



HEALTHTRUST[®]
UNIVERSITY CONFERENCE



Rhythm or Rate & When to Anticoagulate: Changes in 2024 AFib Guidelines

Joseph McCoy, PharmD, HealthTrust – Far West Division

Jeff Murawsky, M.D., FACP, HCA Healthcare – Far West Division



Disclosures



The presenters have no real or perceived conflicts of interest related to content in this presentation

Note: The content presented is for informational purposes only and is based upon the presenter(s) knowledge and opinion. It should not be relied upon without independent consultation with and verification by appropriate professional advisors. Individuals and organizations shall have sole responsibility for any actions taken in connection with the content herein. HealthTrust, the program presenter(s) and their employers expressly disclaim any and all warranties as to the content as well as any liability resulting from actions or omissions of any individual or organization in reliance upon the content.

This program may contain the mention of suppliers, brands, products, services or drugs presented in a case study or comparative format using evidence-based research. Such examples are intended for educational and informational purposes and should not be perceived as an endorsement of any particular supplier, brand, product, service or drug.

Learning Objectives



At the end of this session, participants should be able to:

1. Recall pathophysiological processes contributing to the manifestation of atrial fibrillation (AFib, AF) and management strategies in accordance with the latest AF guidelines.
2. Identify updated management strategies in treating Atrial Fibrillation that consider staging, concurrent comorbidities and individual patient factors.
3. Recognize recent evidence, guidance and interpretations of thromboembolism risk scoring and delineate clinical scenarios for initiating and discontinuing anticoagulation in Atrial Fibrillation.



ATRIAL FIBRILLATION

Introduction



Introduction



Atrial Fibrillation (AF) is a common type of arrhythmia

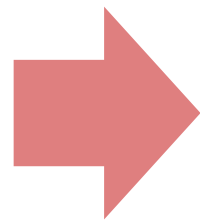


AF affects approximately 6 million people in the United States & nearly 40 million people worldwide

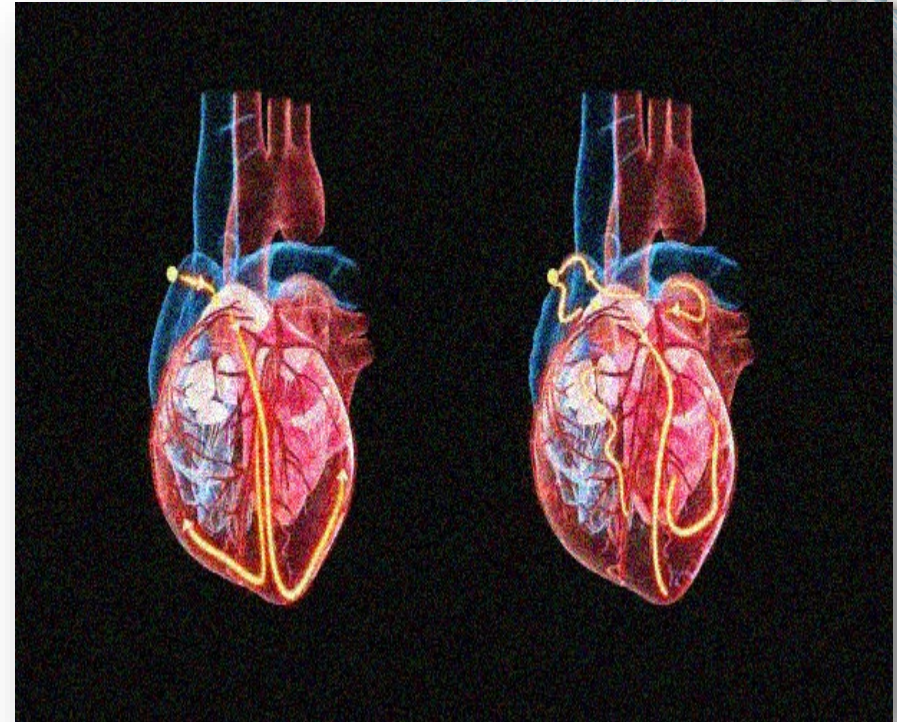


AF is characterized by an irregular, irregular heartbeat

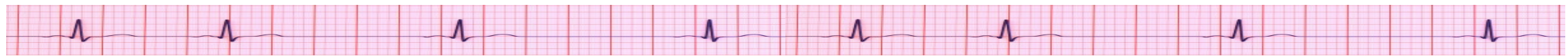
In AF, the normal rhythmic contractions of the atria are replaced by rapid, erratic electrical impulses



causing the atria to quiver instead of contracting effectively



Source: Getty Images. Used with permissions

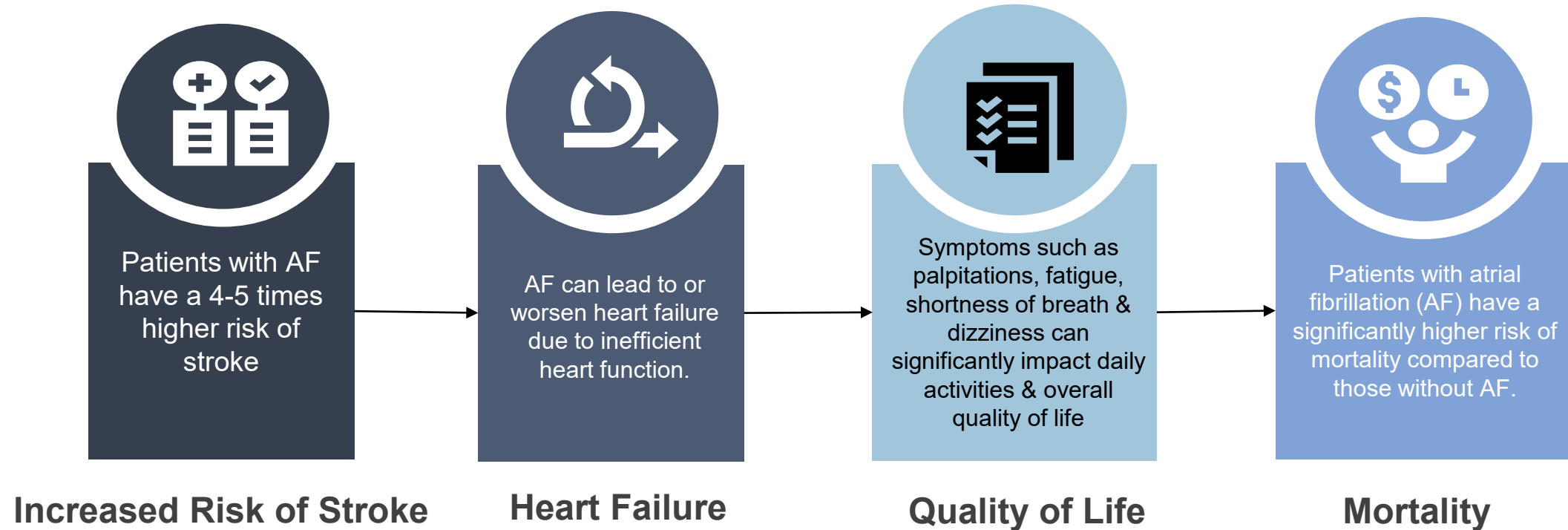


Source: Getty Images. Used with permissions

Introduction, *continued*



Impact on Patient Outcomes



Source: Calkins H, Tomaselli GF, Morady F. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

