomatic impairment

Presentation

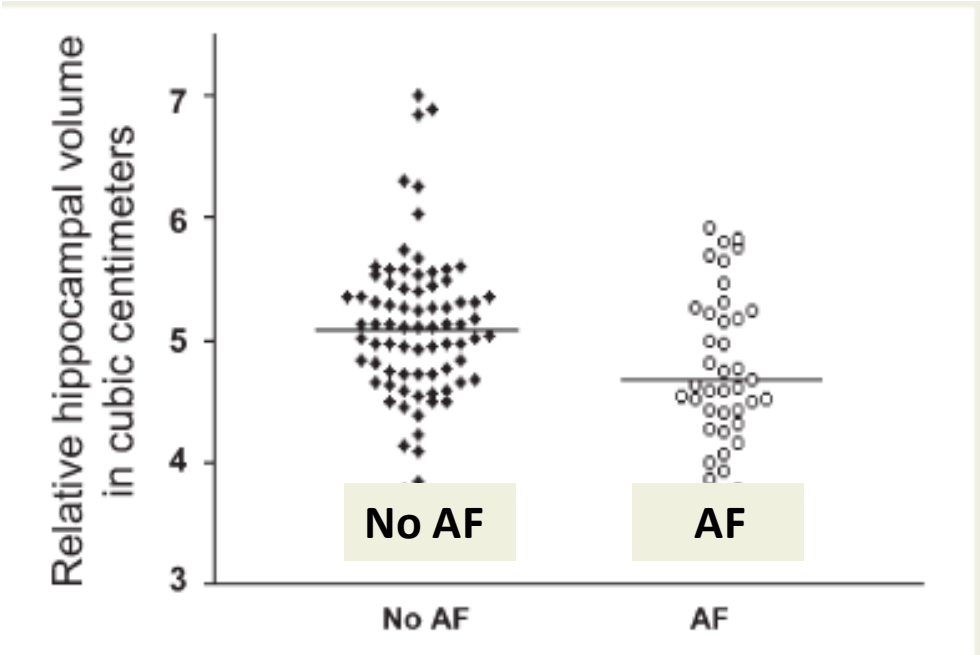
- Palpitations, SOB, chest discomfort, effort intolerance, lightheadedness, irritability
- Fatigue
- CHF
- TIA/CVA
- Syncope – uncommon
- Sudden death – extremely rare
- No or mild symptoms –especially in elderly

Impact of Afib

Learning and Memory in AF

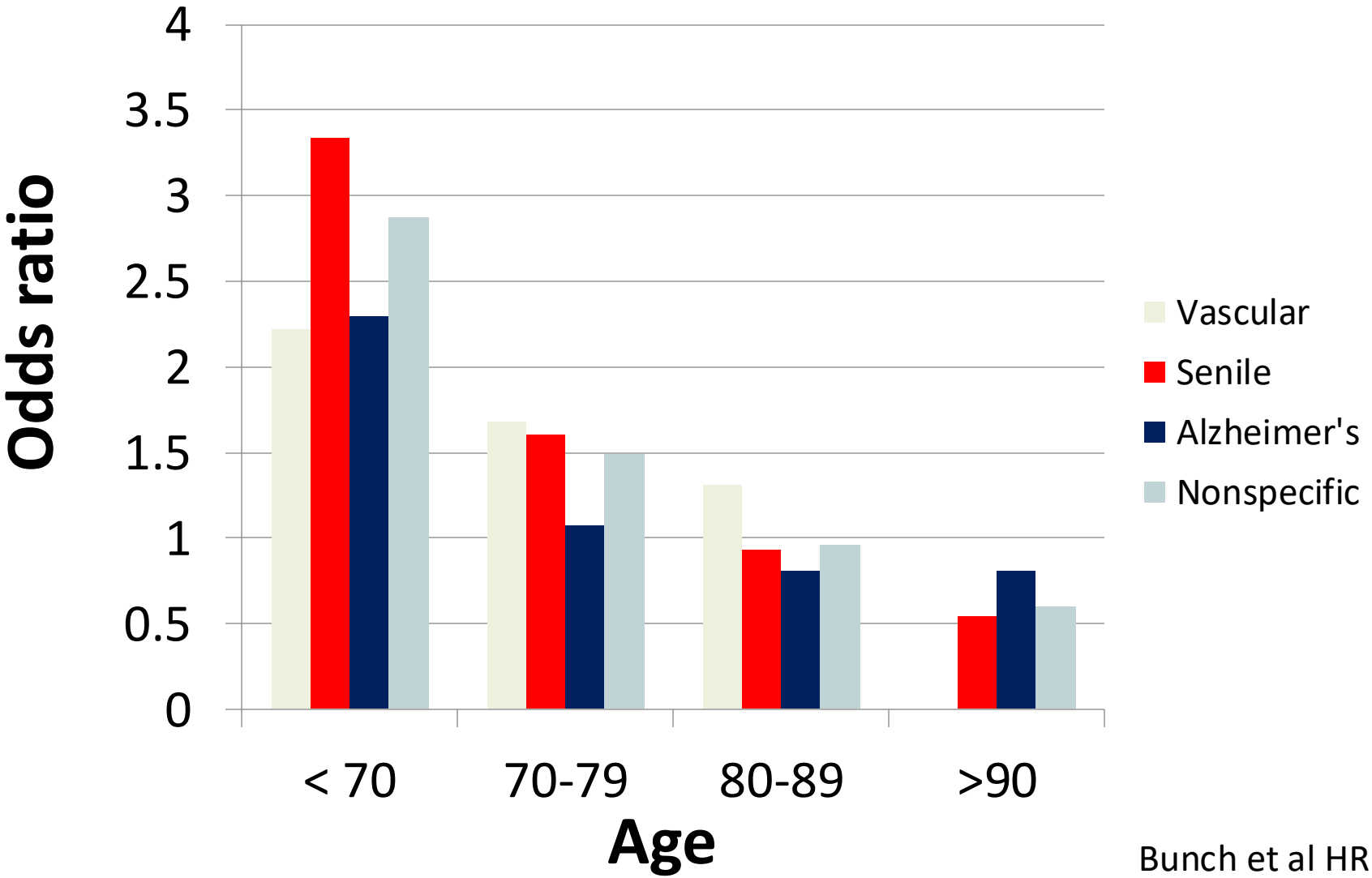


Hippocampal volume



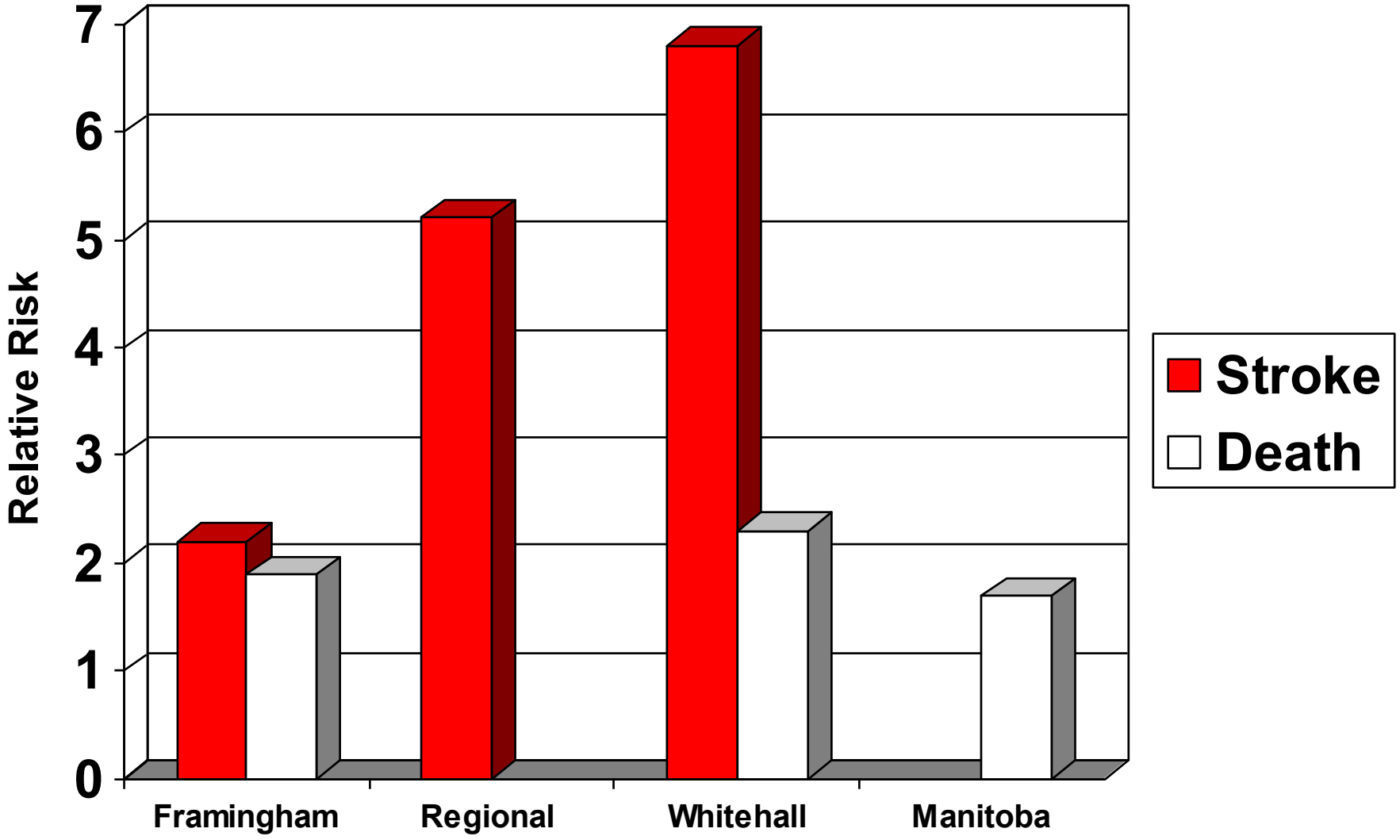
Knecht et al EHJ 2008

AF and Dementia (N=37,025)



Bunch et al HR 2010

Impact of AF


Relative Risk
7
6
5
4
3
2
1
0
Framingham
Regional
Whitehall
Manitoba
Stroke
Death

Stroke risk with AF

- CHA_2DS_2-VASc scoring system

CHA_2DS_2-VASc Risk	Score
CHF/EF ≤ 40%	1
Hypertension	1
Age ≥ 75	2
Diabetes	1
Stroke/TIA/ Thromboemboli	2
Vasc Disease	1
Age 65 - 74	1
Female	1

CHA2DS2-VASc score	Patients (*n* = 7329)	Adjusted stroke rate (%/year)
0	1	0
1	**422 (6%)**	**1.3**
2	1230	2.2
3	1730	3.2
4	1718	4.0
5	1159	6.7
6	679	9.8
7	294	9.6
8	82	6.7
9	14	15.2

HAS-BLED Score

Hypertension History? (uncontrolled, >160 mmHg systolic)	☐ Yes +1
Renal Disease? (Dialysis, transplant, Cr >2.6 mg/dL or >200 µmol/L)	☐ Yes +1
Liver Disease? (Cirrhosis, Bilirubin >2x Normal, AST/ALT/AP >3x Normal)	☐ Yes +1
Stroke History?	☐ Yes +1
Prior Major Bleeding or Predisposition to Bleeding?	☐ Yes +1
Labile INR? (Unstable/high INRs,	☐ Yes +1
Age ≥65?	☐ Yes +1
Medication Usage Predisposing to Bleeding? (Antiplatelet agents, NSAIDs)	☐ Yes +1
Alcohol Usage History?	☐ Yes +1
Patient has none of these	None Present
Score	Click!

Letter	Clinical Characteristic*	Score	HAS-BLED Score	Bleeds per 100 Patient-years†
H	Hypertension	1	0	1.13
A	Abnormal renal and liver function (1 point each)	1 or 2	1	1.02
S	Stroke	1	2	1.88
B	Bleeding	1	3	3.74
L	Labile INRs	1	4	8.70
E	Elderly	1		
D	Drugs or alcohol (1 point each)	1 or 2 Maximum 9 points		

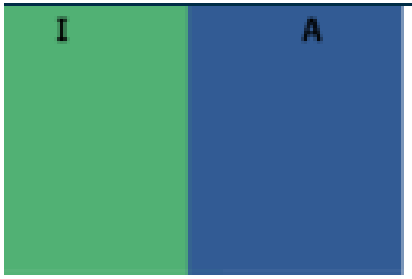
Anticoagulation

- Valvular AF now has a definition
  - Moderate to severe mitral stenosis
  - Mechanical valve
  - Only warfarin for these patients (RE-ALIGN trial)
- Aspirin removed from the guidelines
  - Lack of data
- Bioprosthetic valve data is poor
  - Not included in CHADS VASc validating studies
  - No data long term use

Female no longer counts

I	A	1. **For patients with AF and an elevated CHA_2DS_2-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended.** **Options include:** ■ Warfarin (LOE: A) (S4.1.1-5–S4.1.1-7) ■ Dabigatran (LOE: B) (S4.1.1-8) ■ Rivaroxaban (LOE: B) (S4.1.1-9) ■ Apixaban (LOE: B) (S4.1.1-10), or ■ Edoxaban (LOE: B-R) (S4.1.1-11) **MODIFIED:** This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of CHA_2DS_2-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system. (Section 4.1. in the 2014 AF Guideline) The original text can be found in Section 4.1 of the 2014 AF guideline. Additional information about the comparative effectiveness and bleeding risk of NOACs can be found in Section 4.2.2.2.
	B	
	B	
	B	
	B-R	
IIa	B	12. **For patients with AF (except with moderate-to-severe mitral stenosis or a mechanical heart valve) and a CHA_2DS_2-VASc score of 0 in men or 1 in women, it is reasonable to omit anticoagulant therapy** (S4.1.1-24, S4.1.1-25). **MODIFIED:** Exclusion criteria are now defined as moderate-to-severe mitral stenosis or a mechanical heart valve. (Section 4.1. in the 2014 AF Guideline)
IIb	C-LD	15. **For patients with AF (except with moderate-to-severe mitral stenosis or a mechanical heart valve) and a CHA_2DS_2-VASc score of 1 in men and 2 in women, prescribing an oral anticoagulant to reduce thromboembolic stroke risk may be considered** (S4.1.1-31–S4.1.1-35). **MODIFIED:** Exclusion criteria are now defined as moderate-to-severe mitral stenosis or a mechanical heart valve, and evidence was added to support separate risk scores by sex. LOE was updated from C to

DOACs recommended over Warfarin



2. **NOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) are recommended over warfarin in NOAC-eligible patients with AF (except with moderate-to-severe mitral stenosis or a mechanical heart valve)** (S4.1.1-8–S4.1.1-11).
   NEW: Exclusion criteria are now defined as moderate-to-severe mitral stenosis or a mechanical heart valve. When the NOAC trials are considered as a group, the direct thrombin inhibitor and factor Xa inhibitors were at least noninferior and, in some trials, superior to warfarin for preventing stroke and systemic embolism and were associated with lower risks of serious bleeding.

