Atrial Fibrillation 2023

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Disclosure of Financial Relationships

Neal A. Chatterjee, MD, MSc

Has no relationships with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients.

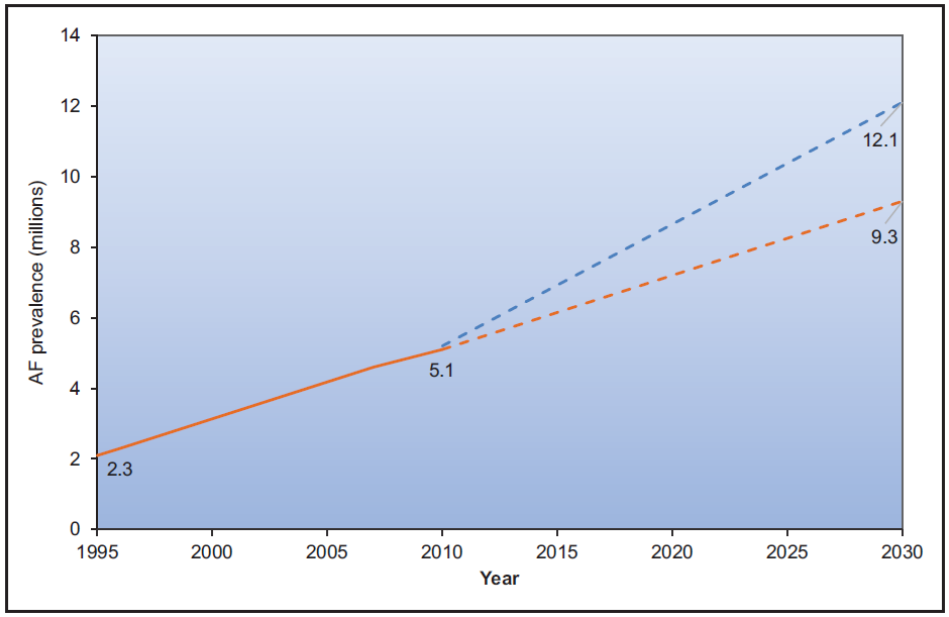
Learning Objectives

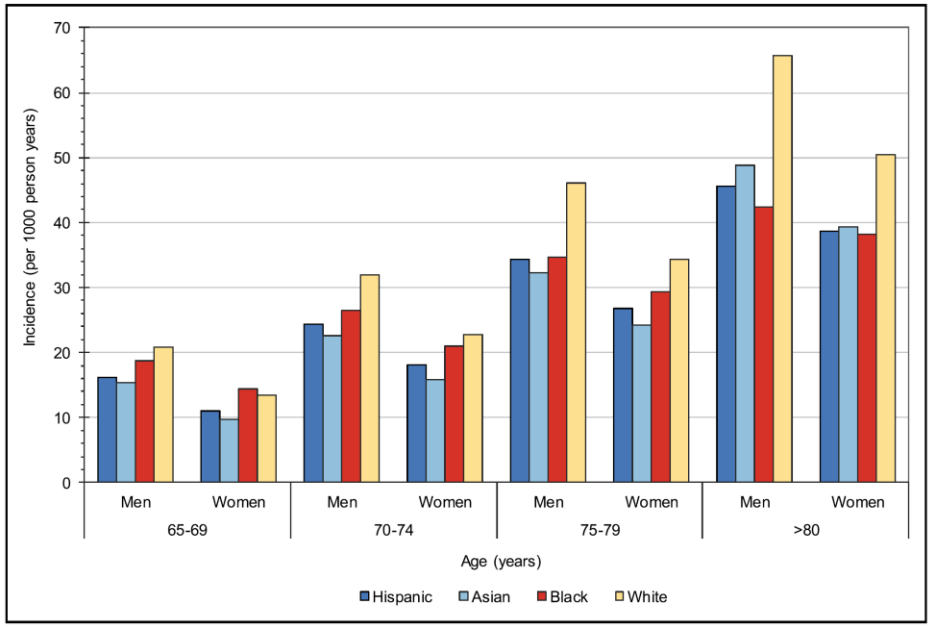
1. How best to address modifiable risk in atrial fibrillation

2. Learn about balancing stroke prevention and bleeding in patients with atrial fibrillation

3. Decide when to refer for rhythm control management

Atrial Fibrillation is a Major Public Health Burden and Anticipated to Increase

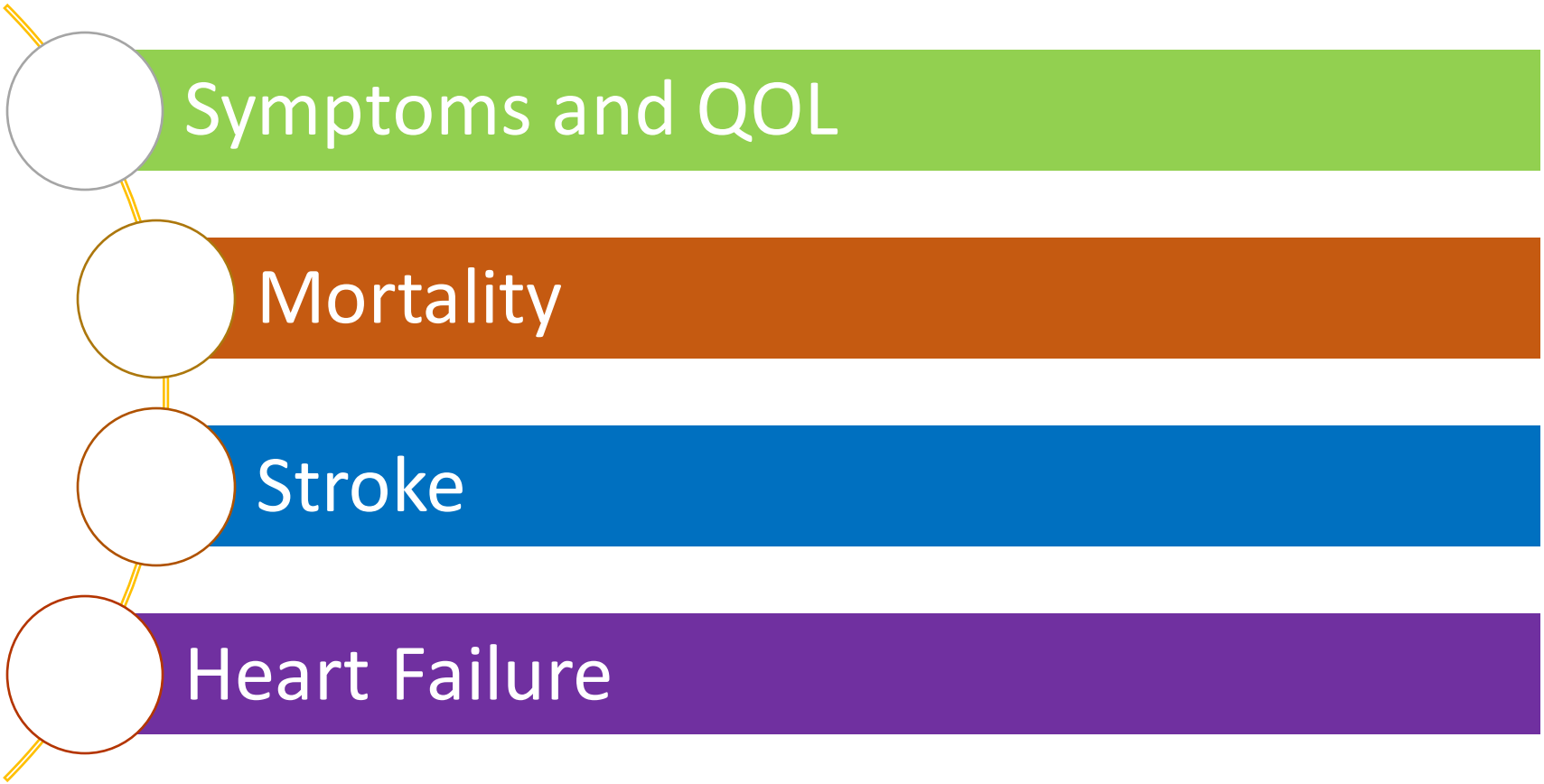




- **Doubling of AF prevalence over next decade**
- **Prevalence ↑ across sex, age, and race/ethnicity**

Circulation. 2017;135:e146–e603. Circulation. 2021;143:e254–e743.

