

A Rational Approach to Atrial Fibrillation

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Disclosures

- None



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PerfectServe

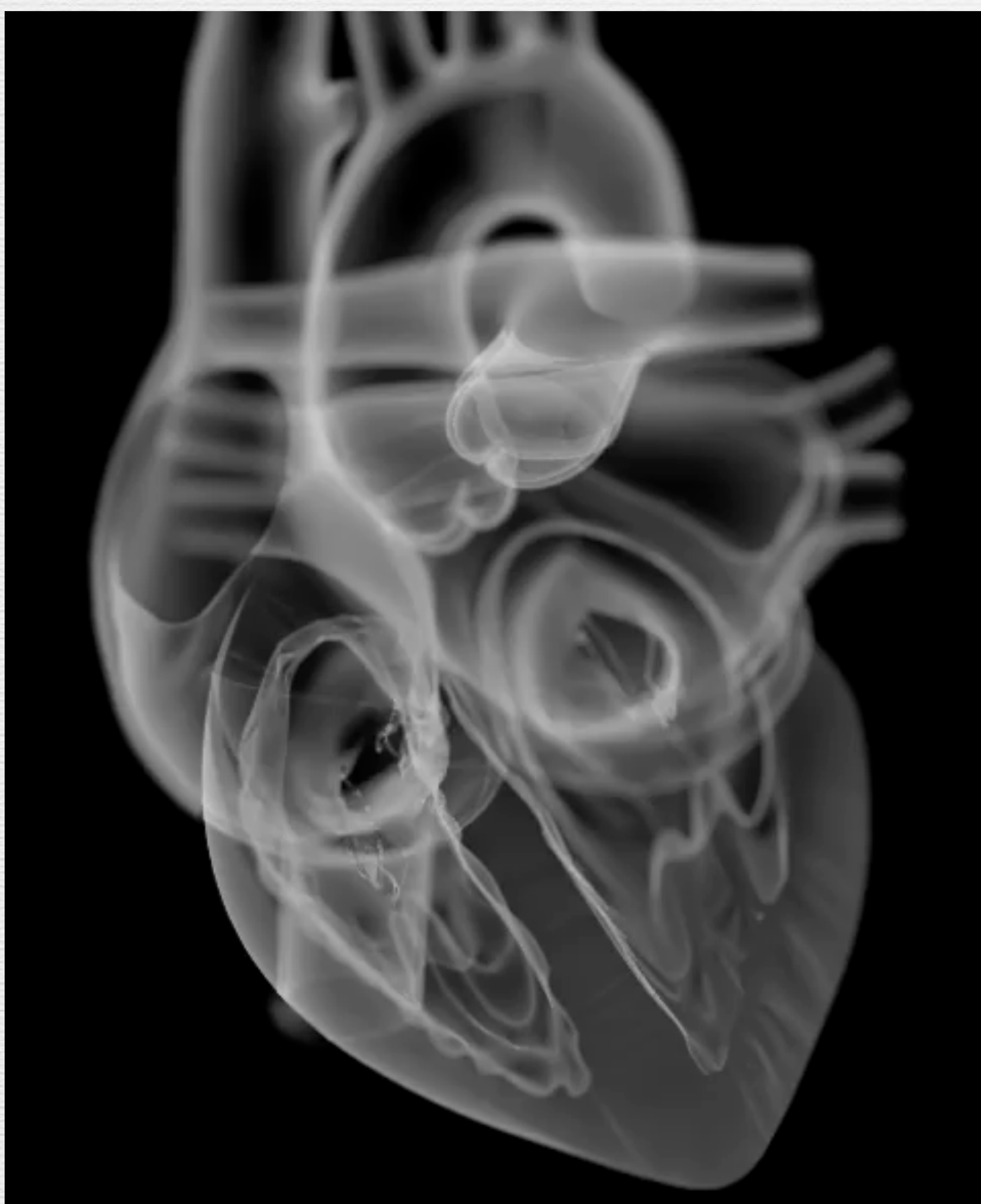
jmahlow@utmck.edu

2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation

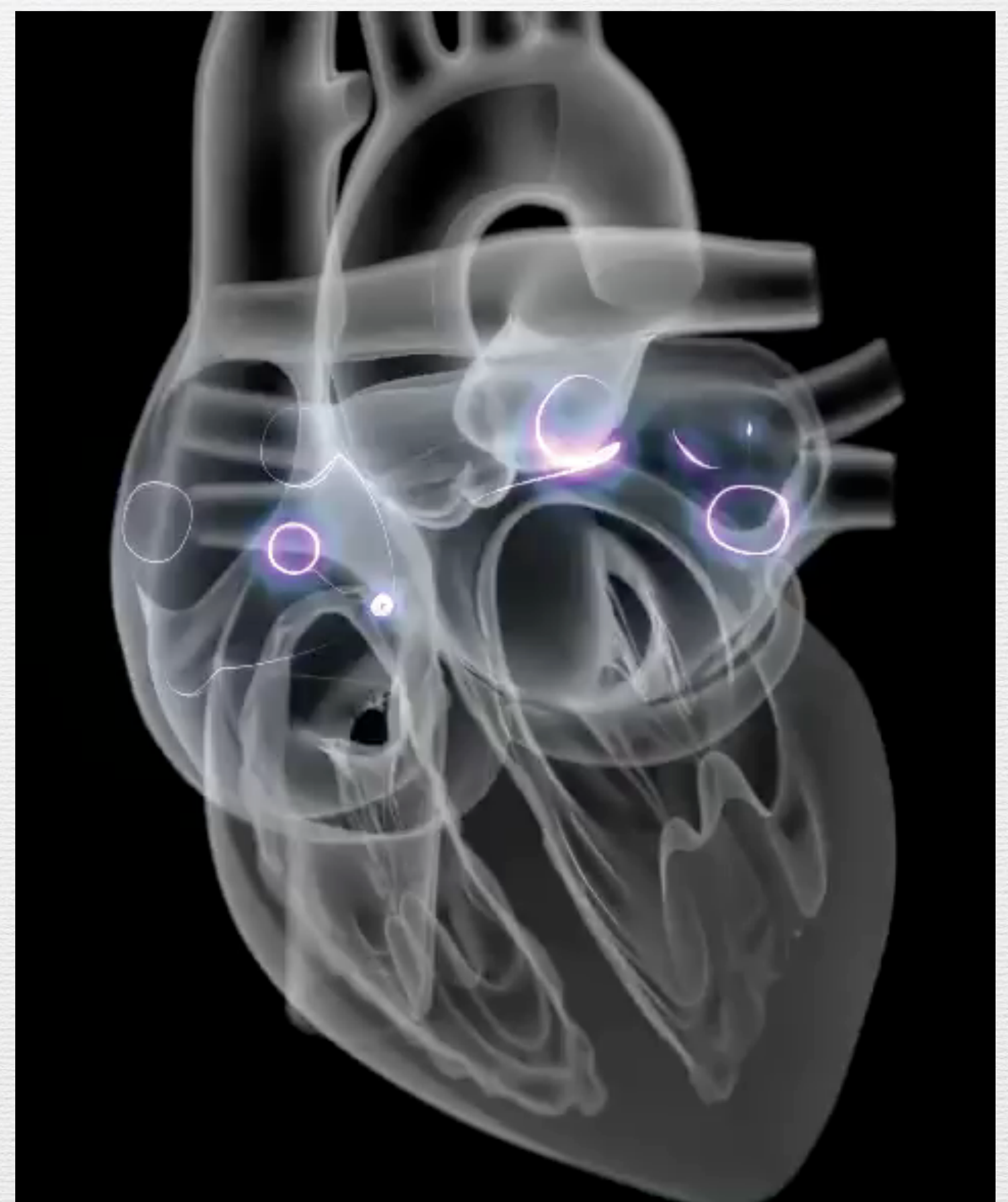
A Report of the American College of Cardiology/American Heart Association
Task Force on Clinical Practice Guidelines and the Heart Rhythm Society

Developed in Collaboration With the Society of Thoracic Surgeons

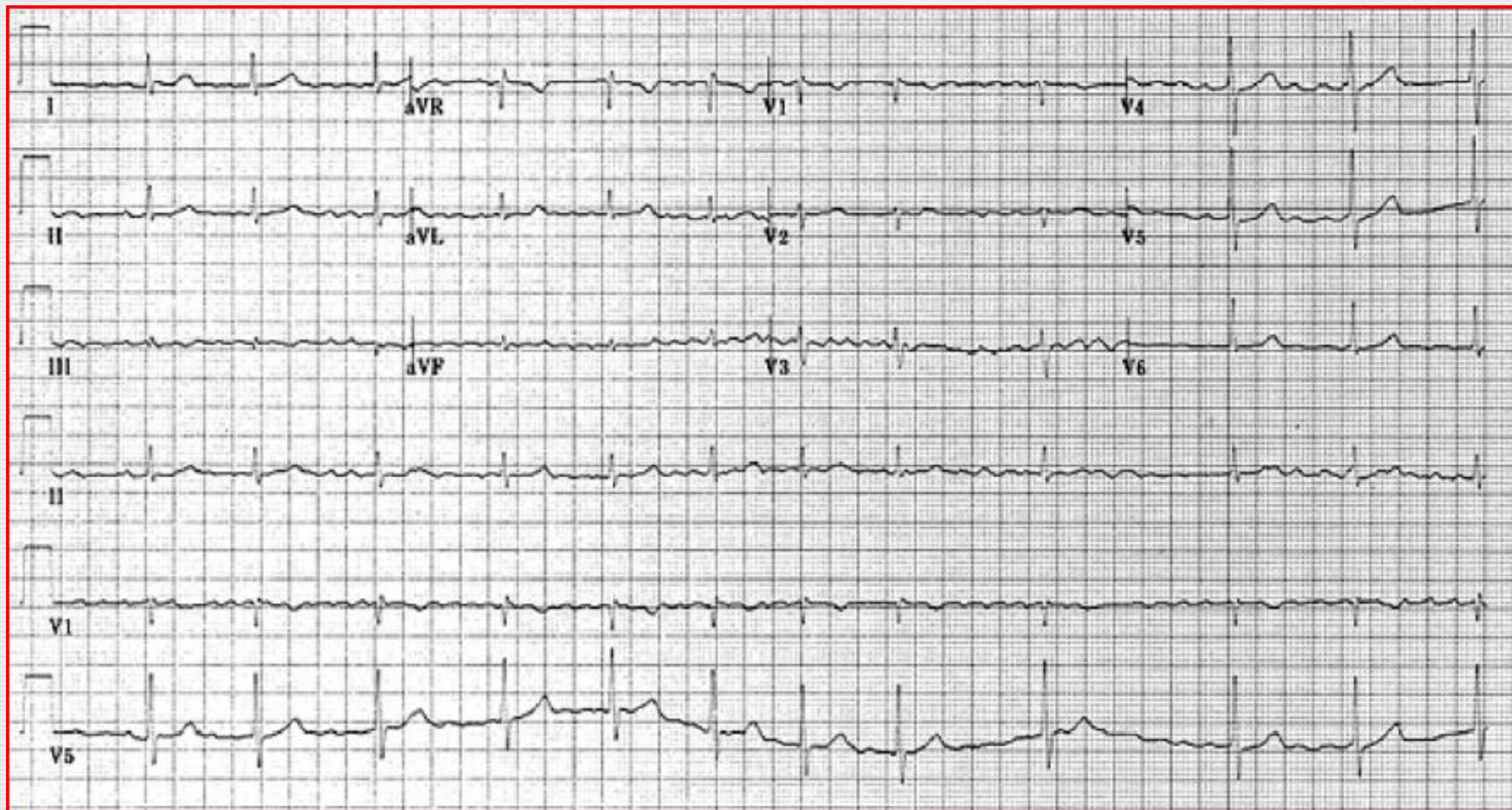
Definition/Pathophysiology/ Epidemiology

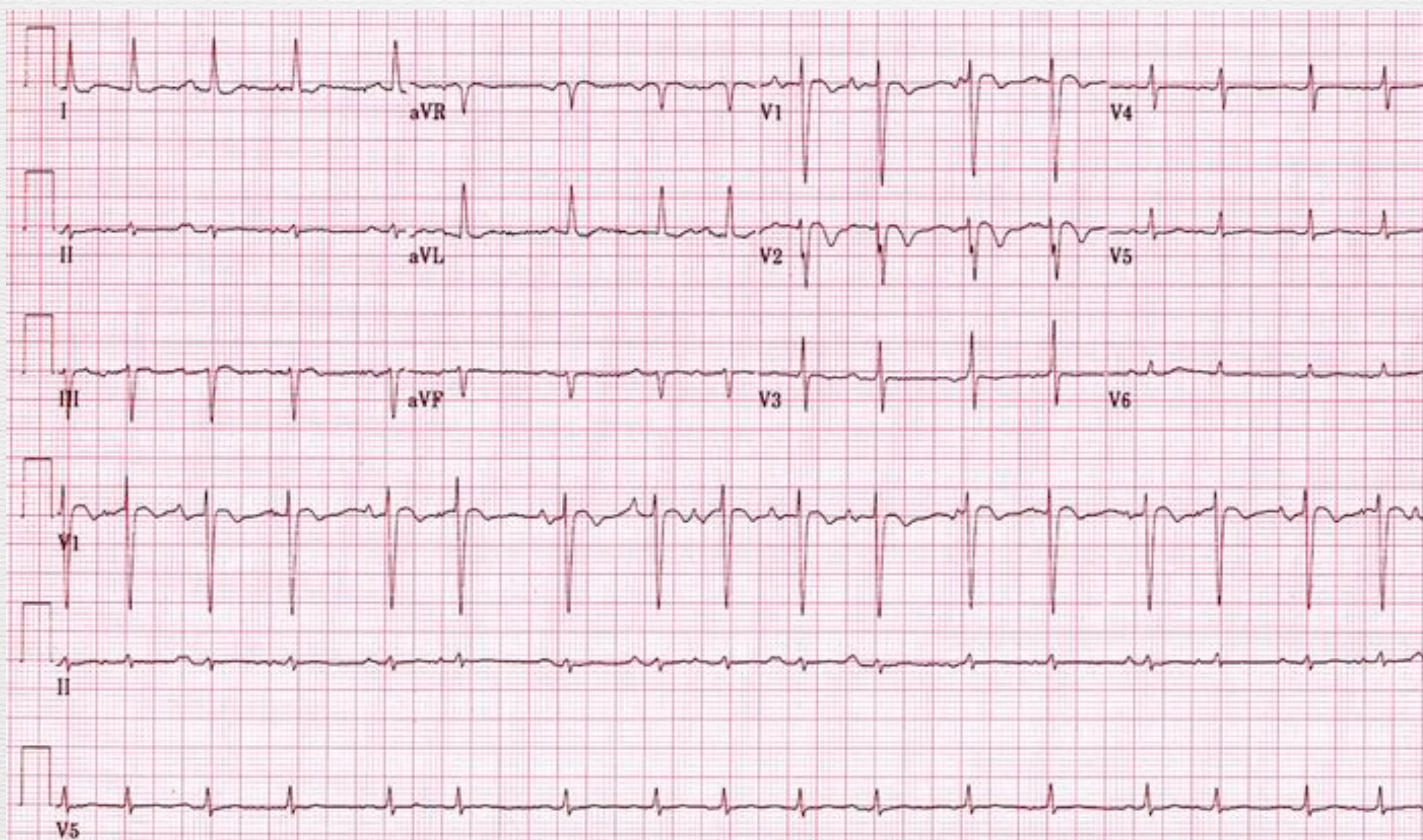


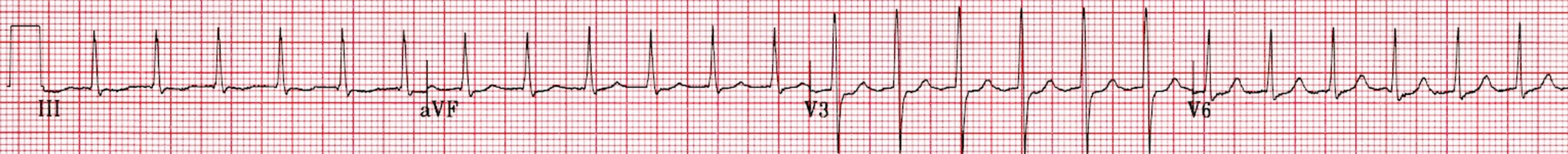
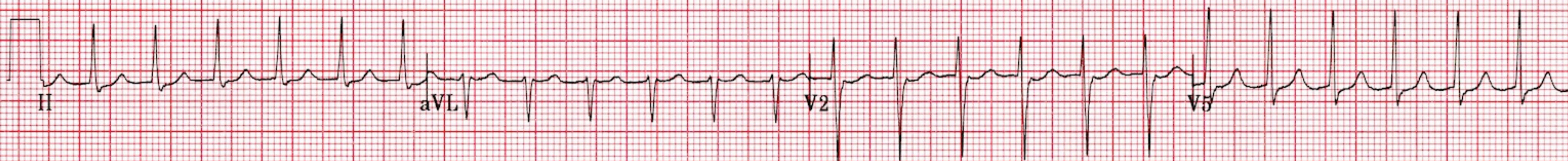
Normal Rhythm



Atrial Fibrillation (AFib)