Renal function and hepatic function should be evaluated at initiation of DOAC and annually

DOAC should not be used in severe hepatic dysfunction

Patients with atrial flutter, anticoagulant therapy should follow same risk profile used for Atrial fibrillation

ESRD patient that require anticoagulation→ warfarin or eliquis

Bridge Trial

- 1800 patients double blinded RCT warfarin bridging with lovenox vs. no bridging
  - Warfarin stopped 5 days prior
  - No mechanical valves
- No difference in thromboembolic events
- 1.3% vs 3.2% increased risk bleeding in bridge group

AF without mechanical valve balance risks of stroke, bleeding and duration of time not anticoagulated in determining bridging

Douketis, NEJM 8/2015

Cardioversions

COR	LOE	RECOMMENDATIONS
I	B-R	1. For patients with AF or atrial flutter of 48 hours' duration or longer, or when the duration of AF is unknown, anticoagulation with warfarin (INR 2.0 to 3.0), a factor Xa inhibitor, or direct thrombin inhibitor is recommended for at least 3 weeks before and at least 4 weeks after cardioversion, regardless of the CHA_2DS_2-VASc score or the method (electrical or pharmacological) used to restore sinus rhythm (S6.1.1-1–S6.1.1-12).
IIa	B-NR	4. For patients with AF or atrial flutter of less than 48 hours' duration with a CHA_2DS_2-VASc score of 2 or greater in men and 3 or greater in women, administration of heparin, a factor Xa inhibitor, or a direct thrombin inhibitor is reasonable as soon as possible before cardioversion, followed by long-term anticoagulation therapy (S6.1.1-13, S6.1.1-14). MODIFIED: Recommendation COR was changed from I in the 2014 AF Guideline to IIa, and LOE was changed from C in the 2014 AF Guideline to B-NR. In addition, a specific CHA_2DS_2-VASc score is now specified.
IIb	B-NR	6. For patients with AF or atrial flutter of less than 48 hours' duration with a CHA_2DS_2-VASc score of 0 in men or 1 in women, administration of heparin, a factor Xa inhibitor, or a direct thrombin inhibitor, versus no anticoagulant therapy, may be considered before cardioversion, without the need for post-cardioversion oral anticoagulation (S6.1.1-13, S6.1.1-14, S6.1.1-16). MODIFIED: Recommendation LOE was changed from C in the 2014 AF Guideline to B-NR to reflect evidence from 2 registry studies and to include specific CHA_2DS_2-VASc scores derived from study results.

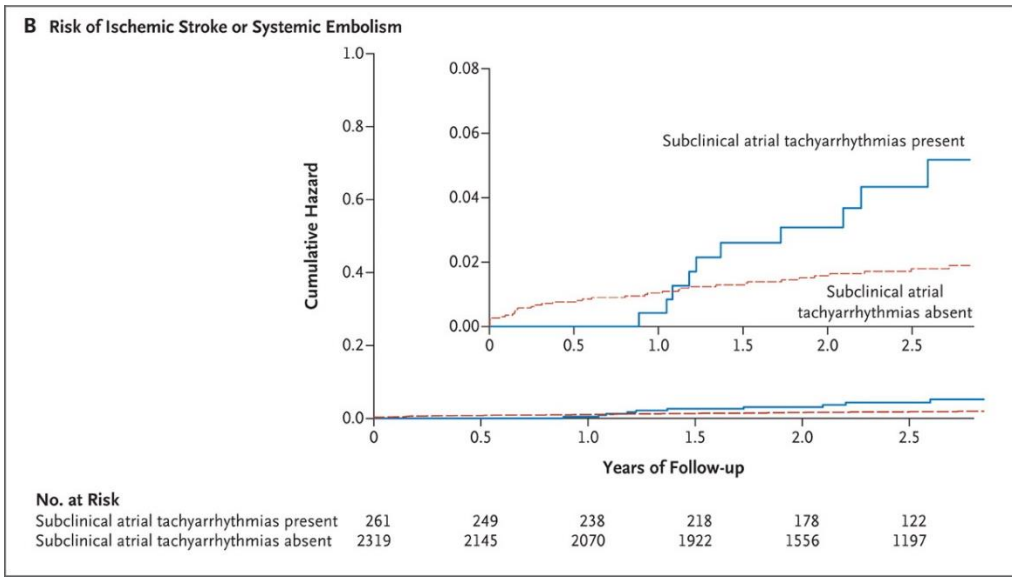
How much atrial fibrillation is required to cause a stroke?

- 48 hours
- 24 hours
- 5.5 hours
- 6 minutes

6 minutes

- Assert trial, *NEJM* 1/2012
- 2580 patients with pacemakers
- HTN

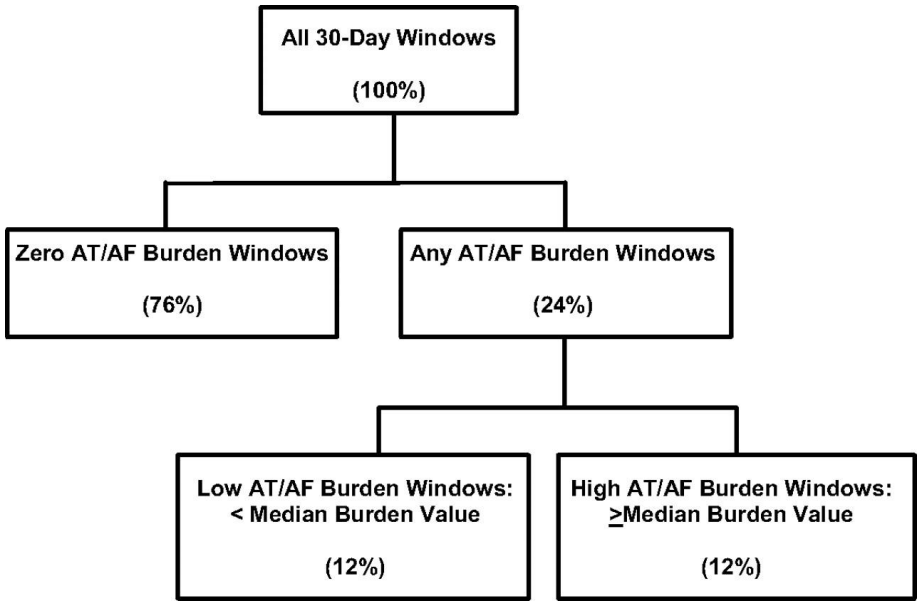
- Monitored for 3 months
  - >190bpm for >6 minutes
- Followed for 2.5 years



- 10% with atrial arrhythmias
- 5x more likely to develop afib
- 2.5x more likely to have a stroke (p=.007)

5.5 hours

- Trends Study, *Circ*, 2009
- 2486 patients
- Chads score 1 or greater
- Pacemaker/Defibrillator
- Followed for 1.4 years



- Low burden vs. zero burden
  - Hazard ration 0.98 p value .97
- High burden vs. zero burden
  - Hazard ratio 2.2 p value .06

Glotzer, t et al. *Circ arrhythmia electrophysiol* 2009:2:474-480

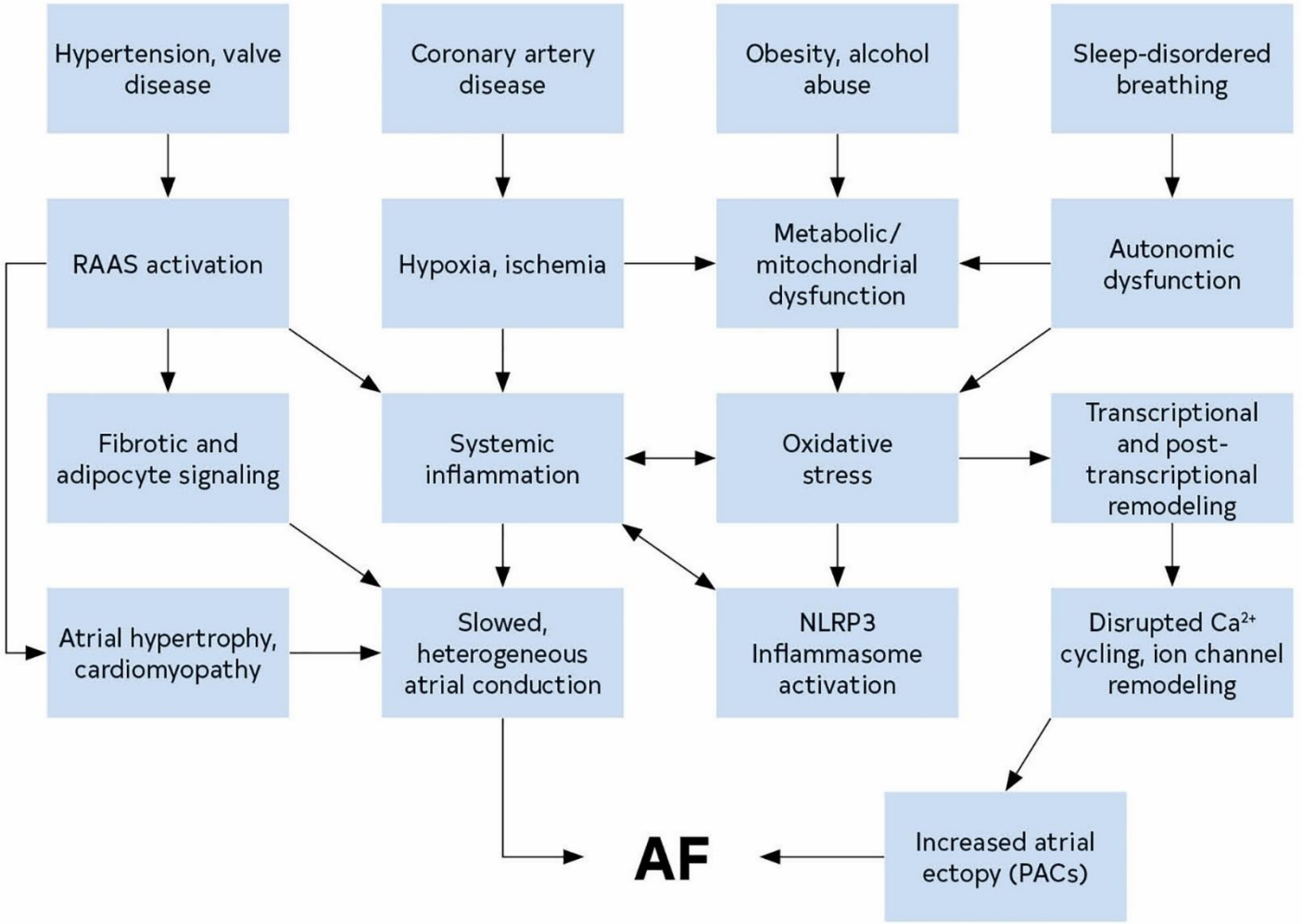
More Studies!

Study	Population / Detection Method	AF Burden Studied	Stroke / SE Risk	Key Insight
ASSERT (2012, 2017)	Pacemaker / ICD (SCAF)	≥6 min; ≥24 h subgroup	6 min–24 h → NS; ≥24 h → ↑ 3× risk	Only **>24 h** SCAF predicts stroke
TRENDS (2009)	CIED	≥5.5 h/day	2× higher TE risk	Burden threshold effect
SOS-AF (2014)	Pooled 10 k device pts	≥1 h/day	HR ~ 2.1	Risk rises even below 24 h
KP-RHYTHM (2018)	Patch (14 d)	≥11.4 % time in AF (~1.6 h/day)	3× TE risk off OAC	**Cumulative burden** > episode duration
NOAH-AFNET 6 (2023)	AHRE > 6 min; no ECG AF	6 min–24 h	NS stroke ↓; ↑ bleed	Low event rate ≈ no net benefit
ARTESiA (2024)	Device-detected AF 6 min–24 h + CHA_2DS_2-VASc ≥ 3 (M/ ≥ 4 F)	6 min–24 h	Stroke/SE 0.78 % vs 1.24 % per yr (Apixaban vs Aspirin) HR 0.63 ↑ Bleed HR 1.8	Even **short SCAF** warrants OAC if high-risk

My Rule

- >24 hour of afib on a monitor
  - anticoagulation
- 6min-24 hours
  - Discussion, chads vasc score
  - Less ischemic stroke, more hemorrhage
- <6 minutes
  - Continue monitoring

Lifestyle Management of Atrial Fibrillation



Weight loss in obese patients

I	B-R	1. **For overweight and obese patients with AF, weight loss, combined with risk factor modification, is recommended** (S7.13-1–S7.13-3). NEW: New data demonstrate the beneficial effects of weight loss and risk factor modification on controlling AF.

Modifiable risk factors:

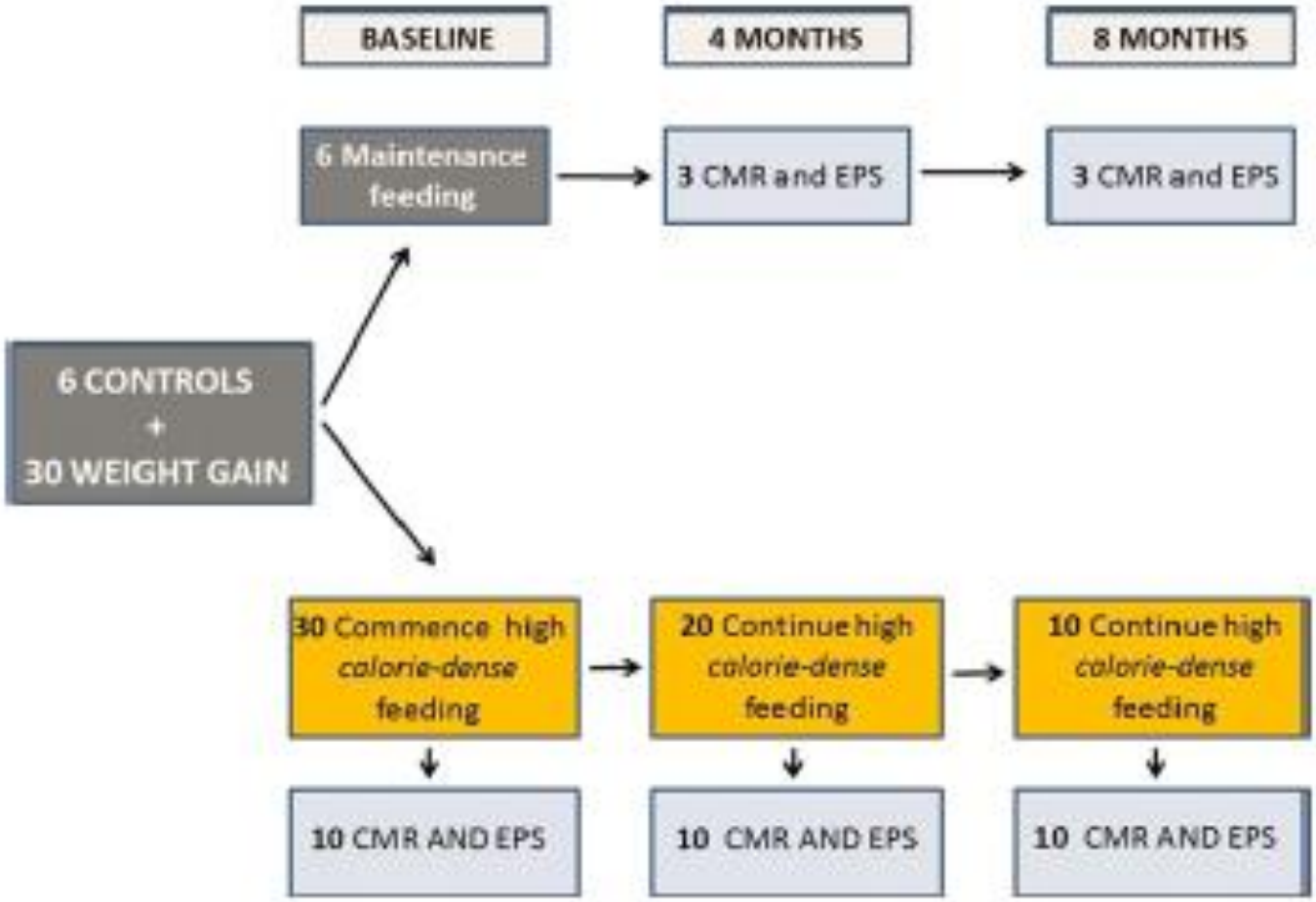
1. Sleep Apnea Treatment
2. Essential HTN
3. Hyperlipidemia
4. Glucose intolerance
5. Alcohol use
6. Tobacco dependence
7. Obesity