How Atrial Fibrillation Affects Lives of Our Patients



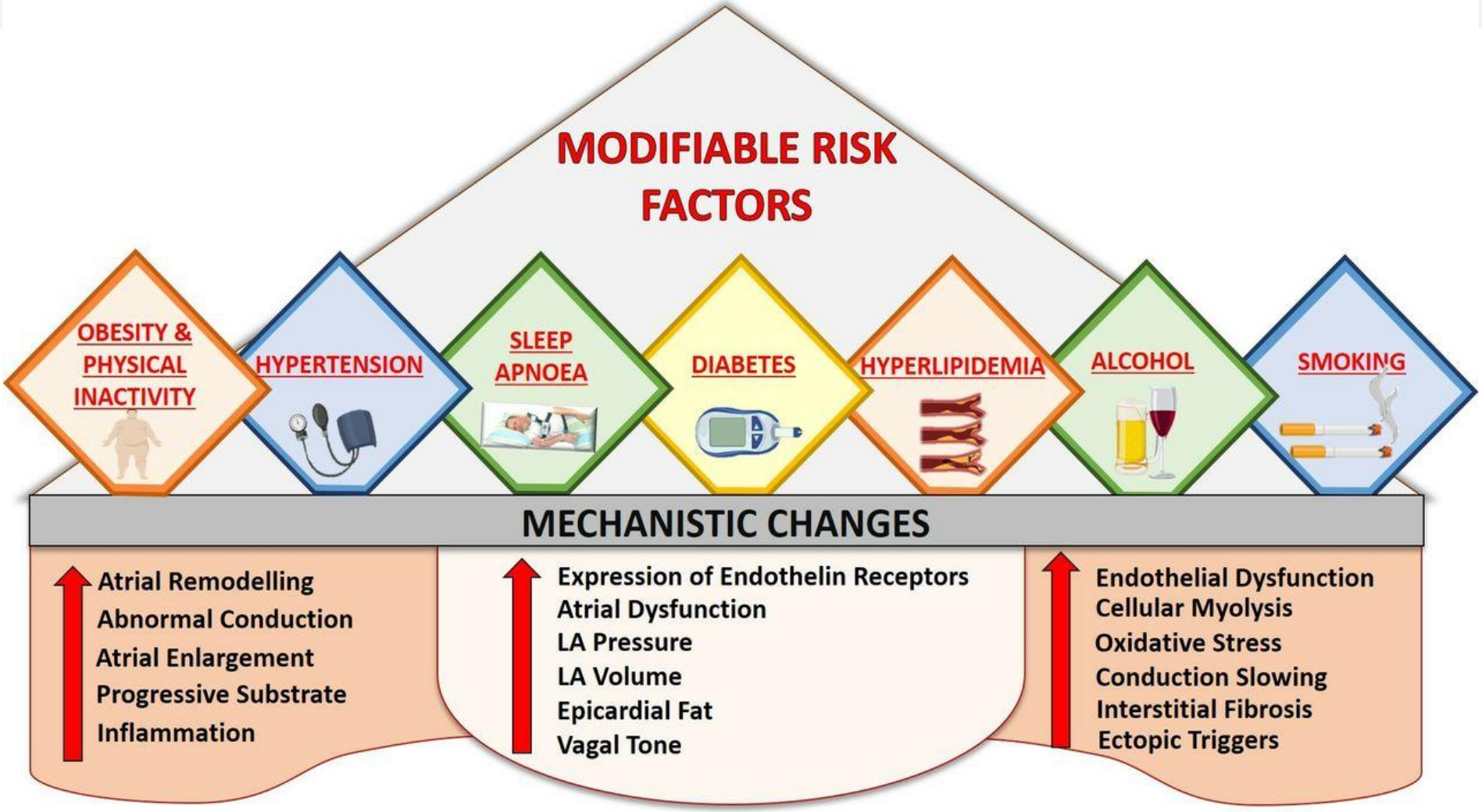
LEARNING OBJECTIVE 1

Implement risk factor management in atrial fibrillation

Clinic Patient: Mary

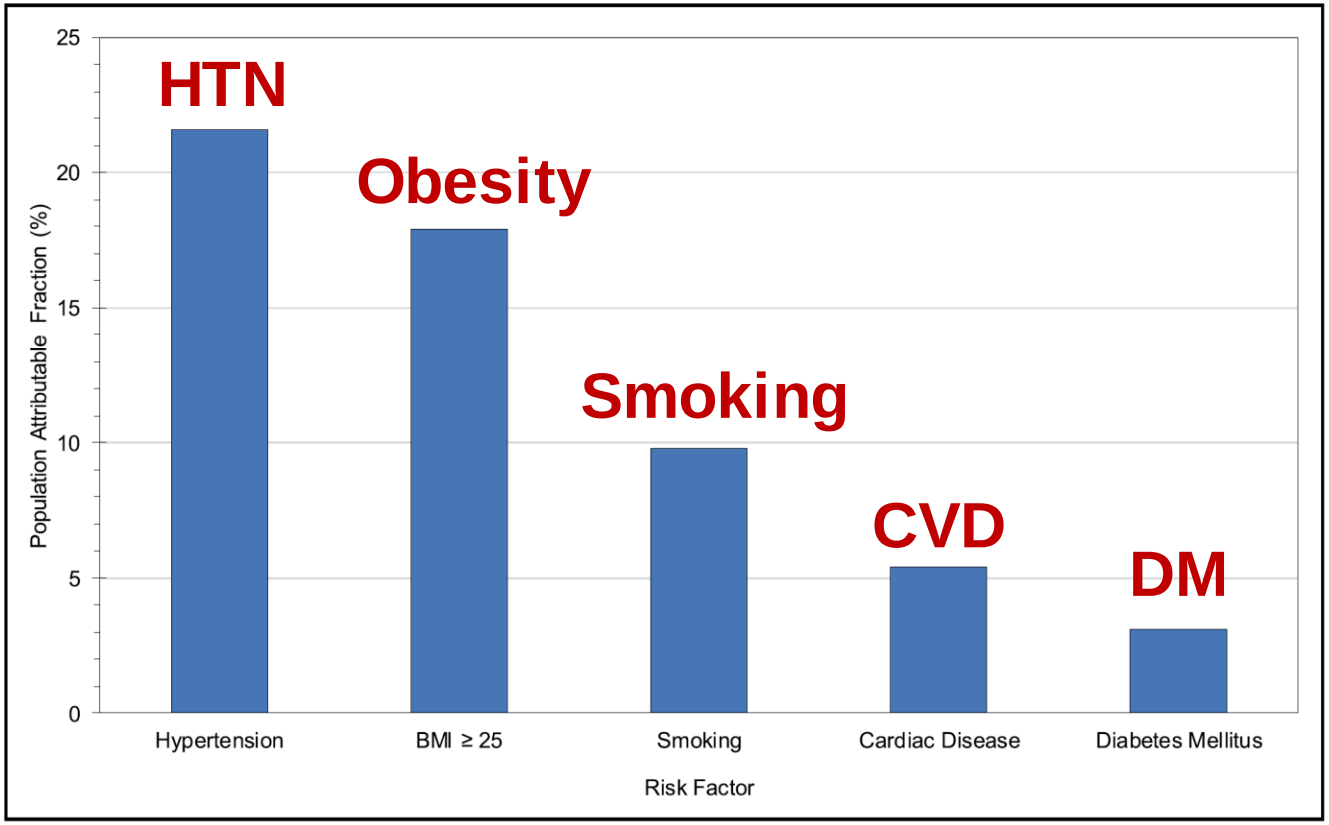
- 69-year-old female with paroxysmal AF
- History of HTN on hydrochlorothiazide, 145/94
- Normal LV function
- No diabetes, no TIA/CVA
- One beer at dinner, partner says she snores at night
- Mild/moderate SOB with Afib, HR 125 beats/min

Modifiable Risk for AF in the Population



Heart 2020;106:325-332

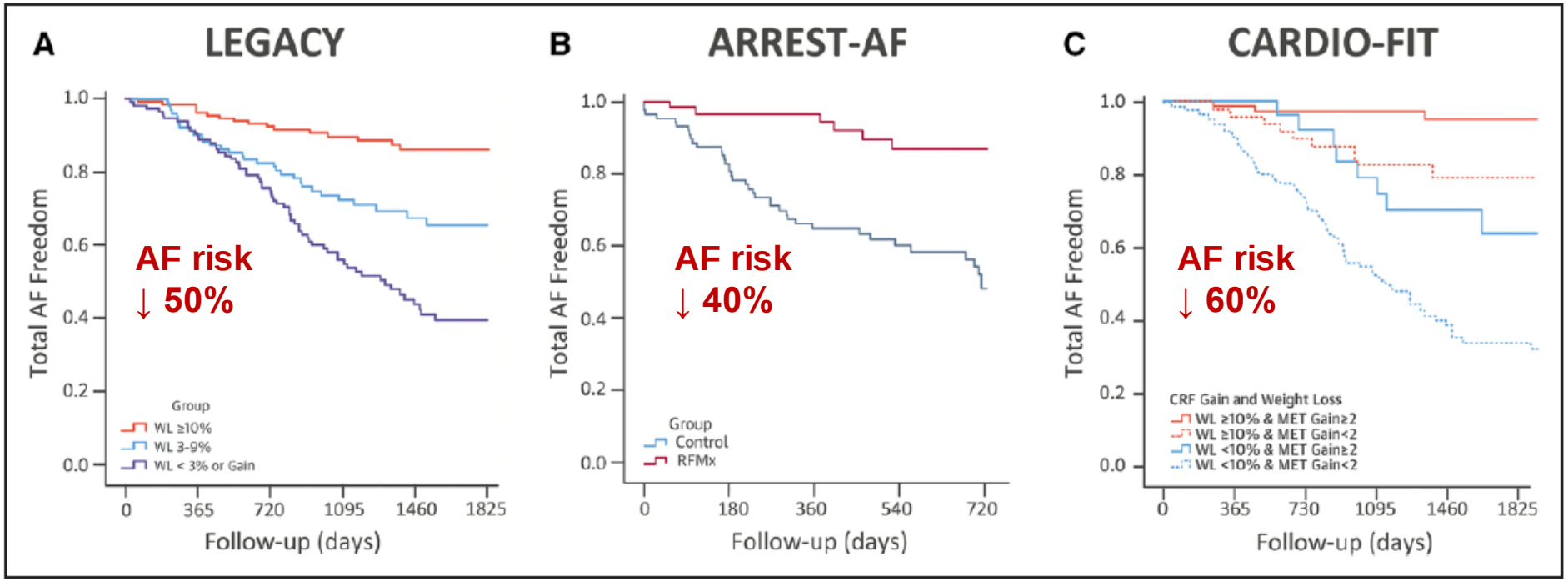
Modifiable Risk at the Population Level



- **Primordial prevention MATTERS!**

Circulation. 2021;143:e254–e743.

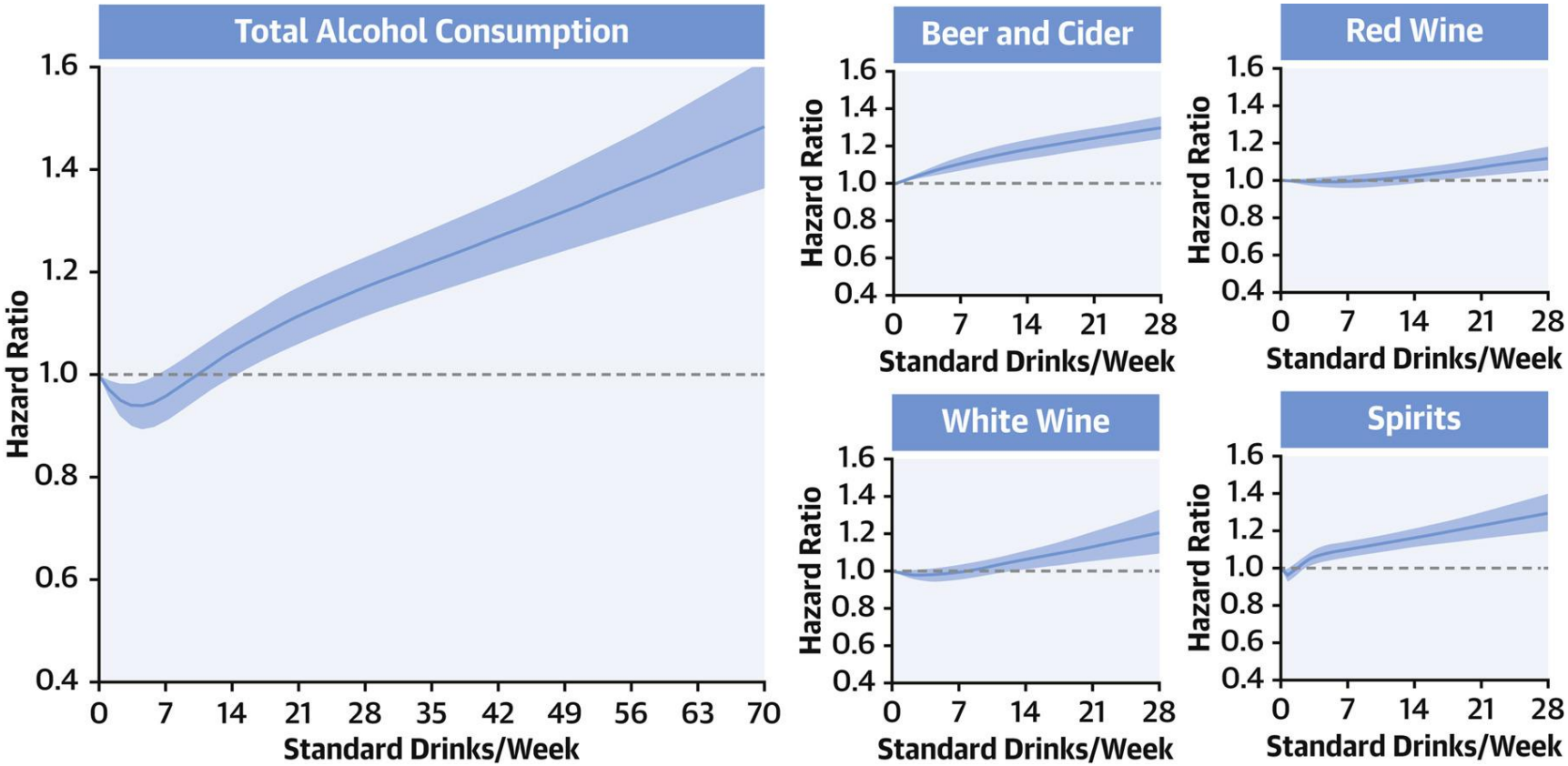
Weight Loss as Potent Anti-Arrhythmic



- **Weight loss and/or exercise ~ 50% absolute risk reduction in AF**
- **Exercise/Weight Loss equivalent to catheter ablation for AF therapy**

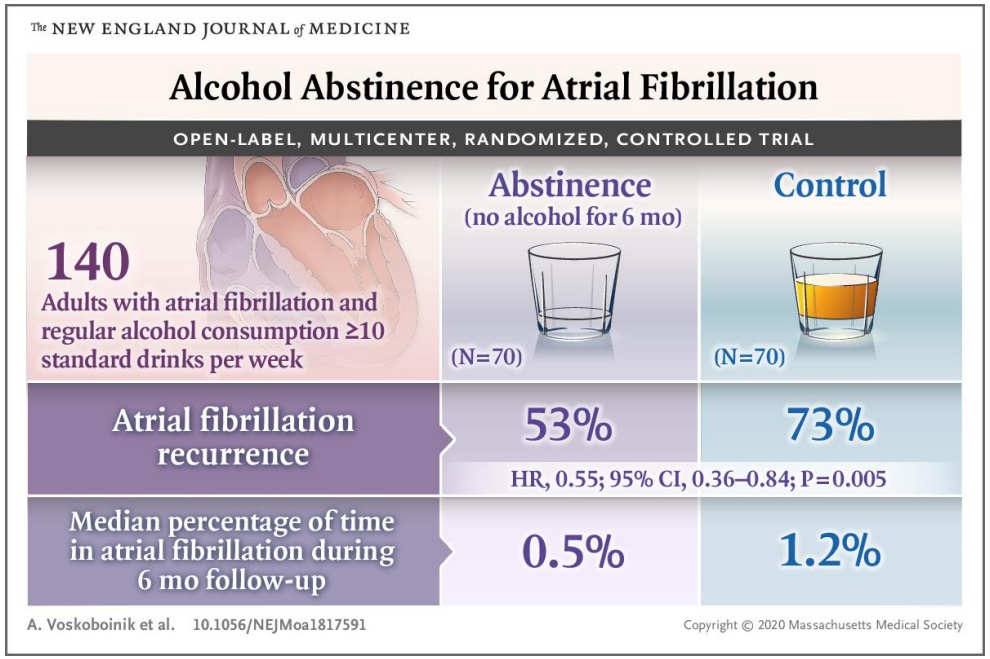
Lau et al. Circulation 2017;136:583-596.