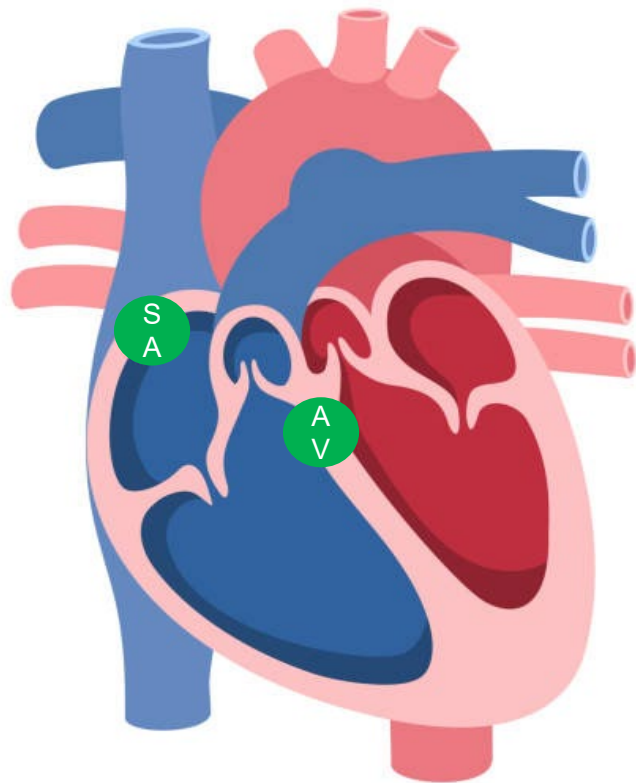


ATRIAL FIBRILLATION

Pathophysiology



Normal Electrical Conduction



Sinoatrial Node

The SA node is the heart's natural pacemaker, initiating electrical impulses



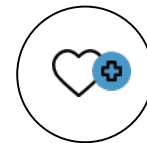
Atrioventricular Node

The AV node coordinates signals between atria & ventricles in heart's electrical system.



Tissue Depolarization

Cardiac tissue depolarization: electrical signal spreads, cells become charged, leading to muscle contraction



Coordinated Contraction

Synchronized muscle contractions ensure efficient blood pumping, driven by the heart's electrical signals.

Source: Getty Images: Used with permissions

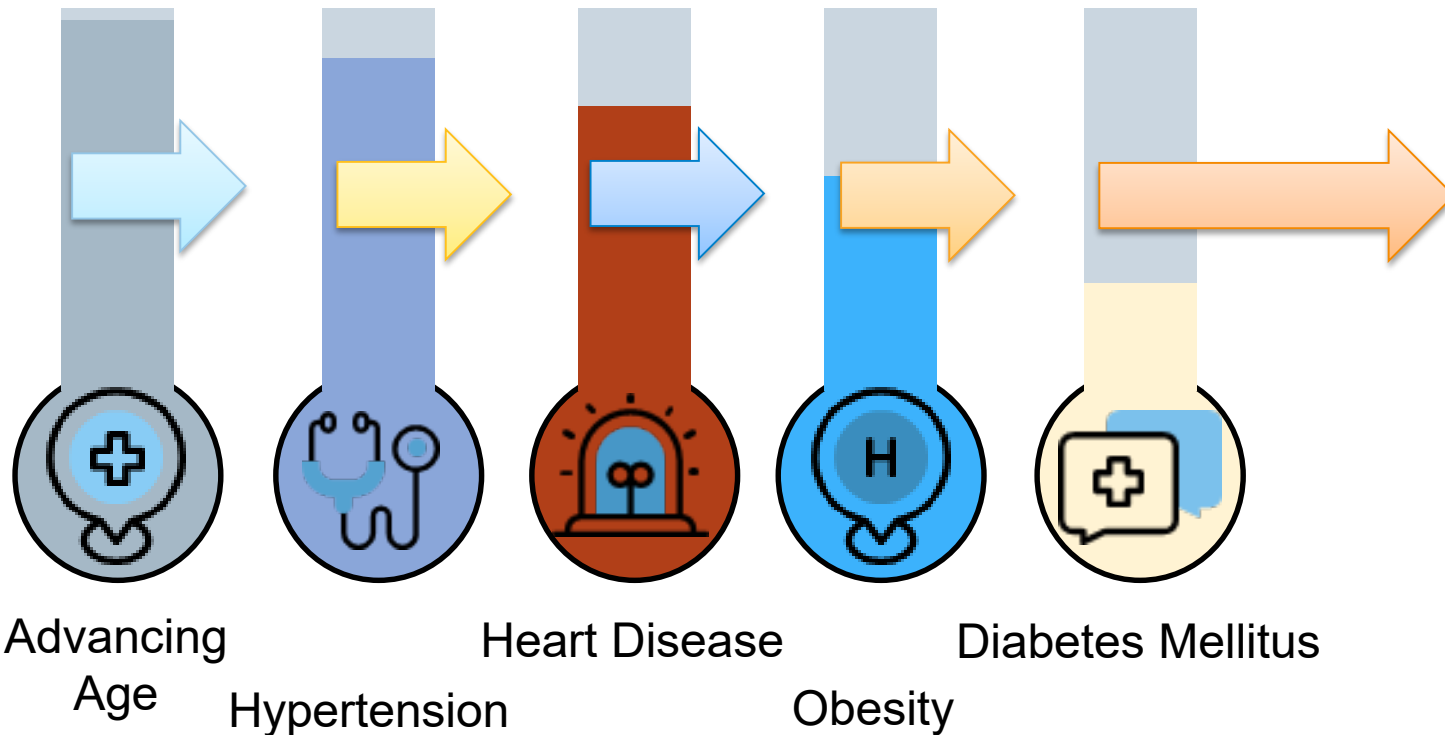
Source: Nattel S, Tomaselli GF, Morady F. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

SA = sinoatrial
AV = atrioventricular

Atrial Fibrillation



Risk Factors & Pathogenesis



Inflammation

Fibrotic formation

Structural stress

Altered electrical properties of cells

Physiological & Structural Changes to the Atria

Source: Kalman JM, Sanders P. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

Structural & Physiological Changes in Atrial Fibrillation



Electrical Remodeling:

Changes in atrial electrical properties, like ion channel dysfunction, disrupt normal conduction, fostering reentry circuits & ectopic foci,



Structural Remodeling:

Atrial structural changes, like fibrosis & enlargement, disrupt electrical conduction, fostering arrhythmias like AF. Linked to hypertension, heart failure & aging.



Autonomic Dysfunction:

Autonomic imbalance, with \uparrow sympathetic and \downarrow parasympathetic activity, disrupts atrial electrophysiology, fostering arrhythmias like AF by enhancing automaticity



Triggered Activity:

Ectopic foci generate abnormal impulses triggering premature depolarizations, promoting AF initiation. Altered calcium handling, inducing delayed afterdepolarizations, contributes to triggered activity.