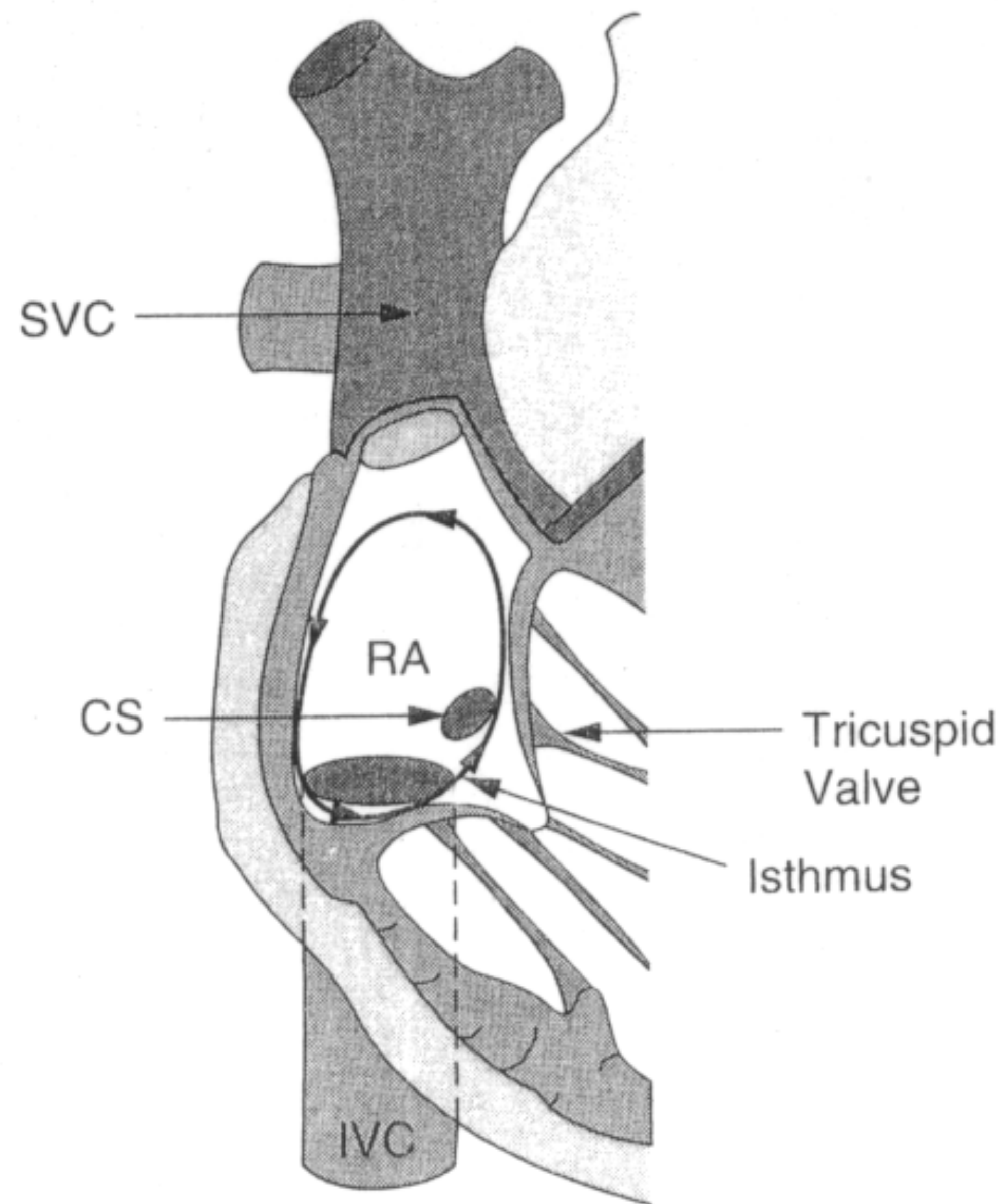


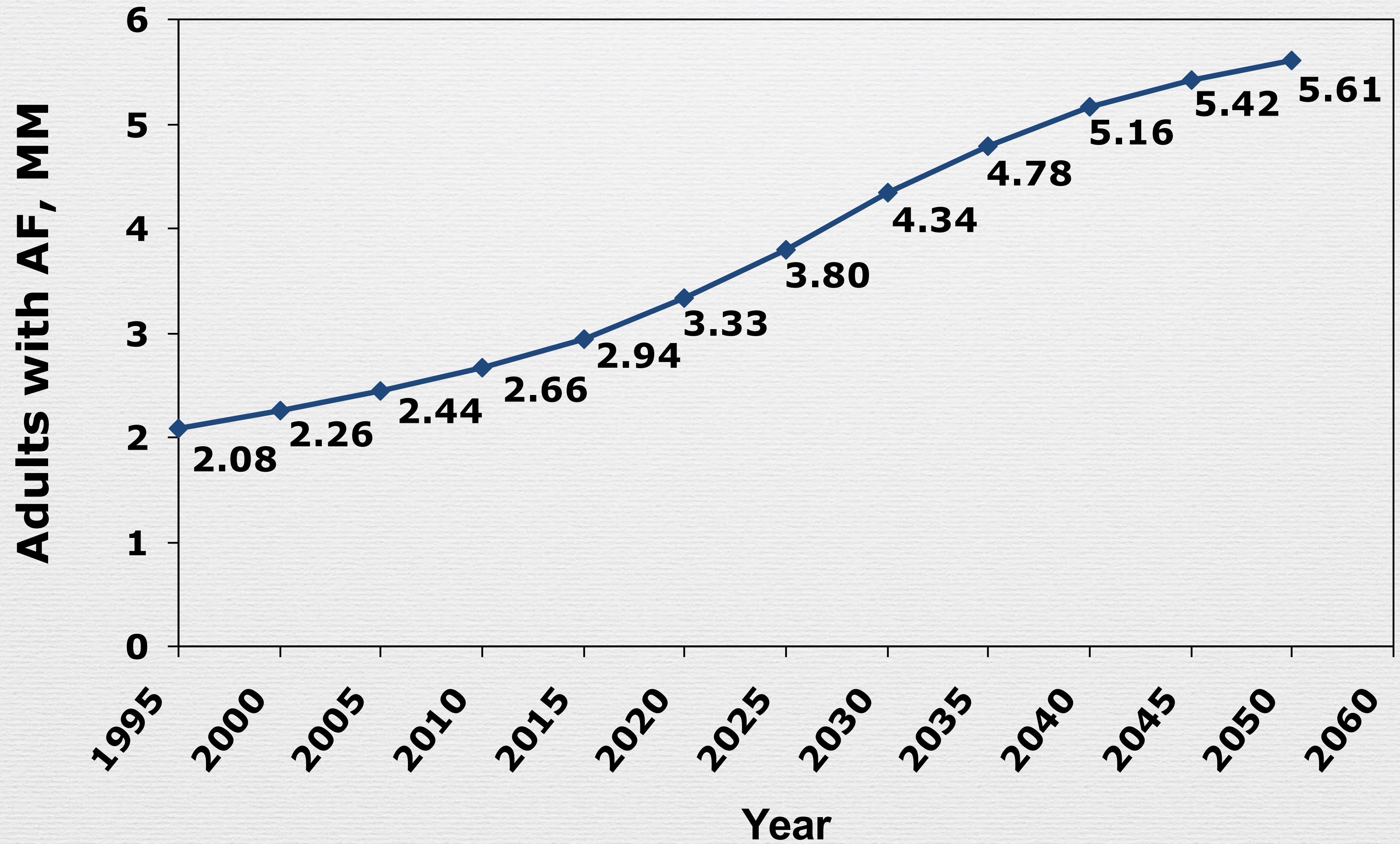
150 Hz 25.0 mm/s 10.0 mm/mV

4 by 2.5s + 1 rhythm ld

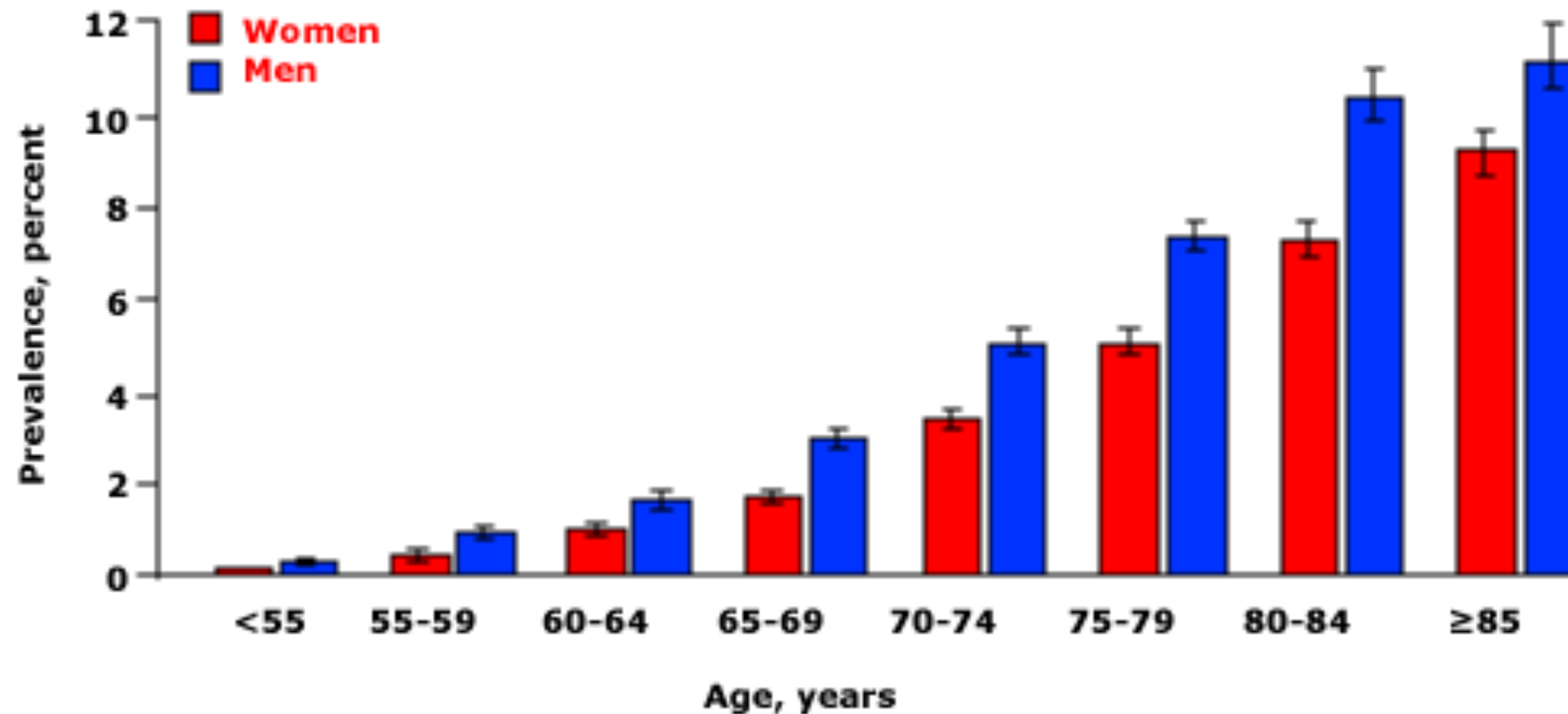
MAC35 009B.1

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Prevalence of atrial fibrillation with age



In a cross-sectional study of almost 1.9 million men and women, the prevalence of atrial fibrillation increases with age, ranging from 0.1 for those less than 55 years of age to over 9 percent in those ≥85 years of age. At all ages, the prevalence is higher in men than women.

Data from Go, AS, Hylek, EM, Phillips, K, et al, JAMA 2001; 285:2370.

Definitions

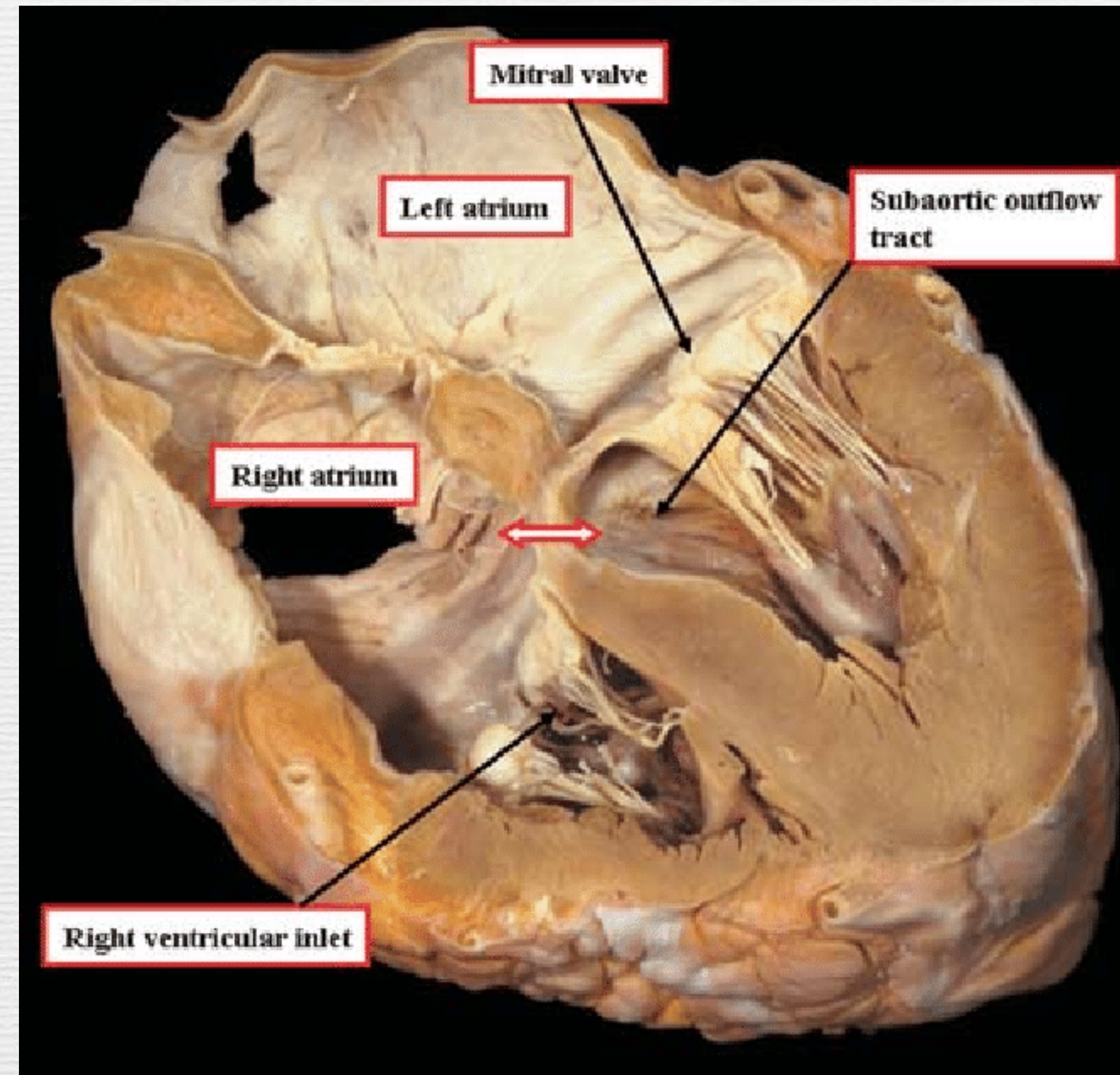
- Paroxysmal AF: terminates spontaneously within 7 days
- Persistent AF: will not terminate spontaneously
- Longstanding persistent AF: > 1 year
- Permanent AF
- “Nonvalvular” AF: Not in the guidelines anymore



“R”ational Approach to AF

- Root Control
- Risk Control
- Rate Control
- Rhythm Control

Root Control



Things that put stress on the heart

- Being alive

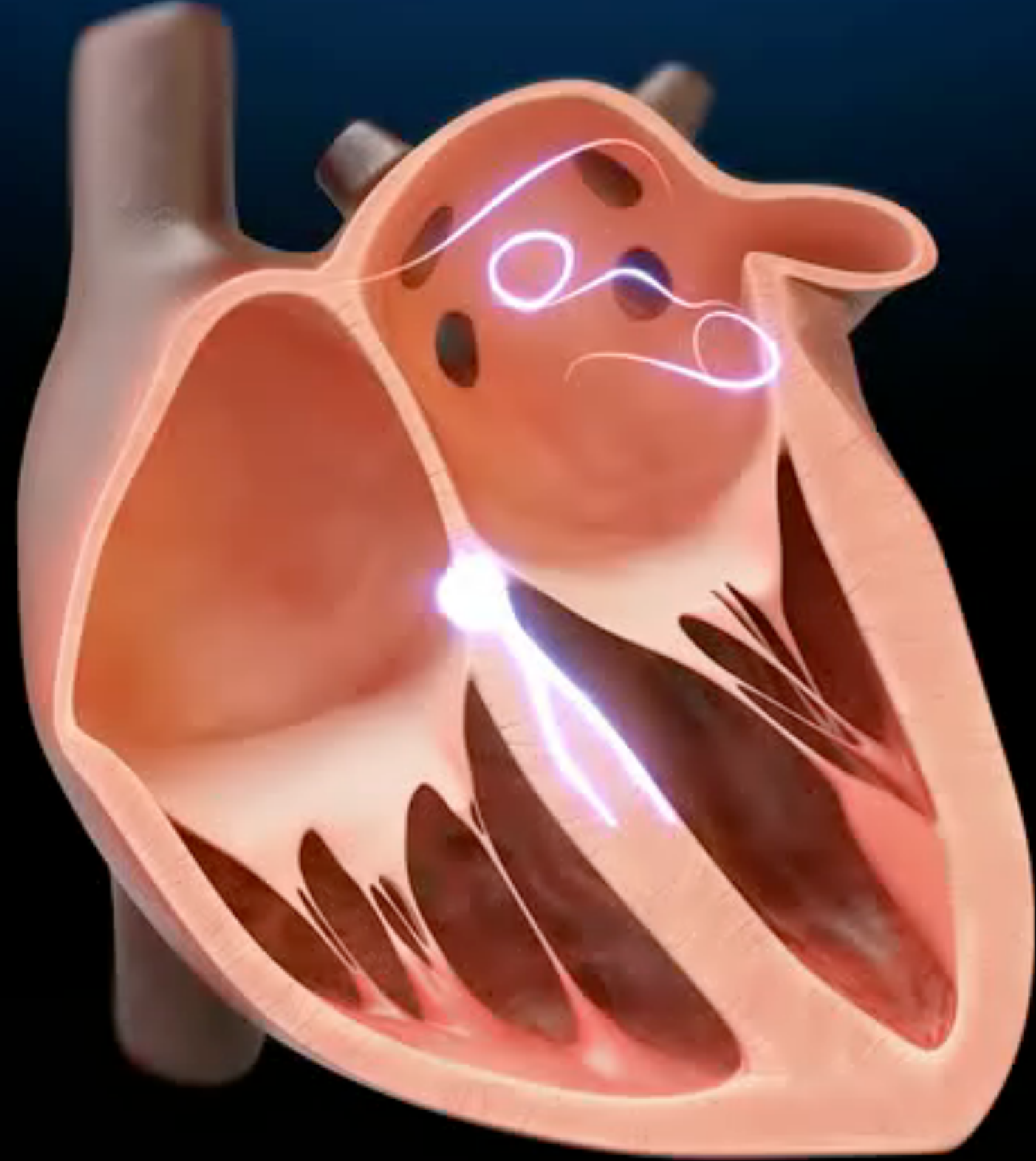
Things that put stress on the heart

- Being alive
- Alcohol
- Obstructive sleep apnea
- Hypertension
- Other comorbidities

Things that put stress on the heart

- Being alive
- Alcohol
- Obstructive sleep apnea
- Hypertension
- Other comorbidities
- Atrial fibrillation