Alcohol (All Types) Increases AF Risk



Tu et al. JACC: EP 2022

Alcohol Abstinence ~ Freedom from AF



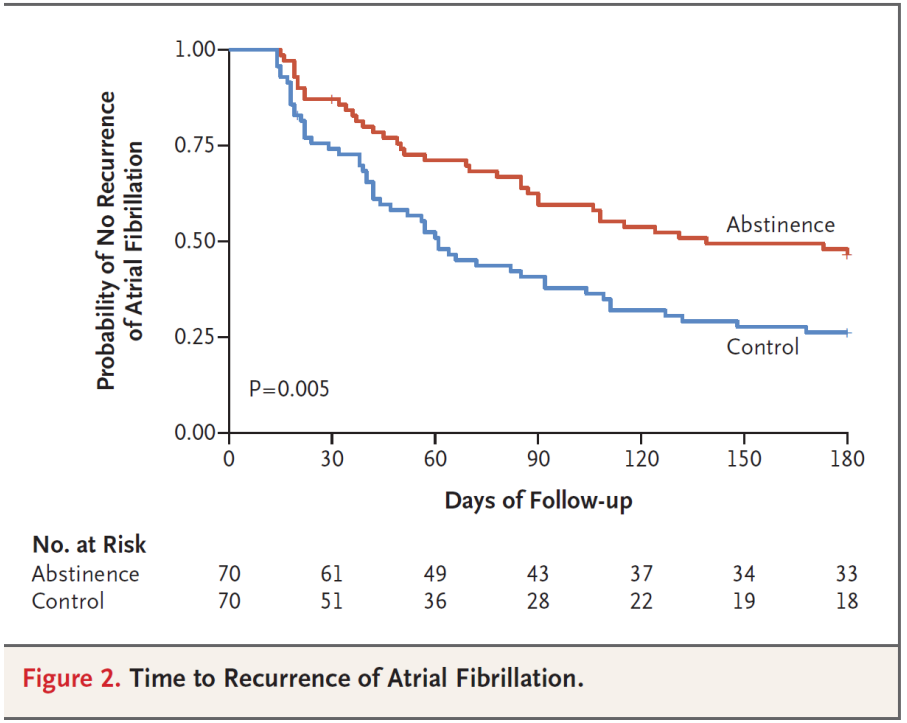
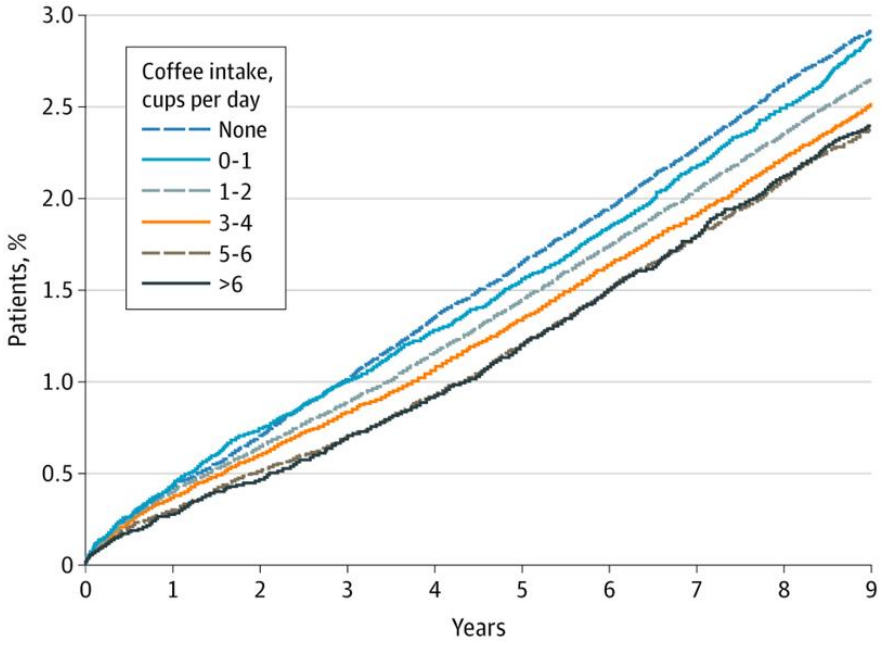


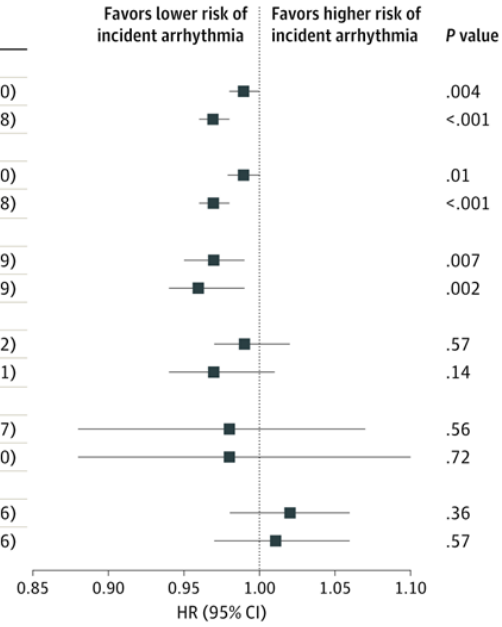
Figure 2. Time to Recurrence of Atrial Fibrillation.

- **Alcohol abstinence ~ 50% relative risk reduction in AF burden**

Coffee and Atrial Fibrillation



Group	HR (95% CI)	P value
All arrhythmia (n = 16 979)		
Unadjusted	0.99 (0.98-1.00)	.004
Adjusted	0.97 (0.96-0.98)	<.001
Atrial fibrillation/flutter (n = 12 811)		
Unadjusted	0.99 (0.98-1.00)	.01
Adjusted	0.97 (0.96-0.98)	<.001
Supraventricular tachycardia (n = 1920)		
Unadjusted	0.97 (0.95-0.99)	.007
Adjusted	0.96 (0.94-0.99)	.002
Ventricular tachycardia (n = 909)		
Unadjusted	0.99 (0.96-1.02)	.57
Adjusted	0.97 (0.94-1.01)	.14
Premature atrial complex (n = 97)		
Unadjusted	0.97 (0.88-1.07)	.56
Adjusted	0.98 (0.88-1.10)	.72
Premature ventricular complex (n = 632)		
Unadjusted	1.02 (0.98-1.06)	.36
Adjusted	1.01 (0.97-1.06)	.57



- **No association of coffee consumption and AF risk**

JAMA Intern Med. 2021;181(9):1185-1193

Coffee and Atrial Arrhythmias

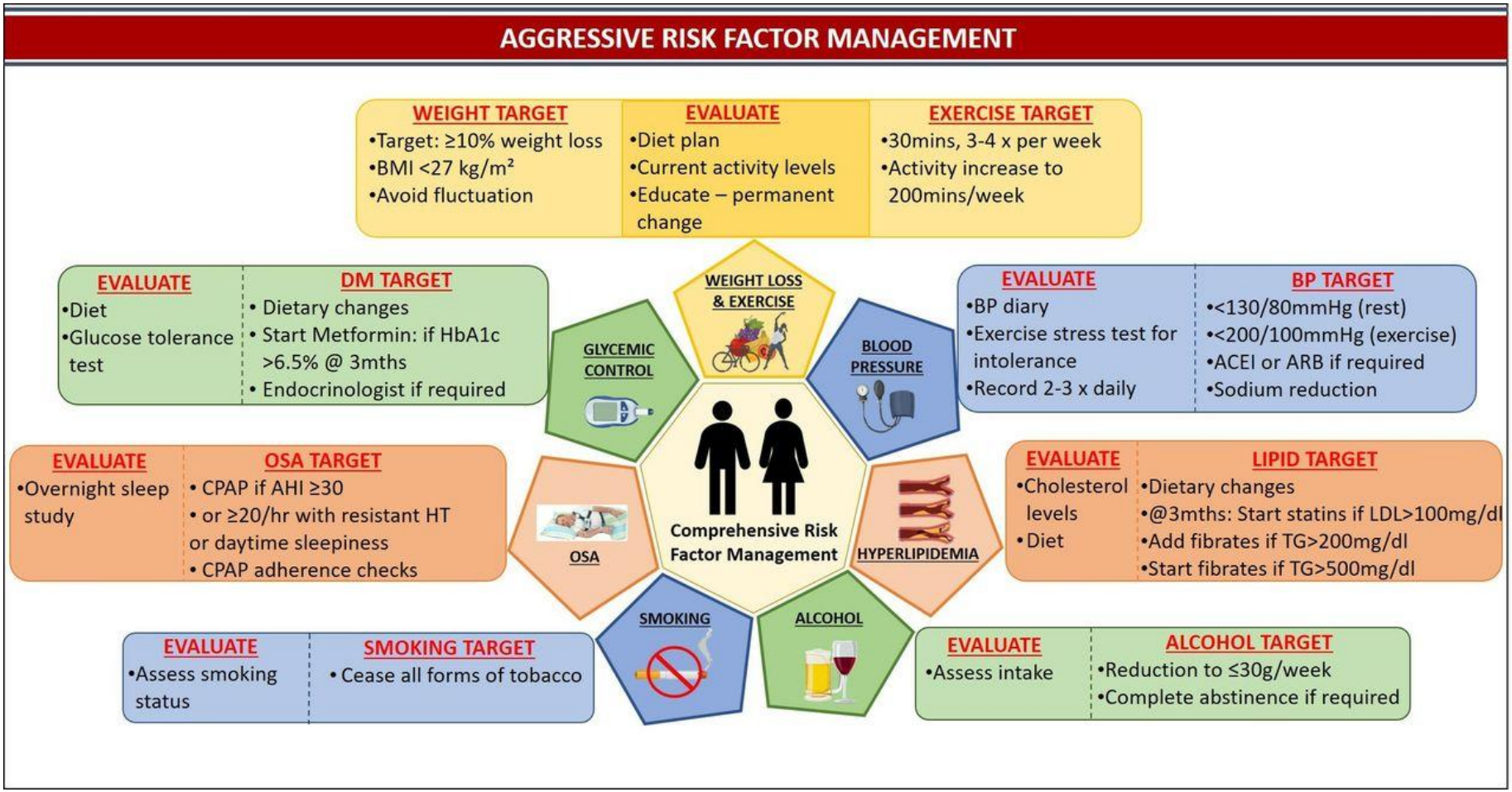
Table 2. Daily Frequency of Arrhythmia.