Source: Kalman JM, Sanders P. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

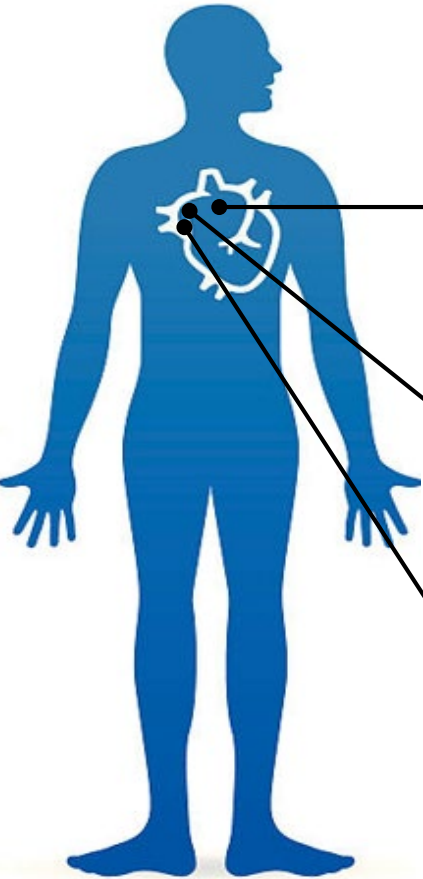
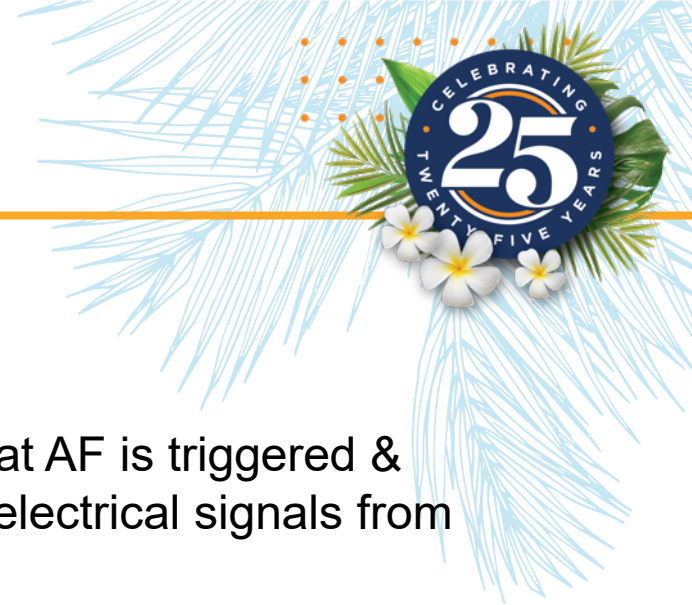
10 | **CE Credit Deadline: 09/30/24**

CONFIDENTIAL – Contains proprietary information.

AF = atrial fibrillation

Mechanistical Concepts

of Atrial Fibrillation



1

**Rapidly Discharging
Autonomic Foci:**

This mechanism suggests that AF is triggered & maintained by fast, irregular electrical signals from abnormal pacemaker tissue

2

**Single Reentrant
Circuit with Fibrillatory
Conduction:**

This theory suggests that a single dominant circuit drives AF. The circuit creates a continuous loop of electrical activity & the impulses spread through the atria in a disorganized manner.

3

**Multiple Reentrant
Wavelets:**

This concept suggests that AF is maintained by many small, self-sustaining circuits (wavelets) that move chaotically through the atria

Source: Getty Images: Used with permissions

Source: Nattel S, Tomaselli GF, Morady F. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

AF = atrial fibrillation

Sequae & Clinical Manifestations



of Atrial Fibrillation



Source: Getty Images: Used with permissions



Tachyarrhythmia leading to fatigue & palpitations



Cardiomyopathy: The irregular heart rhythms & rapid rates can lead to a condition where the heart muscle becomes weakened & enlarged.



Loss of Atrial Kick: Reduction in cardiac output leading to fatigue & potential exacerbation of heart failure



Atrial Quivering: Reduction in atrial contraction leading to incomplete expulsion of blood from atrial & pooling in the atrial appendage. **Thrombus formation**

Question 1



Which of the following sequelae of atrial fibrillation are mechanisms that lead to heart failure?

- A. Supraventricular tachycardia
- B. Loss of atrial kick
- C. Reduced time in atrial diastole
- D. Atrial quivering/loss of coordinated atrial contraction
- E. Tachyarrhythmia induced cardiomyopathy
- F. All of the above



Source: Getty Images: Used with permissions

Answer Question 1



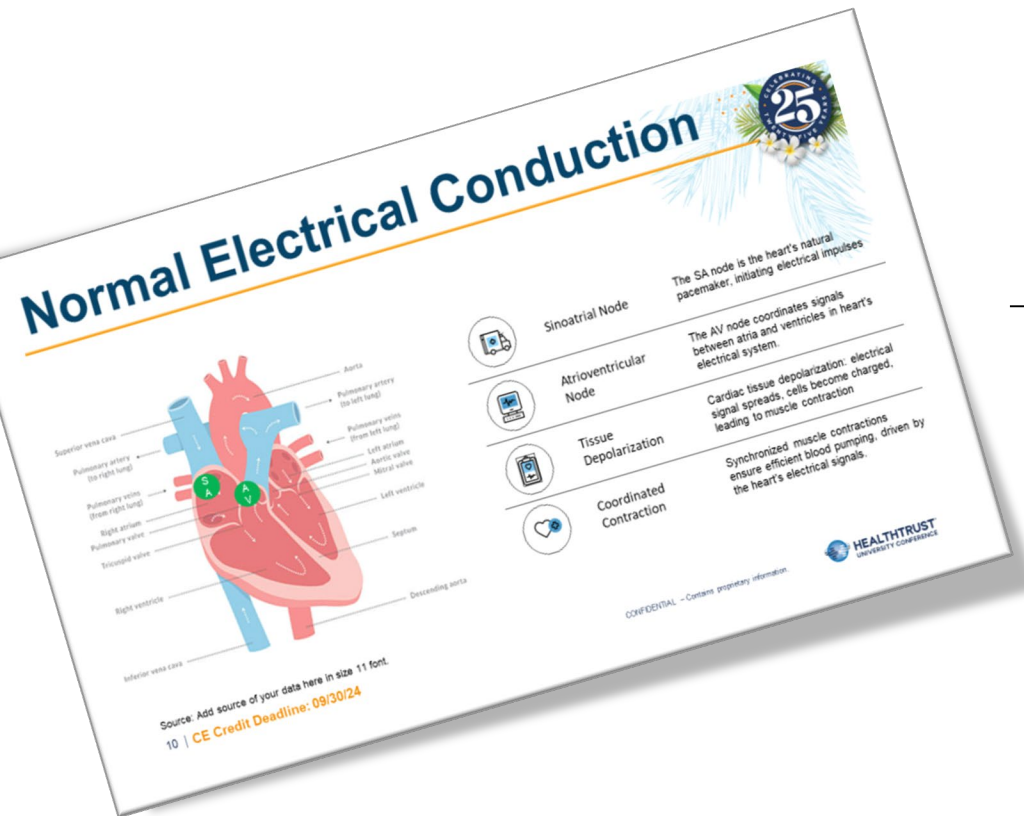
Which of the following sequelae of atrial fibrillation are mechanisms that lead to heart failure?