AFib - Remodeling

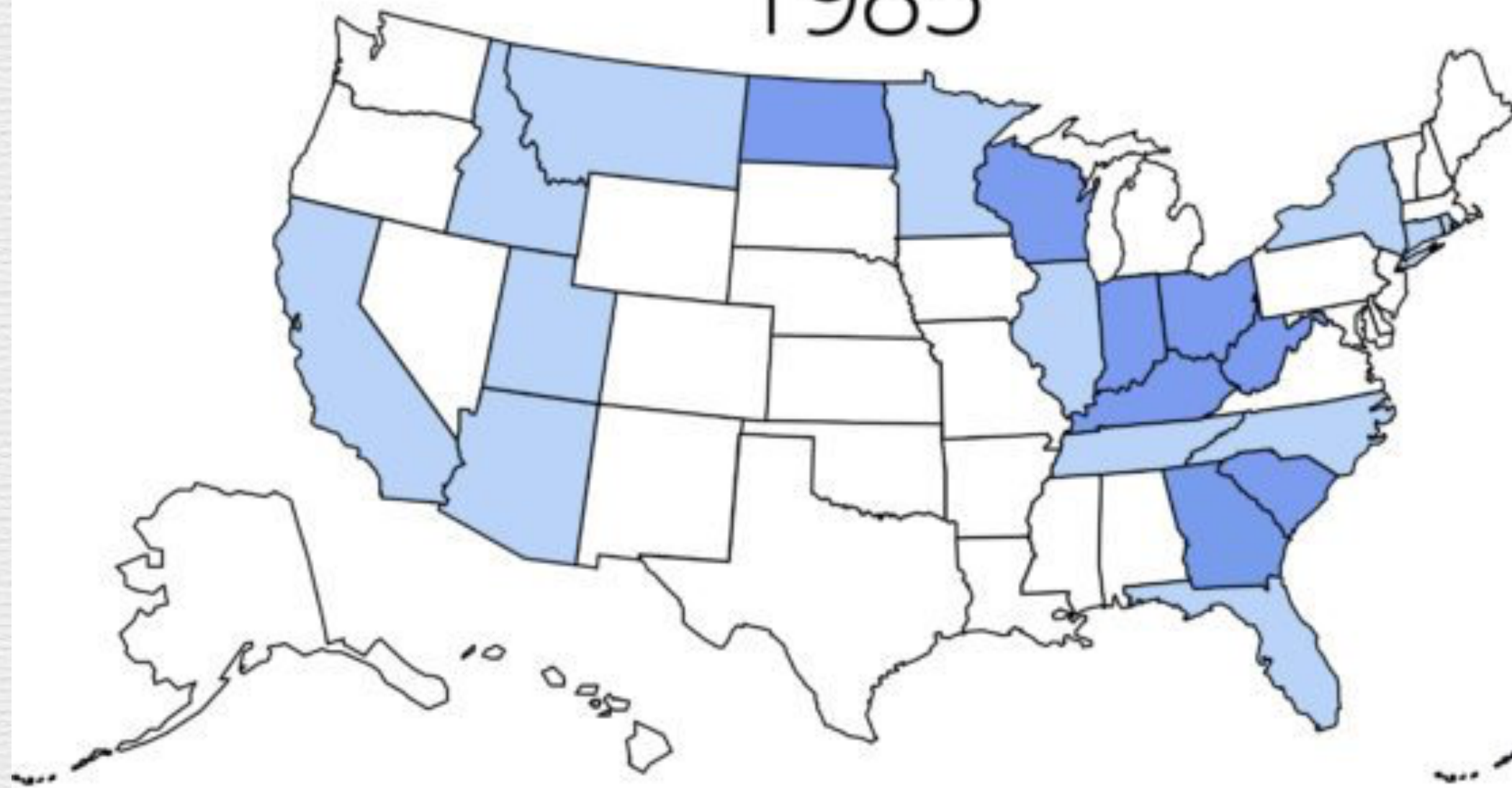


127 BPM

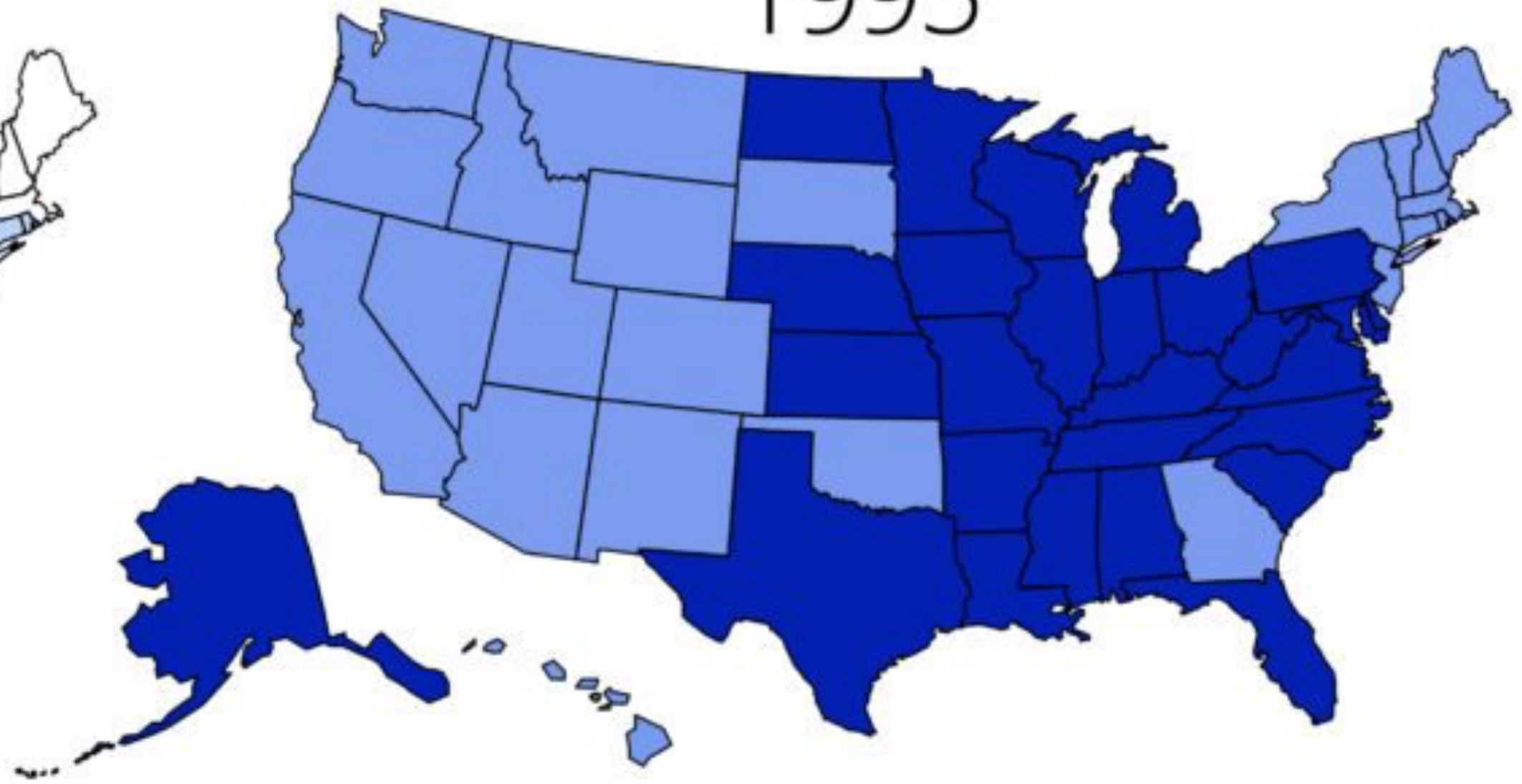
Heart Can Change Shape



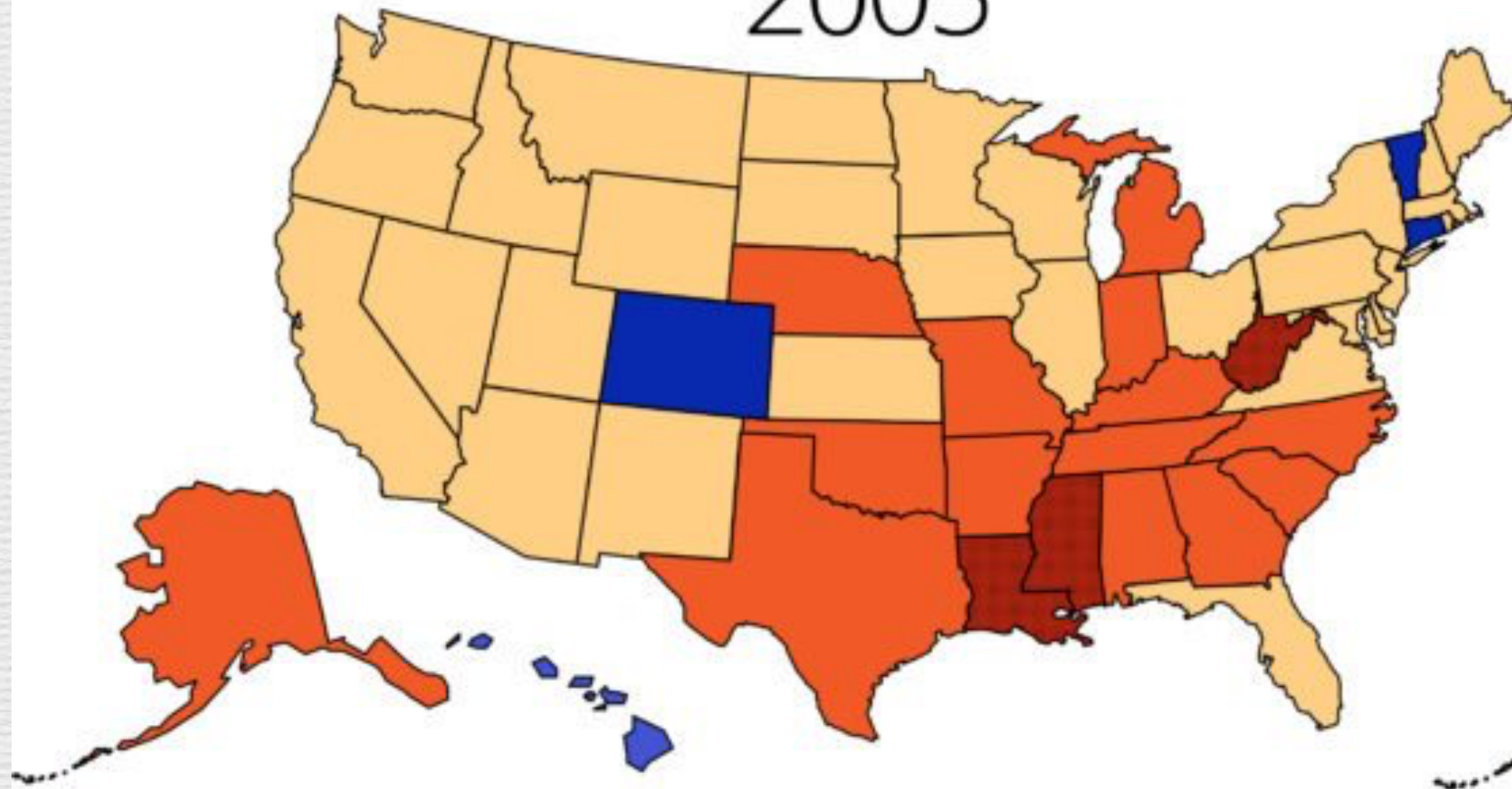
1985



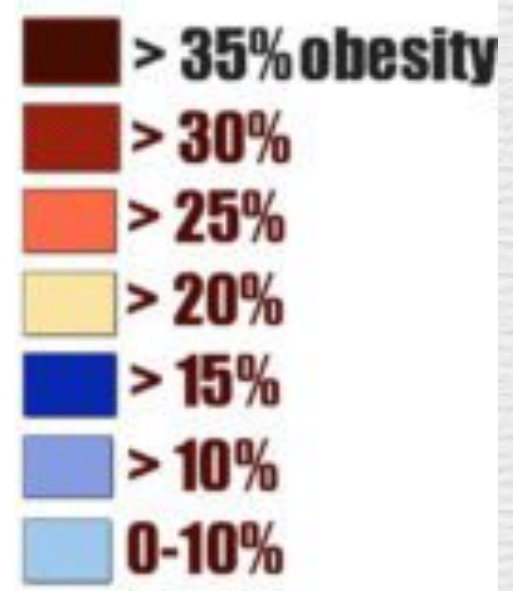
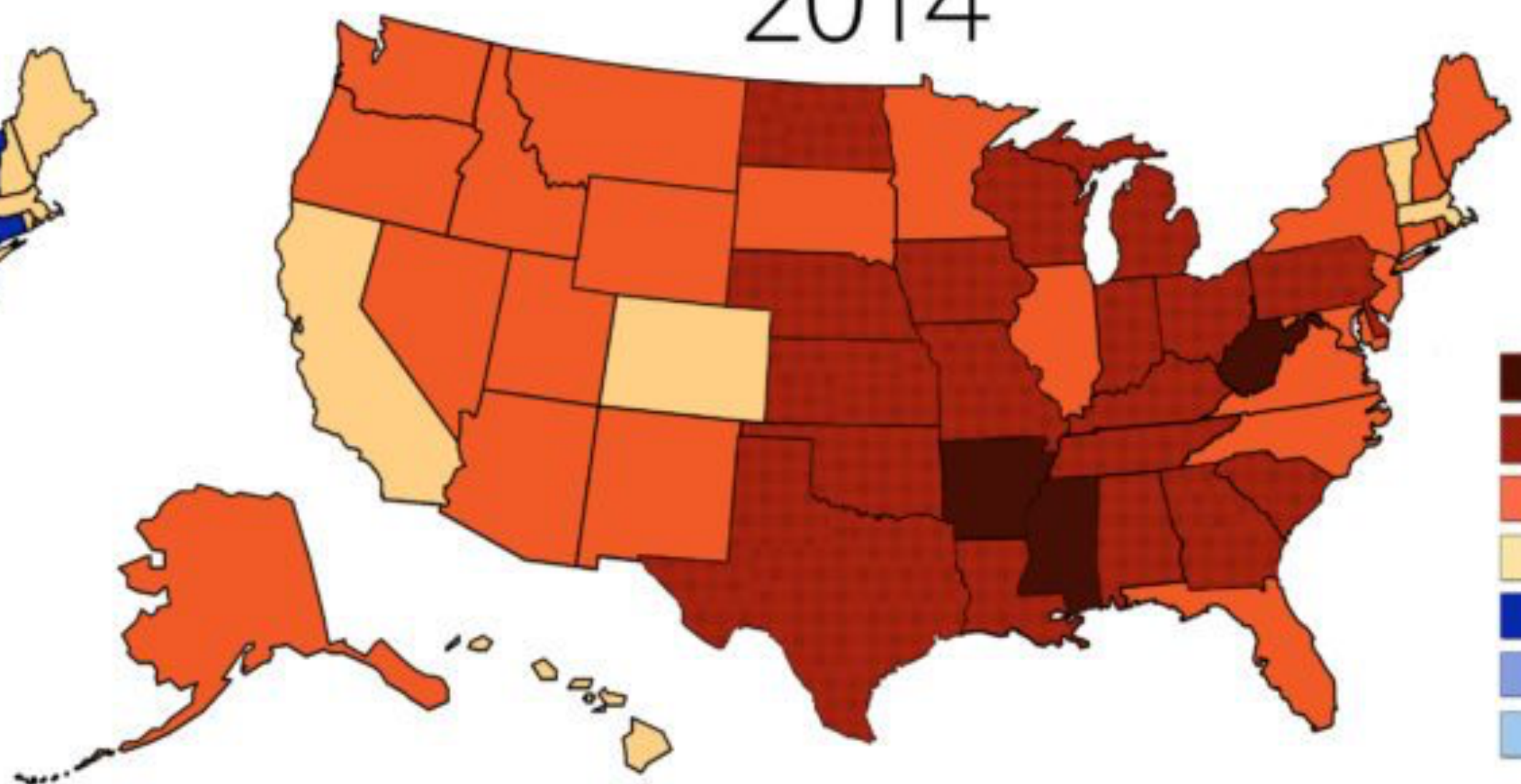
1995



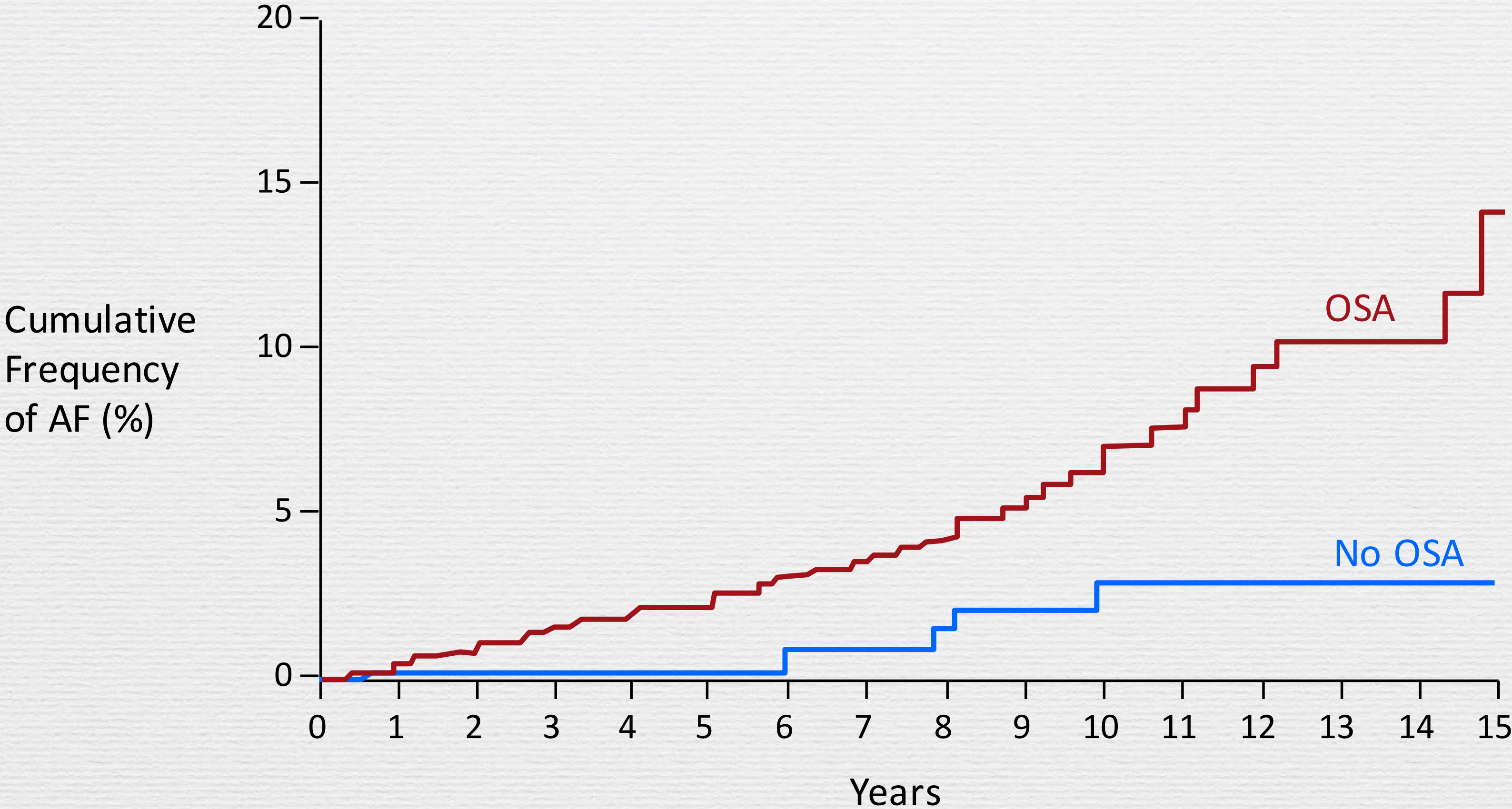
2005



2014



Incidence of AF Based on Presence or Absence of OSA



Number at Risk

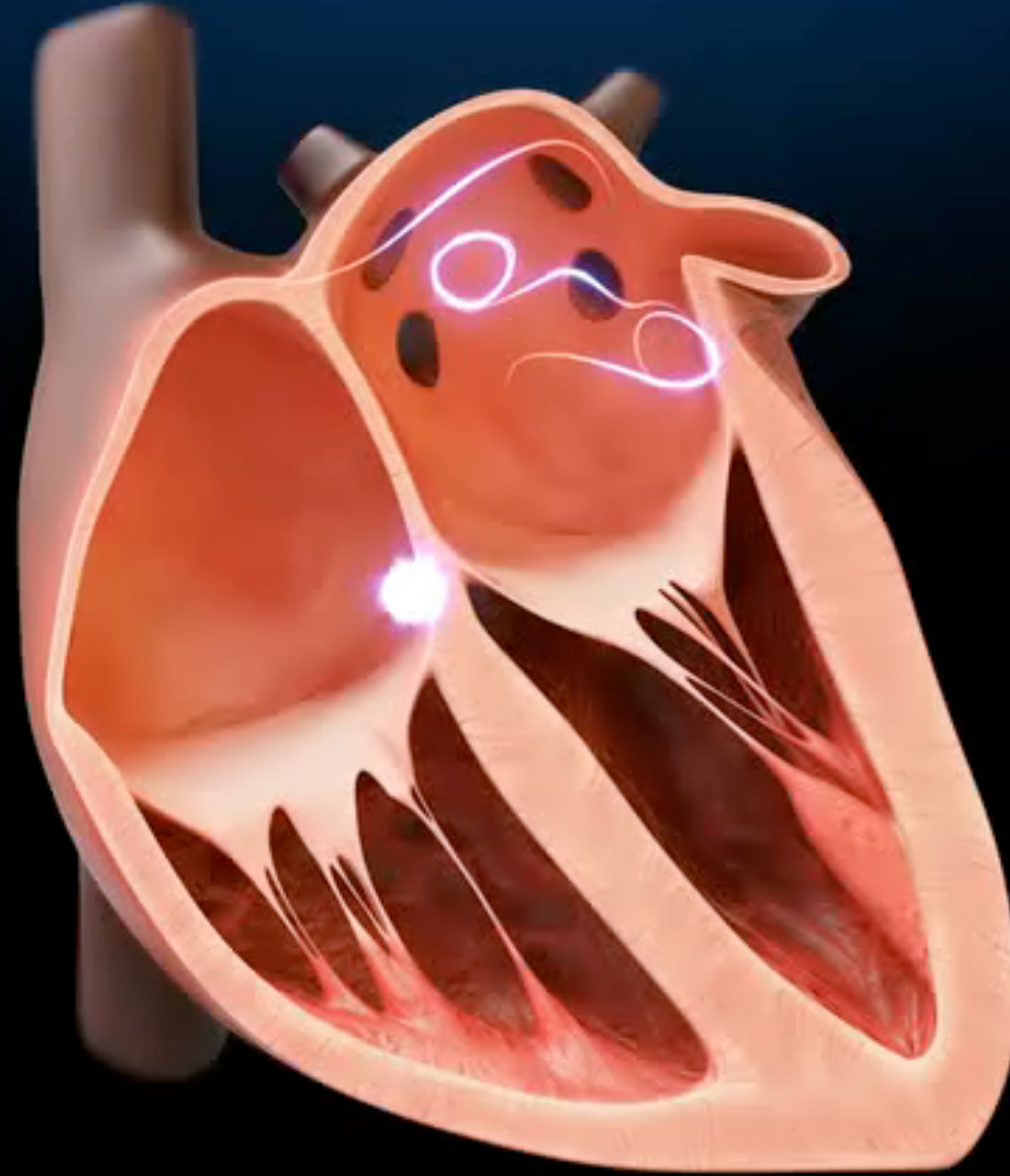
OSA	844	709	569	478	397	333	273	214	173	134	110	94	70	46	29	8
No OSA	2,209	1,902	1,616	1,317	1,037	848	641	502	393	296	217	195	130	94	69	28

Cumulative frequency curves for incident atrial fibrillation (AF) for subjects < 65 years of age with and without obstructive sleep apnea (OSA) during an average 4.7 years of follow-up. $p = 0.002$

Risk Control

- Risk of stroke
- Risk of tachycardia-induced cardiomyopathy

AFib - Stroke Risk



127 BPM



How to Prevent Stroke

CHADS₂ -> CHA₂DS₂VASc

CHADS2 Risk	Score
CHF	1
Hypertension	1
Age > 75	1
Diabetes	1
Stroke or TIA	2

From ESC AF Guidelines
<http://escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-afib-FT.pdf>

CHA2DS2-VASc Risk	Score
CHF or LVEF ≤ 40%	1
Hypertension	1
Age ≥ 75	2
Diabetes	1
Stroke/TIA/Thromboembolism	2
Vascular Disease	1
Age 65 - 74	1
Female	1

How to Prevent Stroke

CHADS₂ -> CHA₂DS₂VASc

CHADS2 score	Patients (n = 1733)	Adjusted stroke rate %/ year
0	120	1.9
1	463	2.8
2	523	4.0
3	337	5.9
4	220	8.5
5	65	12.5
6	5	18.2

CHA2DS2-VASc score	Patients (n = 7329)	Adjusted stroke rate %/ year
0	1	0
1	422	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

From ESC AF Guidelines: <http://www.escard.org/guidelines/new/af/af-guidelines/GuidelinesDocumentafguidelinesfbf1.pdf>

Pharmacotherapy

- Aspirin (SPAF trial)
- NOAC / DOAC
- Warfarin

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).