Outcome	Coffee Consumption	Caffeine Avoidance	Treatment Effect*
	daily mean no.		
Premature atrial contractions	58	53	1.09 (0.98–1.20)†
Premature ventricular contractions	154	102	1.51 (1.18–1.94)
Episodes of nonsustained supraventricular tachycardia	0.17	0.20	0.83 (0.68–1.02)
Episodes of nonsustained ventricular tachycardia	0.01	0.01	1.14 (0.43–2.99)‡

- **No association of coffee consumption and atrial arrhythmias (PAC, SVT)**

Marcus GM et al. NEJM 2023

Modifiable and Environmental Factors Associated with AF Risk



Heart 2020;106:325-332

Back to Mary

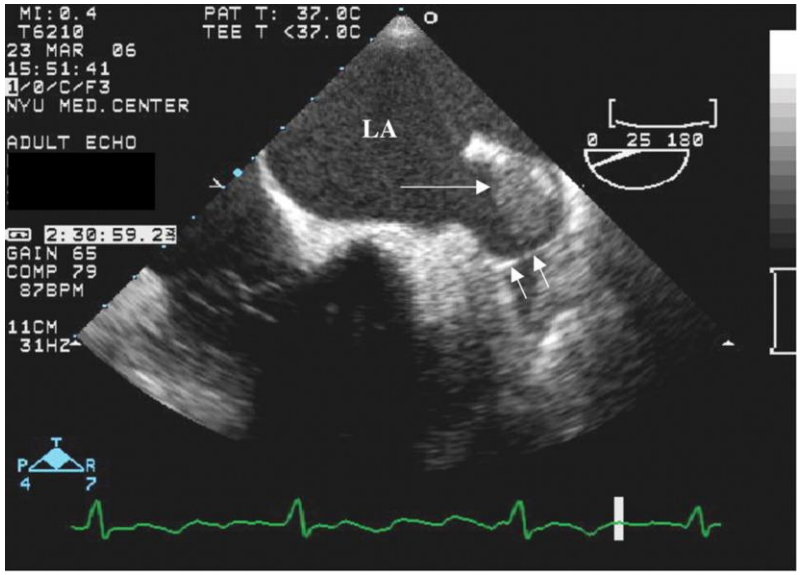
- Referred for **sleep study**
- **Abstain from alcohol**
- **Adjust anti-hypertensive** regimen
- **What about anticoagulation?**

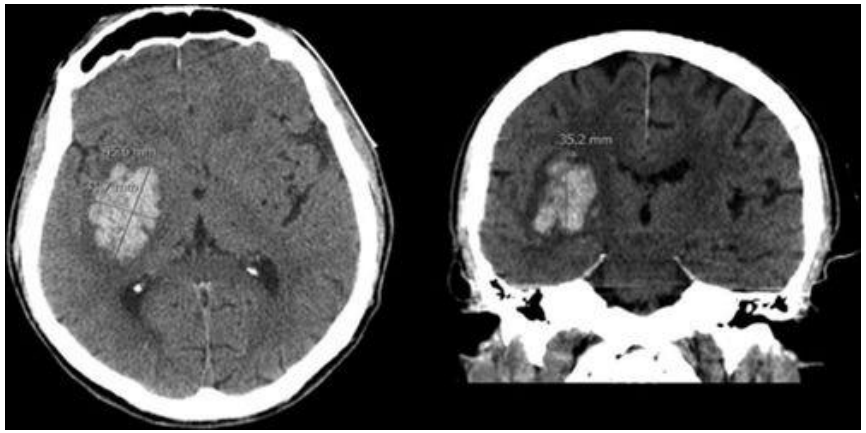
LEARNING OBJECTIVE 2

Balancing stroke and bleeding risk

at the bedside in atrial fibrillation

Embolic Stroke is Feared Complication of Atrial Fibrillation





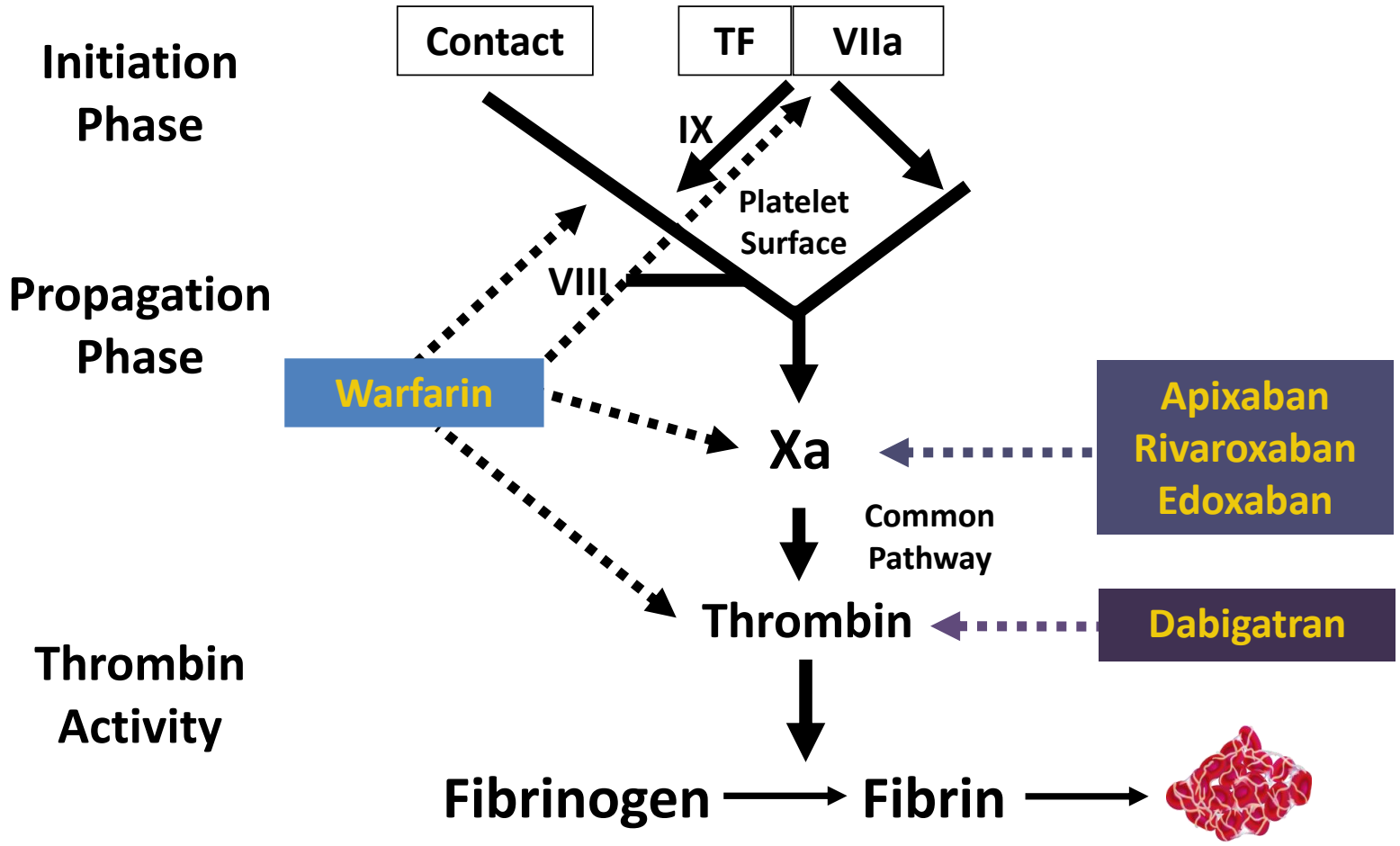
Assessment of Thrombo-Embolic Risk

Risk factors		
C	Congestive Heart Failure	+1 point
H	Hypertension	+1 point
A_2	Age ≥75	+2 point
D	Diabetes	+1 point
S_2	Stroke/TIA History	+2 point
V	Vascular Disease	+1 point
A	Age 65-74	+1 point
S	Sex (Female)	+1 point

Stroke risk per year	
SCORE	% RATE PER YEAR
0	0%
1	1.3%
2	2.2%
3	3.2%
4	4.0%
5	6.7%
6	9.8%
7	9.6%
8	6.7%
9	15.2%

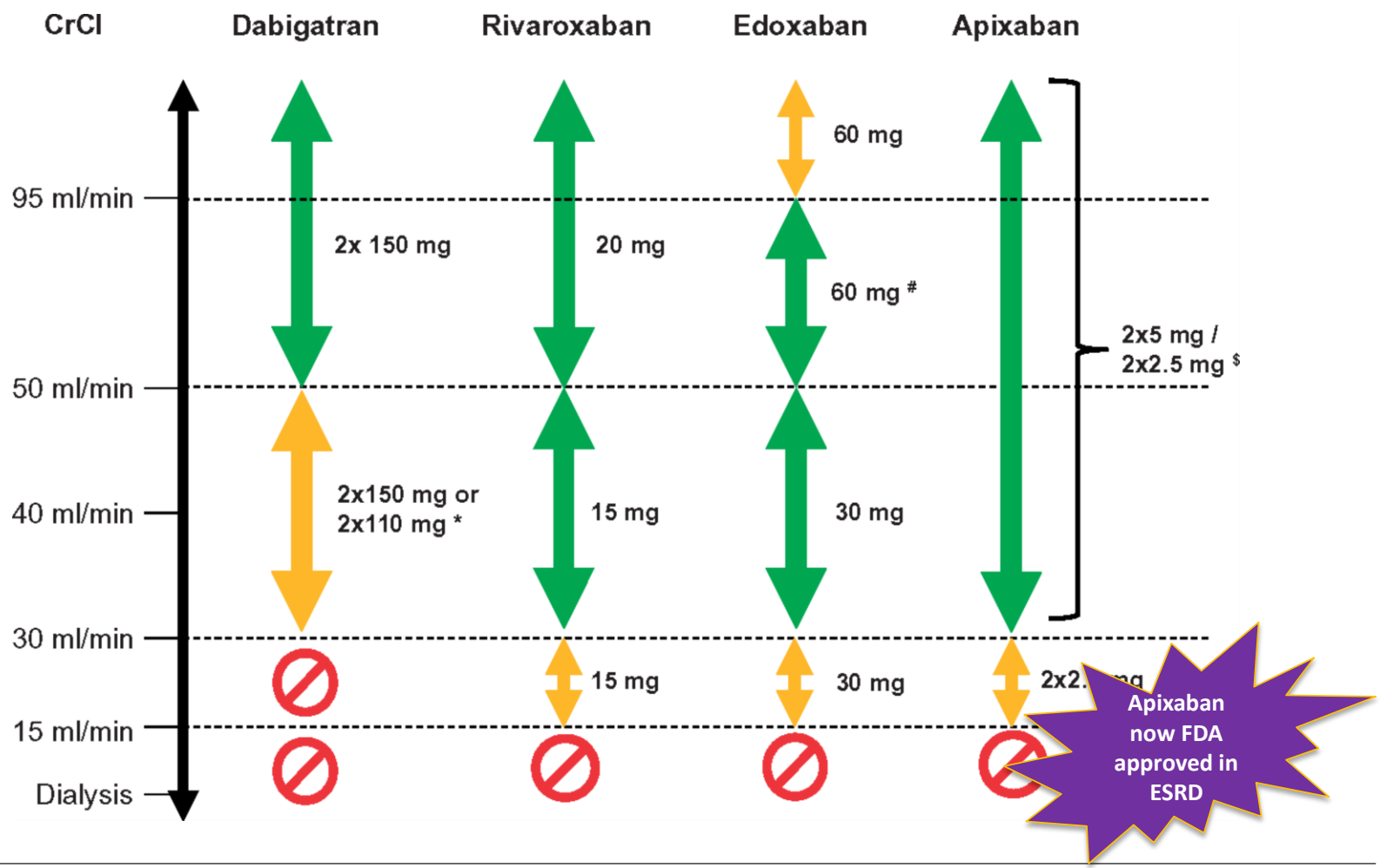
Eur Heart J 2010;31:2369-2429

Anticoagulation Options – There are Many!