- A. Supraventricular tachycardia
- B. Loss of atrial kick
- C. Reduced time in atrial diastole
- D. Atrial quivering/loss of coordinated atrial contraction
- E. Tachyarrhythmia induced cardiomyopathy
- F. **All of the above**



Source: Getty Images: Used with permissions

Targets for Treatment for Atrial Fibrillation



	Ectopic Foci	I	Class I Antiarrhythmic Drugs (Sodium Channel Blockers)
		III	Class III Antiarrhythmic Drugs (Potassium Channel Blockers)
		A	Ablation
	Atrioventricular Node	B	Beta blockers
		C	Calcium Channel Blockers
		A	Amiodarone
		D	Digoxin
	Tissue Depolarization	A	Adenosine
		I	Class I antiarrhythmic
		III	Class III antiarrhythmic

Source: Calkins H, Tomaselli GF, Morady F. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 2022.

15 | **CE Credit Deadline: 09/30/24**

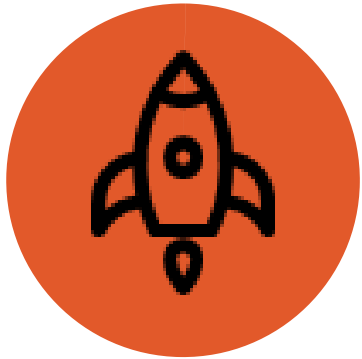
CONFIDENTIAL – Contains proprietary information.



Historical Classification of Atrial Fibrillation

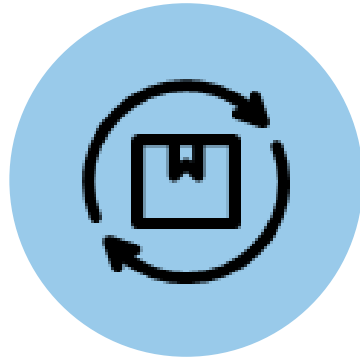


Paroxysmal



Self-terminates within 7 days

Persistent AF



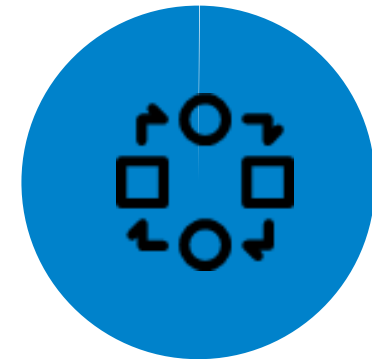
Fails to self-terminate within 7 days

Long-standing persistent AF



AF that has lasted for more than 12 months

Permanent AF



Persistent AF for which there is a decision to no longer pursue a rhythm control strategy

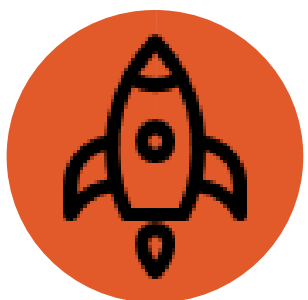
AF = atrial fibrillation

Source: Joglar JA, et al. Circulation 2024

Atrial Fibrillation



Disease Progression Model



Paroxysmal

Initial Stage

- Triggers & Initiation
- Autonomic Dysfunction
- Early Electrical Remodeling



Persistent AF

Intermediate Stage

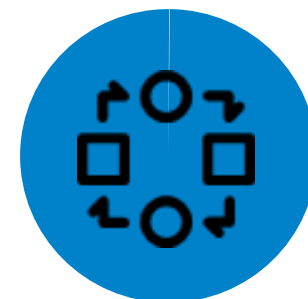
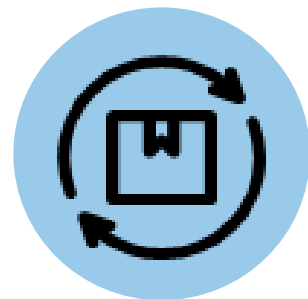
- Sustained Electrical Remodeling
- Structural Remodeling
- Calcium Mishandling
- Chronic Inflammation



Permanent AF

Advanced Stage

- Extensive Structural & Electrical Remodeling
- Loss of Contractile Function
- Autonomic Remodeling



Recommendations for Atrial Fibrillation Staging



At Risk for AF	Pre AF	Paroxysmal	Persistent	Longstanding Persistent	Successful AF Ablation	Permanent AF
Presence of Risk Factors	Electrical or Structural Changes with Predisposition	Paroxysmal	Persistent	Longstanding Persistent	Successful AF Ablation	No Further Attempts at Rhythm Control
<div style="background-color: #27ae60; color: white; padding: 5px; display: inline-block; width: 100%;">Treat Modifiable Risk Factors</div>						
<div style="background-color: #27ae60; color: white; padding: 5px; display: inline-block; width: 80%;">Ongoing Monitoring for AF Burden</div>						
<div style="background-color: #27ae60; color: white; padding: 5px; display: inline-block; width: 90%;">Is AF Associated with Pathophysiological Changes</div>						
<div style="background-color: #27ae60; color: white; padding: 5px; display: inline-block; width: 95%;">Stroke Risk Assessment & Therapy if Appropriate</div>						
<div style="background-color: #27ae60; color: white; padding: 5px; display: inline-block; width: 100%;">Treat Symptoms</div>						



MANAGEMENT STRATEGIES

In Atrial Fibrillation



Management Strategies for At-risk or Pre-Atrial Fibrillation



Source: Getty Images: Used with permissions

Primary & Secondary Prevention



Initiate comprehensive guideline-directed Lifestyle & Risk Factor Modification (LRFM) for AF



LRFM should target:

- Physical inactivity/Obesity
- Unhealthy alcohol consumption
- Smoking
- **Diabetes**
- **Hypertension***
- Sleep (obstructive sleep apnea)

Source: Joglar JA, et al. Circulation 2024

*clinical pearl

Emergent Management Strategies

for Atrial Fibrillation



Patients often report to the ED with AF with Rapid Ventricular Rate (RVR)



If the patient is hemodynamically unstable, **immediate** transthoracic cardioversion may be appropriate



Cardioversion should be preceded by TEE to rule out a left atrial thrombus

- AF has been present for longer than **48 hours**
- AF duration is unclear & the patient is not already anticoagulated



If the patient has marked hemodynamic compromise, **immediate cardioversion without a TEE is advised**

Source: Joglar JA, et al. Circulation 2024

21 | **CE Credit Deadline: 09/30/24**

AF = atrial fibrillation

TEE = Transesophageal Echocardiography

CONFIDENTIAL – Contains proprietary information.

Rhythm or Rate:

Let's Negotiate (Acutely)



Primary goal in the acute setting of rate control is symptom management



Beta Blockers or Non-dihydropyridine calcium channel blockers provided that EF >40%) are recommended for acute rate control