Class I

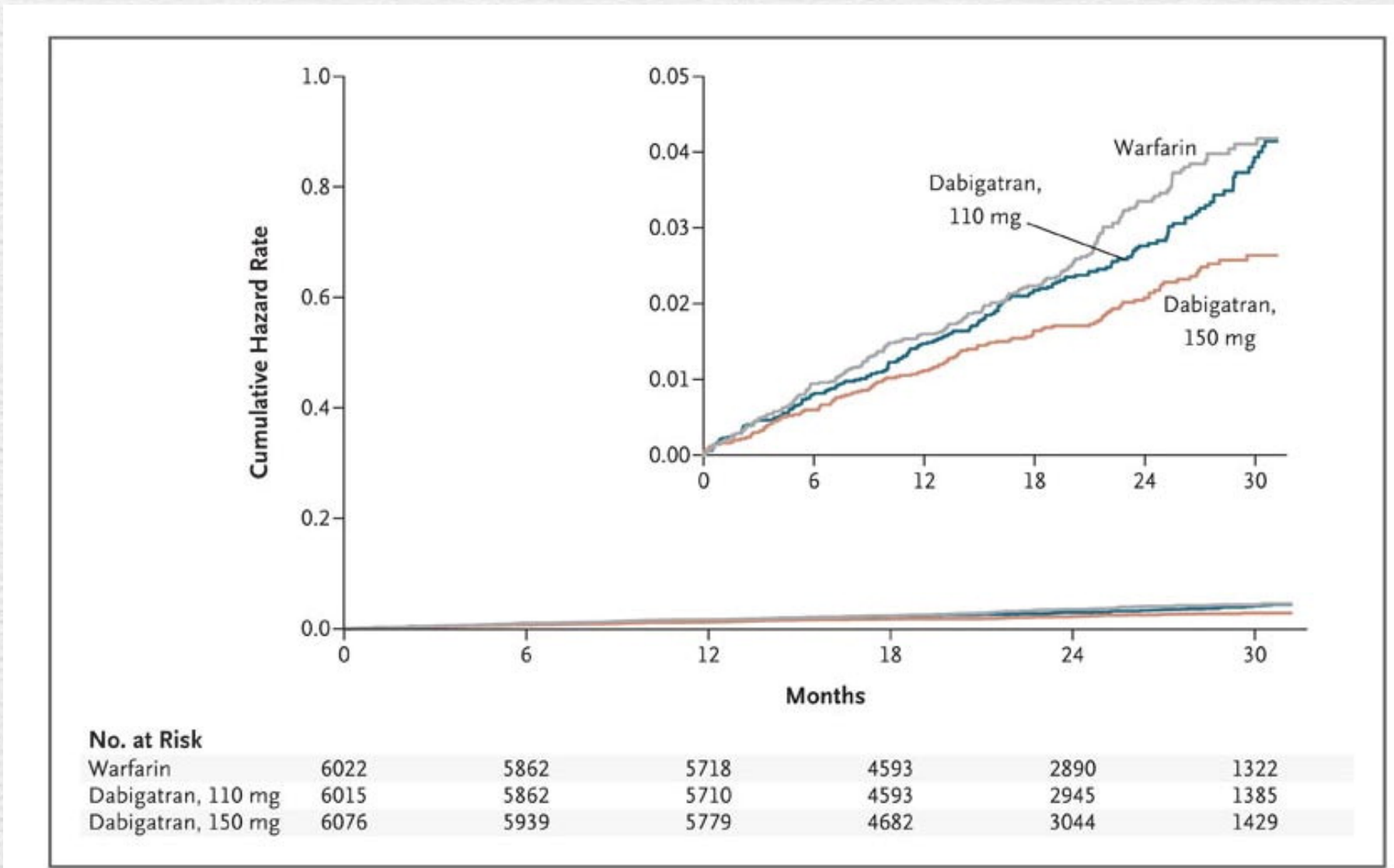
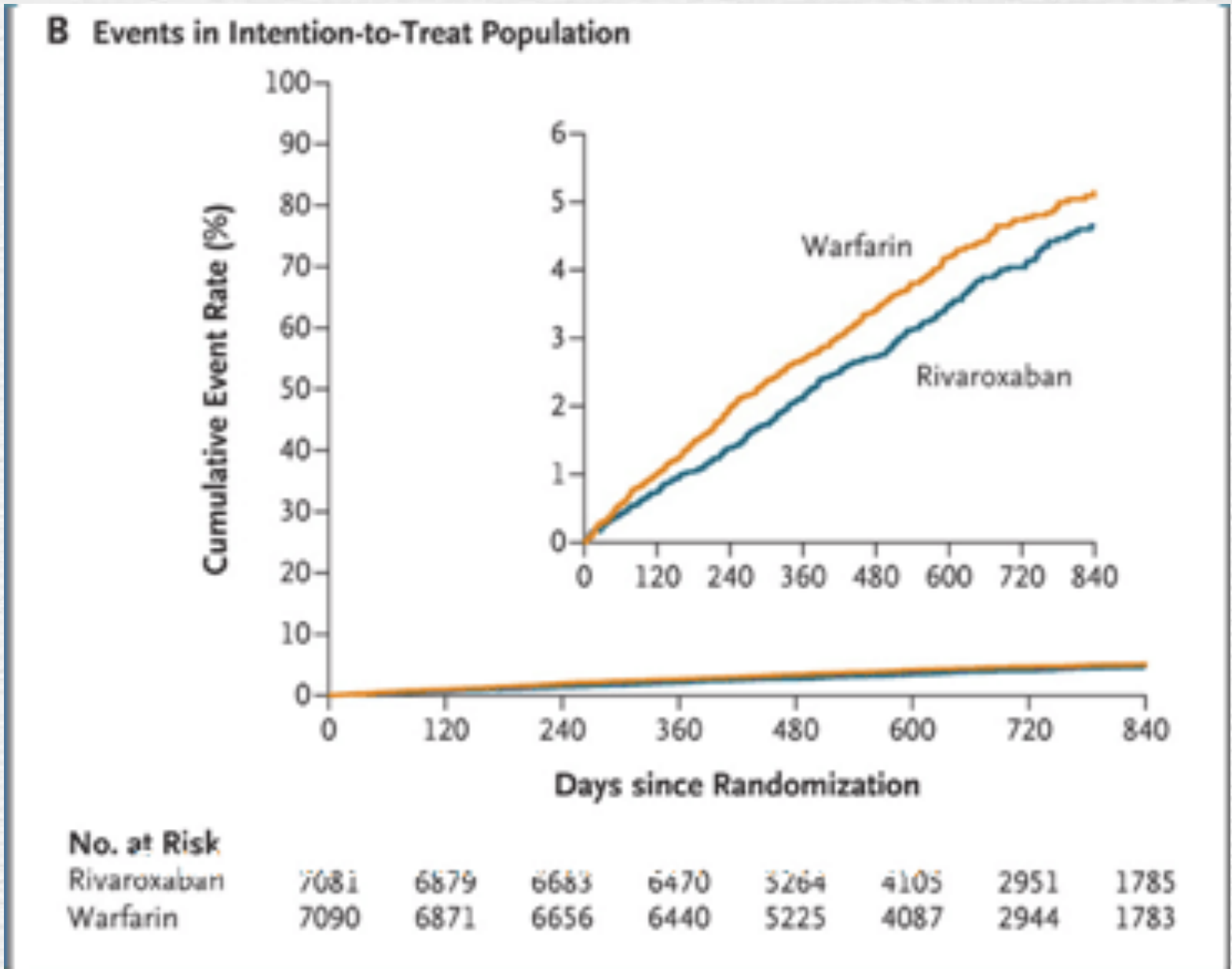
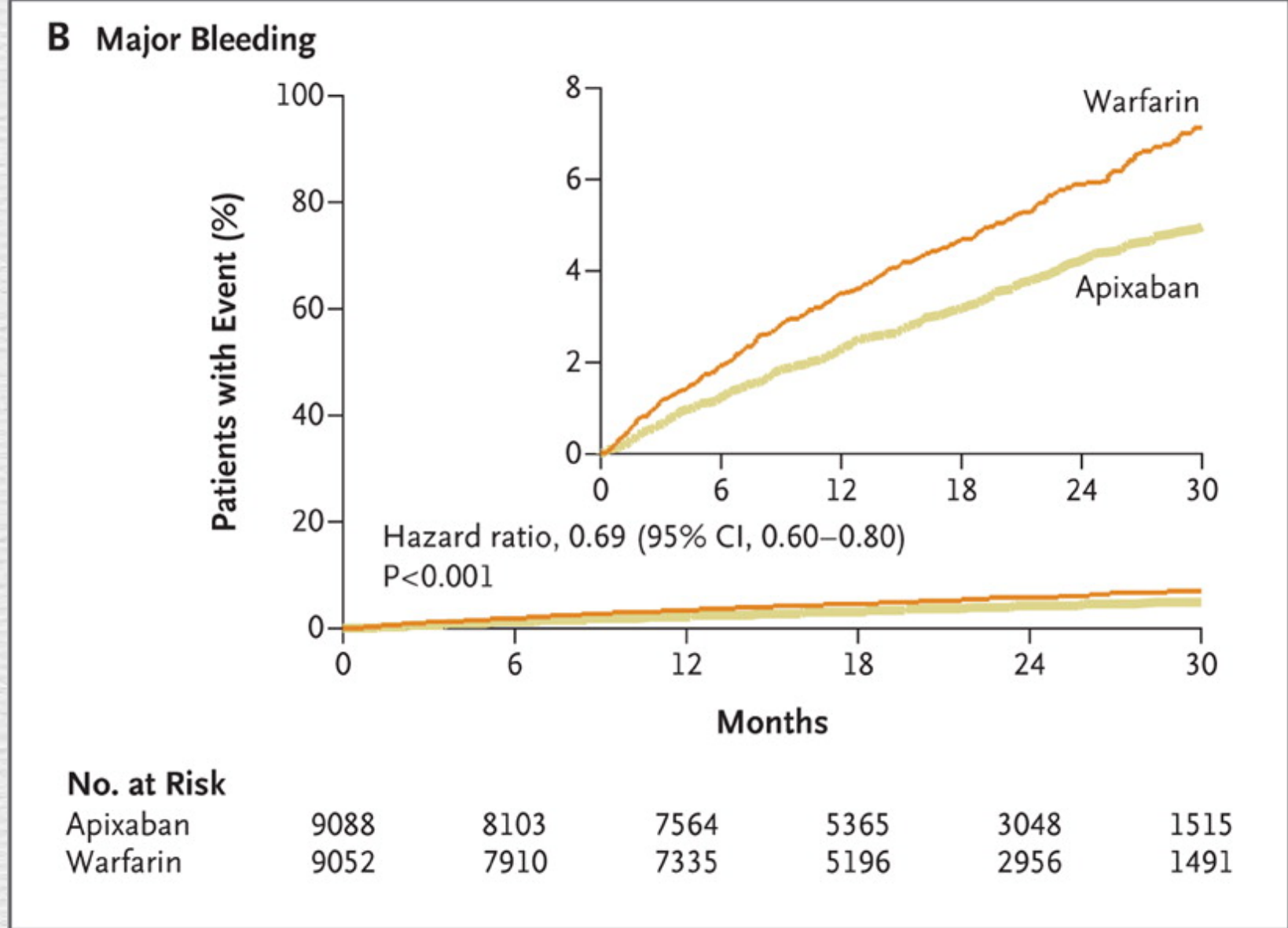
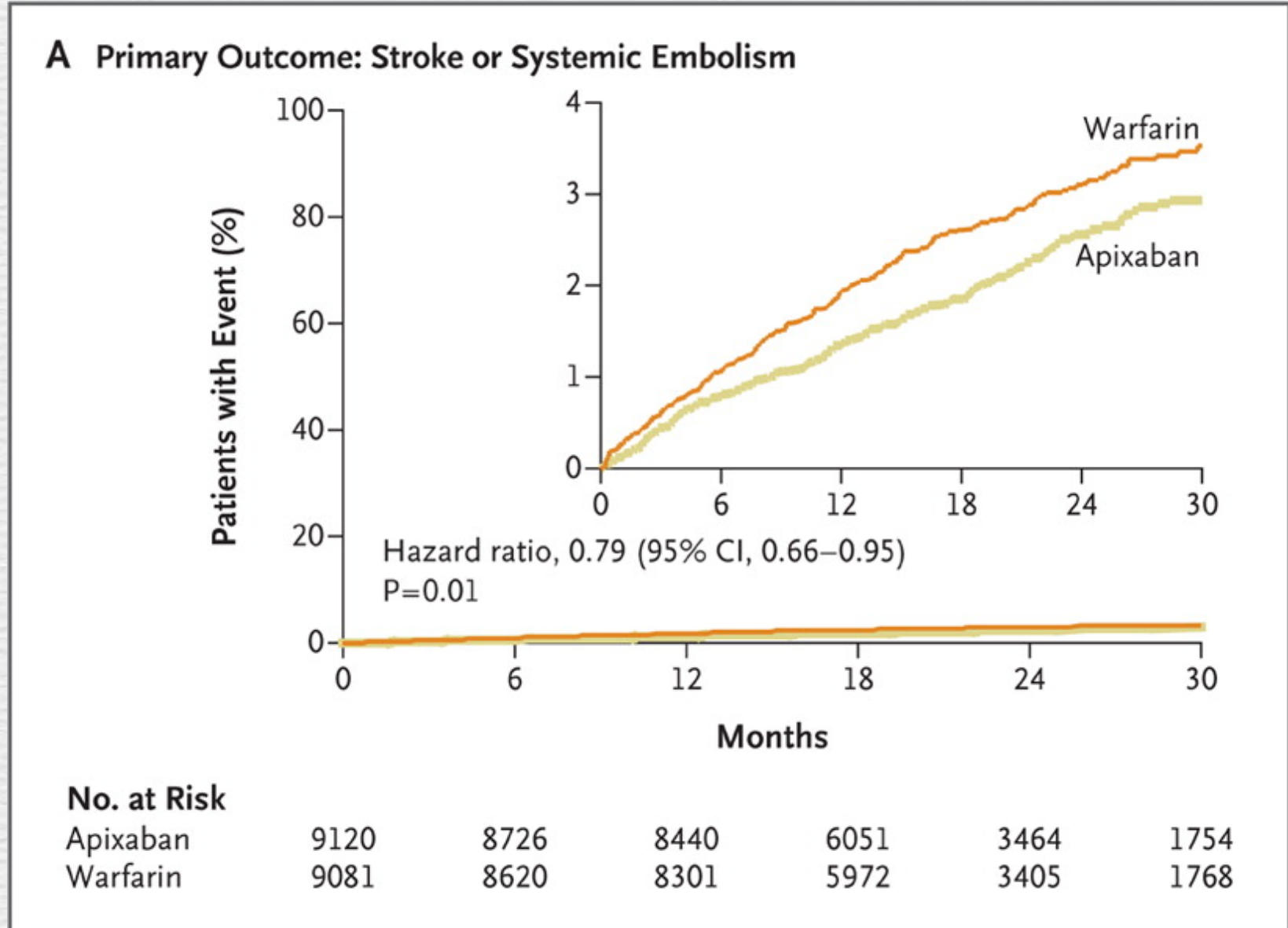
- 1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient's values and preferences. (*Level of Evidence: C*)**

DOACs

- Dabigatran <-> Idarucizumab
- Rivaroxaban <-> Andexanet alfa
- Apixaban <-> Andexanet alfa
- Edoxaban

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).

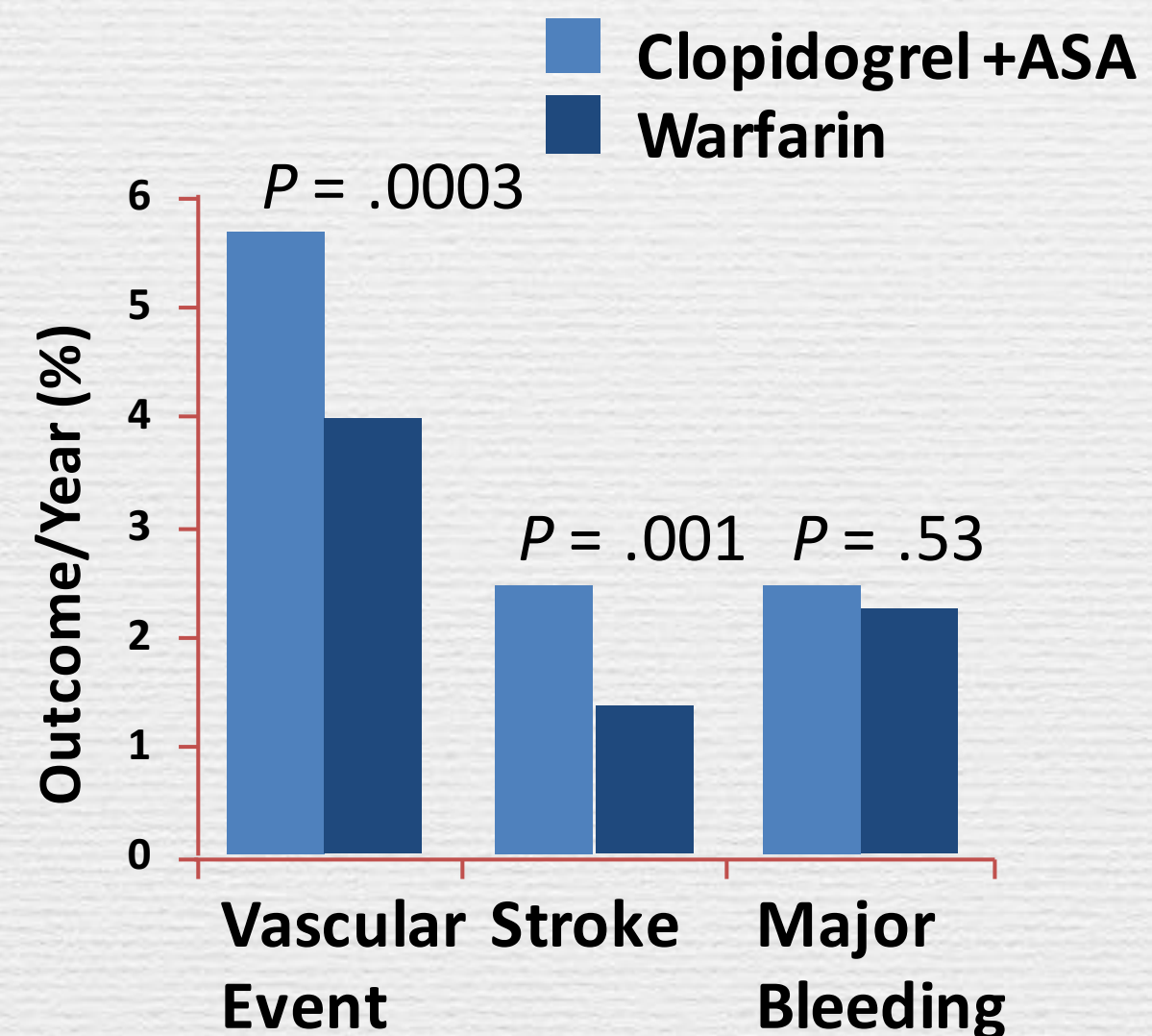




The Role of Clopidogrel

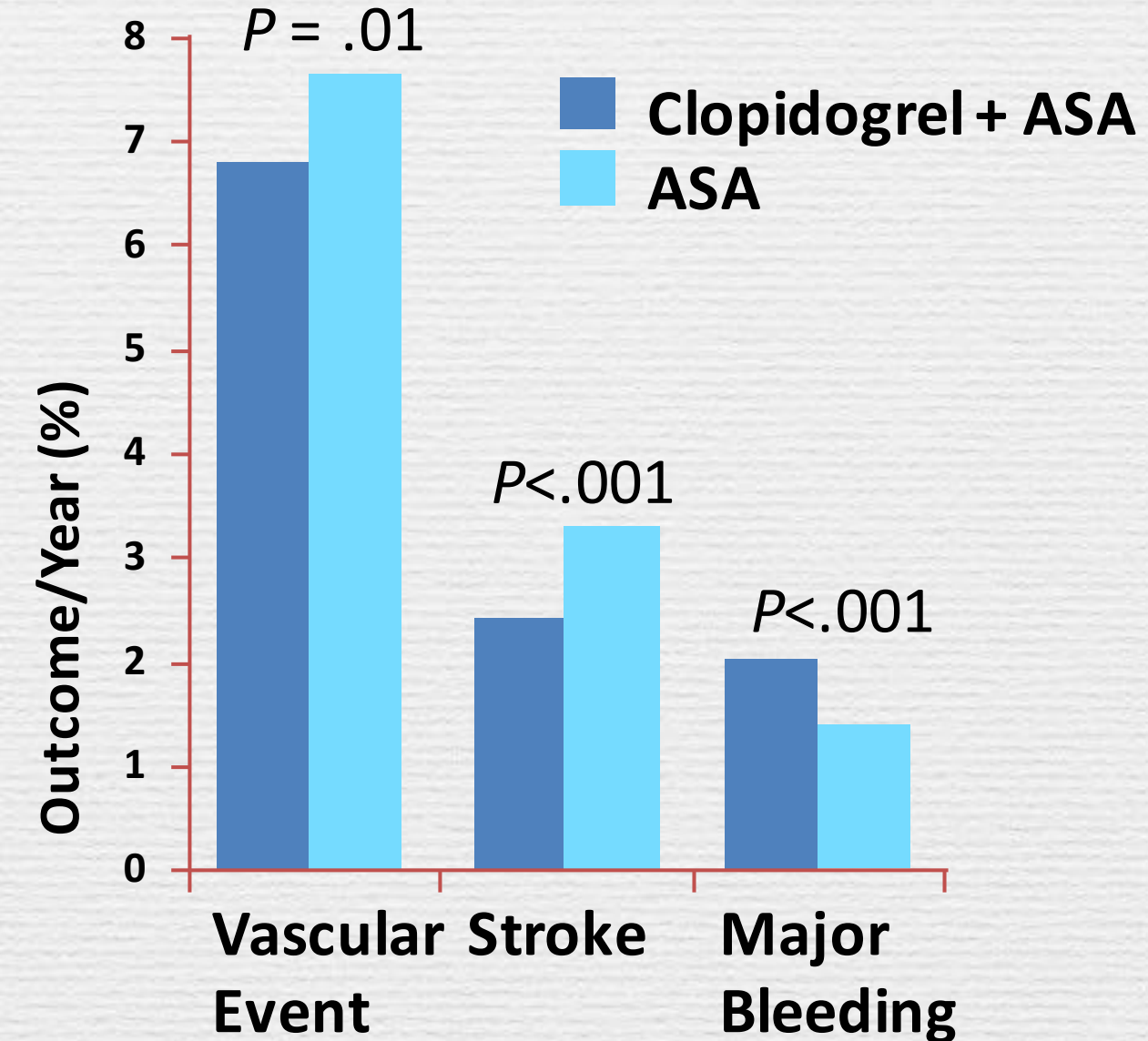
ACTIVE-W:

6706 randomized patients;
trial stopped



ACTIVE-A:

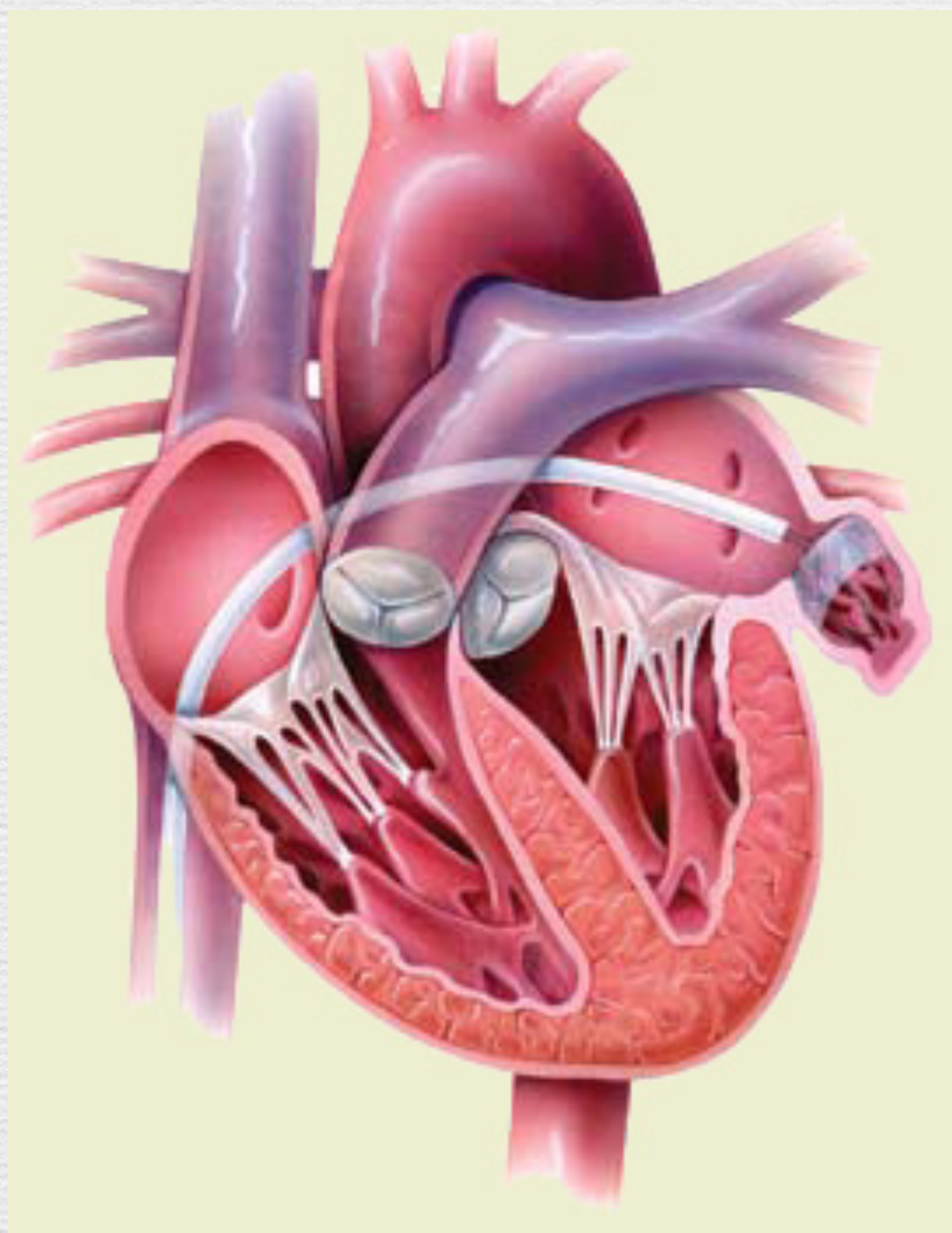
7554 randomized patients;
median follow-up of 3.6 years



ACTIVE = AF Clopidogrel Trial with Irbesartan for Prevention of Vascular Events.

ACTIVE Investigators. *Lancet*. 2006;367:1903-1912. ACTIVE Investigators. *N Engl J Med*. 2009;360(20):2066-2078.

Watchman Device / LAA Closure



Circulation. 2013 Feb 12;127(6):720-9. doi: 10.1161/CIRCULATIONAHA.112.114389. Epub 2013 Jan 16.

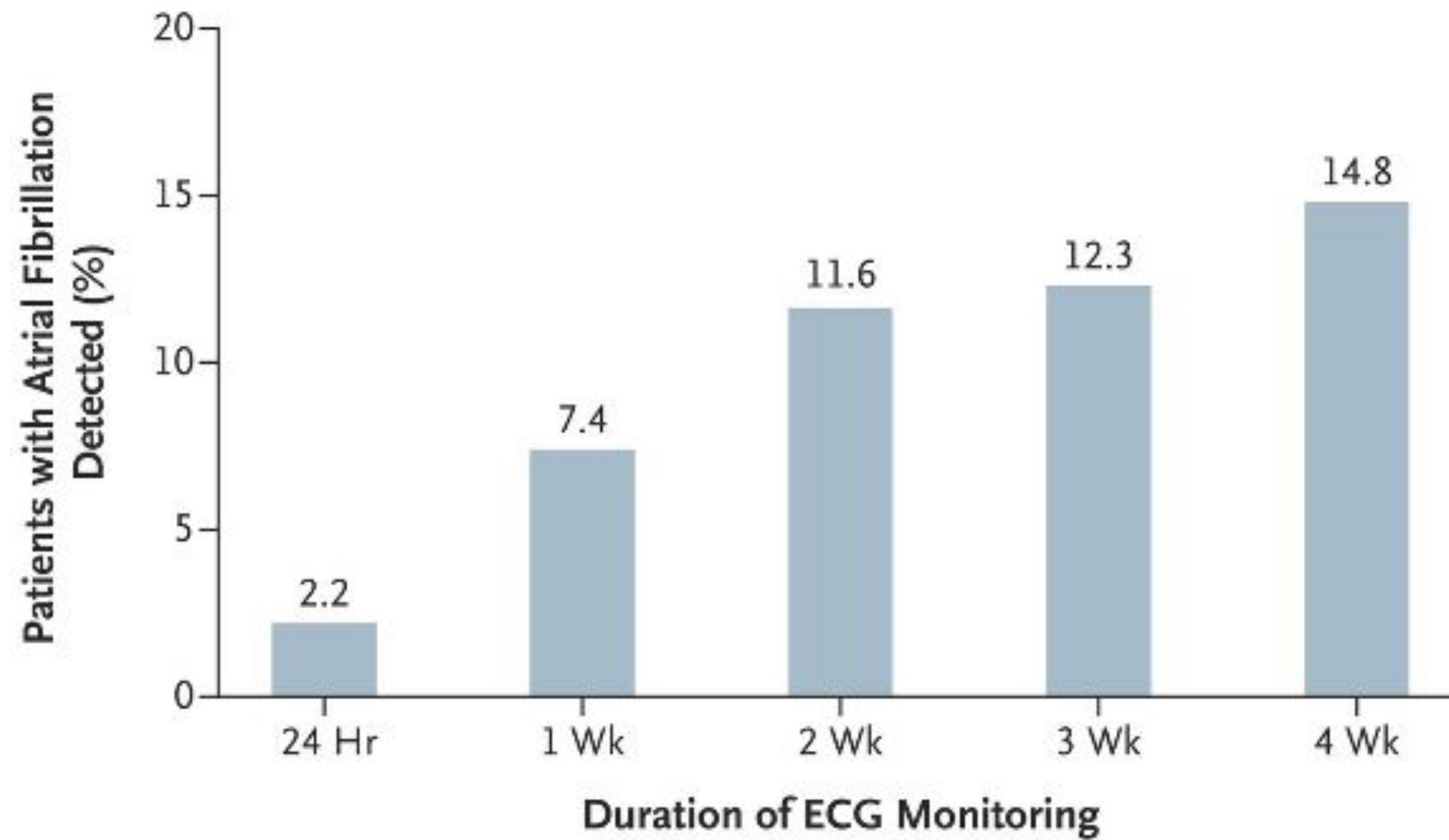
Percutaneous left atrial appendage closure for stroke prophylaxis in patients with atrial fibrillation: 2.3-Year Follow-up of the PROTECT AF (Watchman Left Atrial Appendage System for Embolic Protection in Patients with Atrial Fibrillation) Trial.

Reddy VY¹, Doshi SK, Sievert H, Buchbinder M, Neuzil P, Huber K, Halperin JL, Holmes D; PROTECT AF Investigators.

CONCLUSIONS: The "local" strategy of left atrial appendage closure is noninferior to "systemic" anticoagulation with warfarin. PROTECT AF has, for the first time, implicated the left atrial appendage in the pathogenesis of stroke in atrial fibrillation.

Percutaneous LAA occlusion may be considered in patients with AF at increased risk of stroke who have contraindications to long-term anticoagulation (S4.4.1-1-S4.4.1-5).

Cryptogenic Stroke

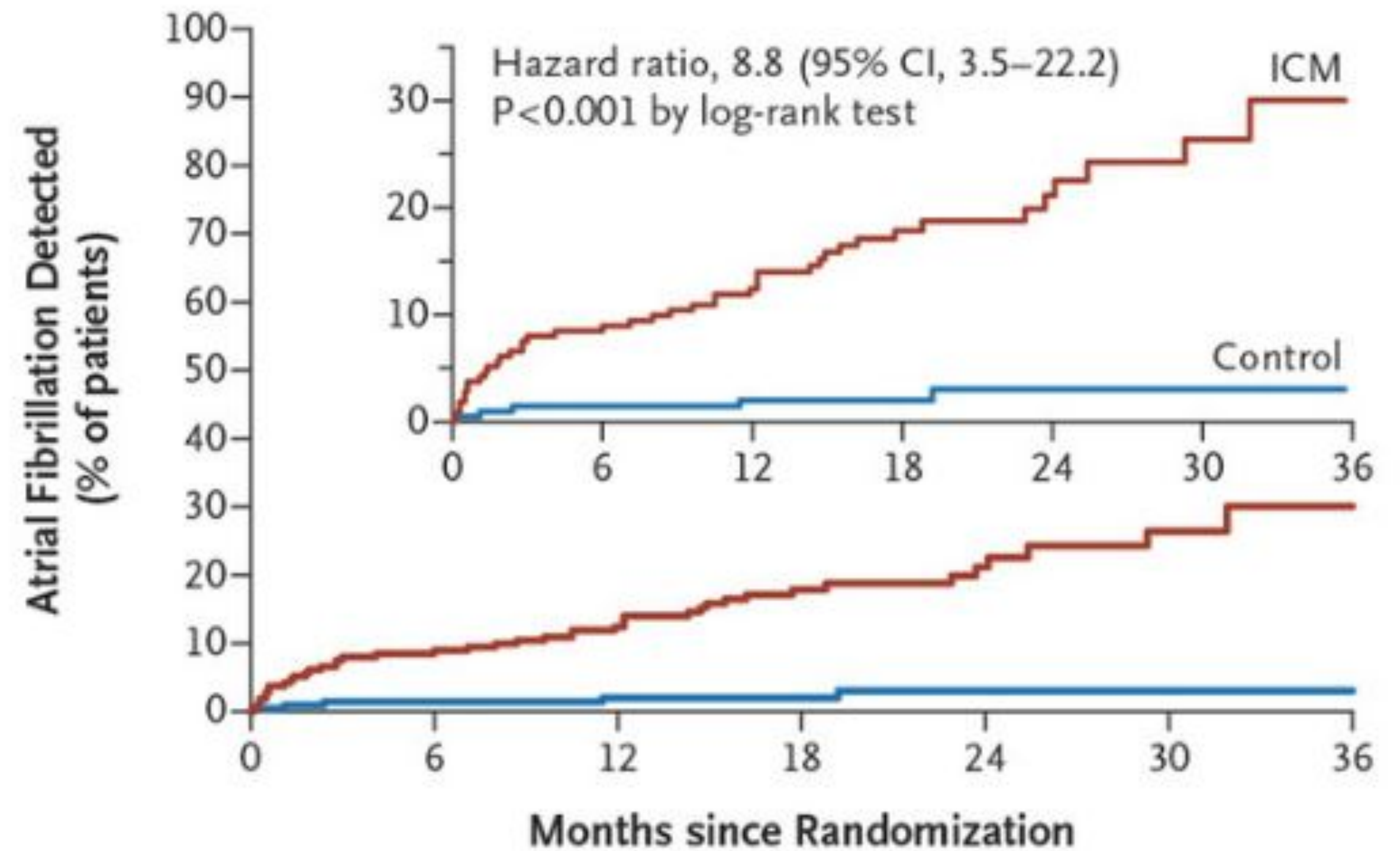


EMBRACE Trial

CRYSTAL-AF Trial



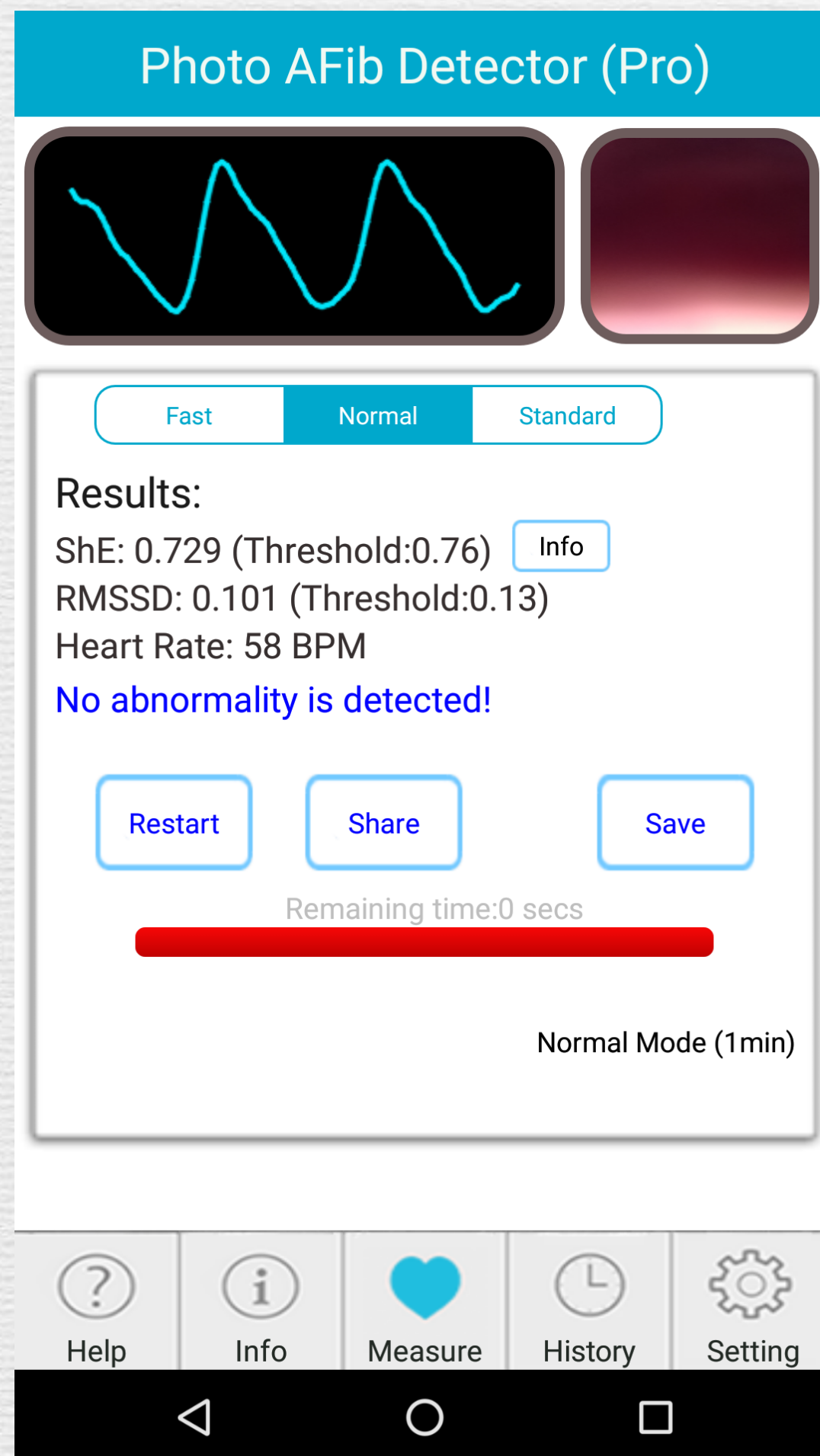
C Detection of Atrial Fibrillation by 36 Months



No. at Risk

Control	220	194	167	114	72	36	7
ICM	221	191	173	102	57	29	8

AF Detection



Apple Heart Study



AliveCor Mobile ECG

Use your smartphone or tablet to instantly detect a serious heart condition in your ECG

Buy Now

FDA cleared

HAS-Bled Score

- Hypertension
- Renal Disease
- Liver Disease
- Stroke History
- Prior major bleeding
- Labile INR
- Age > 65
- Medications
- Alcohol use



Granny Falls

ABSTRACT

PURPOSE: Patients at high risk for falls are presumed to be at increased risk for intracranial hemorrhage, and high risk for falls is cited as a contraindication to antithrombotic therapy. Data substantiating this concern are lacking.

METHODS: Quality improvement organizations identified 1245 Medicare beneficiaries who were documented in the medical record to be at high risk of falls and 18 261 other patients with atrial fibrillation. The patients were elderly (mean 80 years), and 48% were prescribed warfarin at hospital discharge. The primary endpoint was subsequent hospitalization for an intracranial hemorrhage, based on ICD-9 codes.

RESULTS: Rates (95% confidence interval [CI]) of intracranial hemorrhage per 100 patient-years were 2.8 (1.9–4.1) in patients at high risk for falls and 1.1 (1.0–1.3) in other patients. Rates (95% CI) of traumatic intracranial hemorrhage were 2.0 (1.3–3.1) in patients at high risk for falls and 0.34 (0.27–0.45) in other patients. Hazard ratios (95% CI) of other independent risk factors for intracranial hemorrhage were 1.4 (1.0–3.1) for neuropsychiatric disease, 2.1 (1.6–2.7) for prior stroke, and 1.9 (1.4–2.4) for prior major bleeding. Warfarin prescription was associated with intracranial hemorrhage mortality but not with intracranial hemorrhage occurrence. Ischemic stroke rates per 100 patient-years were 13.7 in patients at high risk for falls and 6.9 in other patients. Warfarin prescription in patients prone to fall who had atrial fibrillation and multiple additional stroke risk factors appeared to protect against a composite endpoint of stroke, intracranial hemorrhage, myocardial infarction, and death.