Chest 2010;138:1093-1100

DOAC Dose Adjustment in Kidney Disease



Eur Heart J 2018;39:1330-1393

Reversal Agents Exist for All DOACs

- Dabigatran
  - Idarucizumab (Praxbind)
- Rivaroxaban and Apixaban
  - Andexanet Alpha
    - Expensive
    - Studied in intracranial and GI bleeding

Assessment of Bleeding Risk

HAS-BLED Score

Letter	Clinical Characteristic	Points
H	Hypertension (≥ 160 mm Hg systolic)	1
A	Abnormal renal and liver function (1 point each)	1 or 2
S	Stroke	1
B	Bleeding	1
L	Labile INRs (< 60% time in therapeutic range)	1
E	Elderly (eg, age ≥ 65 years)	1
D	Drugs or alcohol (1 point each)	1 or 2
		Maximum 9 points

Chest 2010;138:1093-1100

Assessment of Bleeding Risk

Absolute risk bleed > thrombotic event

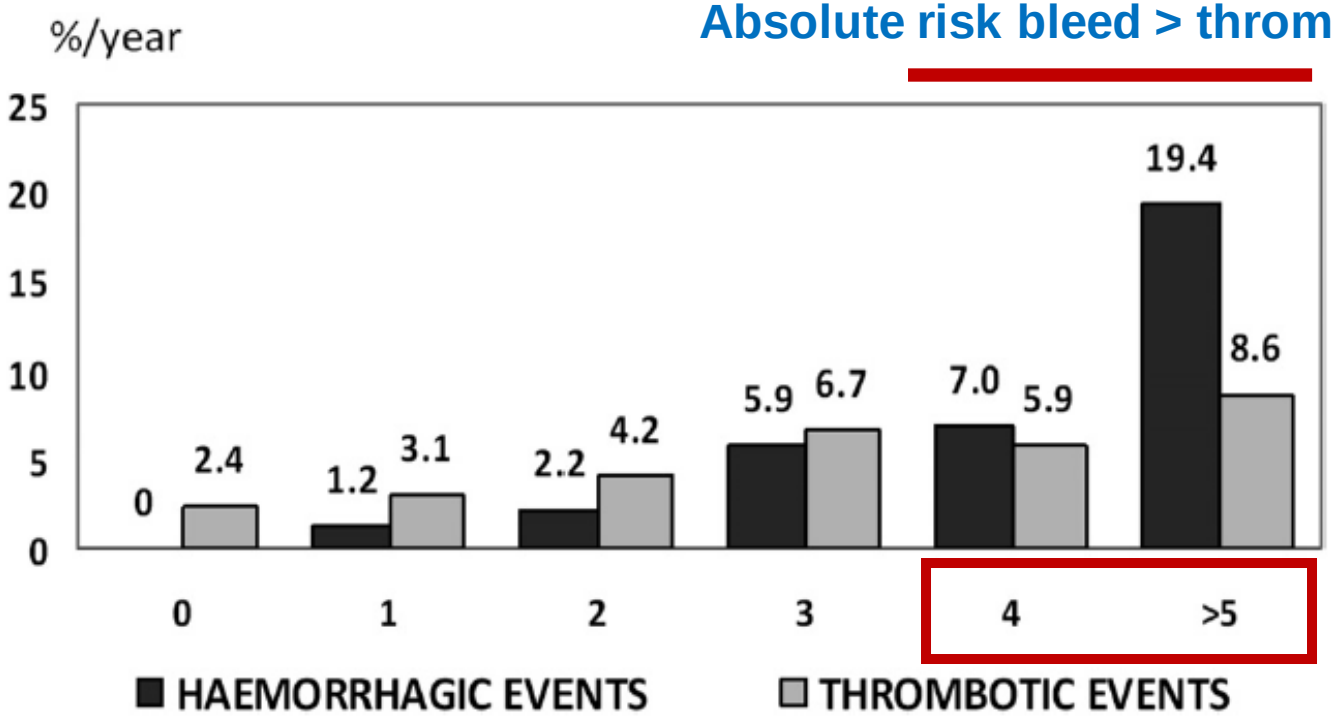


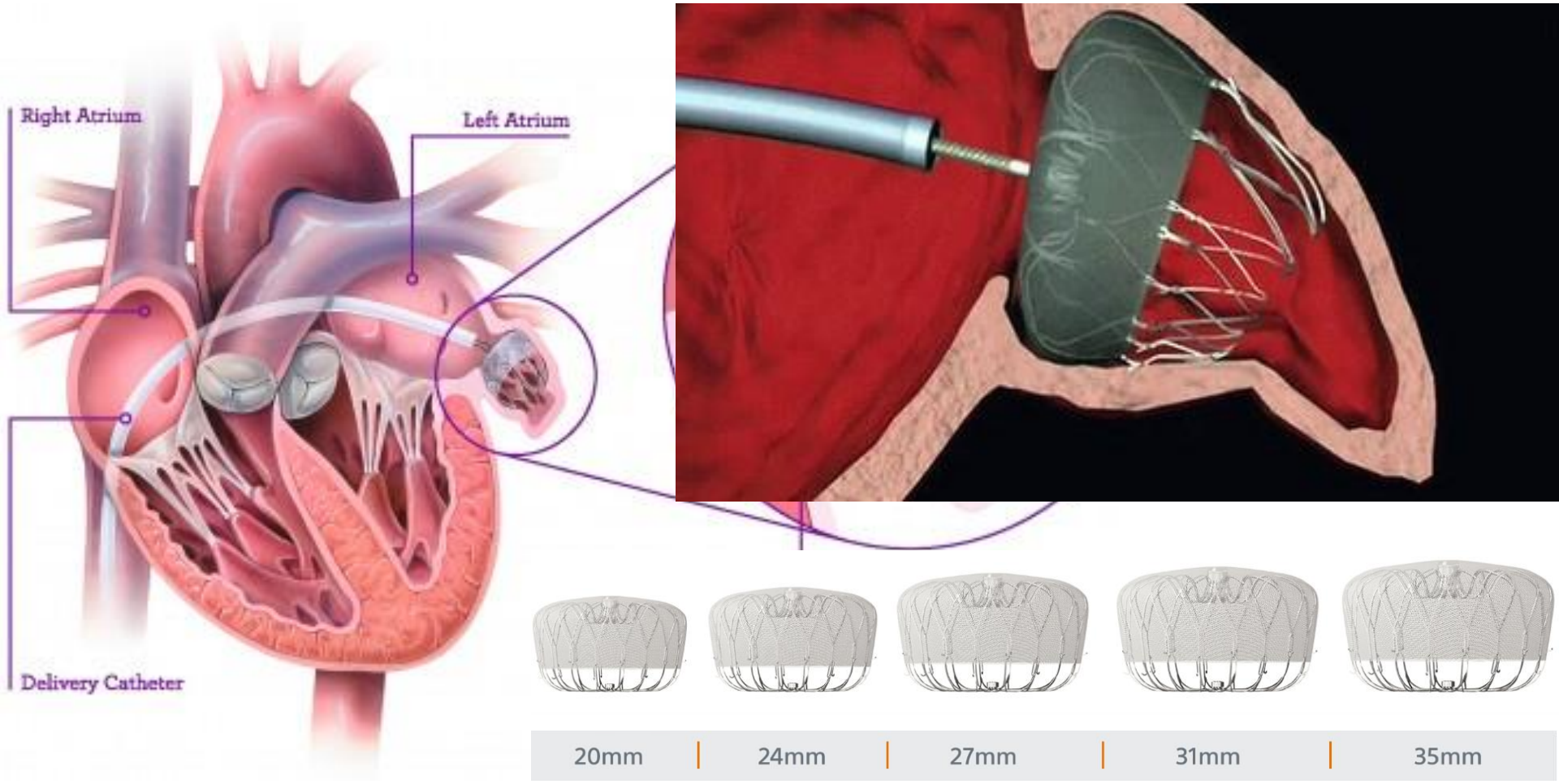
Figure. Hemorrhagic and thrombotic events according to HAS-BLED (hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile INR [international normalized ratio], elderly, drugs/alcohol concomitantly) score.

HAS-BLED > 5 is HIGH RISK!

Circ Arrhythm Electrophysiol 2012;312-318

Alternative to Oral Anticoagulation

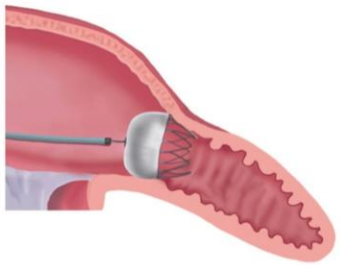
Watchman left atrial appendage occlusion



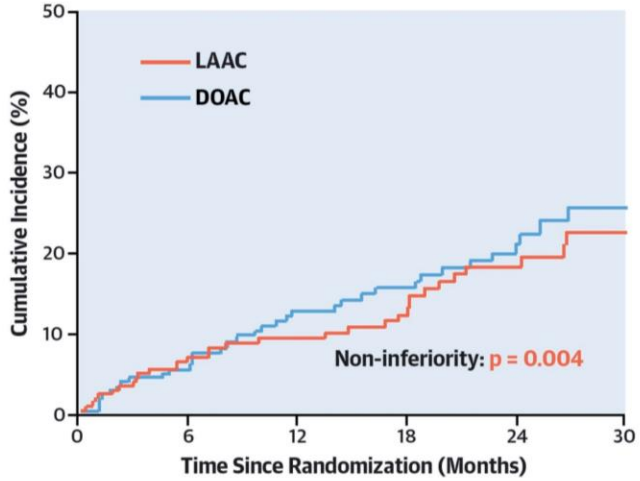
Alternative to Oral Anticoagulation

PRAGUE-17 Randomized Clinical Trial

- 402 High-Risk AF Pts ➡ Randomized
  - CHA_2DS_2-VASc = 4.7 ± 1.5
  - HAS-BLED = 3.1 ± 0.9
- Follow-up: 20.8 ± 10.8 mo (695 pt-year)



Primary Endpoint
Stroke, TIA, SE, CV Death, Bleeding, or Complications



	sHR (95% CI)	p value
Primary Endpoint		
mITT	0.84 (0.53-1.31)	0.44
Per Protocol	0.82 (0.52-1.30)	0.40
On-Treatment	0.79 (0.49-1.25)	0.31
All-Stroke/TIA	1.00 (0.40-2.51)	0.99
CV Death	0.75 (0.34-1.62)	0.46
Major + NMCR Bleeding		
All	0.81 (0.44-1.52)	0.51
Nonprocedural	0.53 (0.26-1.06)	0.07

JACC 2020;75:3122-3135

When to Consider LAA Occlusion

- **High bleeding risk**
  - Elevated HAS-BLED scores
  - Prior major or life-threatening bleeding
  - Contra-indication to anti-coagulation
- **Frailty**
- **Lifestyle/personal choice**

DOAC Safe for the Majority

Table 3. Bleeding Outcomes and Net Clinical Outcomes.*

Outcome	Apixaban Group (N=9088)		Warfarin Group (N=9052)		Hazard Ratio (95% CI)	P Value
	Patients with Event	Event Rate	Patients with Event	Event Rate		
	no.	*%/yr*	*no.*	*%/yr*		
Primary safety outcome: ISTH major bleeding†	327	2.13	462	3.09	0.69 (0.60–0.80)	<0.001
Intracranial	52	0.33	122	0.80	0.42 (0.30–0.58)	<0.001
Other location	275	1.79	340	2.27	0.79 (0.68–0.93)	0.004
Gastrointestinal	105	0.76	119	0.86	0.89 (0.70–1.15)	0.37
Major or clinically relevant nonmajor bleeding	613	4.07	877	6.01	0.68 (0.61–0.75)	<0.001
GUSTO severe bleeding	80	0.52	172	1.13	0.46 (0.35–0.60)	<0.001
GUSTO moderate or severe bleeding	199	1.29	328	2.18	0.60 (0.50–0.71)	<0.001
TIMI major bleeding	148	0.96	256	1.69	0.57 (0.46–0.70)	<0.001
TIMI major or minor bleeding	239	1.55	370	2.46	0.63 (0.54–0.75)	<0.001
Any bleeding	2356	18.1	3060	25.8	0.71 (0.68–0.75)	<0.001