Not a risk factor:

Caffeine (most studies)

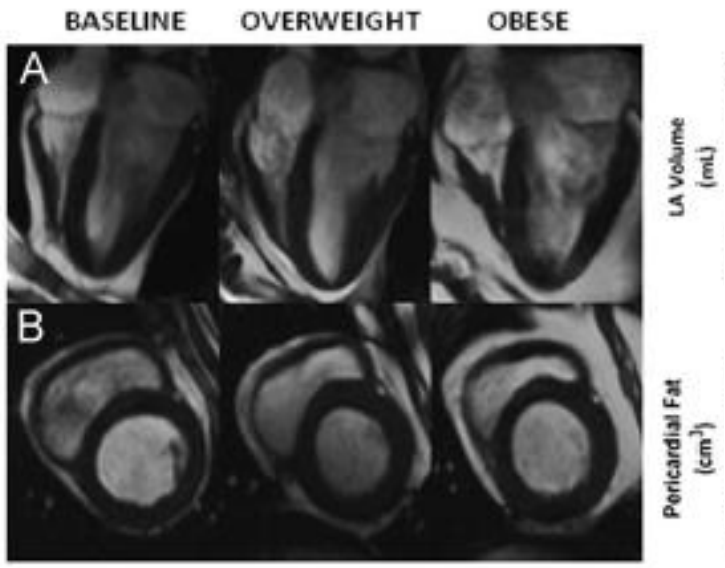
Chocolate

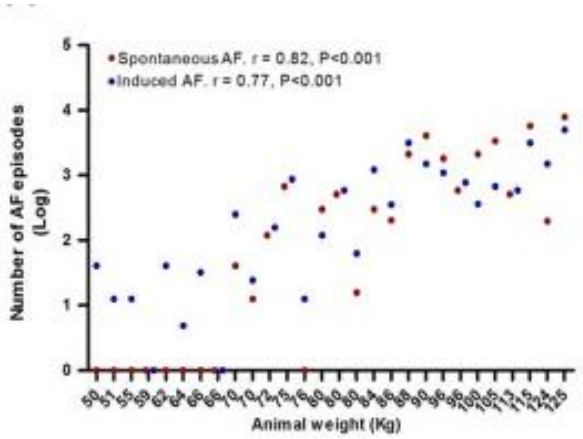
Obesity

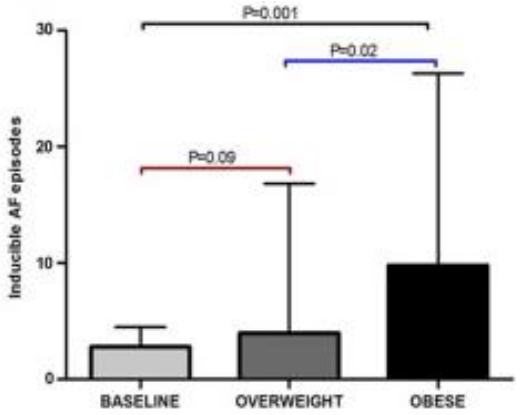


Abed HS, Hrt Rhy: 2013 2050-2060

Results



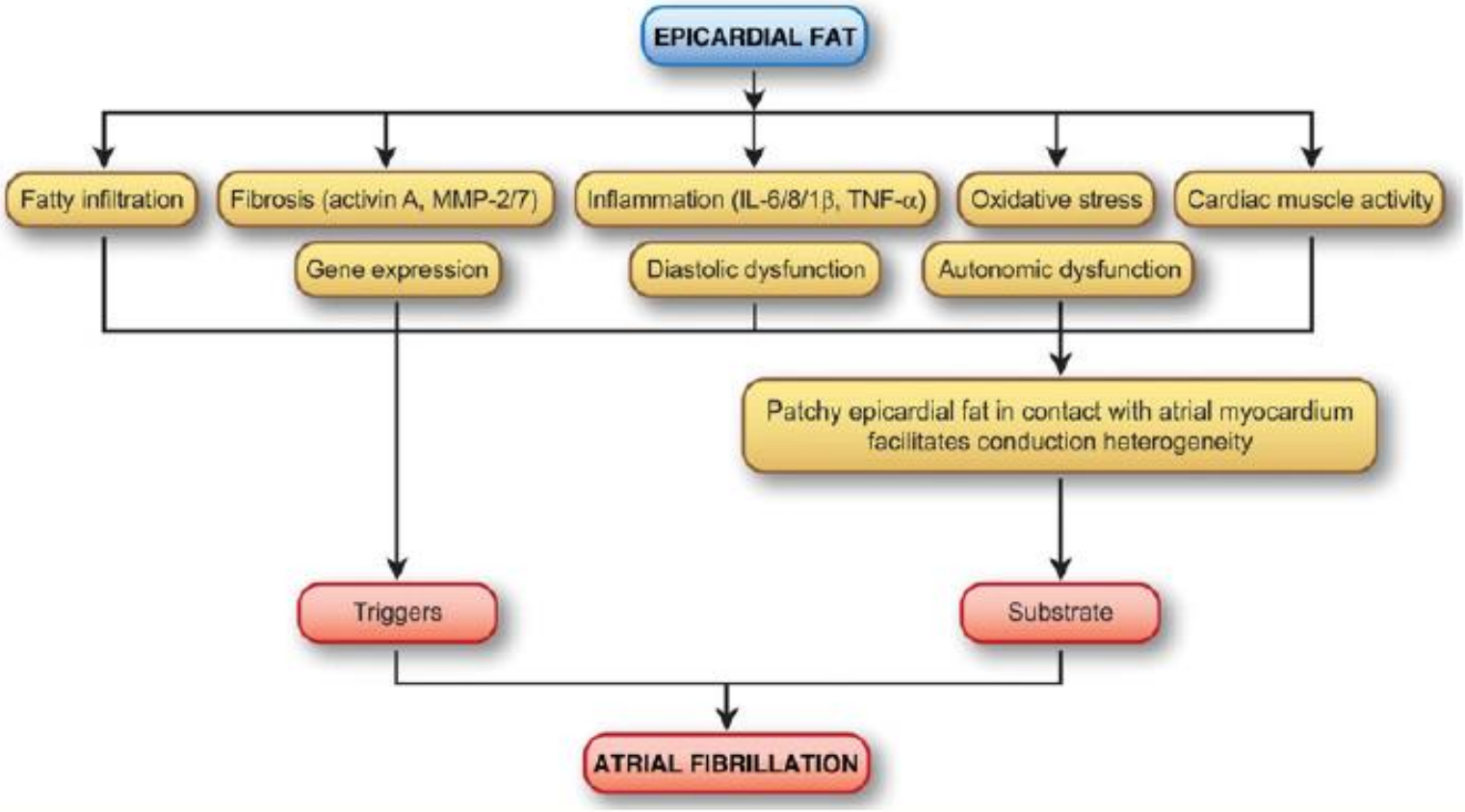




Increased atrial volumes
Elevated blood pressure
Increased ventricular mass
Increased pericardial fat

EPS
increased conduction heterogenity
increased inducibility of afib
increased spontaneous afib

Epicardial fat



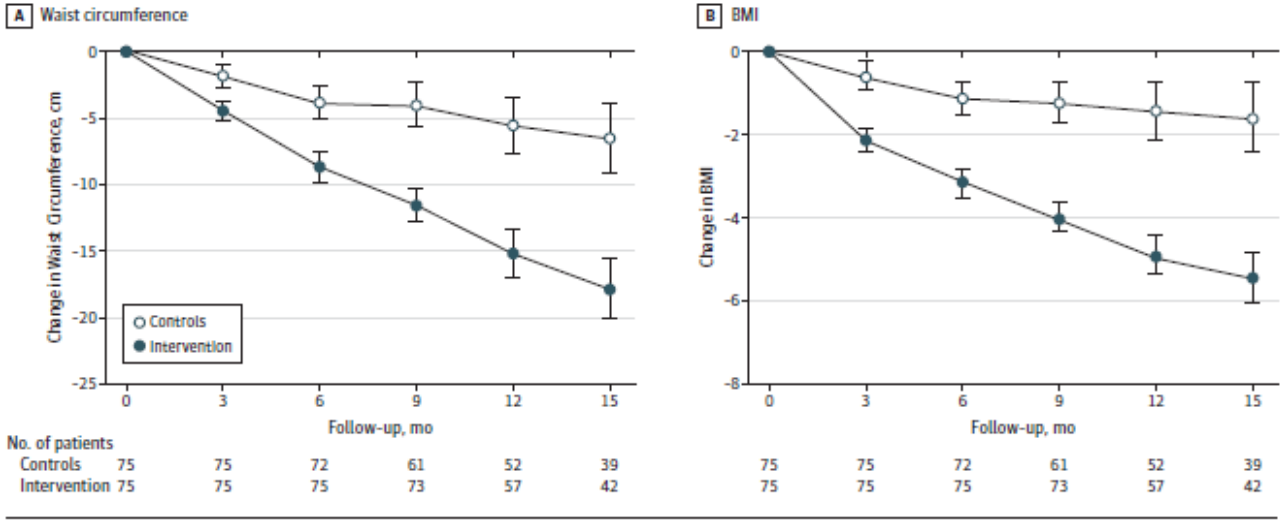
Wong CX, Eur Heart J 2017: 1294-302

Clinical Study

- RCT in 2010 Australia
- 150 obese patients with symptomatic AF
- Randomized
  - Lifestyle advice (control)
  - Aggressive weight management
    - 800-1200 cal/day, hi protein, low glycemic index
    - Exercise schedule 45 minutes 3x/ weekly
- Endpoint (15 months)
  - QOL
  - Holter burden of Afib

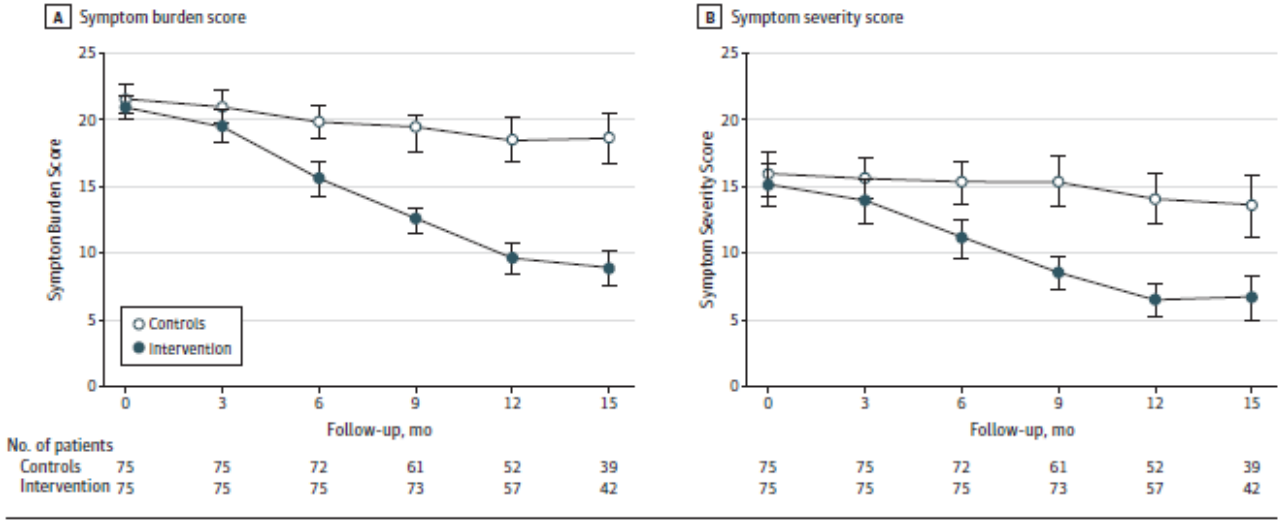
Abed HS, JAMA 2010, 2050-2060

Results



Error bars indicate 95% confidence intervals. BMI indicates body mass index, calculated as weight in kilograms divided by height in meters squared. A, Between-group level of significance: $P = .21$ at time 0, $P = .01$ at 3 months, $P < .001$ at 6, 9, 12, and 15 months. B, Between-group level of significance: $P = .13$ at time 0, $P < .001$ at 3, 6, 9, 12, and 15 months.

Figure 3. Changes in Atrial Fibrillation Symptom Scale (AFSS) Scores Over Study Follow-up



14kg vs 3.6kg weight loss

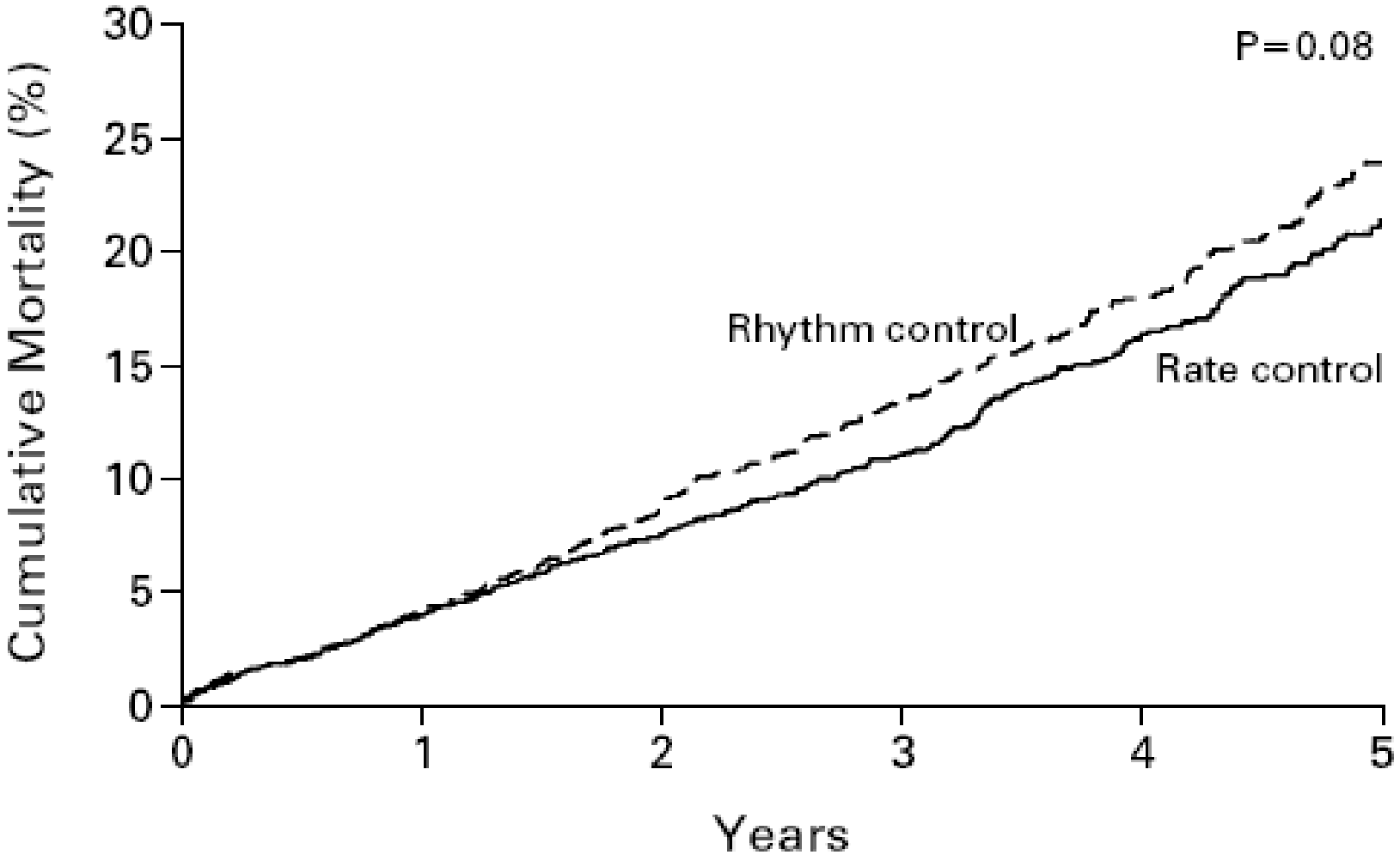
QOL: significant improvement

7 days Holter results @12m

Total duration afib:
treated 1176→491min
Control 1394->1546min

Medical Management of Atrial Fibrillation

AFFIRM – rate vs. rhythm control



AFFIRM NEJM 2002

AFFIRM Trial

Management of atrial fibrillation with the rhythm-control strategy offers no survival advantage over the rate-control strategy, and there are potential advantages, such as a lower risk of adverse drug effects, with the rate-control strategy