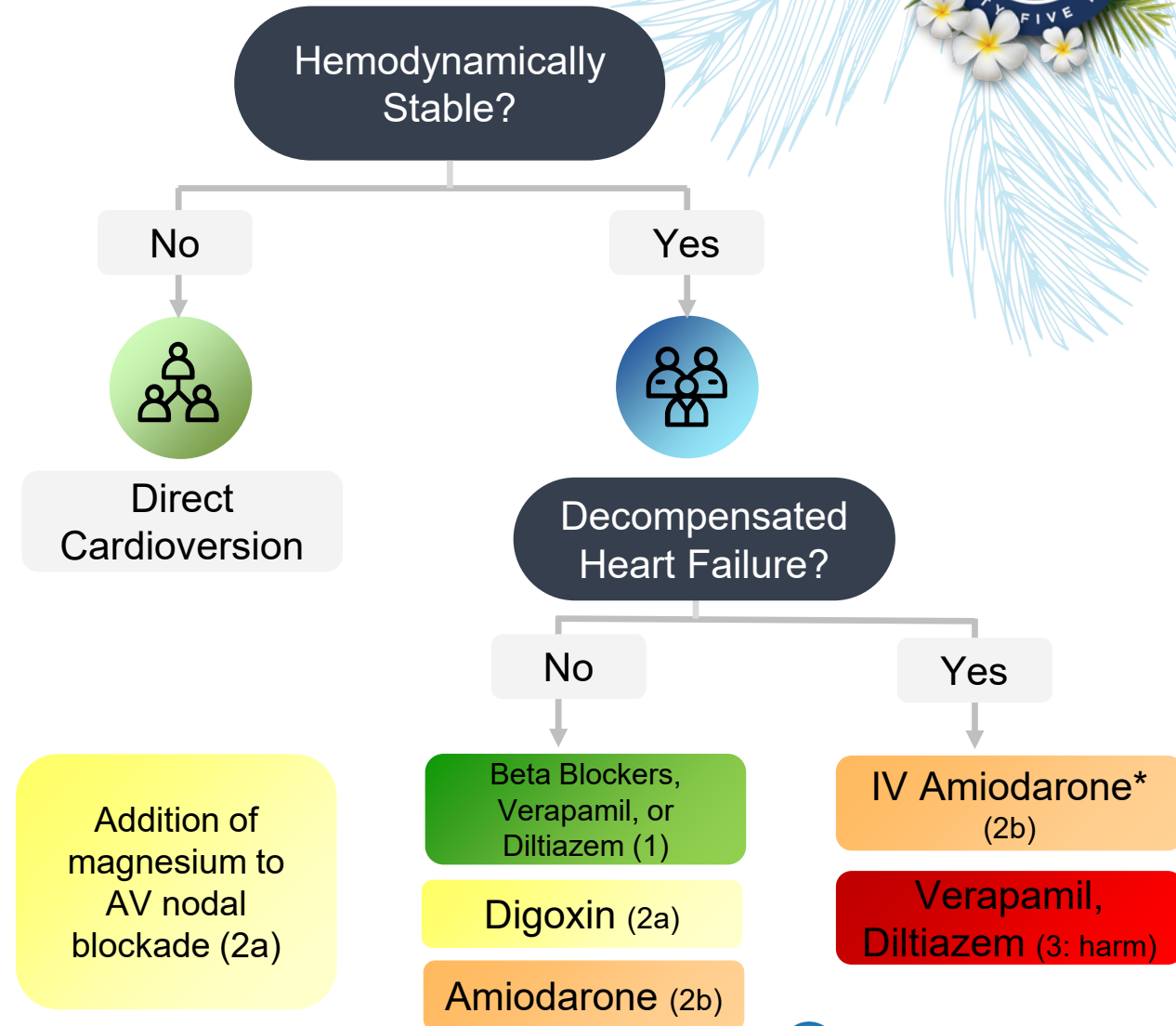


*Consider the risk of cardioversion & stroke when using amiodarone as a rate-control agent

Source: Joglar JA, et al. Circulation 2024

22 | CE Credit Deadline: 09/30/24

EF = ejection fraction
AV = atrioventricular



Question 2



62-year-old male is with NYHA Class II Heart Failure (ejection fraction of 35%), comes to the emergency department complaining of shortness of breath, fatigue and palpitations for the last 5 days. Patient is hemodynamically stable. Which of the following is the BEST management strategy to relieve his symptoms?

- A. Start patient on IV Amiodarone
- B. Cardioversion using Direct Cardioversion without left atrial appendage visualization
- C. Start patient on IV Esmolol
- D. Start patient on Verapamil
- E. Start patient on Diltiazem



Source: Getty Images. Used with permissions

Answer Question 2



62-year-old male is with NYHA Class II Heart Failure (ejection fraction of 35%), comes to the emergency department complaining of shortness of breath, fatigue and palpitations for the last 5 days. Patient is hemodynamically stable. Which of the following is the BEST management strategy to relieve his symptoms?

- A. **Start patient on IV Amiodarone**
- B. Cardioversion using Direct Cardioversion without left atrial appendage visualization
- C. Start patient on IV Esmolol
- D. Start patient on Verapamil
- E. Start patient on Diltiazem



Source: Getty Images. Used with permissions

Rhythm or Rate: **Let's Investigate**



The debate between rate control & rhythm control in AF is a complex & ongoing discussion



Rate control focuses on controlling the heart rate without necessarily converting the patient back to a normal sinus rhythm

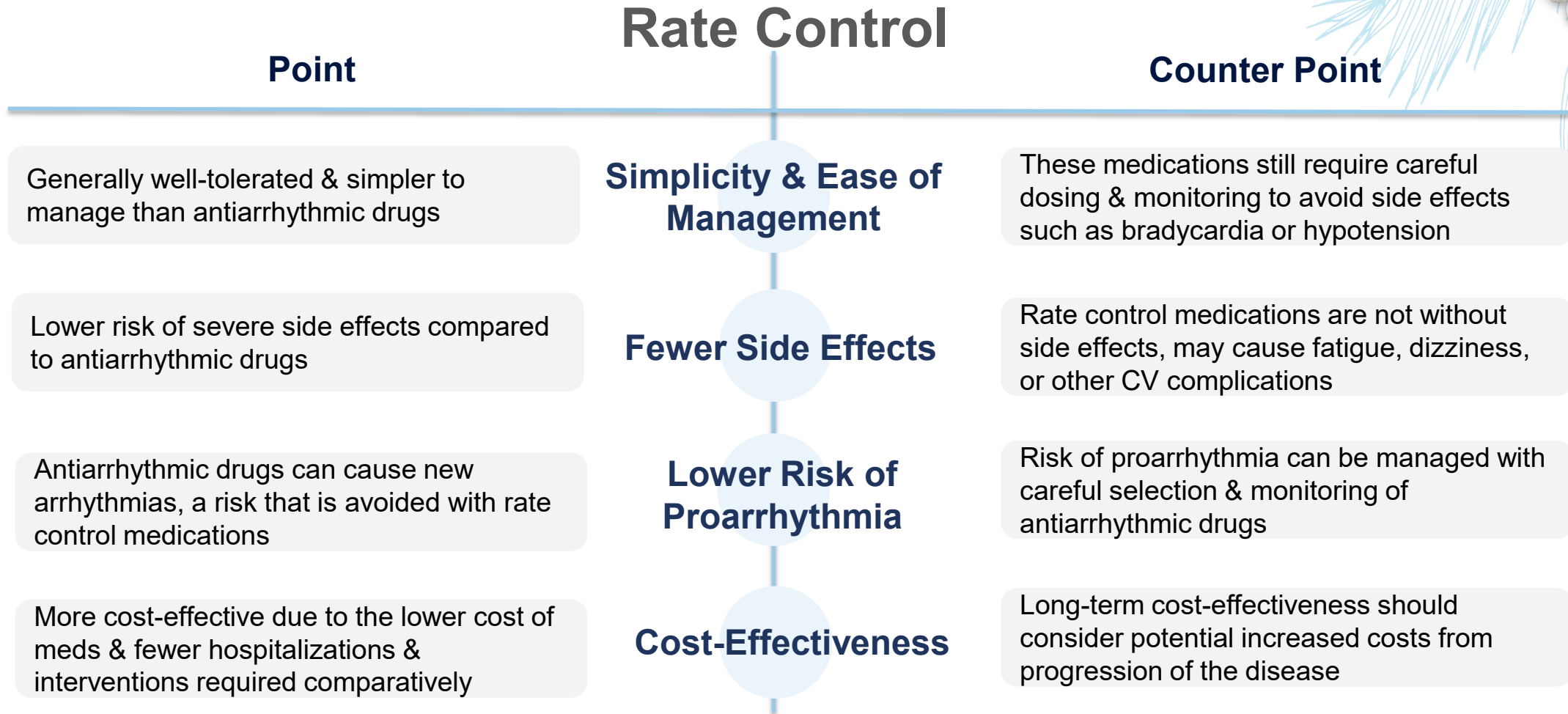


Rhythm control aims to restore & maintain the normal rhythm of the heart



Each approach has distinct benefits & drawbacks, & the choice of strategy can significantly impact patient outcomes