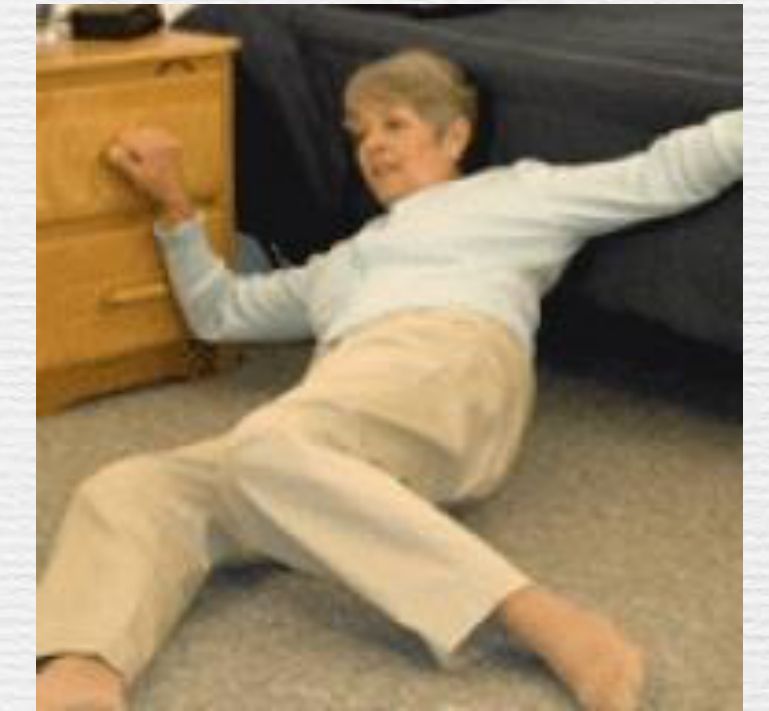
CONCLUSION: Patients at high risk for falls with atrial fibrillation are at substantially increased risk of intracranial hemorrhage, especially traumatic intracranial hemorrhage. However, because of their high stroke rate, they appear to benefit from anticoagulant therapy if they have multiple stroke risk factors.

© 2005 Elsevier Inc. All rights reserved.

Incidence of intracranial hemorrhage in patients with atrial fibrillation who are prone to fall. The American Journal of Medicine (2005) 118, 612–617

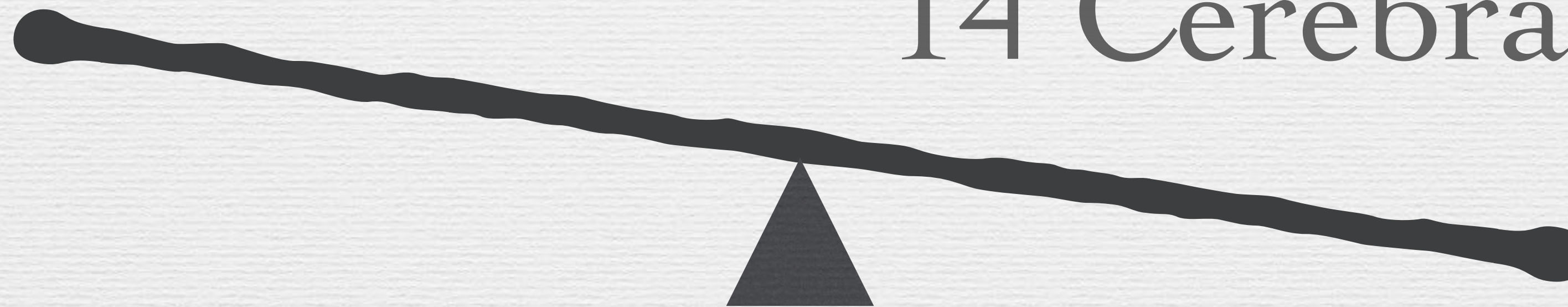
“Prescription of warfarin or aspirin at baseline did not significantly affect risk of intracranial hemorrhage”

“The intracranial hemorrhage 30-day mortality was 51.8% in patients who had been prescribed warfarin, and 33.6% in patients who had not been prescribed warfarin after the baseline hospitalization (P 0.007)”



3 Cerebral Bleeds

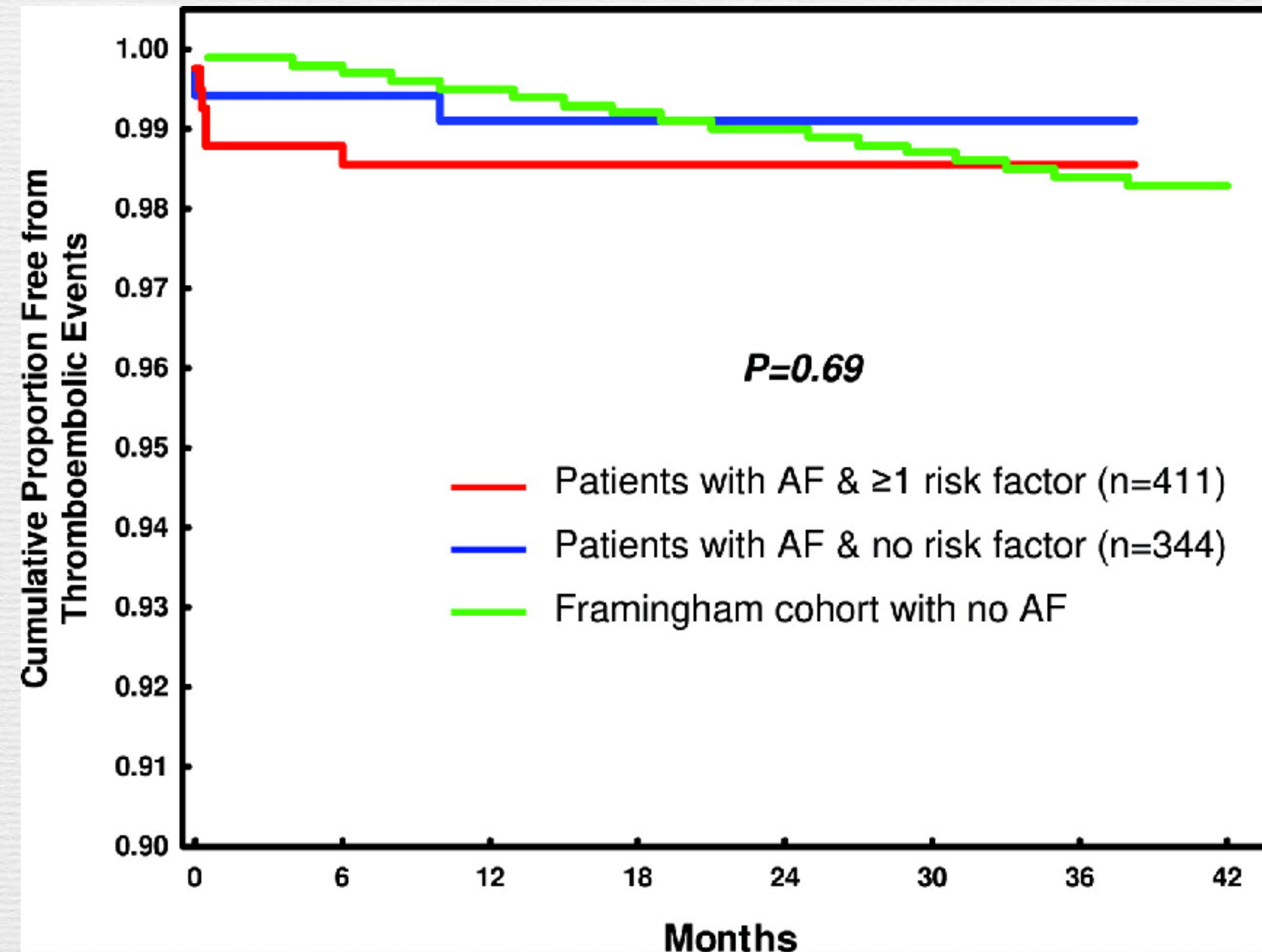
14 Cerebral Infarcts



“I want to stop my blood thinner”

- Watchman device: if followup TEE confirms seal of appendage
- Surgical Ligation: maybe
- Successful catheter ablation:
 - Oral H, Chugh A, Ozaydin M, et al. Risk of thromboembolic events after percutaneous left atrial radiofrequency ablation of atrial fibrillation. *Circulation* 2006;114(8):759-765 Epub 2006 Aug 14

Catheter Ablation- Outcomes



- Oral H, Chugh A, Ozaydin M, et al. Risk of thromboembolic events after percutaneous left atrial radiofrequency ablation of atrial fibrillation. *Circulation* 2006;114(8):759-765 Epub 2006 Aug 14

Risk Control: TICM

- Tachycardia-induced cardiomyopathy remains poorly understood and is likely under-diagnosed
- Recovery typically takes weeks-months
- Ensuring a resting heart rate < 100 BPM seems adequate (RACE II Trial)
- Ellis, Josephson. Heart Failure and TICM. Current Heart Failure Reports 2013

Rate Control: Combination Therapy

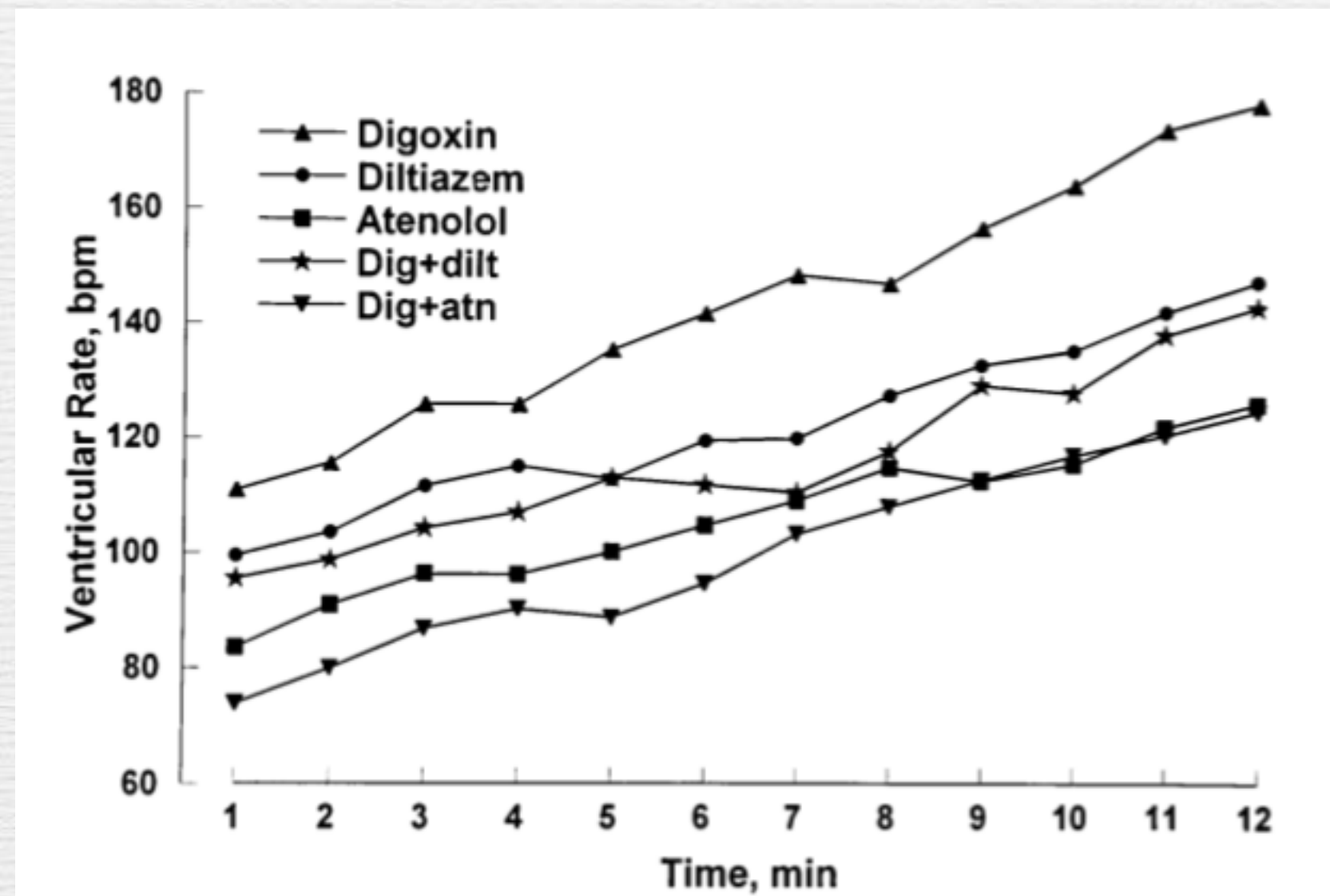
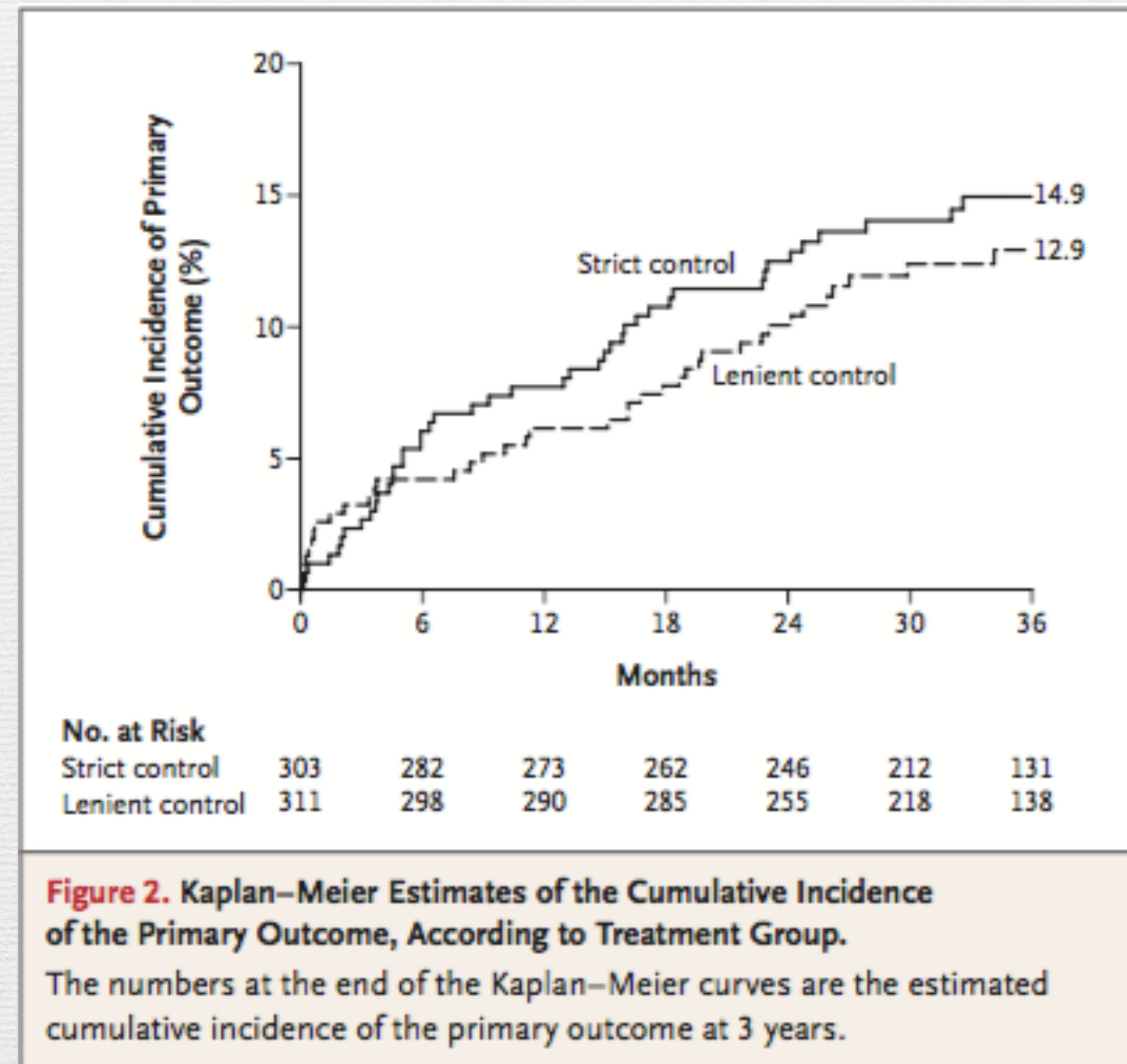


Figure 3. Effect of various pharmacologic regimens on exercise-induced VR in patients with CAF. There was a linear trend in increases in VR on all 5 regimens. The mean VR on digoxin + atenolol treatment was the lowest and was significantly lower than those on digoxin, diltiazem and digoxin + diltiazem. See text for details.

Rate Control



Increased Mortality Associated With Digoxin in Contemporary Patients With Atrial Fibrillation

Findings From the TREAT-AF Study

Mintu P. Turakhia, MD, MAS,*† Pasquale Santangeli, MD,†‡ Wolfgang C. Winkelmayr, MD, MPH, ScD,§
Xiangyan Xu, MS,* Aditya J. Ullal, BA,* Claire T. Than, MPH,* Susan Schmitt, PhD,* Tyson H. Holmes, PhD,||
Susan M. Frayne, MD, MPH,*¶ Ciaran S. Phibbs, PhD,*# Felix Yang, MD,** Donald D. Hoang, BA,*
P. Michael Ho, MD, PhD,††‡‡ Paul A. Heidenreich, MD, MS*†



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CME >

ORIGINAL ARTICLE

The Effect of Digoxin on Mortality and Morbidity in Patients with Heart Failure

The Digitalis Investigation Group*

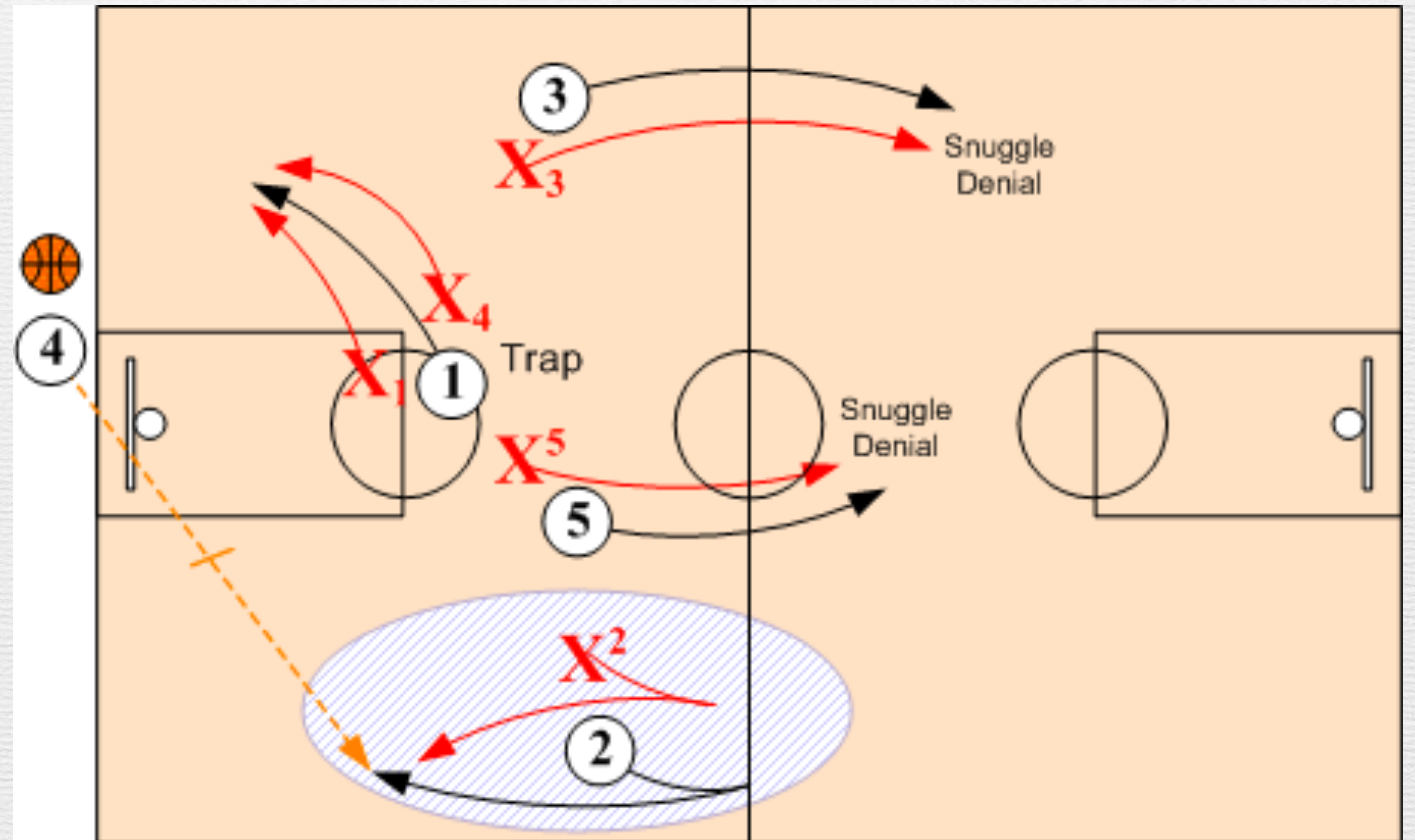
N Engl J Med 1997; 336:525-533 | February 20, 1997 | DOI: 10.1056/NEJM199702203360801