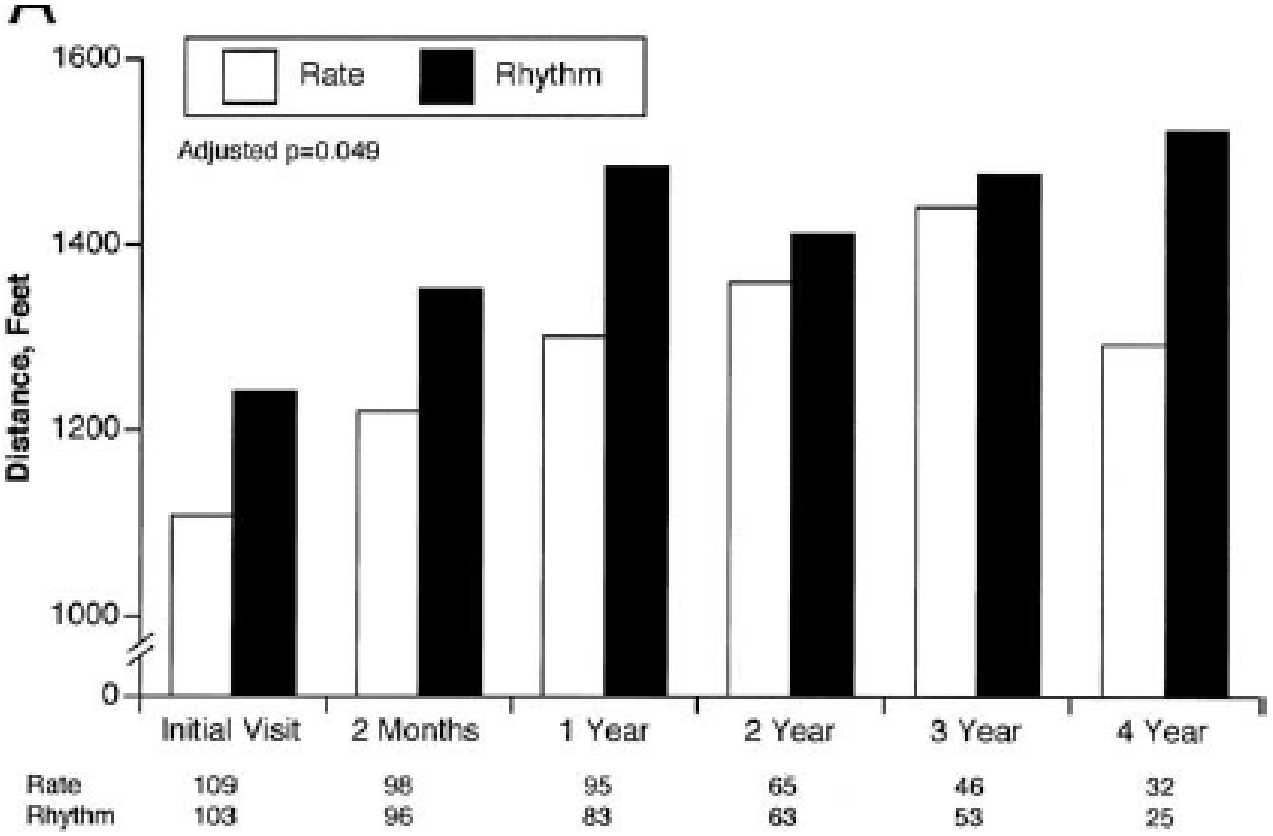
UPMC
LIFE CHANGING MEDICINE

So what is the problem?

AFFIRM

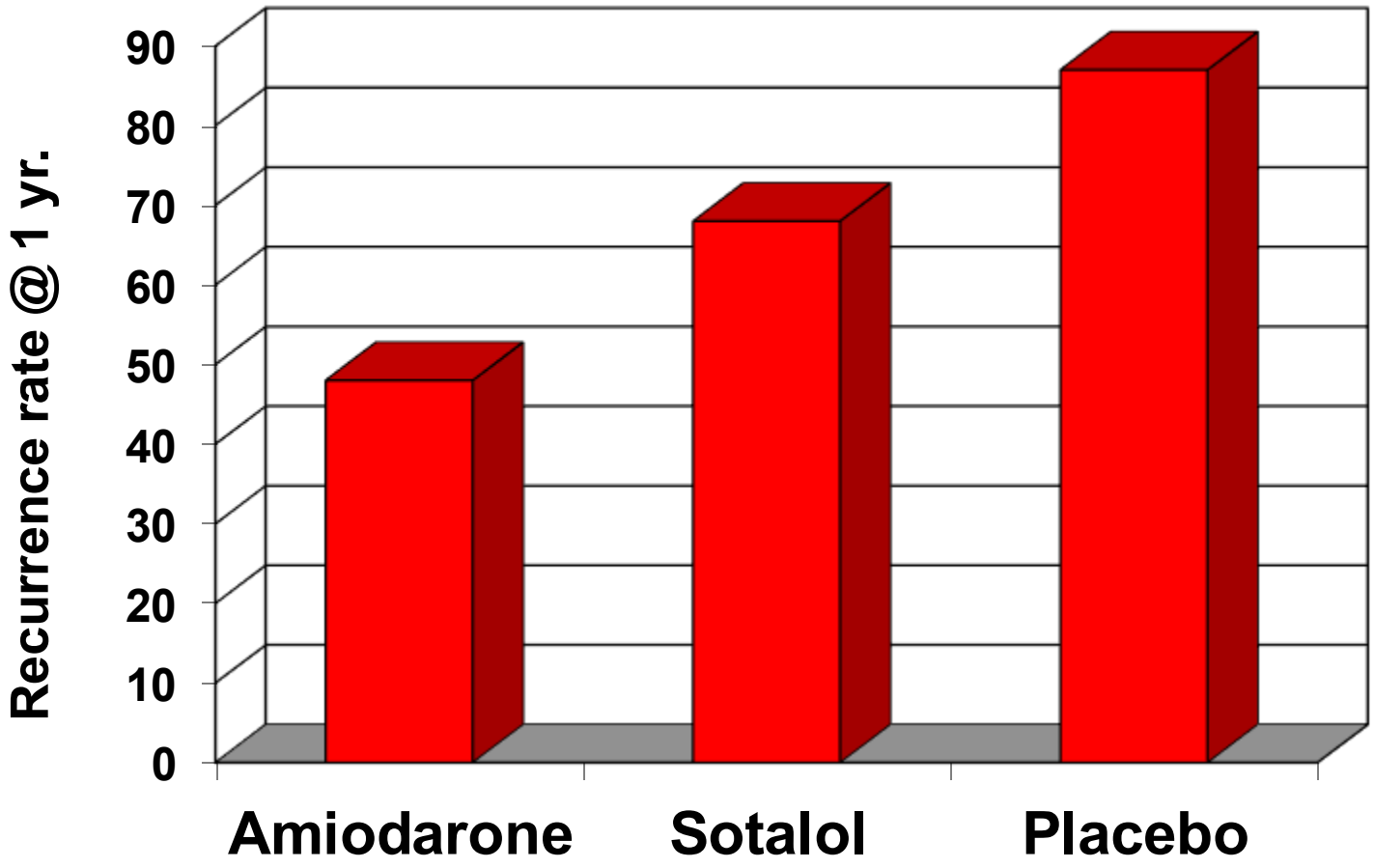
- Should not be extrapolated to all patients with AF
  - Largely asymptomatic
  - Elderly population (average 70 years)
  - Sinus rhythm only “achieved” in 2/3
    - Rhythm status only assessed by ECG in office
    - Prevalence of sinus rhythm likely much lower if assessed by extended monitoring

Problems with AFFIRM



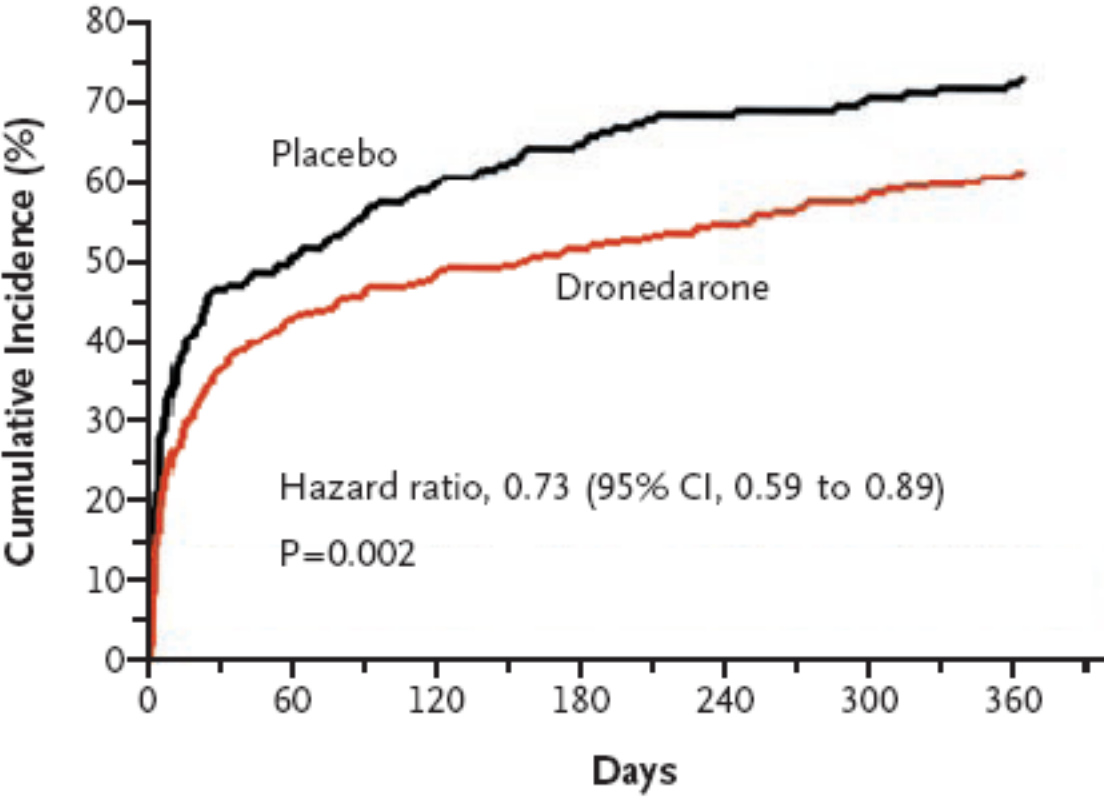
Chung JACC 2005

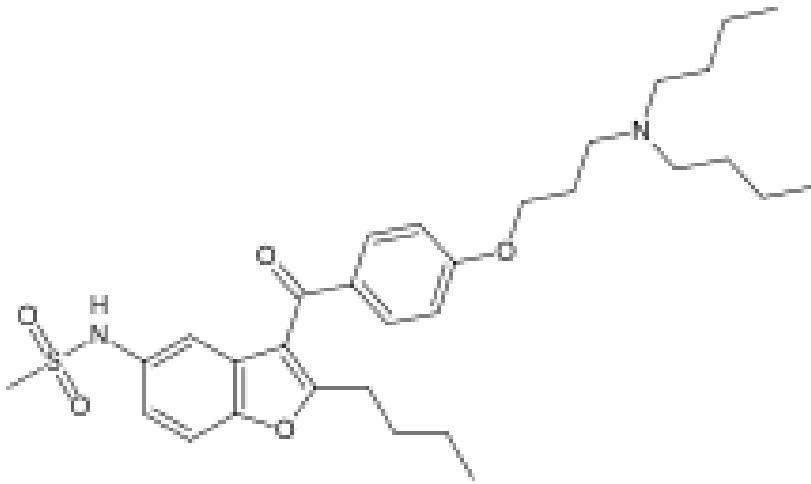
Antiarrhythmic therapy (SAFE-T)



Singh et al NEJM 2005

Dronedarone vs. Placebo





Dronedarone (Multaq)

Singh et al NEJM 2007

On-treatment analysis

- SR associated with improved survival (OR 0.53, $p<0.001$)
- Conclusion
  - beneficial effects of antiarrhythmic therapy neutralized by their harmful side effects
    - Antiarrhythmic drugs increased mortality by 49%
  - Method of achieving sinus rhythm without increasing mortality would be desirable