Rhythm or Rate: **Let's Debate**



Source: Joglar JA, et al. Circulation 2024

26 | **CE Credit Deadline: 09/30/24**

CV = cardiovascular

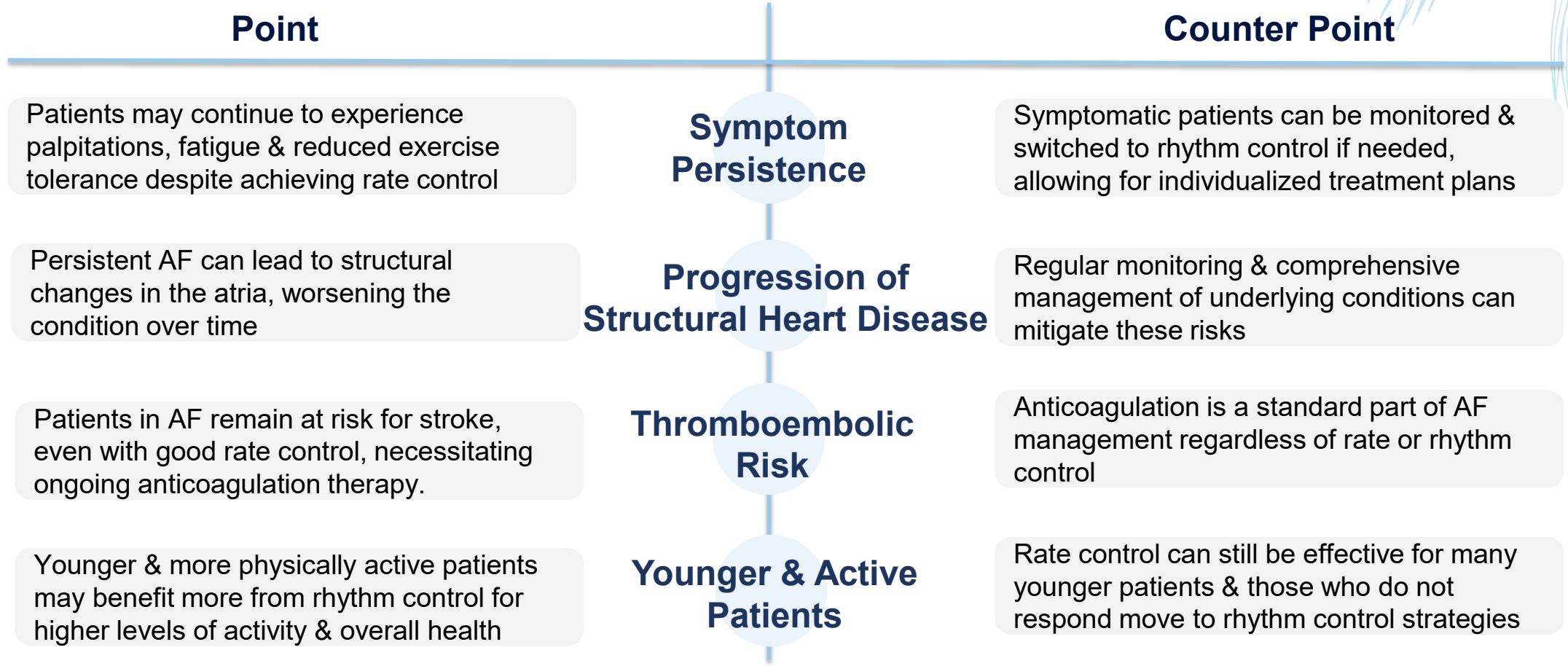
CONFIDENTIAL – Contains proprietary information.