- **Major bleed (intracranial, severe bleeding) < 1% / year**

NEJM 2011;365:981-992

Back to Mary

- **Started on Eliquis 5mg BID**
- **CHADS-VASC is 3** (age, sex, HTN)
  → Stroke risk of 3.2%/year
- **HAS-BLED is 1** (age > 65 years)
  → Low risk of serious bleed

Back to Mary

- **Started on Metoprolol Succinate (for rate and BP control)**
- **Follow-up scheduled in 3 months to reassess symptoms**

Back to Mary

- At 3 month follow-up, BP 114/70 mmHg
- Started CPAP for OSA, abstaining from EtOH
- In sinus rhythm, rate is 55 bpm
- In atrial fibrillation (by Apple Watch), rates are 70 bpm at rest
- Still notes exertional intolerance, fatigue and occasional pre-syncope

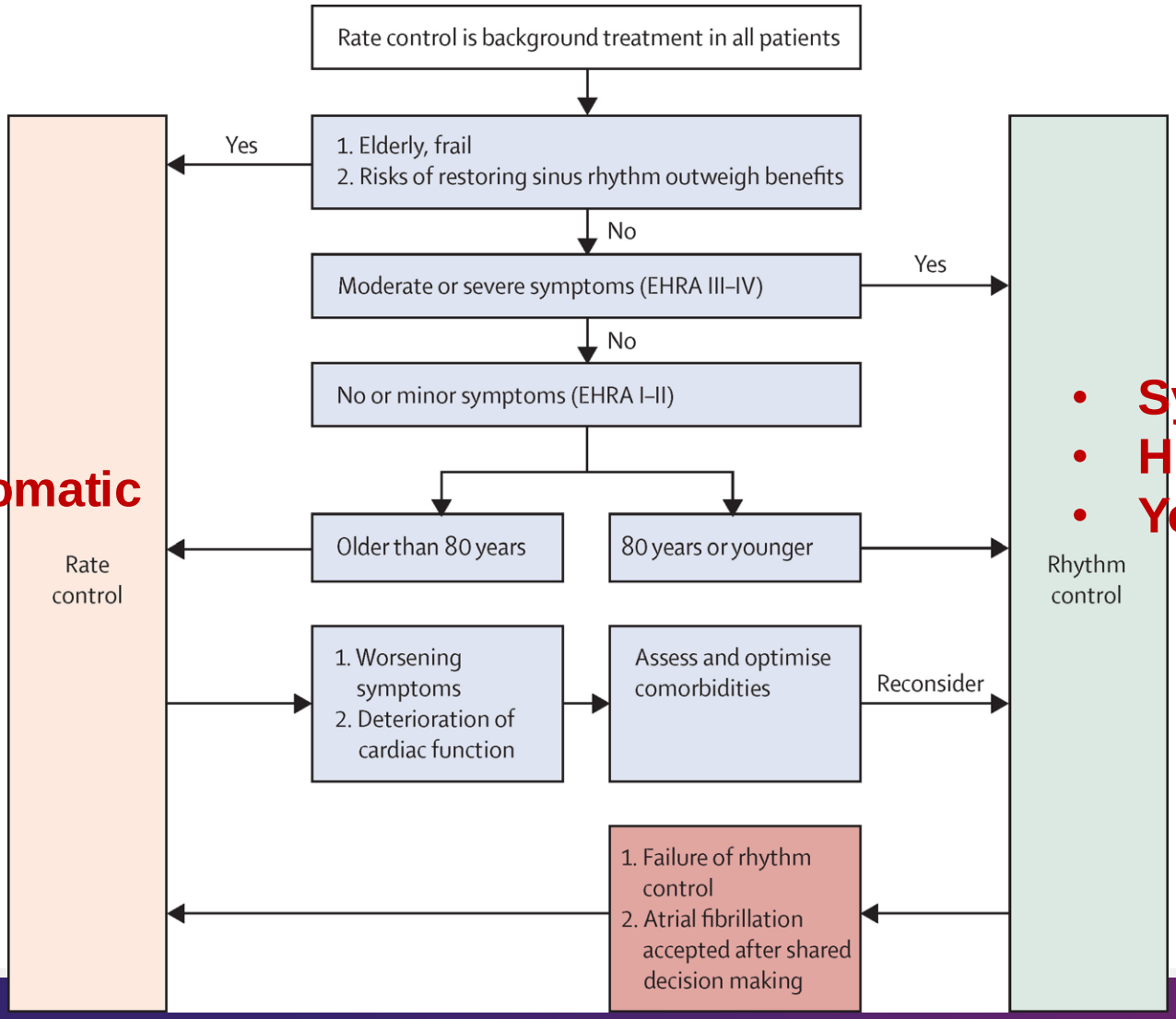
LEARNING OBJECTIVE 3

When to consider rate versus

rhythm control in atrial fibrillation

General Schematic for Rate vs. Rhythm

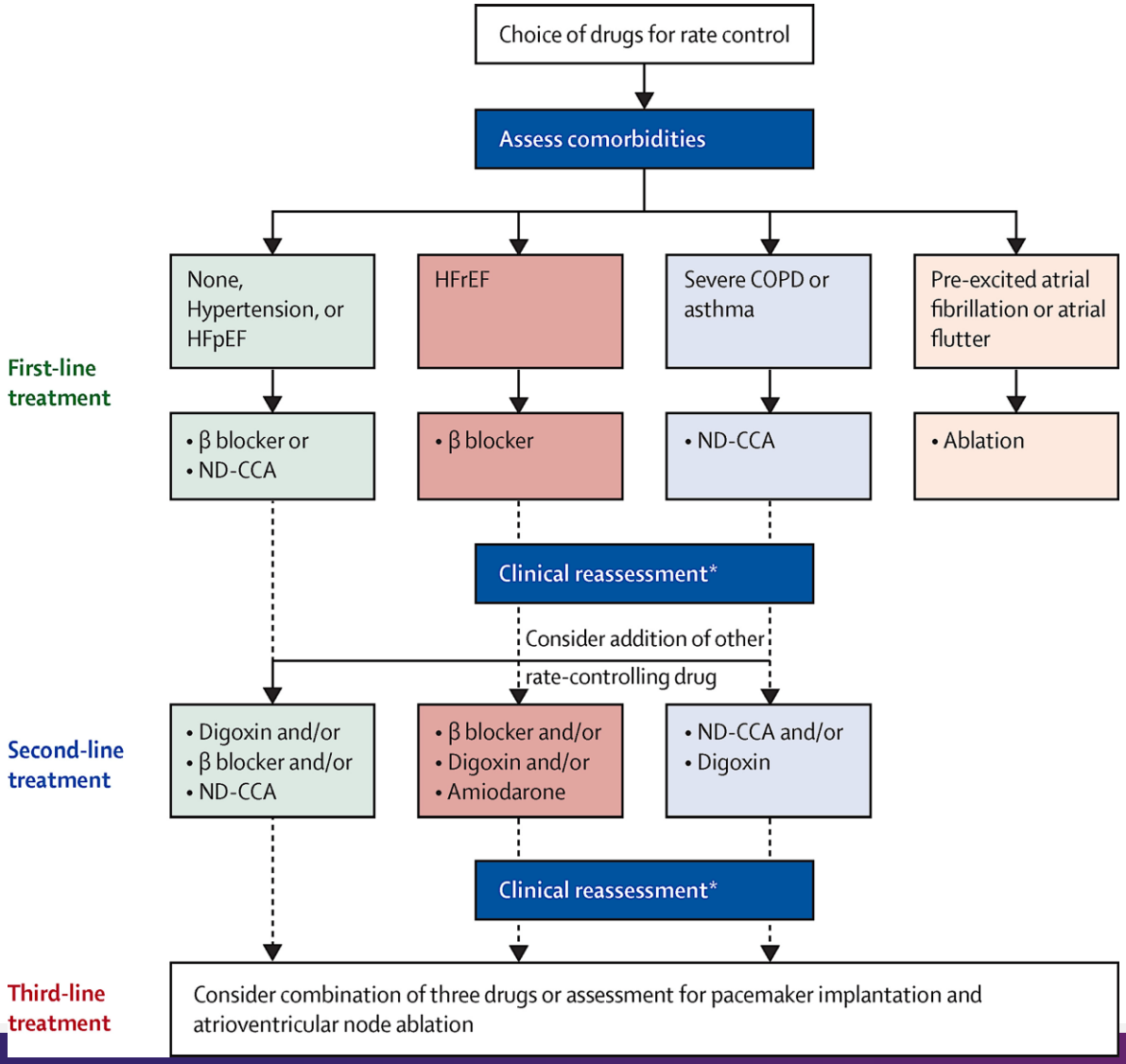
- **Elderly**
- **Asymptomatic**



- **Symptomatic**
- **Heart Failure**
- **Younger**

Van Gelder et al. Lancet 2016

Options for Rate Control



Van Gelder et al. Lancet 2016

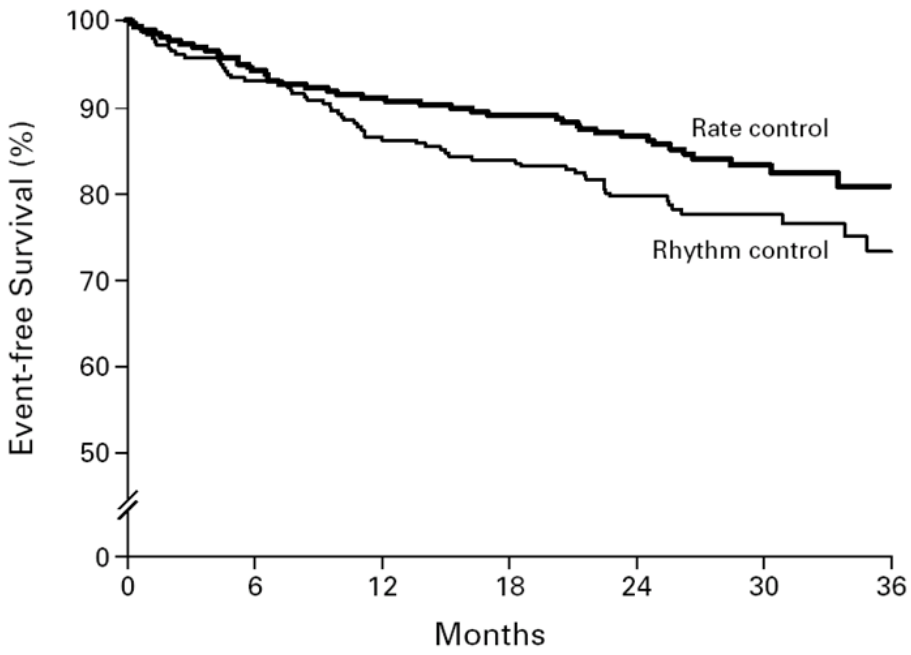
In whom do I use rhythm control?

- **Symptomatic patients** even with good HR
  - Likely undertreated population
- **Tachy-brady syndrome**
- **HF patients**, especially if precipitated by AF
- **Younger patients**

Rate vs. Rhythm – Can Trials Help Us Choose?