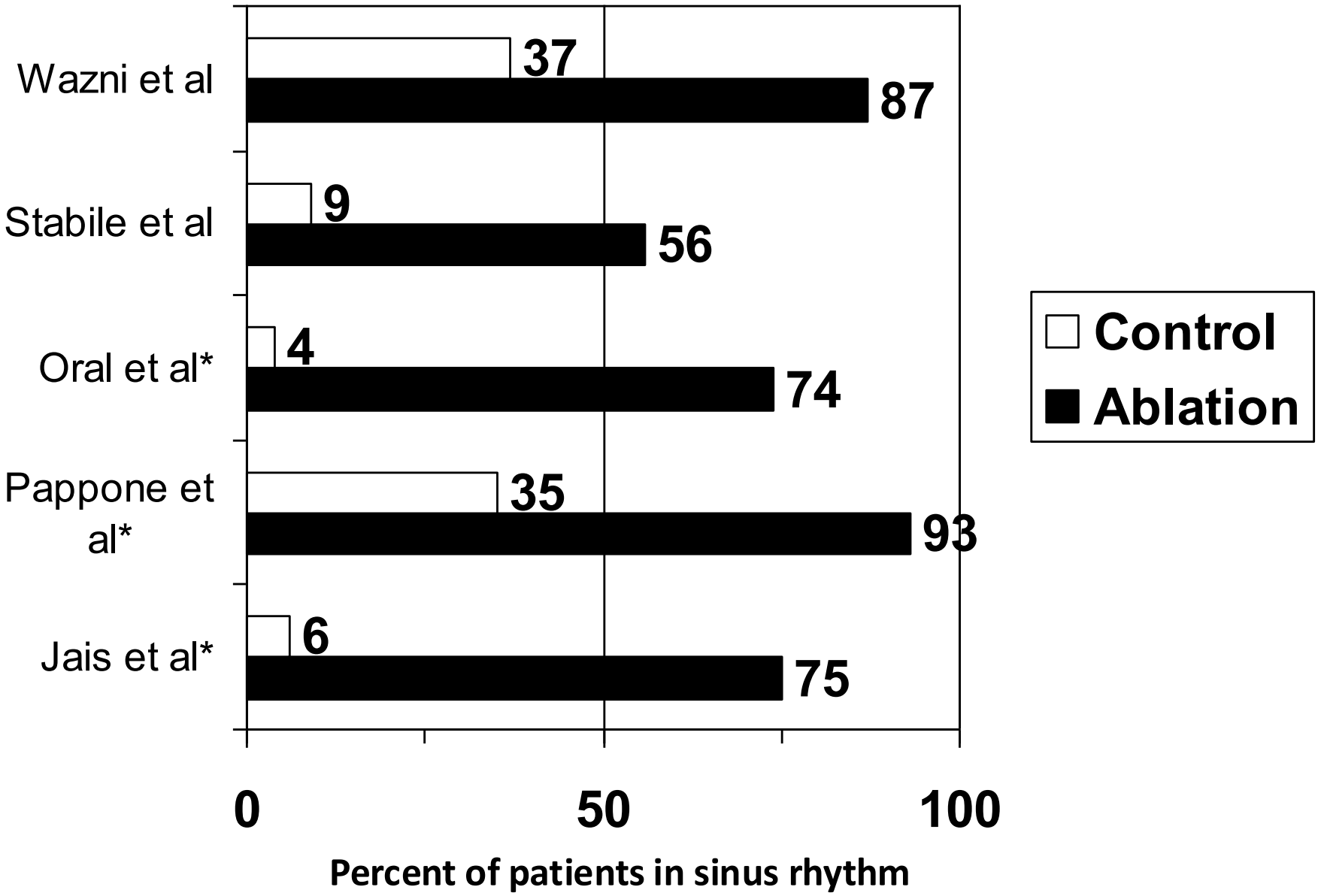
- That method is …

Corley et al Circ 2004

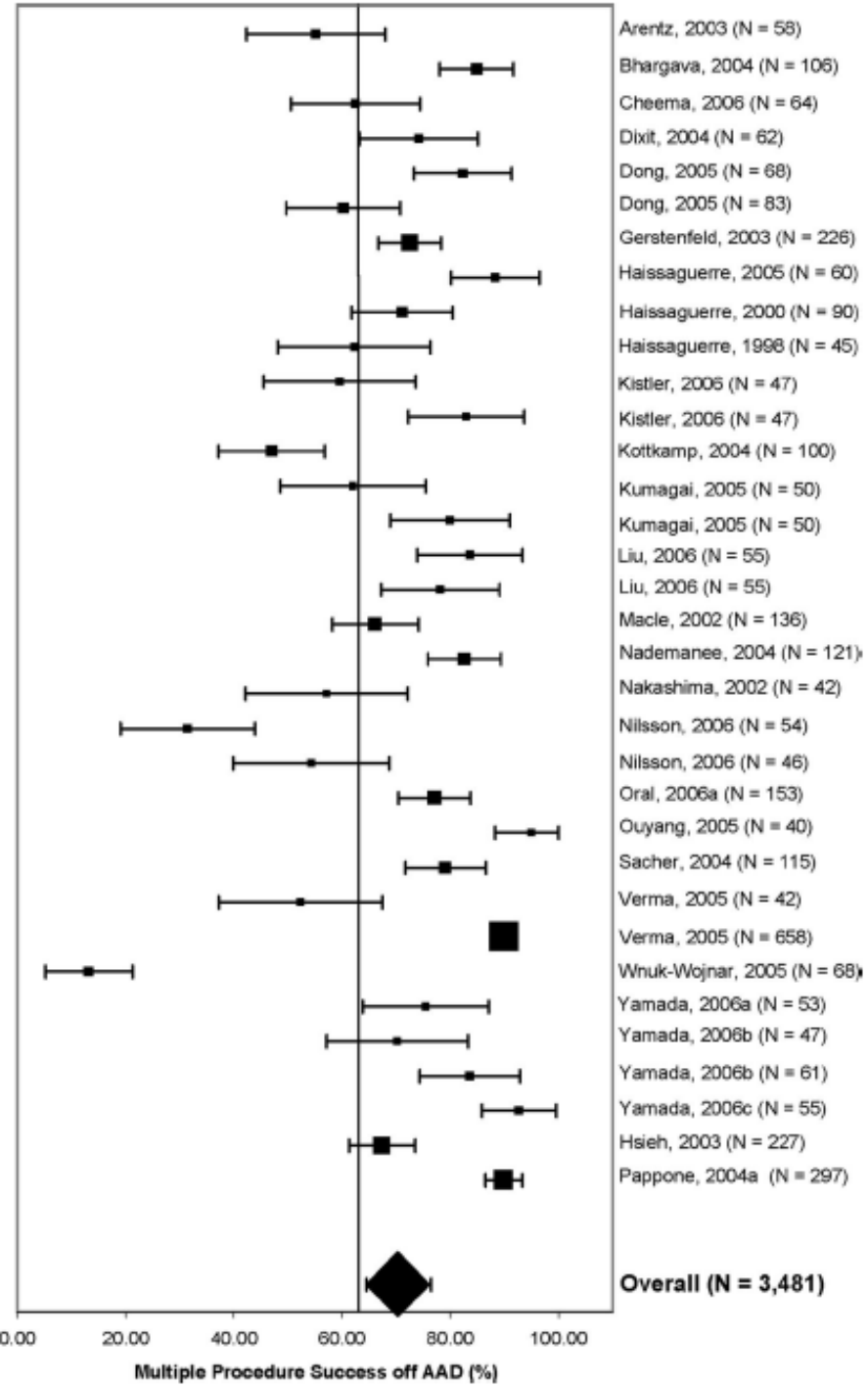
UPMC
LIFE CHANGING MEDICINE

CATHETER ABLATION?

RF ablation versus Anti-arr. drugs



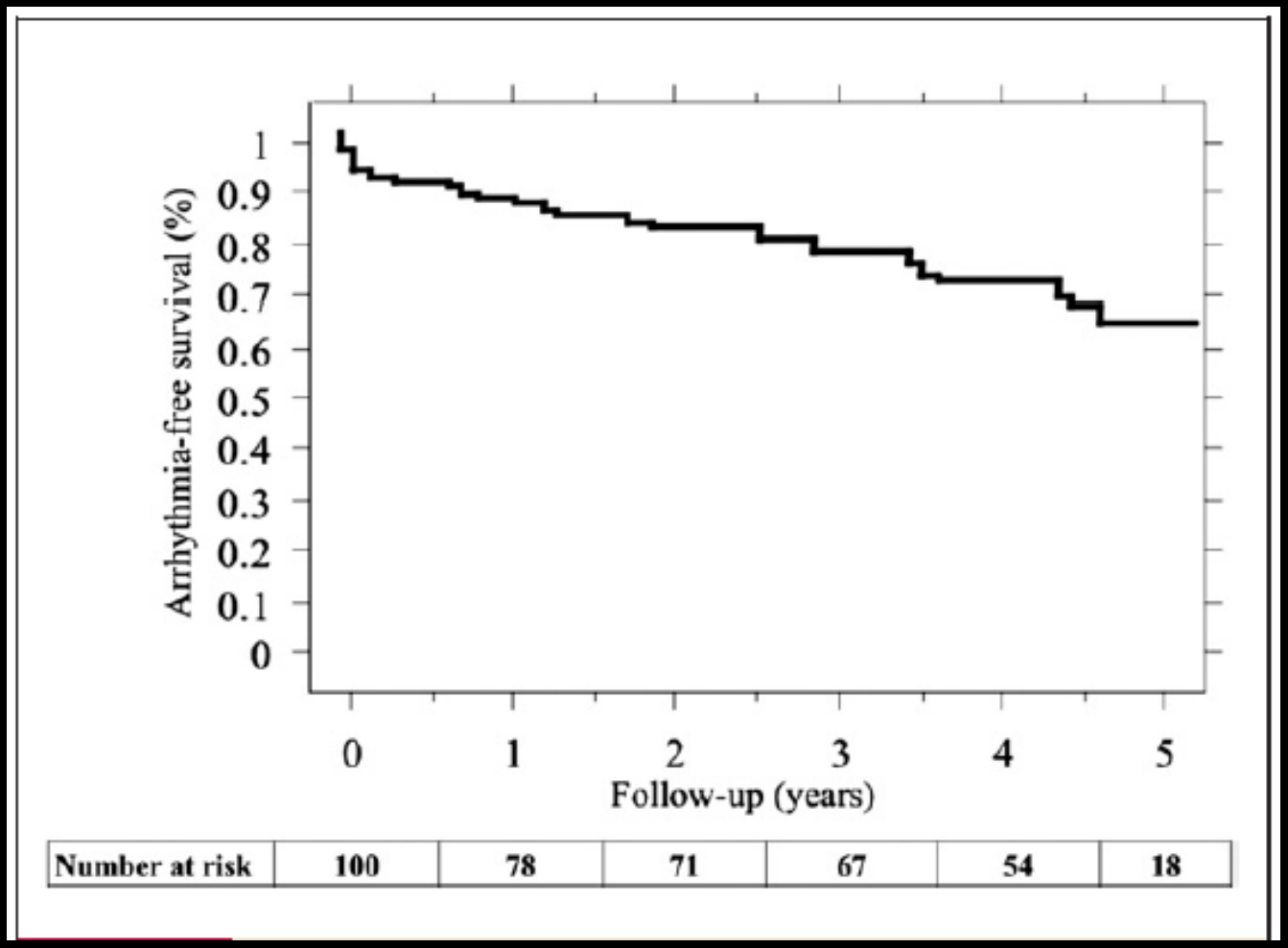
Success of catheter ablation



71% cure rate for paroxysmal atrial fibrillation off of antiarrhythmic therapy with multiple procedures

Calkins Circ EP 2009

Outcomes



Weerasooriya et al JACC 2011

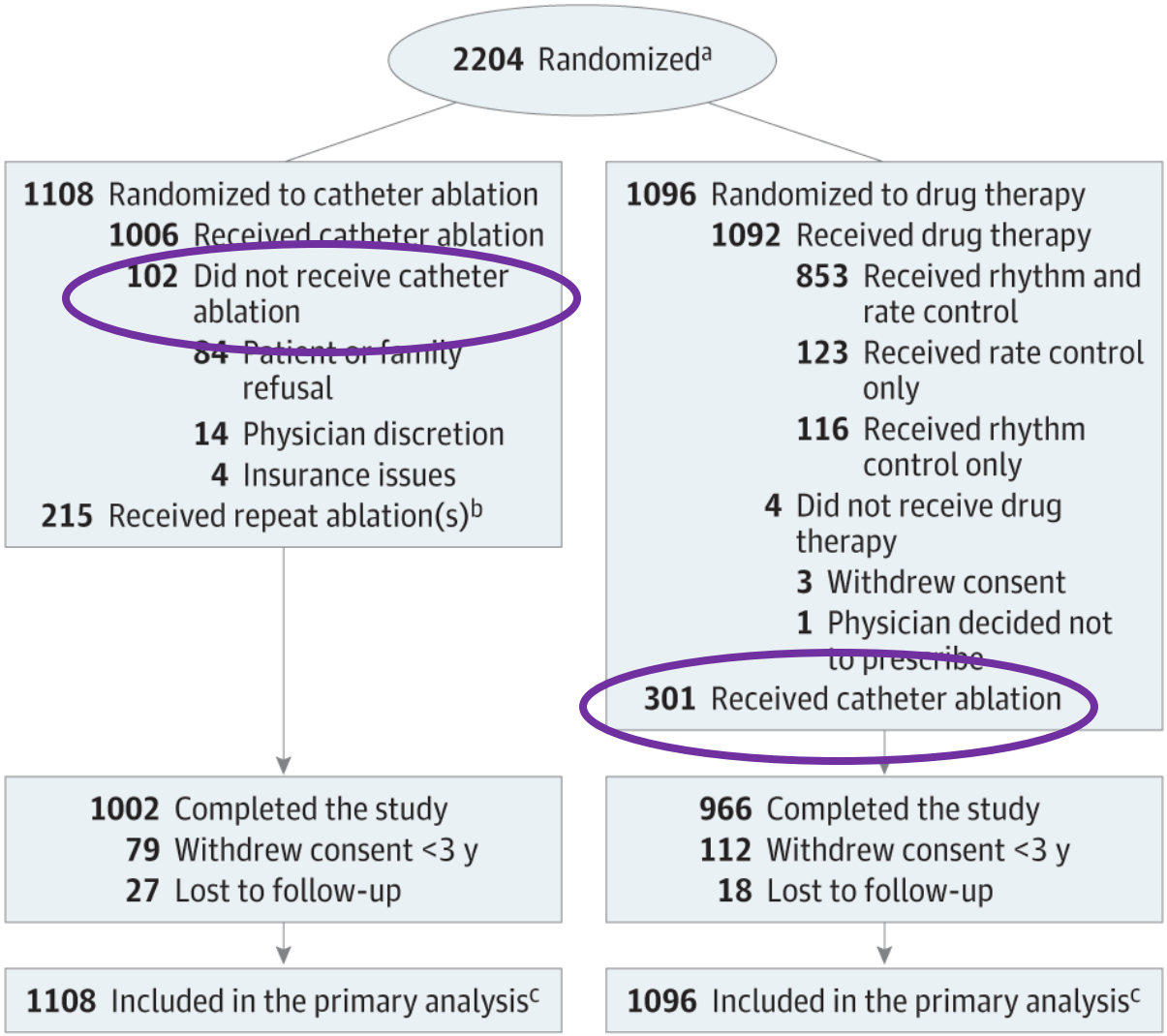
Mortality Benefit?