Rhythm or Rate: *Let's Debate, continued*



Rhythm Control



Source: Joglar JA, et al. Circulation 2024

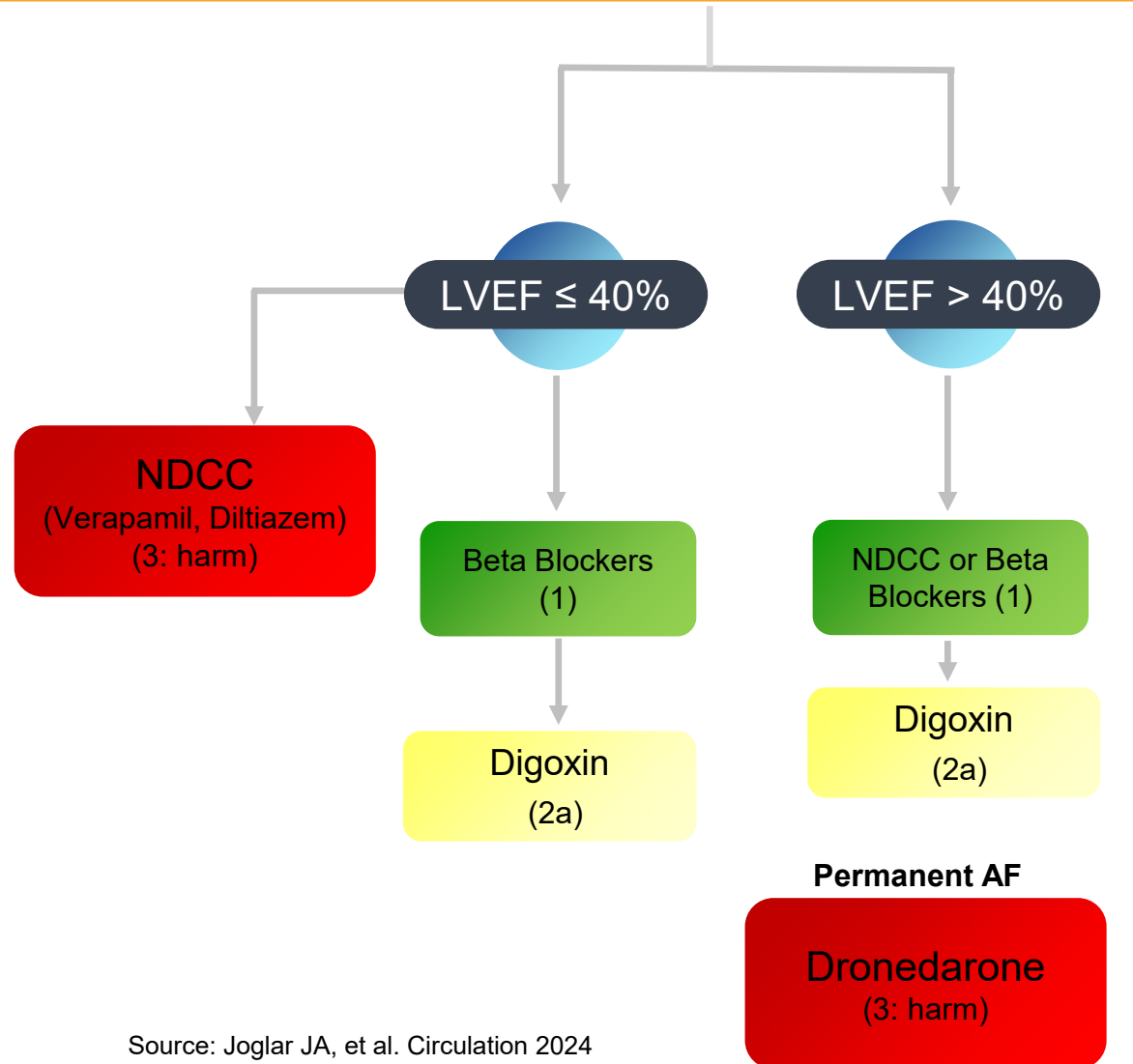
27 | **CE Credit Deadline: 09/30/24**

AF = atrial fibrillation

CONFIDENTIAL – Contains proprietary information.



Rhythm or Rate: Let's Negotiate (Long-term Rate)



Selection of specific agents should consider patient-specific characteristics (i.e. HFrEF, **reactive airway disease**) & **response**



All of these medications should be avoided in patients with **pre-excitation**



In patients with **AF & HF symptoms**, **digoxin** is reasonable for long-term rate control

AF = atrial fibrillation
 HF = heart failure
 HFrEF = heart failure with reduced ejection fraction

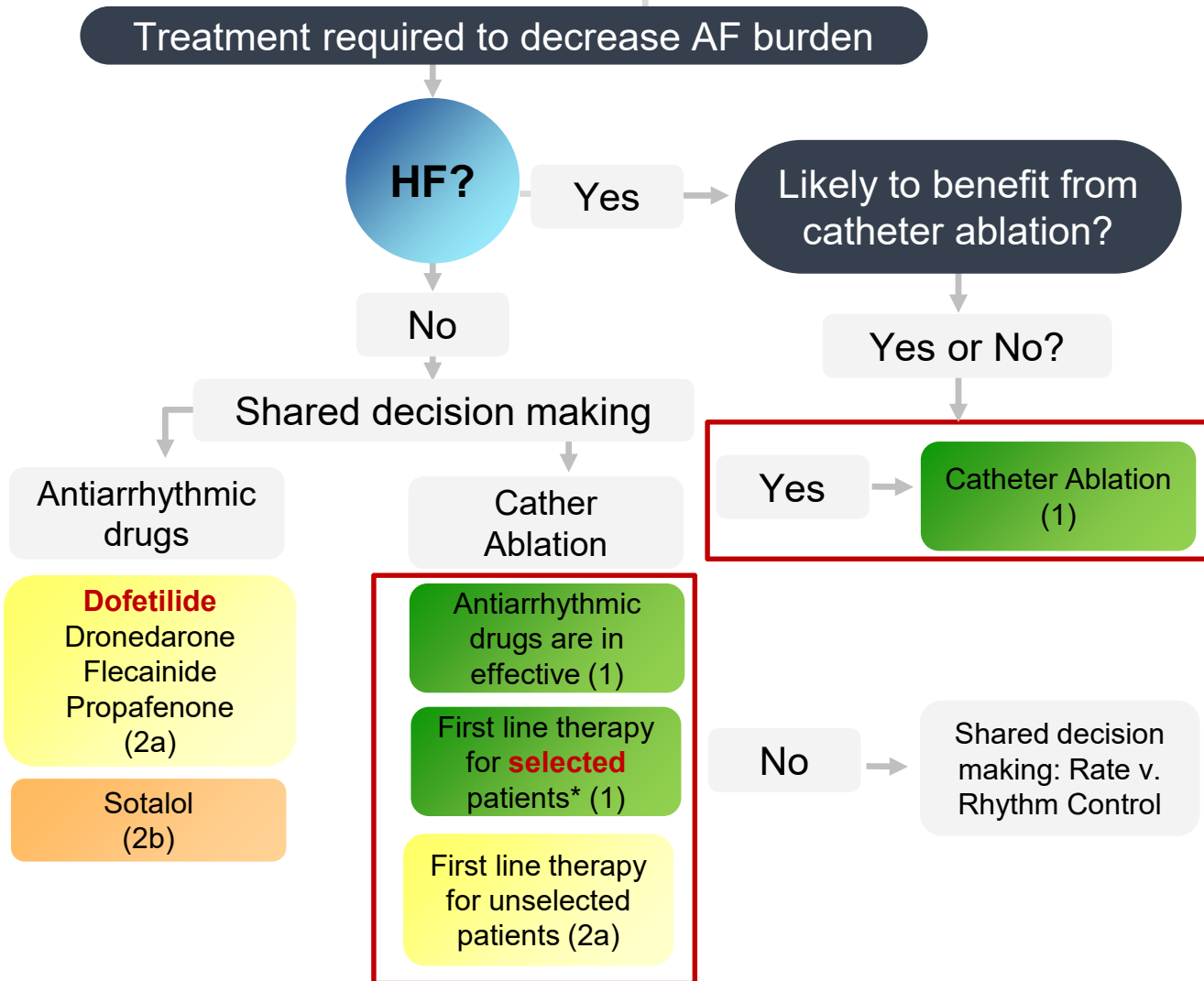
Source: Joglar JA, et al. Circulation 2024

28 | **CE Credit Deadline: 09/30/24**

CONFIDENTIAL – Contains proprietary information.

Rhythm or Rate:

Let's Negotiate (Long-term Rhythm Strategy)



New: Guideline emphasis on early rhythm control



New: Catheter ablation of AF receives a Class 1 indication as first-line therapy in selected patients



New: Catheter ablation of AF in appropriate patients with HFrEF receives a Class 1 indication



Atrial fibrillation (AF) burden is a term used by electrophysiologists to describe the percentage of time a patient is in AF



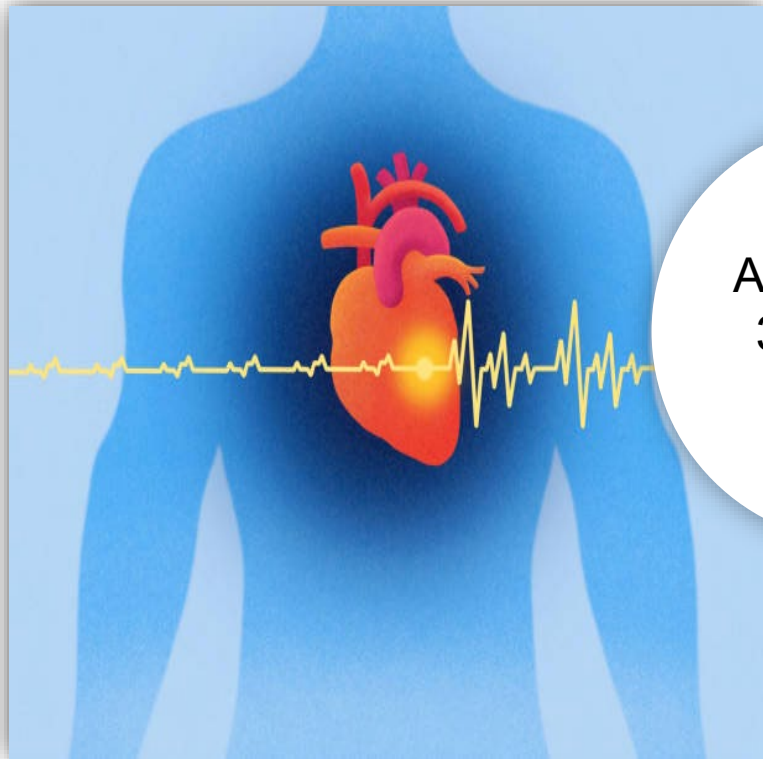
ANTICOAGULATION STRATEGIES

In Atrial Fibrillation



Rhythm or Rate:

Let's Anticoagulate



Atrial rate of
300 – 500
BPM

Loss of “Atrial
Kick” &
“quivering”

Pooling of
blood in left
atrial
appendage

Thrombus
formation &
risk for stroke

Source: Getty Images: Used with permissions

Rhythm or Rate: Let's Anticoagulate



Stroke & systemic embolism event risk threshold for anticoagulation

Anticoagulation recommended if $\geq 2\%/year$ (1)

Anticoagulation recommended if 1 - $2\%/year$ (2a)

A patient's absolute risk of stroke is central to recommendations about anticoagulation:

- **Low** ($\sim < 1\%/y$)
- **Intermediate:** (~ 1 to $\sim 2\%/y$)
- **High** ($\sim > 2\%/y$)

Anticoagulation choice

DOACS preferred over warfarin (except mitral stenosis or mechanical heart valve) (1)

Aspirin either alone or with clopidogrel not recommended to reduce stroke risk (3:Harm)

If no risk factors for stroke, aspirin to prevent thromboembolic events not recommended (no benefit) (2b)

C: Congestive heart failure (1 point)

H: Hypertension (1 point)

A₂: Age ≥ 75 years (2 points)

D: Diabetes mellitus (1 point)

S₂: Prior Stroke or TIA or thromboembolism (2 points)

V: Vascular disease (1 point)

A: Age 65–74 years (1 point)

Sc: Sex category (female sex) (1 point)

C

H

A₂

D

S₂

V

A

Sc

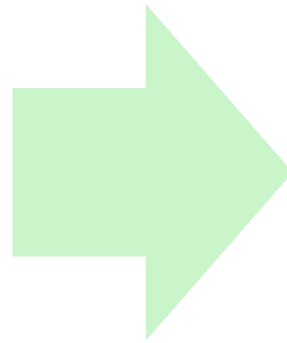
Rhythm or Rate: Let's Pontificate



Anticoagulation in Special Populations

Long – Term Anticoagulation Contraindicated

- Severe bleeding due to a non reversible cause involving GI, pulmonary, or GU systems
- Spontaneous intracranial or intraspinal bleeding to a non – reversible cause
- Serious bleeding related to recurrent falls when cause of falls is not treatable



AF = Atrial Fibrillation
 GI = gastrointestinal
 GU = genitourinary
 LAA = left atrial appendage
 pLAOO = percutaneous left atrial appendage occlusion

Percutaneous Approaches to Occlude the LAA		
COR	LOE	Recommendations
2b	B - R	In patients with AF & a moderate risk to high risk of stroke & a high risk of major bleeding, pLAOO MAY BE a REASONABLE ALTERNATIVE to oral anticoagulation

Cardiac Surgery – LAA Exclusion/Excision		
COR	LOE	Recommendations
2b	A	In patients with AF & undergoing cardiac surgery with a CHA ₂ DS ₂ VASc score ≥ 2 or equivalent stroke risk, the benefit of surgical LAA exclusion in the absence of CONTINUED ANTICOAGULATION TO REDUCE THE RISK OF STROKE & SYSTEMIC EMBOLISM IS UNCERTAIN.

Source: Joglar JA, et al. Circulation 2024

33 | CE Credit Deadline: 09/30/24

CONFIDENTIAL – Contains proprietary information.



Rhythm or Rate: Let's Pontificate



Anticoagulation Clinical Pearls



2

Time (days) for a clot to form under normal physiological conditions

28

Time (days) for mechanical function to fully return after cardioversion

90

Time (days) need to recover from myocardial injury & overexpression of tissue factor from ablation

Source: Getty Images: Used with permissions

Source: Joglar JA, et al. Circulation 2024

Question 3



27-year-old male comes into your clinic after initial diagnosis of paroxysmal atrial fibrillation. Patient has been on anticoagulation for 5 weeks since initial diagnosis and a CHA₂DS₂ VASc score of 0. You cardiovert the patient successfully. Which of the following would be the best anticoagulation management strategy?

- A. Patient has been successfully put back into sinus rhythm, no need for anticoagulation
- B. Anticoagulate for another 5 days
- C. This patient CHA₂DS₂ VASc score dictates this patient should be on anticoagulation indefinitely
- D. This patient should be anticoagulated for 4 weeks and then anticoagulation should be discontinued



Source: Getty Images. Used with permissions

Answer Question 3



27-year-old male comes into your clinic after initial diagnosis of paroxysmal atrial fibrillation. Patient has been on anticoagulation for 5 weeks since initial diagnosis and a CHA₂DS₂ VASc score of 0. You cardiovert the patient successfully. Which of the following would be the best anticoagulation management strategy?

- A. Patient has been successfully put back into sinus rhythm, no need for anticoagulation
- B. Anticoagulate for another 5 days
- C. This patient CHA₂DS₂ VASc score dictates this patient should be on anticoagulation indefinitely
- D. **This patient should be anticoagulated for 4 weeks and then anticoagulation should be discontinued**



Source: Getty Images. Used with permissions

References



1. Calkins H, Tomaselli GF, Morady F. Chapter 66: Atrial Fibrillation: Clinical Features, Mechanisms, and Management. In: Libby P, Bonow RO, Mann DL. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Saunders/Elsevier; 2022. 1272 – 1285.
2. Nattel S, Tomaselli GF. Chapter 62: Mechanisms of Cardiac Arrhythmias In: Libby P, Bonow RO, Mann DL. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Saunders/Elsevier; 2022. 1163 – 1189.
3. Kalman JM, Sanders P. Chapter 65: Supraventricular Tachycardias. In: Libby P, Bonow RO, Mann DL. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Saunders/Elsevier; 2022. 1245 - 1270.
4. Joglar JA, Chung MK, Armbuster AL, et al. 2023 acc/aha/accp/hrs guideline for the diagnosis and management of atrial fibrillation: a report of the american college of cardiology/american heart association joint committee on clinical practice guidelines. Circulation. 2024;149(1):e1-e156.
5. Calkins H, Reynolds MR, Spector P, Sondhi M, Xu Y et al. (2009) Treatment of atrial fibrillation with antiarrhythmic drugs or radiofrequency ablation: two systematic literature reviews and meta-analyses. Circ Arrhythm Electrophysiol 2 (4): 349-361.
6. Schnabel R, Pecun L, Engler D, et al. (2018) Atrial fibrillation patterns are associated with arrhythmia progression and clinical outcomes. University of Birmingham doi 10.1136/heartjnl-2017-312569





Thank you...

- Joseph McCoy – Joseph.Mccoy@healthtrustpg.com
- Jeff Murawsky - Jeffrey.Murawsky@hcahealthcare.com