AFFIRM TRIAL – Two Decades Old

- **No difference** in death, disabling stroke, major bleed, or cardiac arrest
- Rhythm control associated with **more adverse drug effects**
- Rhythm control group had less warfarin use



AFFIRM Investigators, et al. *NEJM*. 2002;347(23);1825-1833.

Rate vs. Rhythm – Can Trials Help Us Choose?

2020

EAST-AFNET 4 TRIAL

Early Rhythm-Control Therapy in Patients with Atrial Fibrillation

AMERICAN COLLEGE of CARDIOLOGY

Parallel-group, open, blinded-outcome-assessment trial

Objective: To assess if early rhythm-control therapy can reduce cardiovascular risk in patients who had recent atrial fibrillation (diagnosed ≤1 year before enrollment)

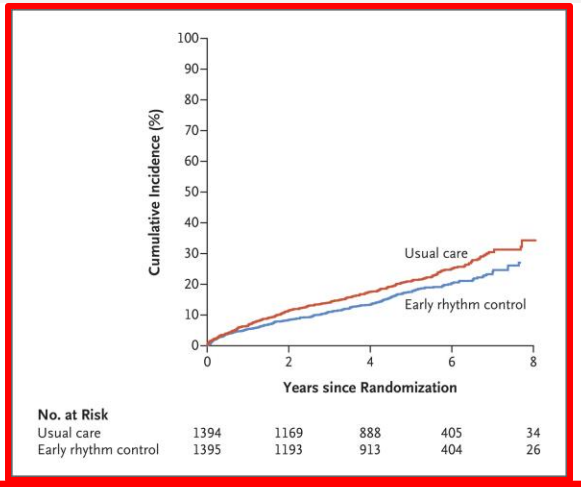
2789 patients

Inclusion criteria: Recent AF (AF diagnosed within 1 year) and >75 years of age, had a previous TIA or stroke, OR met two of the following criteria: age >65 years, female sex, HF, hypertension, DM, severe CAD, CKD, LVH (diastolic septal wall width >15 mm)

Early rhythm control (N=1395) **VS** Usual care (N=1394)

Rhythm Control
Anti-arrhythmics
Ablation

Rate Control



PRIMARY OUTCOME

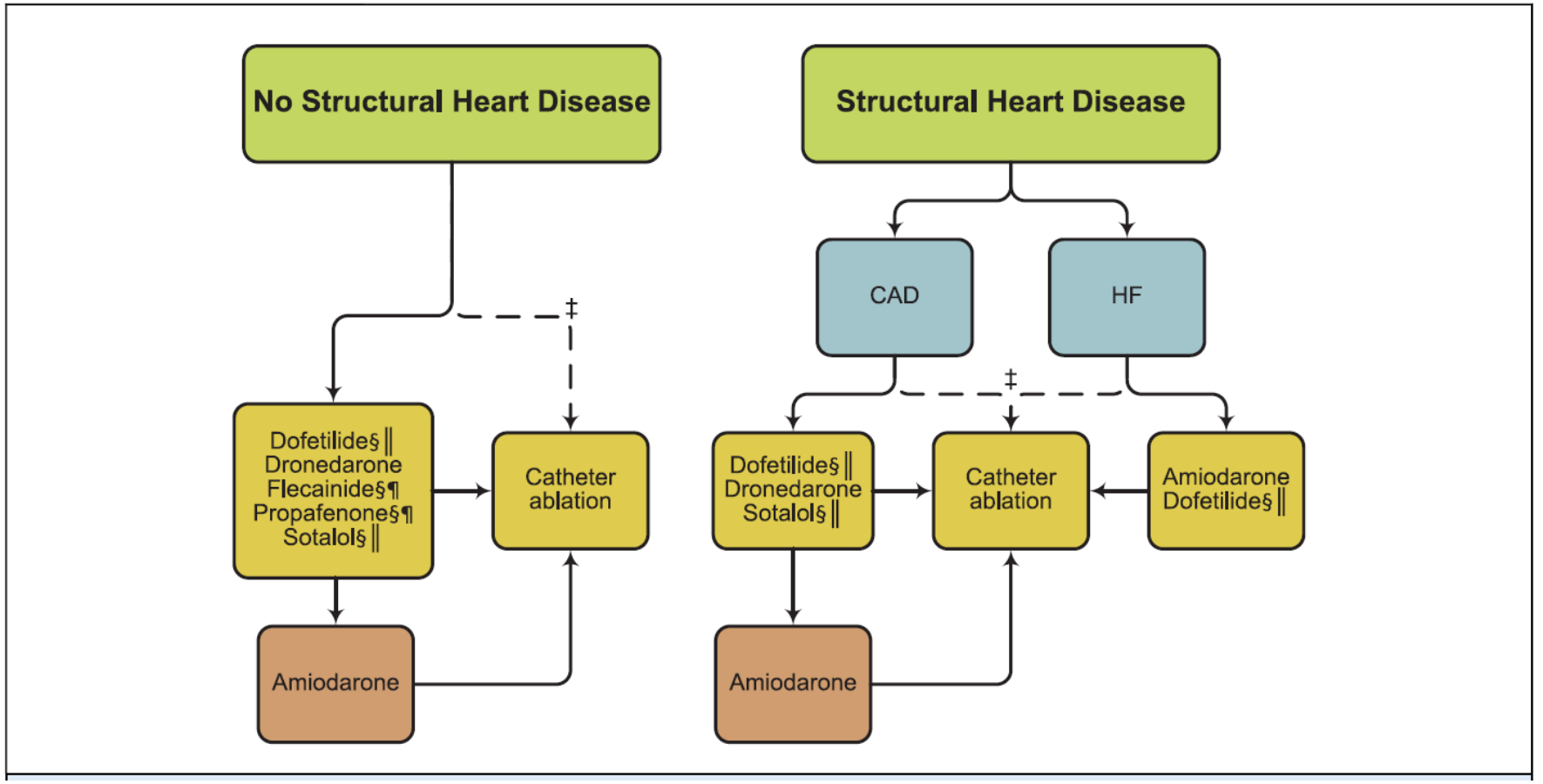
3.9	CV death, stroke, or hospitalization with heart failure or ACS HR 0.79; 96% CI 0.66 to 0.94; P=0.005	5.0
5.8	Nights spent in hospital/yr HR 1.08; 99% CI, 0.92 to 1.28; P=0.23	5.1

SECONDARY OUTCOME

4.9	Serious adverse events related to rhythm-control therapy % HR 1.73; 95% CI, 1.10 to 2.37; P<0.001	1.4

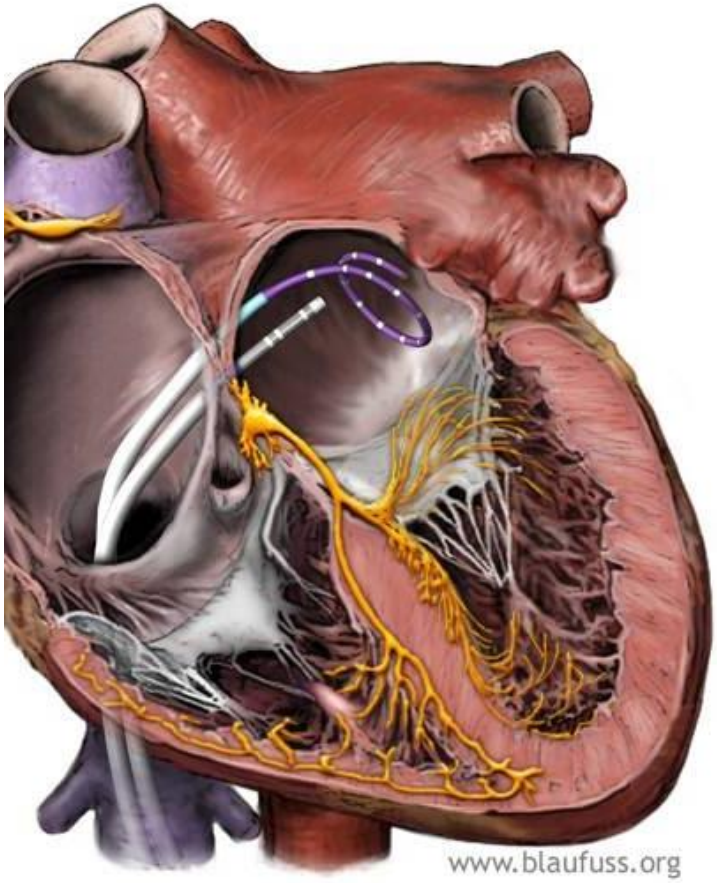
NEJM 2020;383:1305-1316

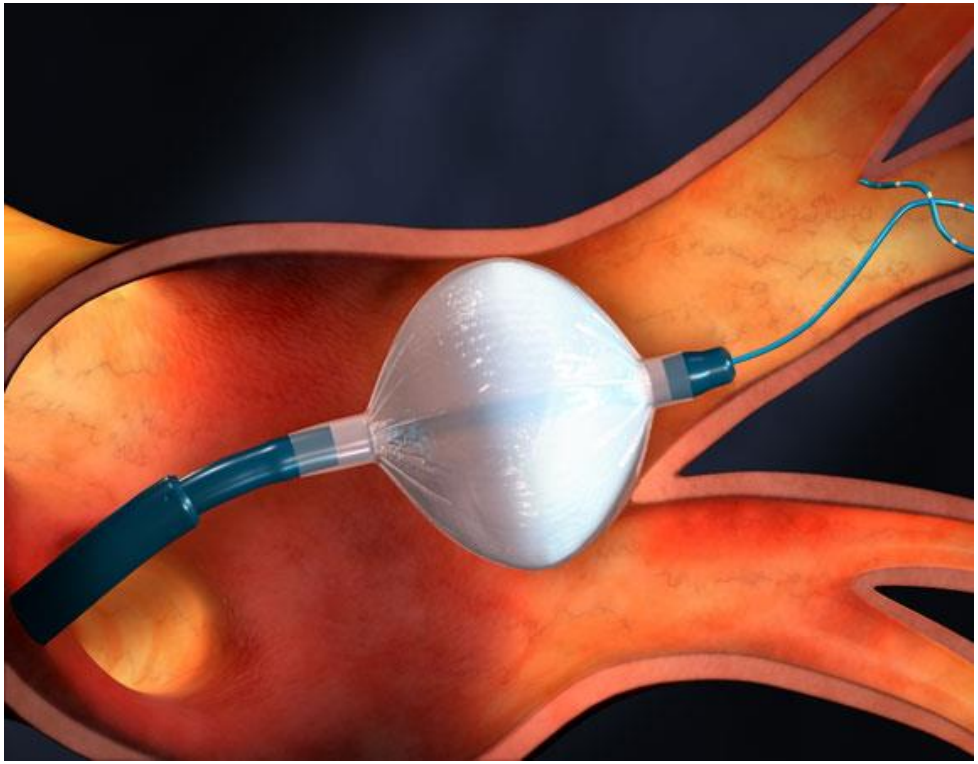
Anti-Arrhythmic Drugs – Which To Choose?



JACC 2014, January et al.