Cabana Study (2019)

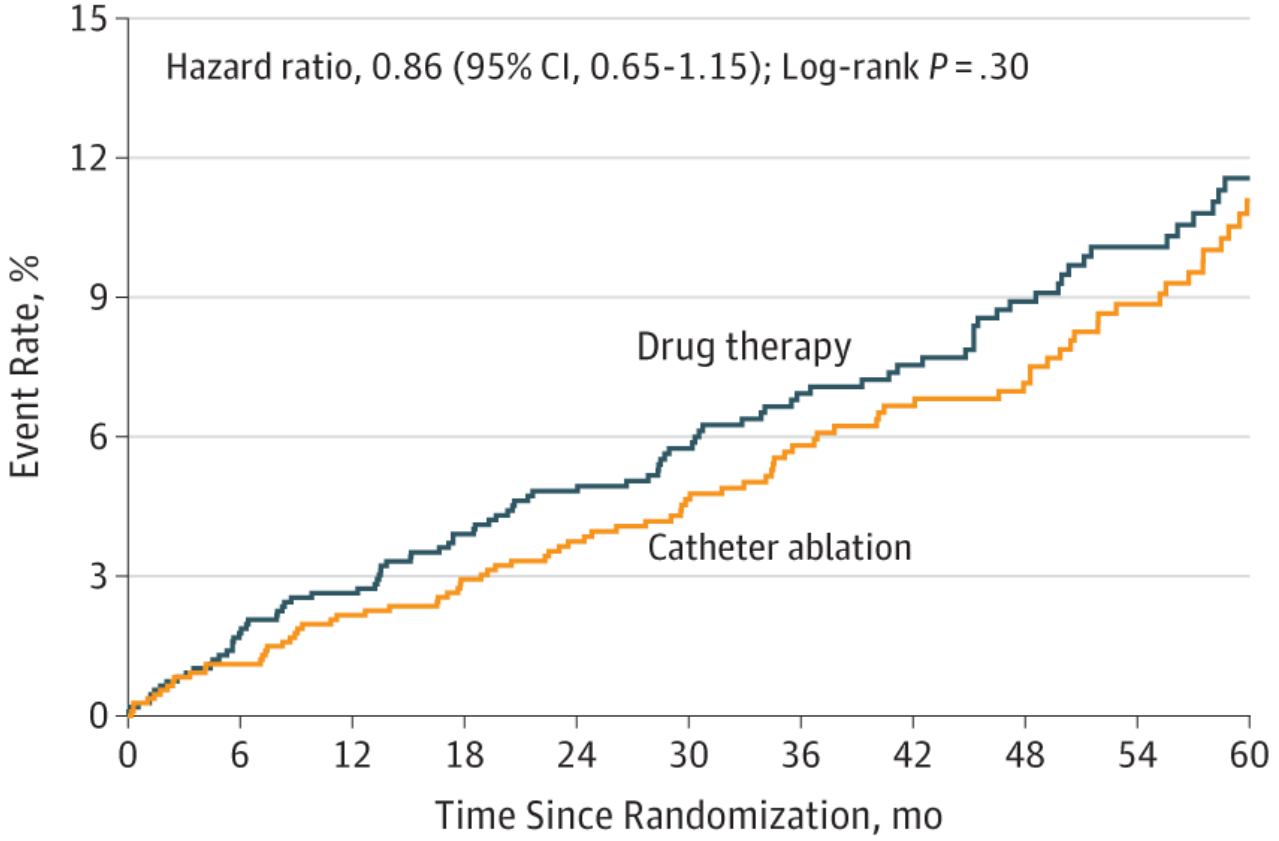
- Double blinded Randomized, 126 centers, 10 countries
- 2204 patients randomized (2009-2016)
- Medical therapy vs Catheter ablation
- Primary End Point
  - Death
  - Stroke
  - Serious Bleeding
  - Cardiac arrest

Packer DL, JAMA 3/2019

Cabana Trial

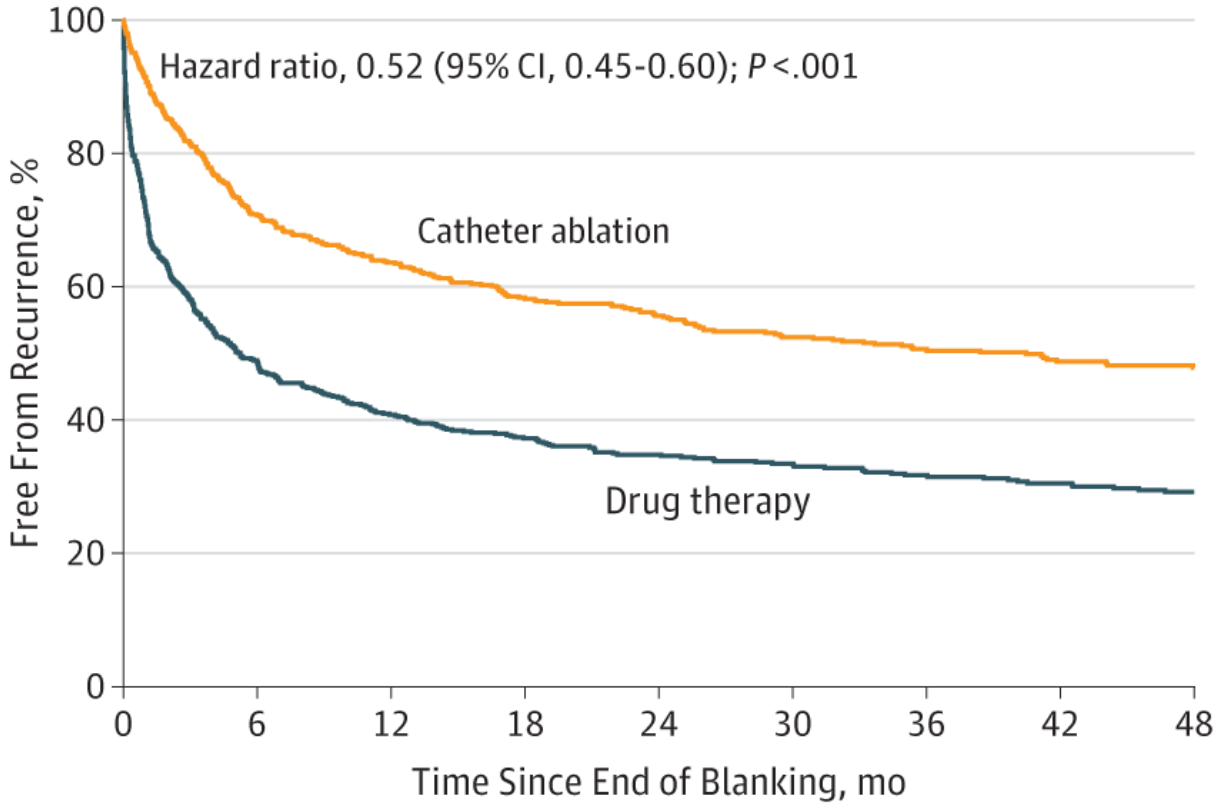


Primary Endpoint P=0.30



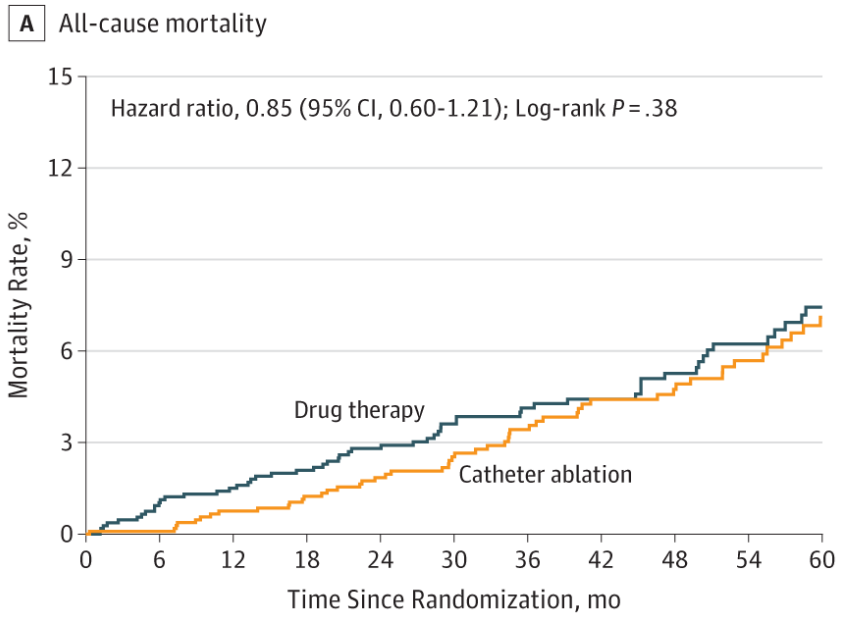
No. at risk											
Drug therapy	1096	1036	1006	970	880	763	652	578	499	418	312
Catheter ablation	1108	1045	1021	996	915	793	700	614	535	432	309

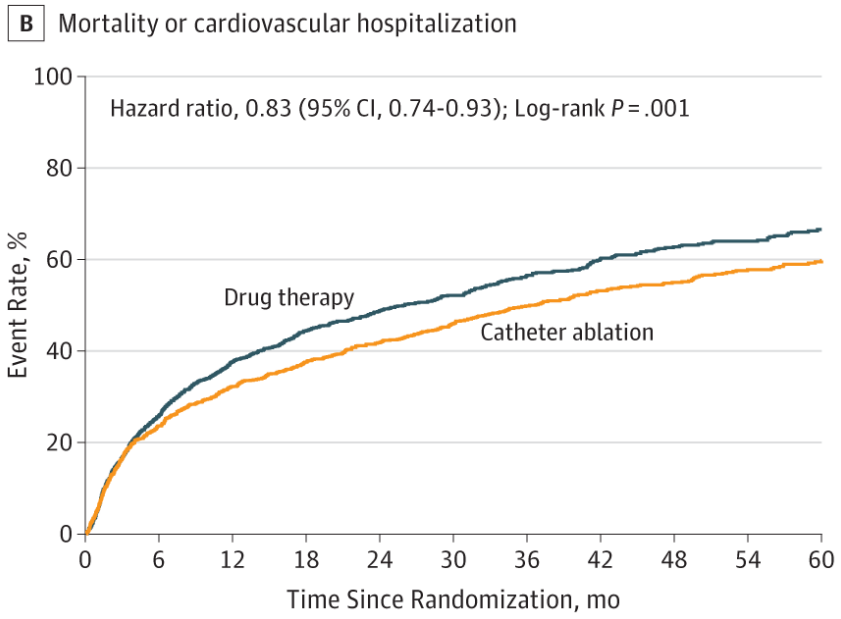
Afib Recurrence



No. at risk									
Drug therapy	629	304	252	212	181	157	131	115	94
Catheter ablation	611	432	381	328	291	241	201	163	134

SubGroup Analysis





No. at risk

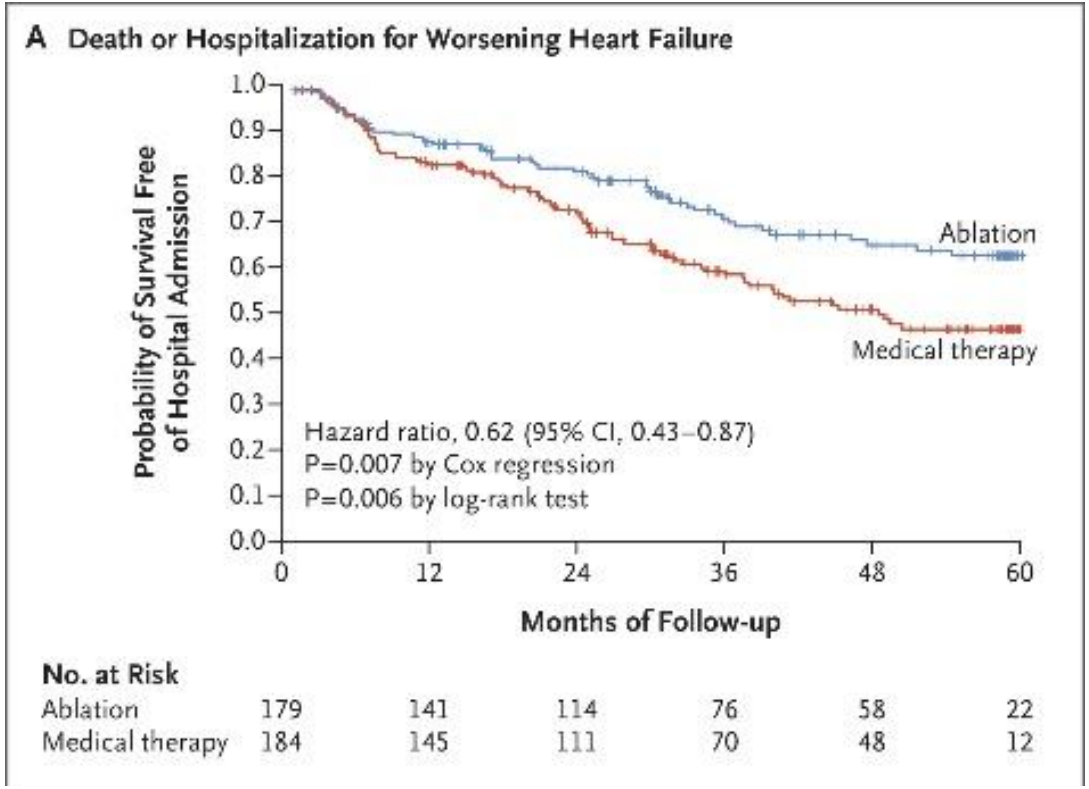
Drug therapy	1096	1046	1023	992	903	783	679	606	527	445	334
Catheter ablation	1108	1058	1035	1013	933	814	724	632	555	455	332

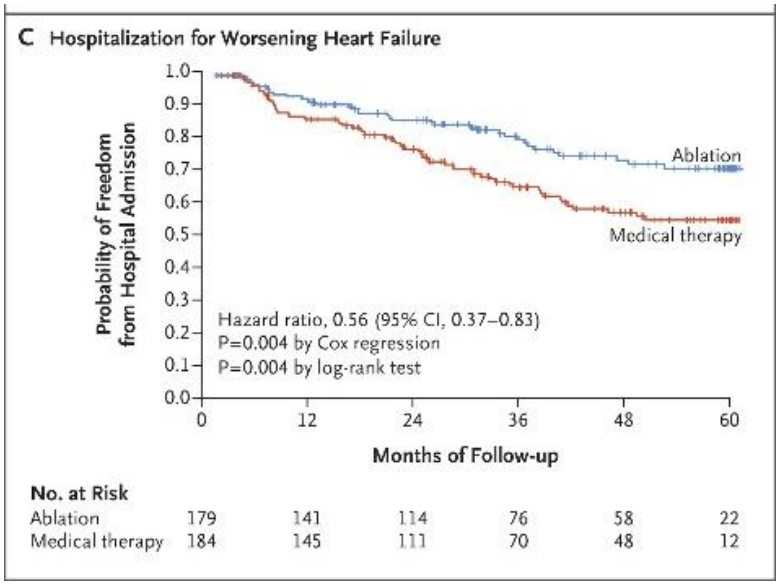
1096	778	643	563	474	387	302	244	197	165	112
1108	807	708	643	558	450	372	307	261	207	137

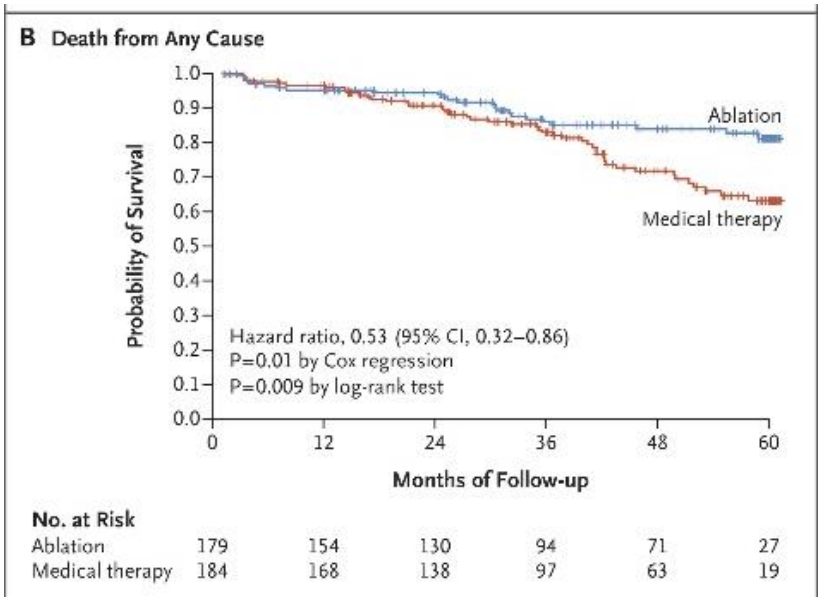
Castle HF Trial

- 363 patients
  - EF <35%, NYHA class II, III or IV
- Randomized
  - Medical Therapy vs. Ablation
- Primary end point
  - Death from any cause
  - Hospitalization for worsening heart failure
  - 16% absolute risk reduction
  - 40% relative risk reduction