Treatment

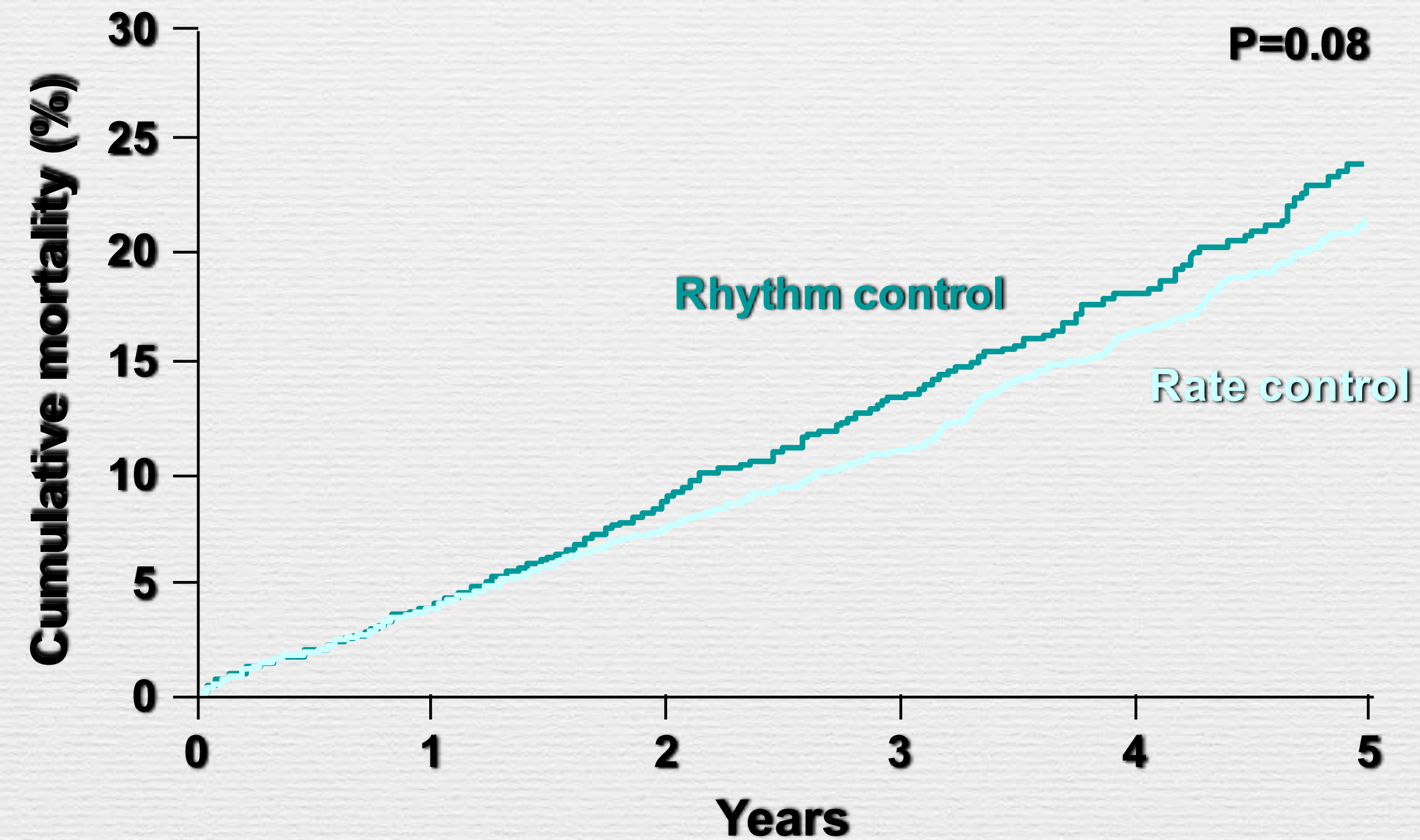


Treatment

- Root conditions
- Prevent stroke
- Rate
- Rhythm
- Procedure/Surgery



Rhythm Control- AFFIRM Trial



AFFIRM Trial

- 4060 patients, all ≥ 65 years old, all with tolerable symptoms
- No difference in death, stroke, major bleeding, QOL
- More bradycardia, TdP, hospitalizations in AAD group

AFFIRM Trial did not address:

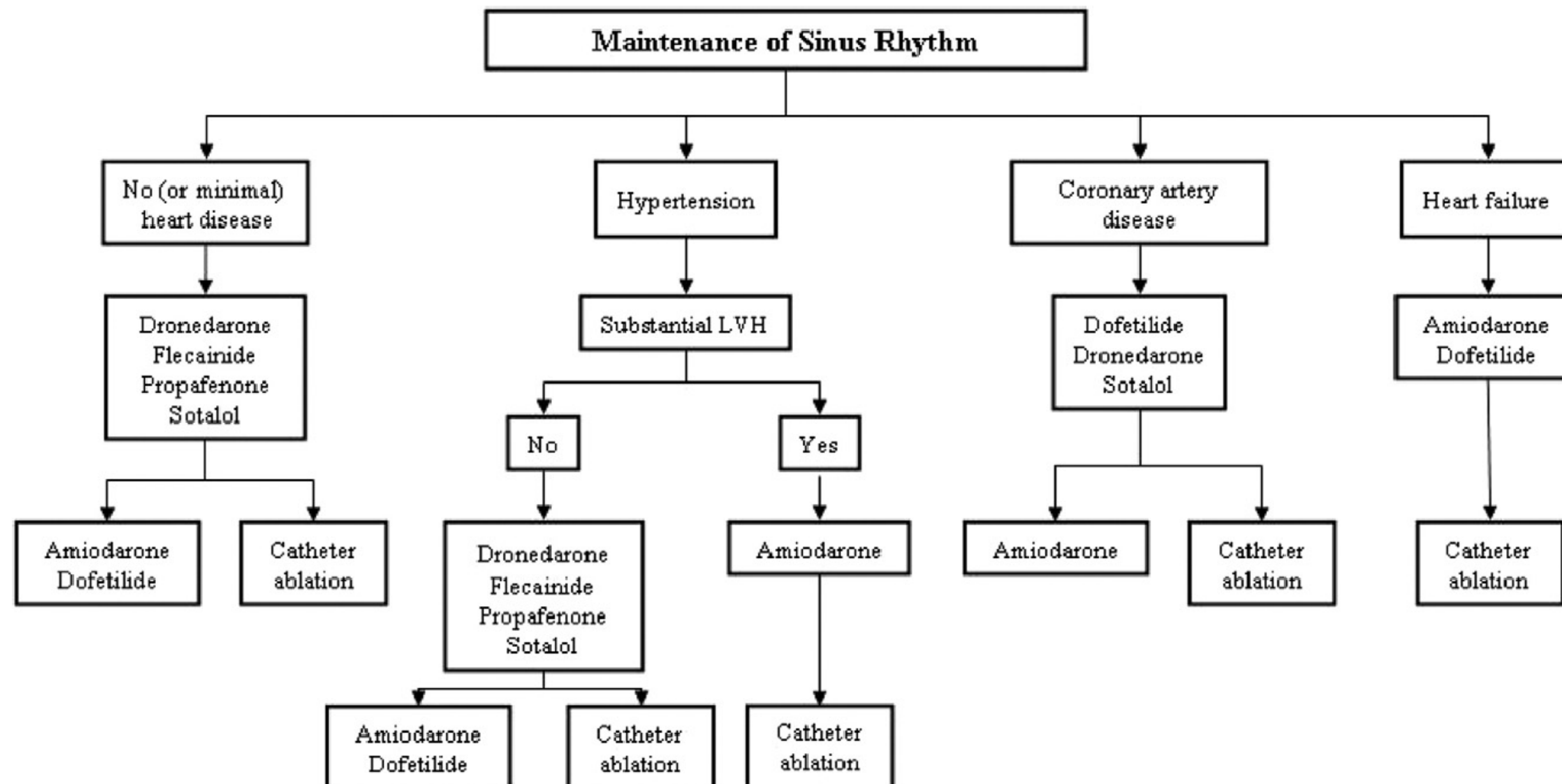
- Patients < 65 years old
- Patients with intolerable symptoms
- Patients undergoing catheter ablation
- Substudy analysis: patients that were able to maintain sinus rhythm did better
- “Rhythm control, if used, may be abandoned early if it is not fully satisfactory”

Rhythm Control- Pharmacology

230

Wann *et al.*
Guideline Focused Update: Atrial Fibrillation

JACC Vol. 57, No. 2, 2011
January 11, 2011:223-42



Adverse Effects

- Dysrhythmia
 - Prolonged QTc (> 500 msec), TdP
 - Syncope
 - Bradycardia
- New bundle branch block
- Cough (amiodarone)

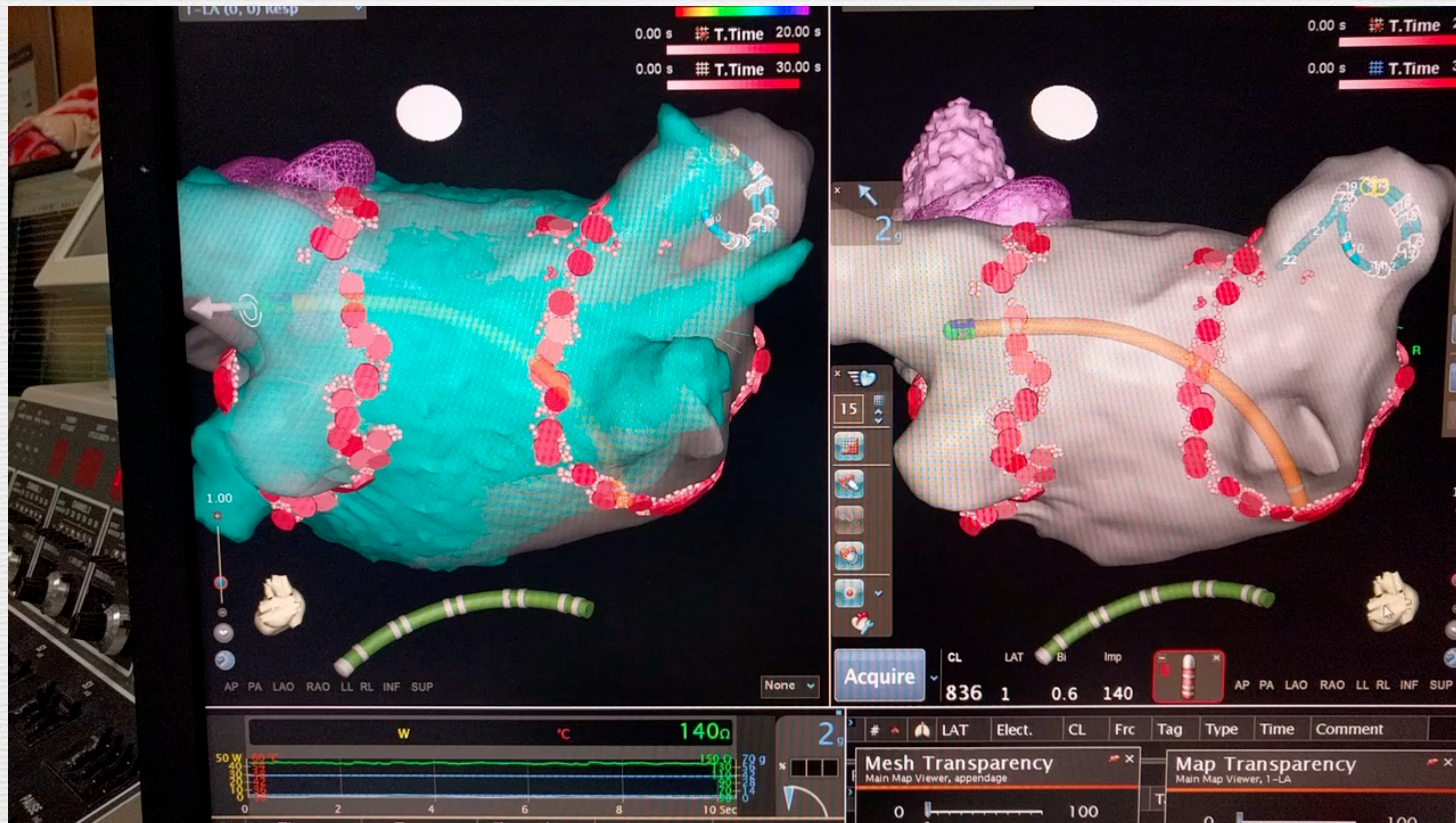
Contraindications to AAD

- Structural heart disease (flecainide, propafenone, +/- sotalol)
- Renal disease (sotalol)
- Longstanding atrial fibrillation, heart failure (dronedarone)
- CAD/High risk for MI (flecainide, propafenone)
- Pulmonary issues (amiodarone)

Invasive Approaches

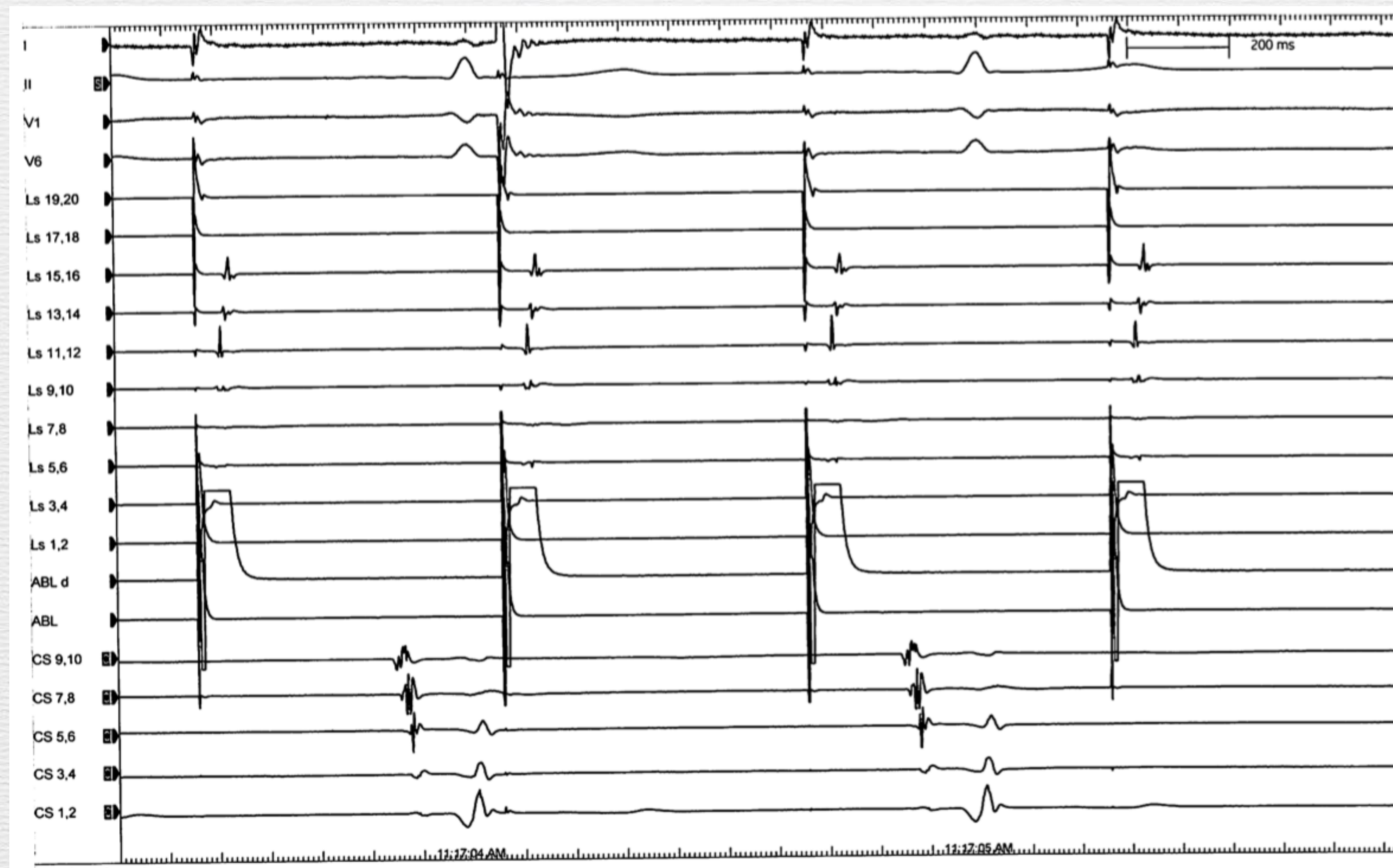
- Catheter ablation
- Surgery
- Hybrid approach / “Convergent” Procedure
- Pacemaker/AV Node ablation
 - Beneficial only when adequate rate control has not been achieved via other therapies

Catheter Ablation for Atrial Fibrillation



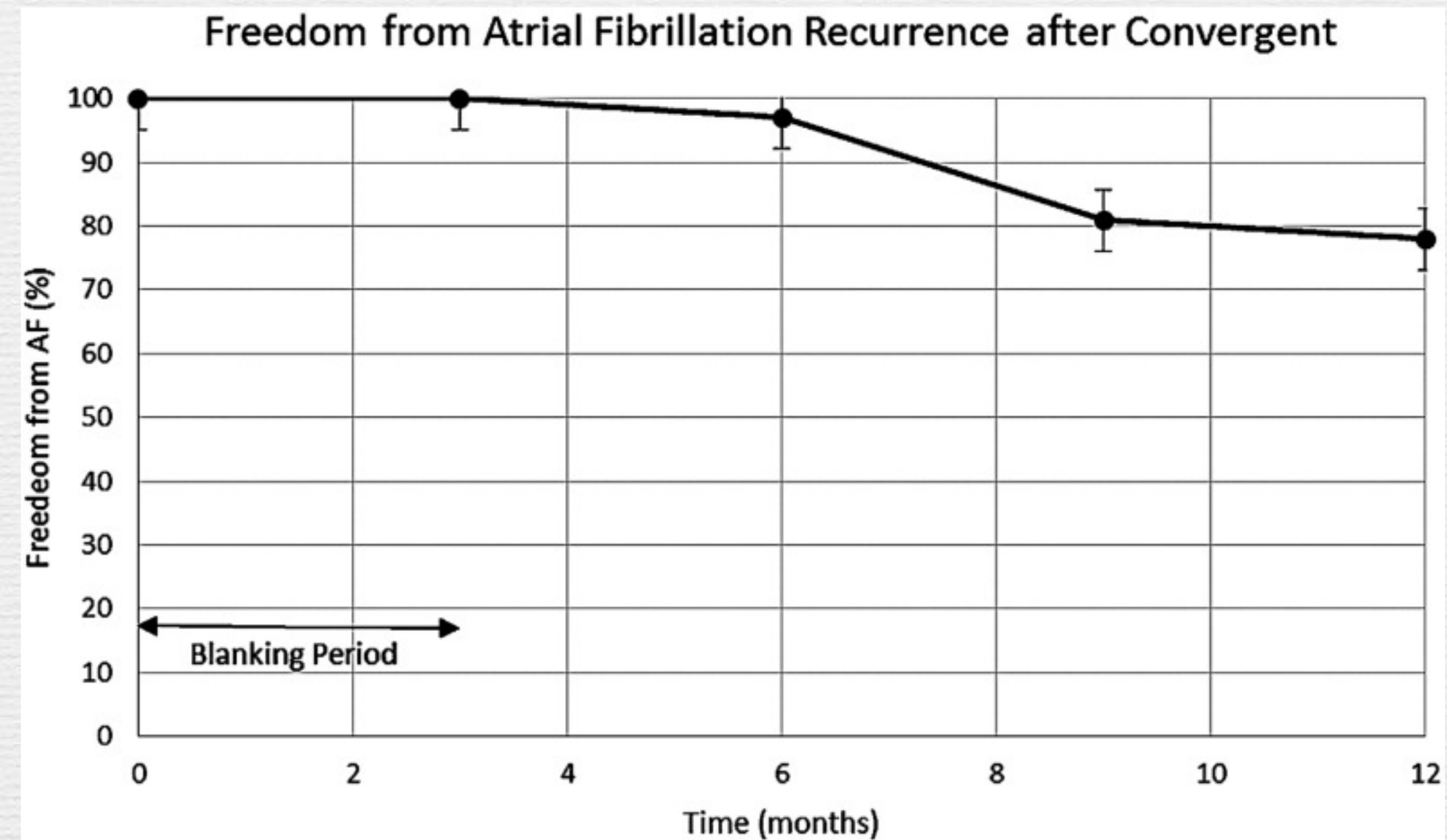
Catheter Ablation for Atrial Fibrillation