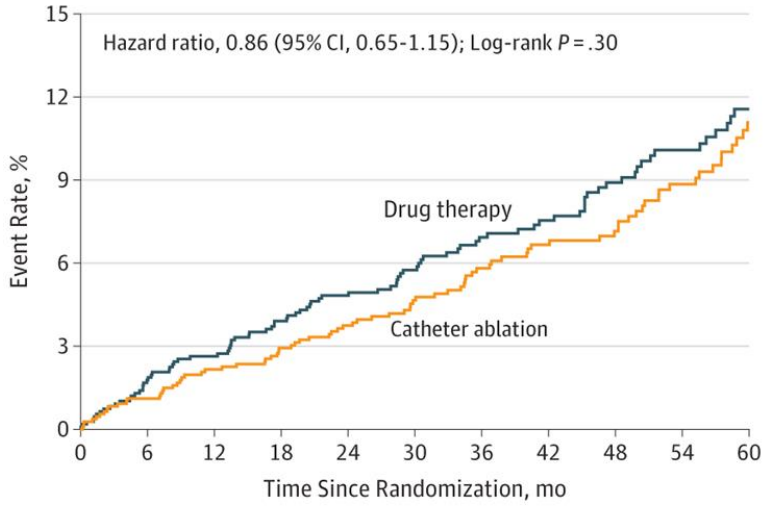
Catheter Ablation for Atrial Fibrillation





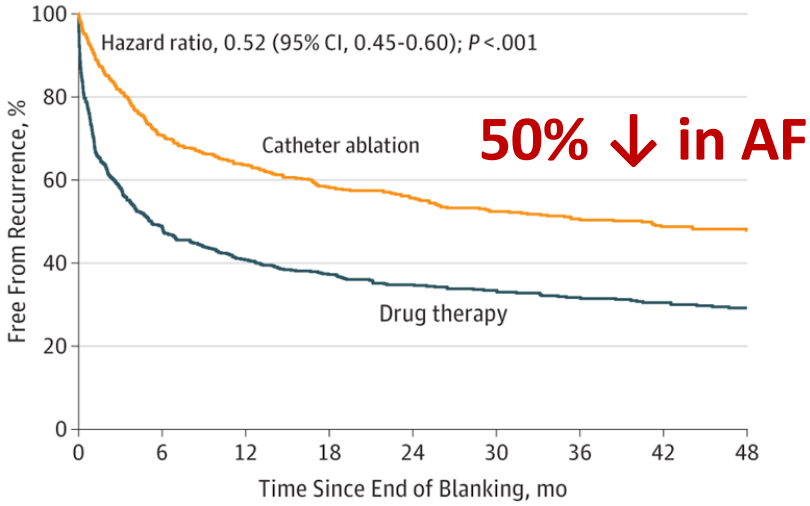
Catheter Ablation vs. Rate Control - CABANA

Death, Stroke, Cardiac Arrest



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

Recurrent Atrial Fibrillation



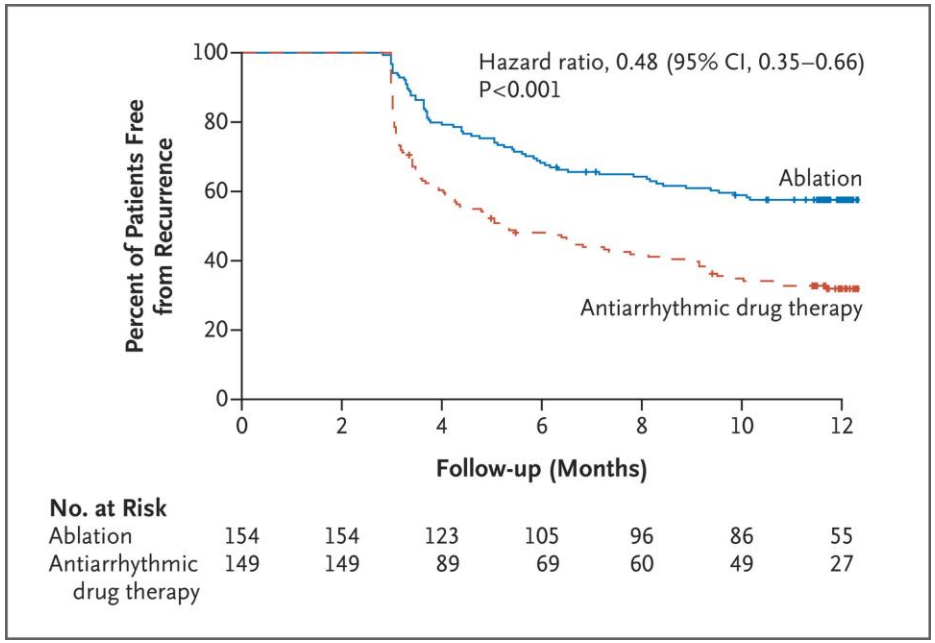
50% ↓ in AF

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

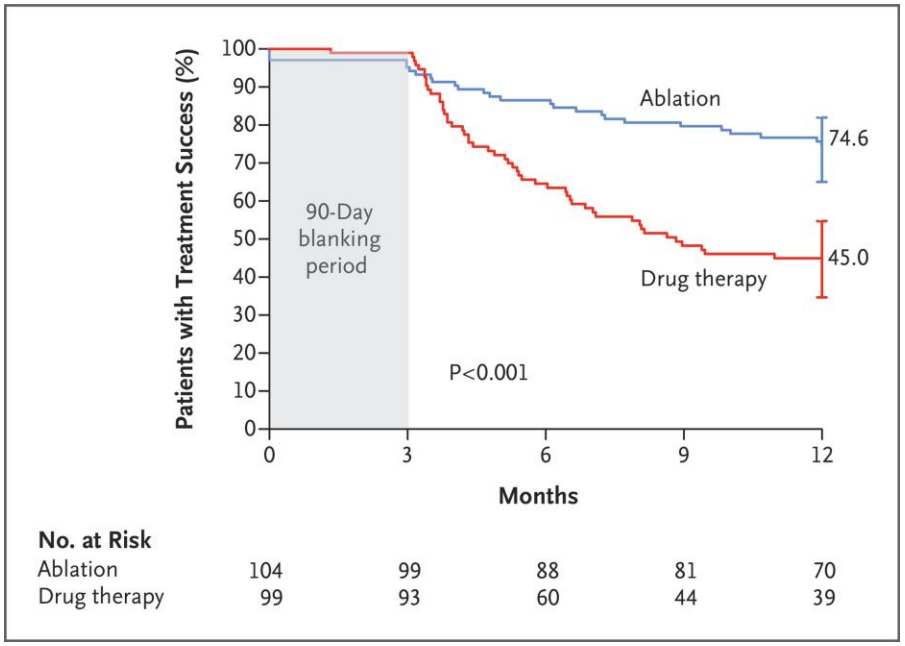
Packer et al. JAMA 2019;321(13):1261-1274

Catheter Ablation vs. Anti-Arrhythmics

EARLY AF Trial



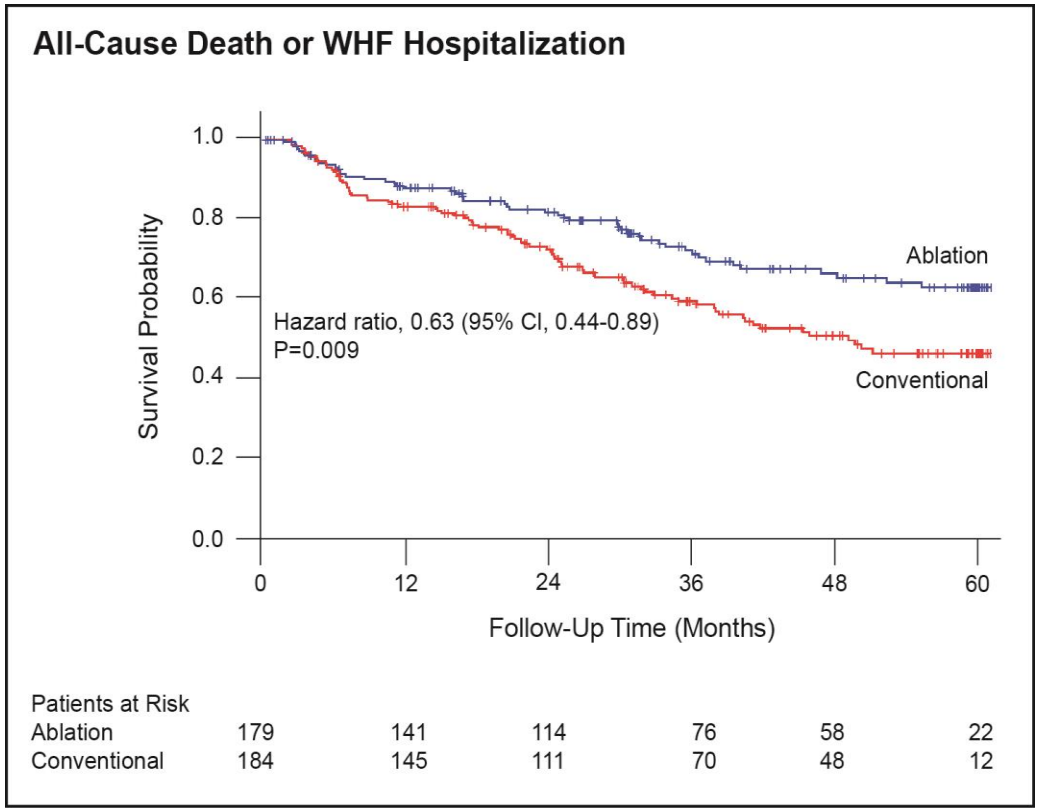
STOP AF Trial

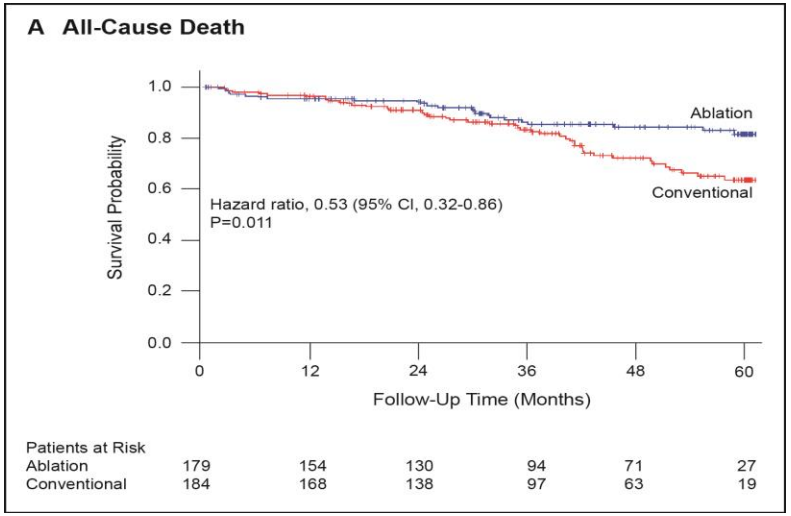


- **Ablation ↓ AF recurrence by 50% vs. AAD therapy**

Packer et al. JAMA 2019;321(13):1261-1274

Catheter Ablation Improves Survival in Heart Failure and Low LVEF – CASTLE-HF





- **Ablation ↓ mortality by 50% in systolic heart failure**

NEJM 2018, Marrouch et al.

Rhythm Control in 2023

- **Early rhythm control may improve CV outcomes**
  - → 20% ↓ in CV endpoints (EAST-AFNET)

- **Ablation more effective than drug therapy**
  - → 50% ↓ in AF recurrence vs. drug therapy (CABANA)
  - → 50% ↓ in AF recurrence vs. AAD (STOP-AF, EARLY AF)
  - → ↑ QOL by multiple metrics (CABANA, STOP-AF)
  - → 50% ↓ in mortality in HF/Low LVEF (CASTLE-HF)
  - → <1% rate of major complication

- **AAD Drug Choice Influenced by Underlying CV Disease**
  - → 4-5% adverse event rate (EAST-AFNET)

Back to Mary

- **Referral to EP to discuss rhythm control options**

- **Favor catheter ablation over AAD given ↑ efficacy, safety profile of ablation**

CONCLUSION

Take Home Messages

- Modifiable risk factor management is KEY after diagnosis of atrial fibrillation
- DOAC are safe and effective – other strategies (e.g. Watchman) can be considered in appropriate setting
- Rhythm control for younger, symptomatic patients (or heart failure)
- Ablation is the most effective tool we have to maintain sinus rhythm

When should I refer my patient?

- **Anytime!**
- **The sooner after the diagnosis the better**
  - Comprehensive and collaborative approach with the primary provider
  - Risk factor modification: weight loss, sleep apnea treatment, HTN, DM, smoking, alcohol cessation
  - Therapeutic options including ablation work better in the early stages of the disease

Thank You!

Questions?

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