Marrouche, N NEJM 1/2018







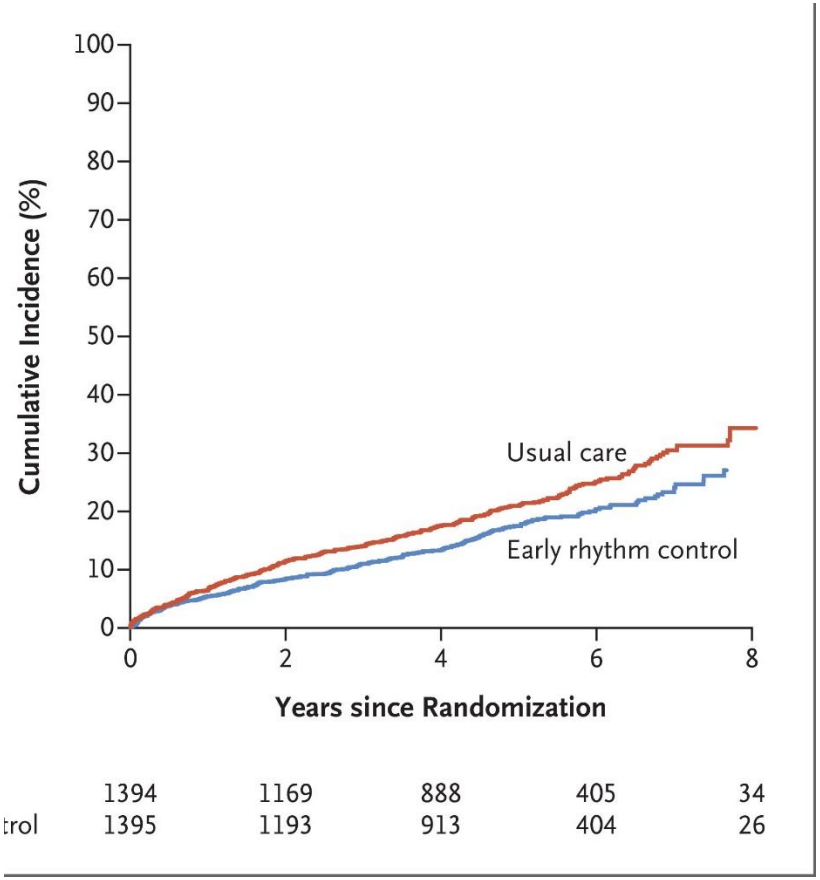
EAST-AFNET 4 Trial

- 2800 patients
  - Afib diagnosed <1 year before enrollment
- Early rhythm control (82% NSR) vs. Usual care (60%NSR)
- Primary Outcome
  - Death from cardiovascular causes
  - Stroke
  - Heart failure hospitalization
- Secondary Endpoint
  - # of nights spent in the hospital

Kirchhof P, NEJM 8/2020

Primary EndPoint

- Primary Endpoint
  - RRR: 21%
  - Effect was consistent across subgroups
- Secondary Endpoint
  - Not significant

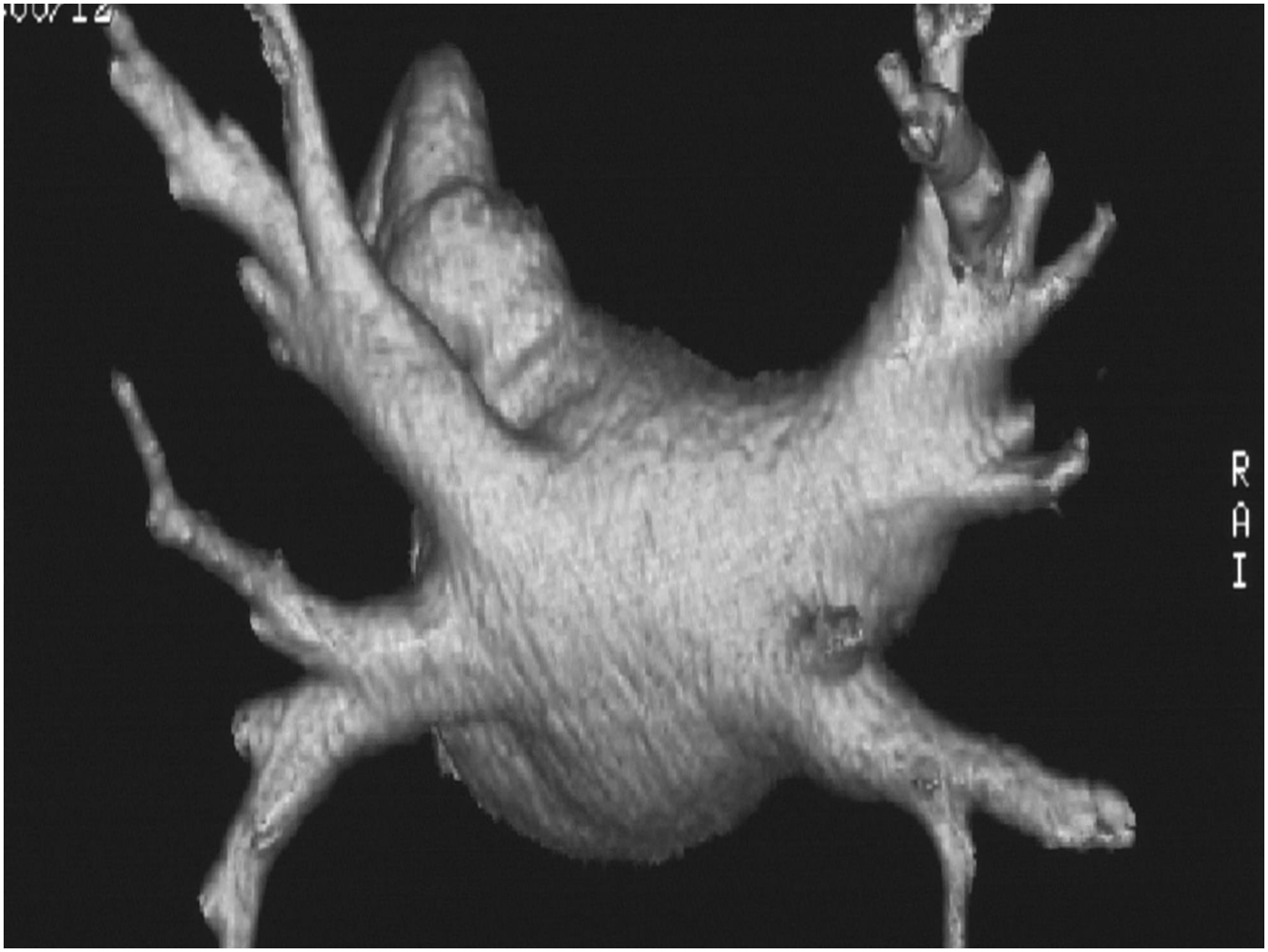


HRS Guidelines

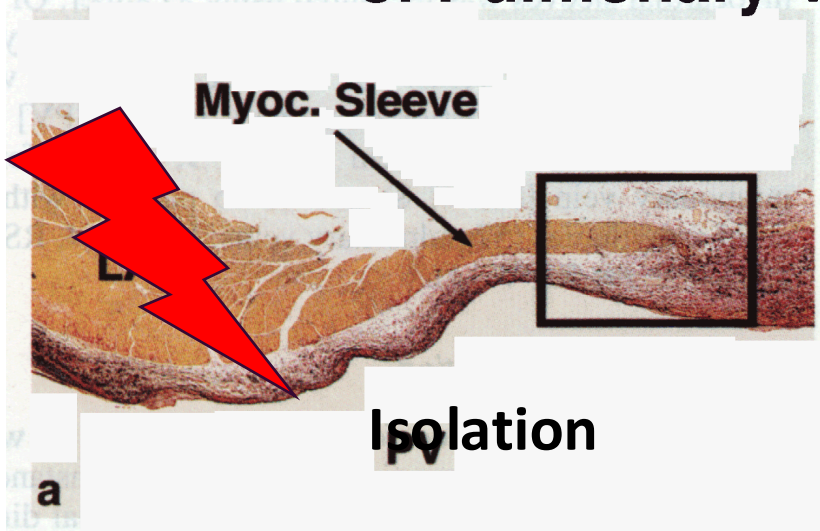
COR	LOE	Recommendations
1	A	1. In patients with symptomatic AF in whom antiarrhythmic drugs have been ineffective, contraindicated, not tolerated or not preferred, and continued rhythm control is desired, catheter ablation is useful to improve symptoms.[1-10]
1	A	2. In selected patients (generally younger with few comorbidities) with symptomatic paroxysmal AF in whom rhythm control is desired, catheter ablation is useful as first-line therapy to improve symptoms and reduce progression to persistent AF.[11-16]

COR	LOE	Recommendations
1	B-NR	1. In patients who present with a new diagnosis of HFrEF and AF, arrhythmia-induced cardiomyopathy should be suspected, and an early and aggressive approach to AF rhythm control is recommended.[1,2]
1	A	2. In appropriate patients with AF and HFrEF who are on GDMT, and with reasonable expectation of procedural benefit (Figure 24), catheter ablation is beneficial to improve symptoms, QOL, ventricular function, and cardiovascular outcomes.[3-13]

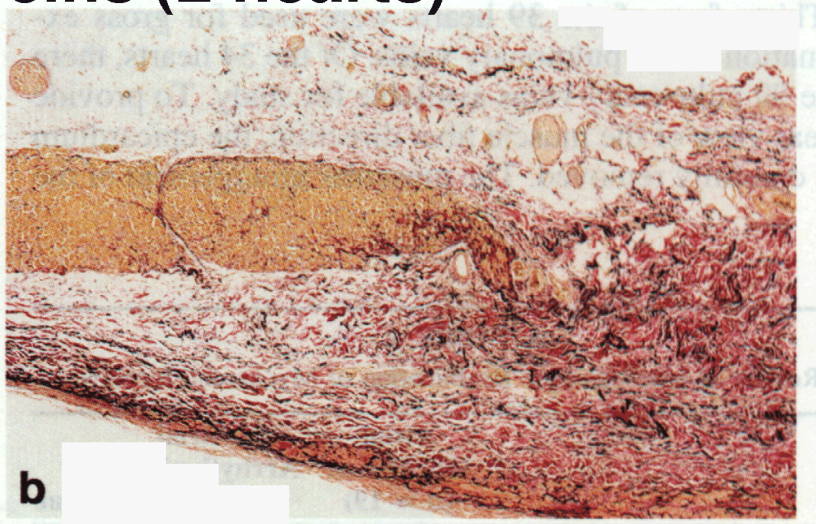
Pathophysiology of Atrial Fibrillation

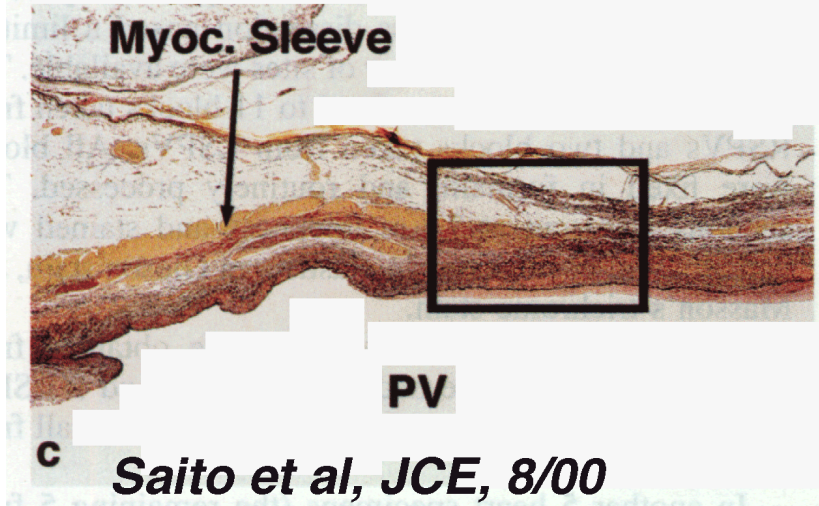


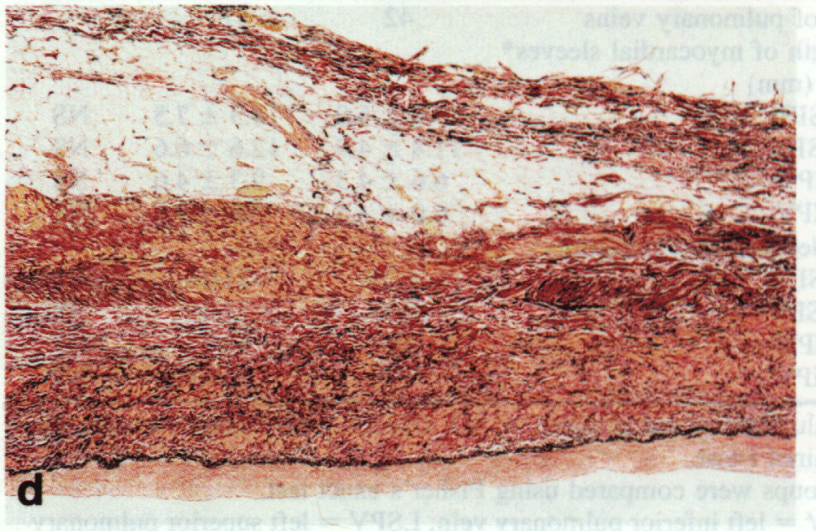
Microscopic Appearance of Myocardial Sleeves of Pulmonary Veins (2 hearts)