- Indications: symptomatic paroxysmal or persistent atrial fibrillation, failed at least one class I or class III antidysrhythmic medication
- Typically overnight hospital stay, recovery period of a few days
- Success rate: 70-80% for paroxysmal AF, 50-60% for persistent AF
- Complication rate: 1% Stroke/death





Catheter Ablation- outcomes



Short and Intermediate Term Outcomes of the Convergent Procedure: Initial Experience in a Tertiary Referral Center

Robert Tonks¹, Gurion Lantz², Jeremy Mahlow¹, Jeffrey Hirsh¹, Lawrence S Lee²

Affiliations + expand

PMID: 31495813 PMCID: [PMC7046930](#) DOI: [10.5761/atcs.aa.19-00164](#)

Catheter Ablation- Complications

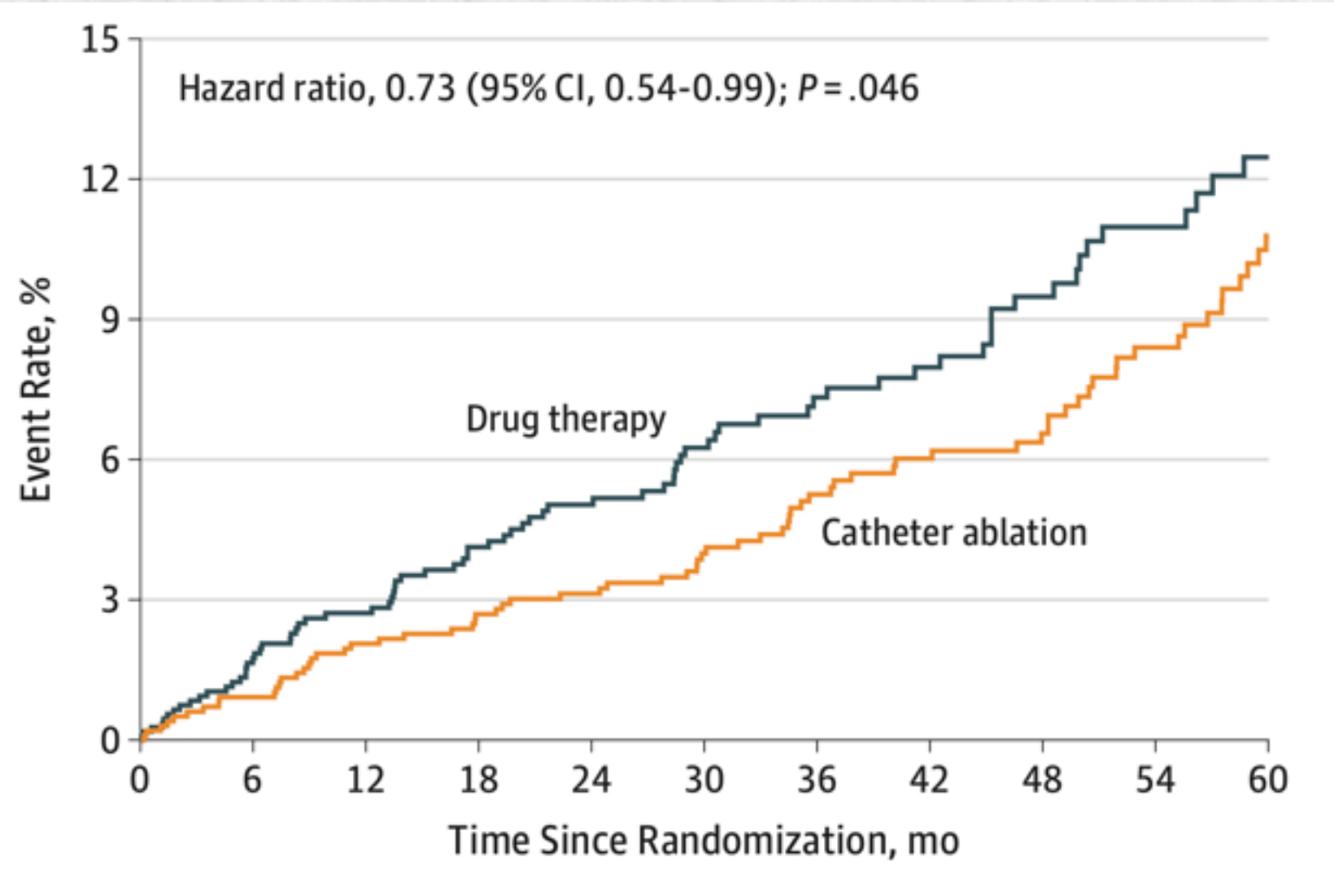
- Pericardial tamponade
- Atrial-esophageal fistula
- Pulmonary vein stenosis
- Phrenic nerve paralysis
- Stroke
- More minor complications (~5%)

JAMA | Original Investigation

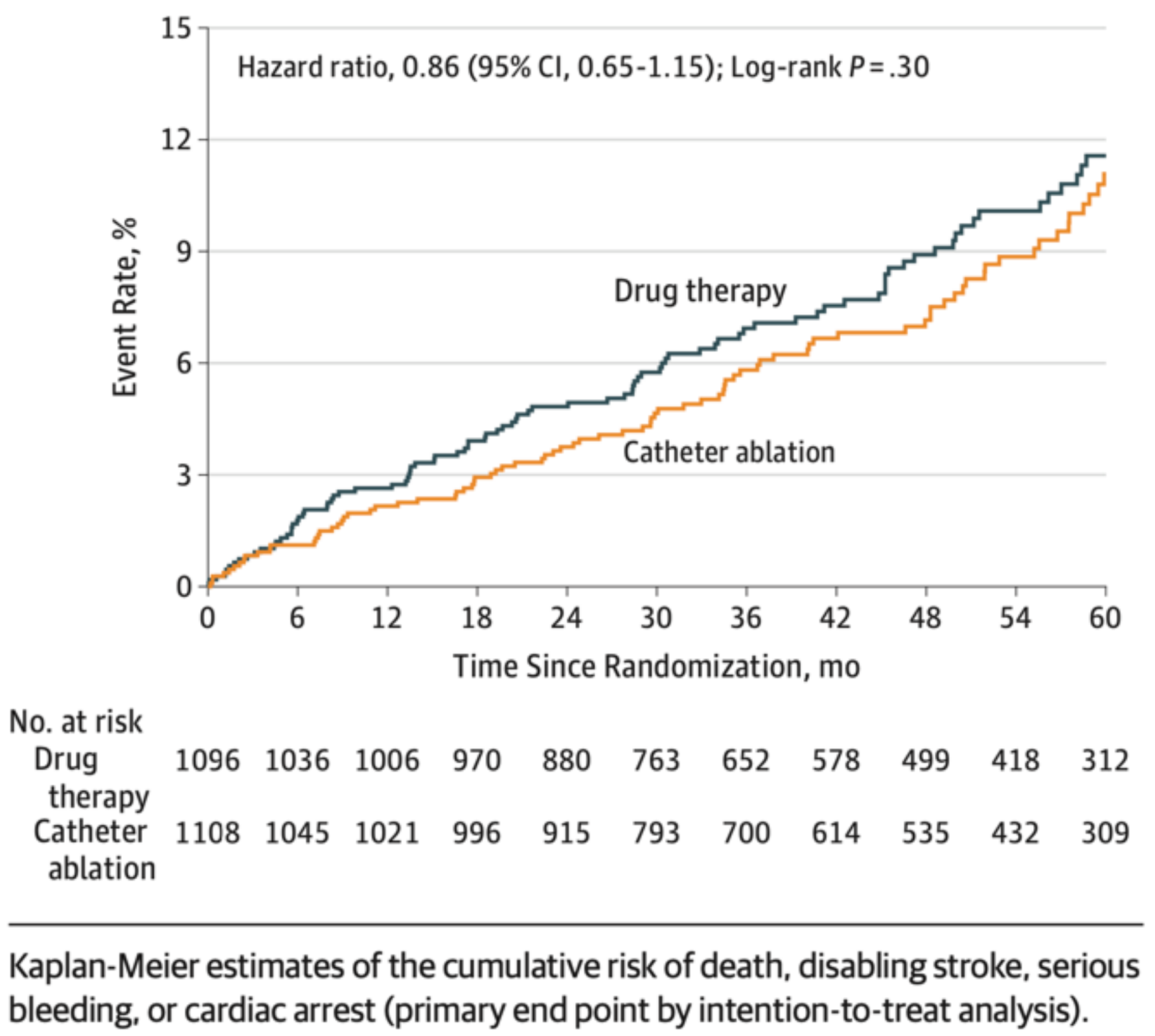
Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation

The CABANA Randomized Clinical Trial

Douglas L. Packer, MD; Daniel B. Mark, MD, MPH; Richard A. Robb, PhD; Kristi H. Monahan, RN; Tristram D. Bahnson, MD; Jeanne E. Poole, MD; Peter A. Noseworthy, MD; Yves D. Rosenberg, MD, MPH; Neal Jeffries, PhD; L. Brent Mitchell, MD; Greg C. Flaker, MD; Evgeny Pokushalov, MD; Alexander Romanov, MD; T. Jared Bunch, MD; Georg Noelker, MD; Andrey Ardashev, MD; Amiran Revishvili, MD; David J. Wilber, MD; Riccardo Cappato, MD; Karl-Heinz Kuck, MD; Gerhard Hindricks, MD; D. Wyn Davies, MD; Peter R. Kowey, MD; Gerald V. Naccarelli, MD; James A. Reiffel, MD; Jonathan P. Piccini, MD, MHS; Adam P. Silverstein, MS; Hussein R. Al-Khalidi, PhD; Kerry L. Lee, PhD; for the CABANA Investigators



Per-protocol analysis

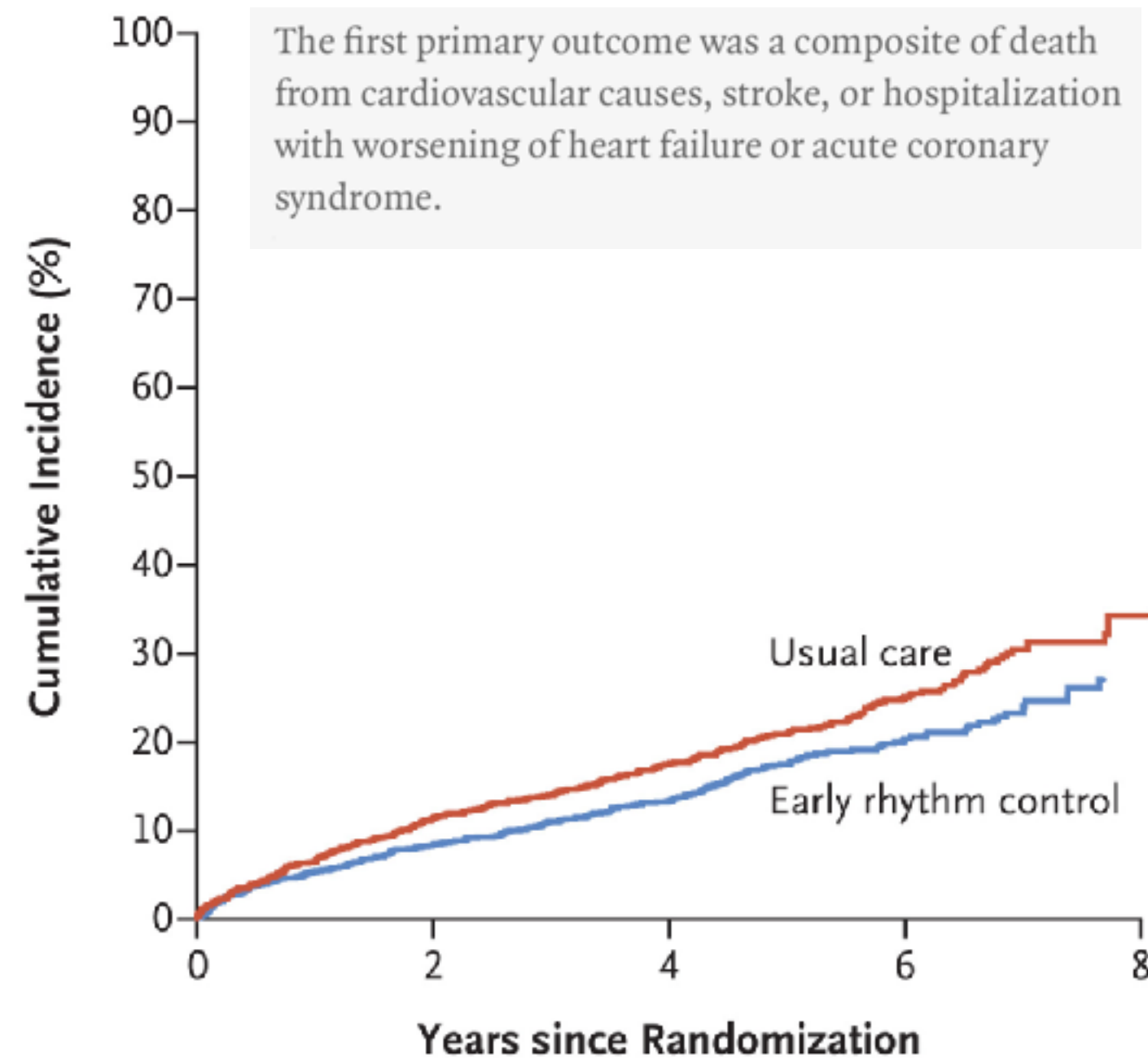


CHF Subgroup analysis:
43% relative reduction in mortality
36% relative reduction in primary endpoint



Early Rhythm-Control Therapy in Patients with Atrial Fibrillation

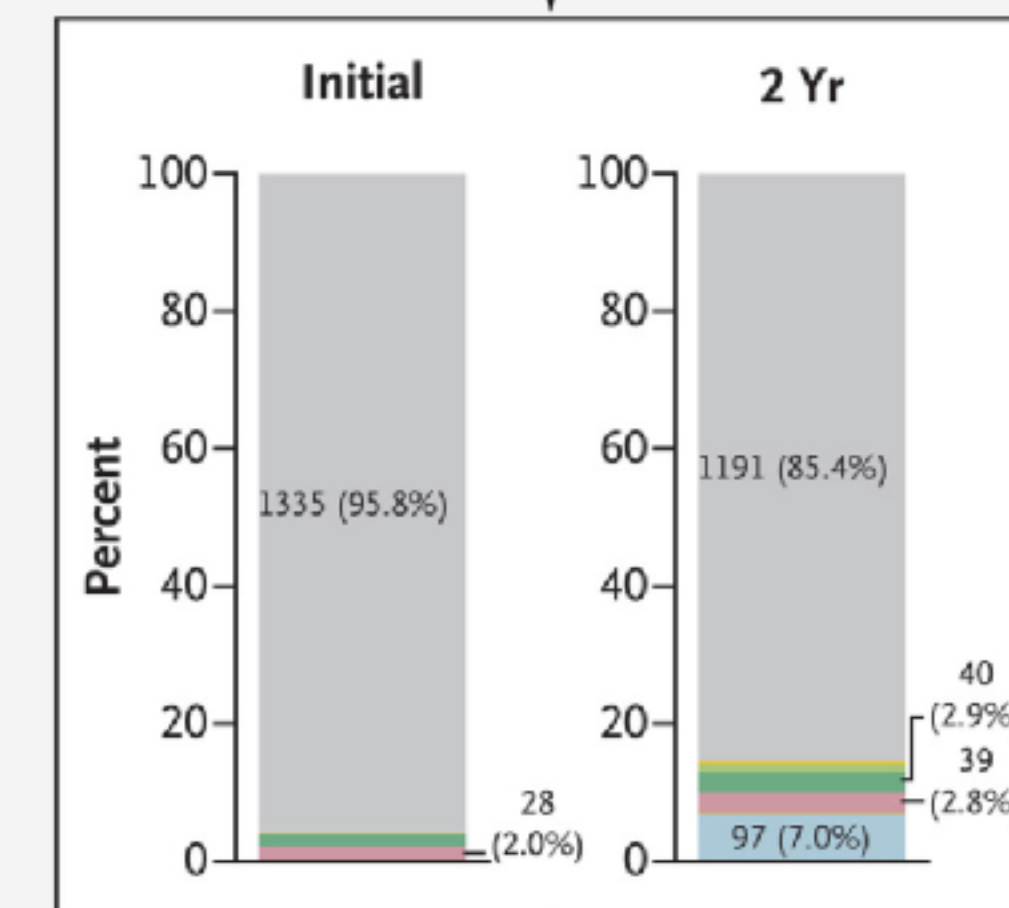
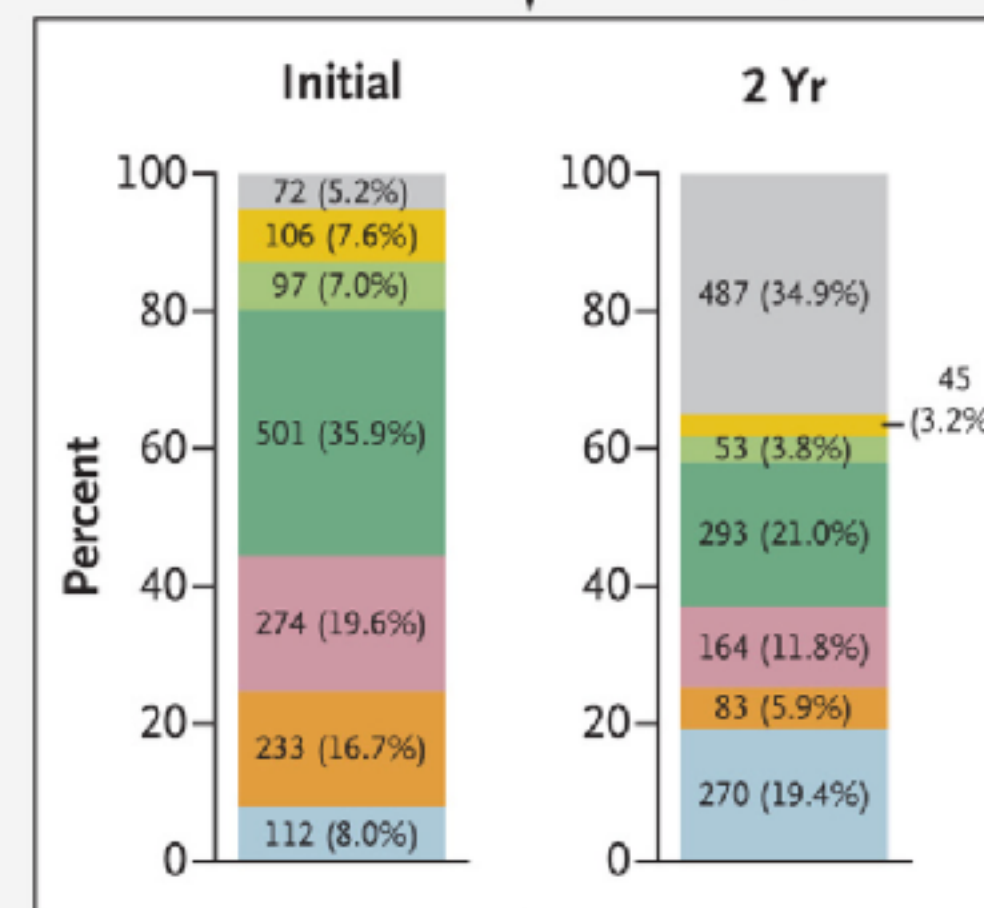
Paulus Kirchhof, M.D., A. John Camm, M.D., Andreas Goette, M.D., Axel Brandes, M.D., Lars Eckardt, M.D., Arif Elvan, M.D., Thomas Fetsch, M.D., Isabelle C. van Gelder, M.D., Doreen Haase, Ph.D., Laurent M. Haegeli, M.D., Frank Hamann, M.D., Hein Heidbüchel, M.D., Ph.D., et al., for the EAST-AFNET 4 Trial Investigators*



No. at Risk

Usual care	1394	1169	888	405	34
Early rhythm control	1395	1193	913	404	26

Rhythm Control Chosen by Site



- None
- Other antiarrhythmic drug
- Propafenone
- Flecainide
- Amiodarone
- Dronedarone
- AF ablation

30% were asymptomatic

95% eventually had AF ablation

The End!