Isolation

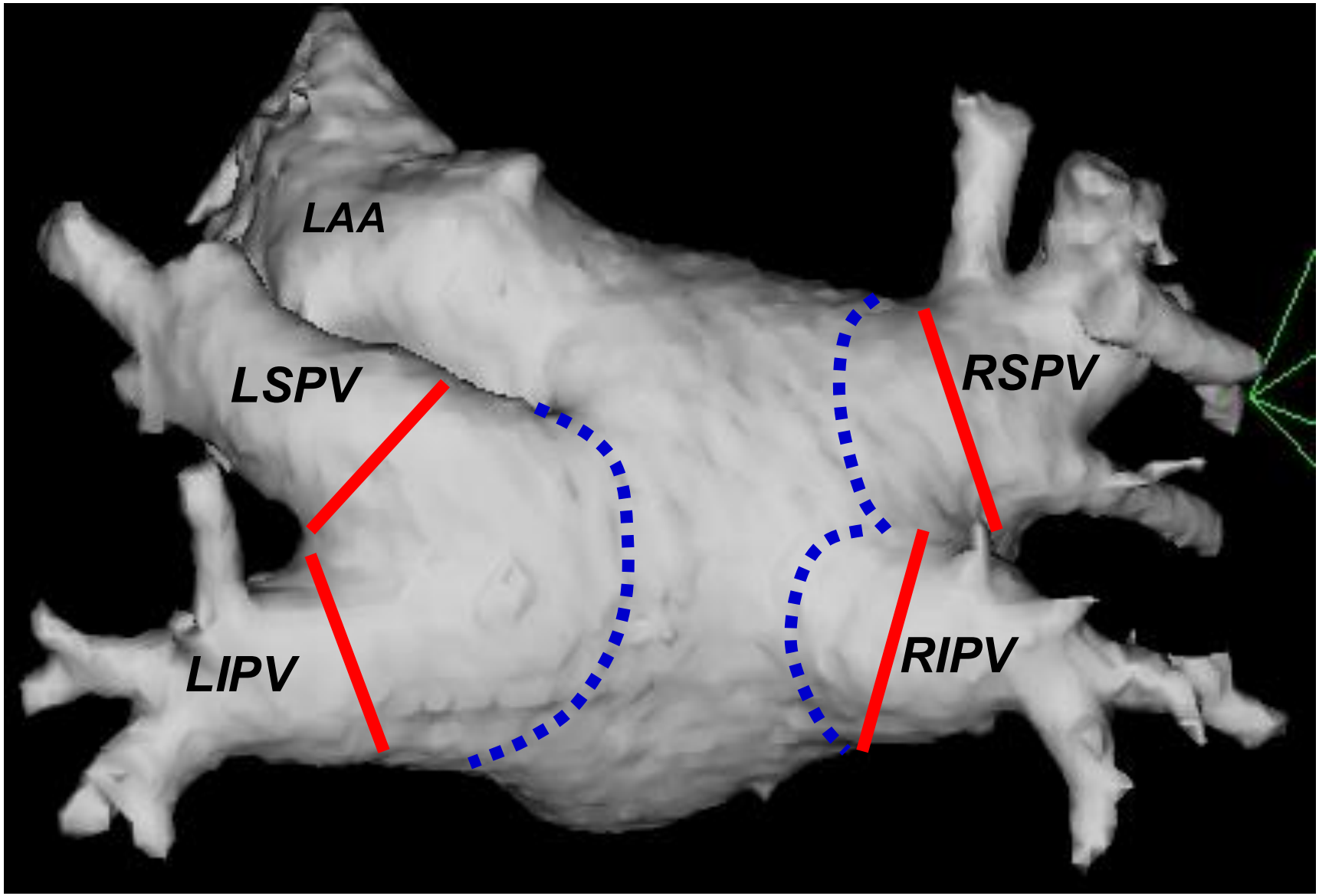






Saito et al, JCE, 8/00

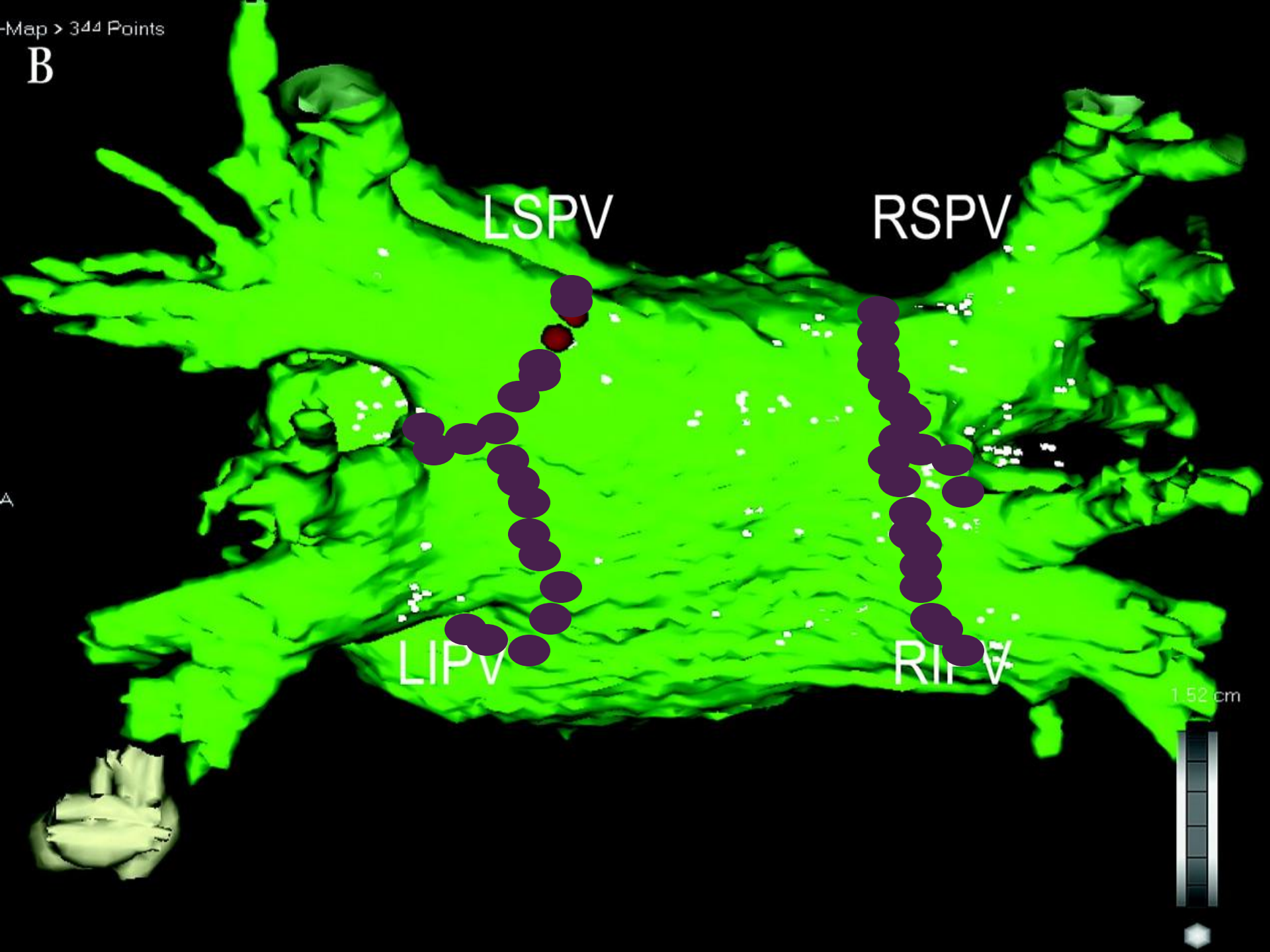
PV Ostium *vs.* Antrum



Afib Progression

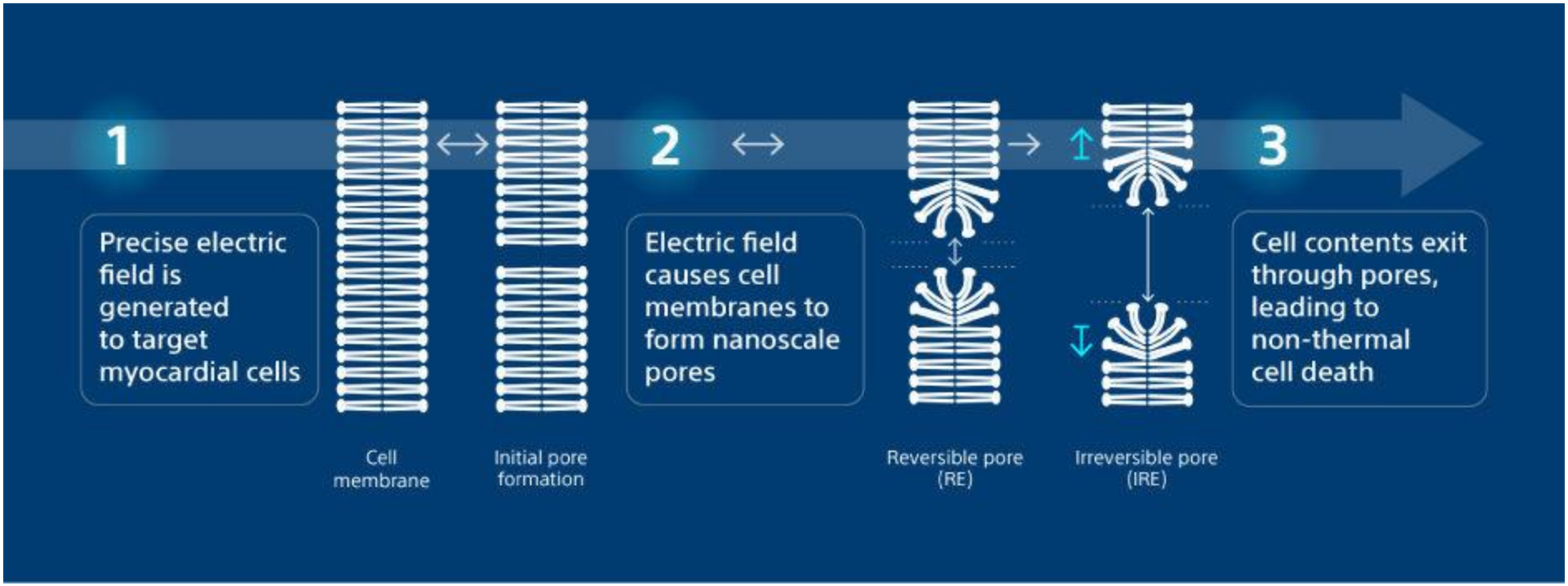
NaviStar® Catheter B Curve

(Red / 2.0" / 5.1 cm)


-Map > 344 Points
B
LSPV
RSPV
LIPV
RIPV
1.52 cm

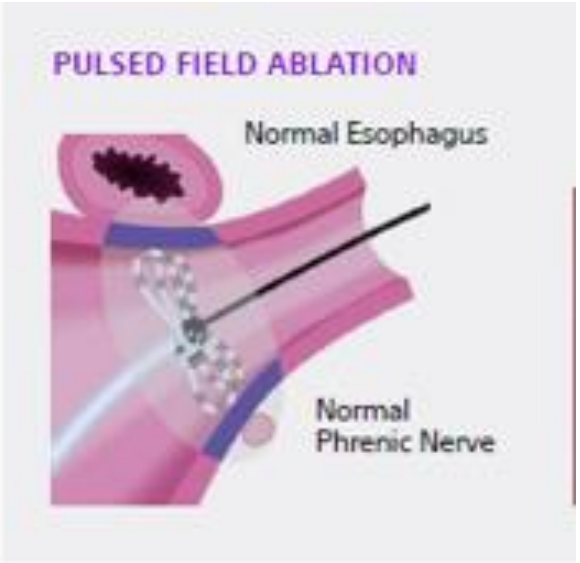
Farapulse Catheter

Pulsed Field Ablation (PFA)



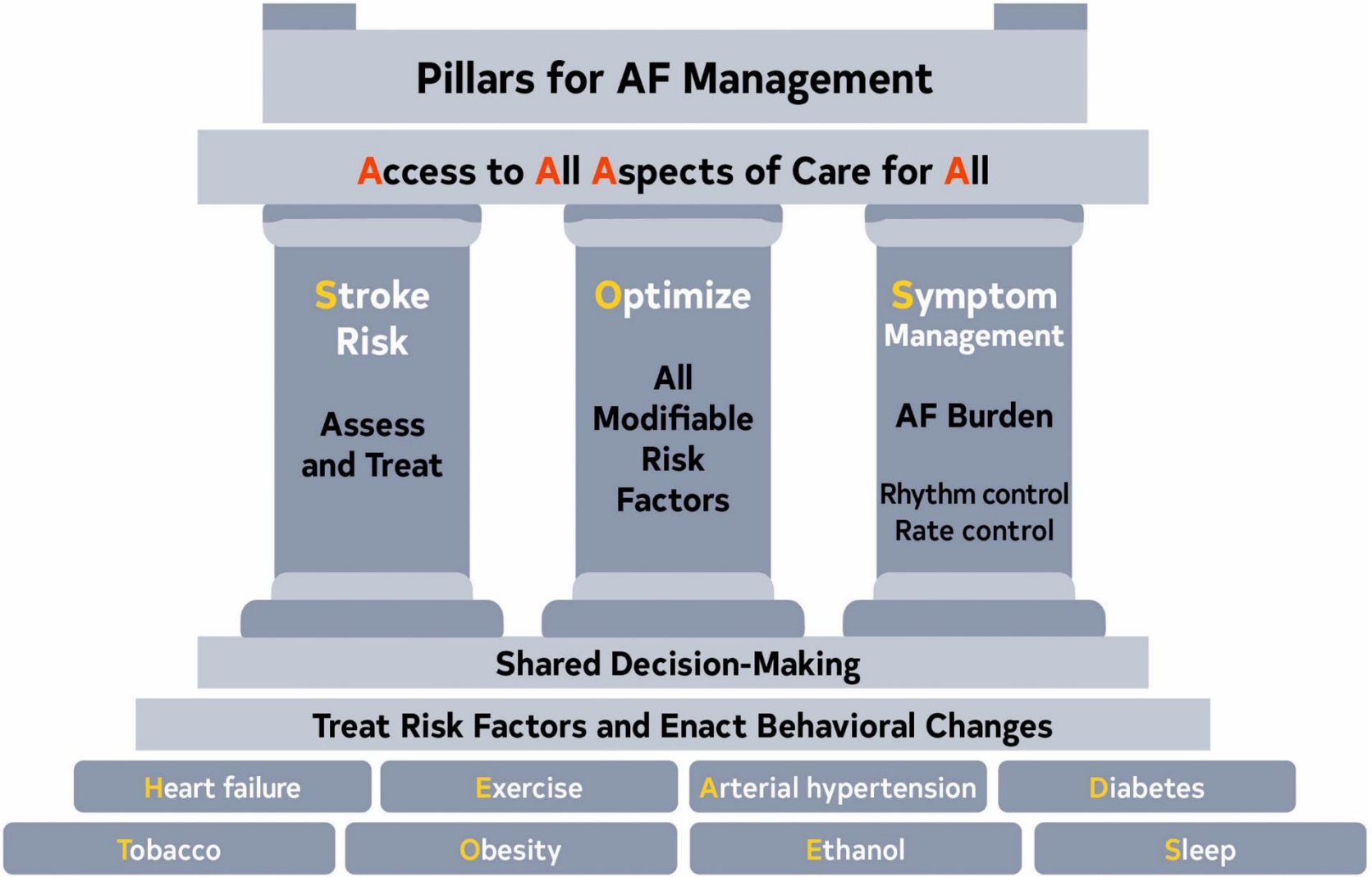
Electroporation

Safety Mechanism



Ablation for Atrial Fibrillation

- 30-60 minutes
- Same Day Discharge (2 hours postprocedure)
- 70-80% freedom from AF without antiarrhythmic medications
- 20% - re-do rate
- Serious complications – 1%


Pillars for AF Management
Access to All Aspects of Care for All
Stroke Risk
Assess and Treat
Optimize
All Modifiable Risk Factors
Symptom Management
AF Burden
Rhythm control
Rate control
Shared Decision-Making
Treat Risk Factors and Enact Behavioral Changes
Heart failure
Exercise
Arterial hypertension
Diabetes
Tobacco
Obesity
Ethanol
Sleep

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Thank you