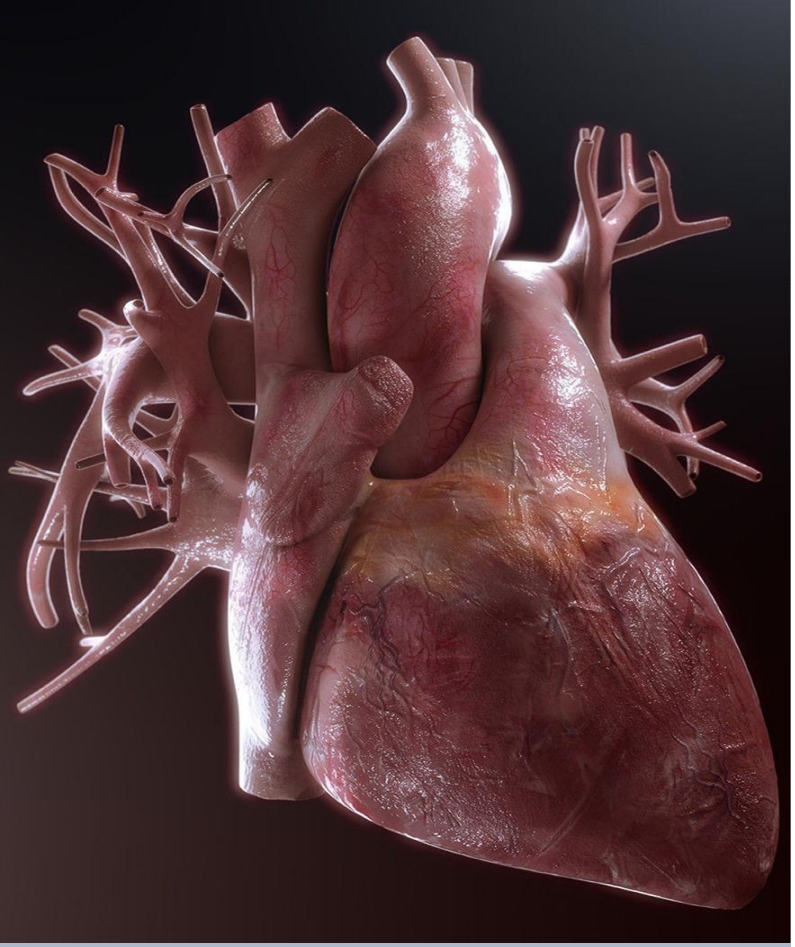

The Arrhythmias going to get you

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Disclosures

- Relationship with Novartis Pharmaceuticals Corporation, Amgen, Amarin, Bayer, Pfizer, Lexicon Pharmaceuticals, and Idorsia that includes consulting or advising.
- Relationship with Janssen that includes research grant funding paid directly to the research department

Objectives

- Review the most common arrhythmia, Atrial Fibrillation.
- Discuss screening and diagnosis
- Review and discuss the acute/chronic management through lifestyle
- Discuss implications of pharmacologic treatment

Atrial Fibrillation

Case

- Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.
- PastHx: Hypertension “for years.” Menopause at age 55.
- MEDS: As above.
- Vitals: BP 130/80, HR 103, SaO2 96%, T 98.9, Wt. 165 Ht. 5’6” BMI 26.6
- LABS: Serum Cr 1.1; AST 23; ALT 32; A1c 5.8%; TSH 2.23
- She has an **irregularly irregular** rhythm.

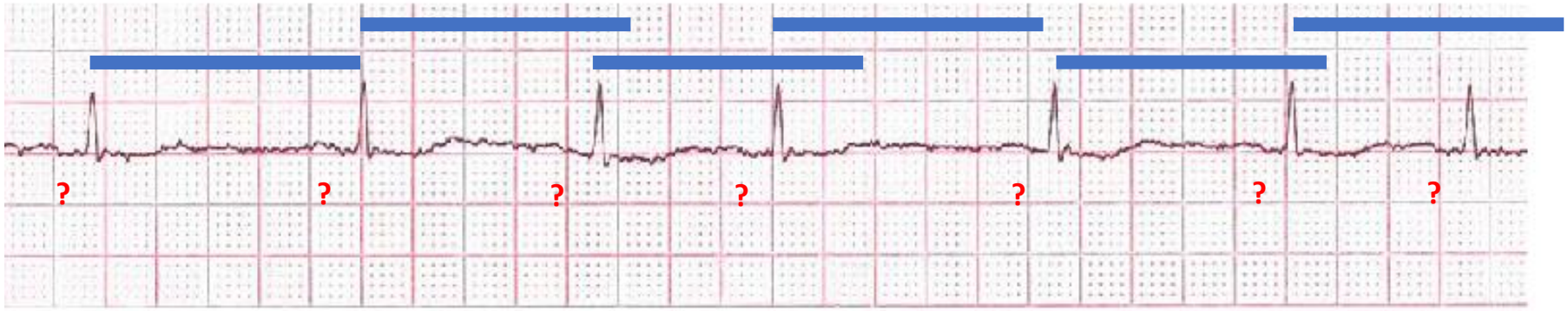
What is Atrial Fibrillation?

- Atrial Fibrillation is a common heart rhythm disorder characterized by irregular and often rapid heartbeats.

Atrial Fibrillation (AF)

Initial gold-standard detection

- **Electrocardiogram (EKG) relatively cheap, efficient, and ubiquitous.**
  - Provides the diagnosis of AF
- Findings:
  - Irregularly Irregular R-R Interval
  - No discernible P waves or related p-wave/QRS complexes



Basic Clinical Evaluation – Newly Diagnosed AF

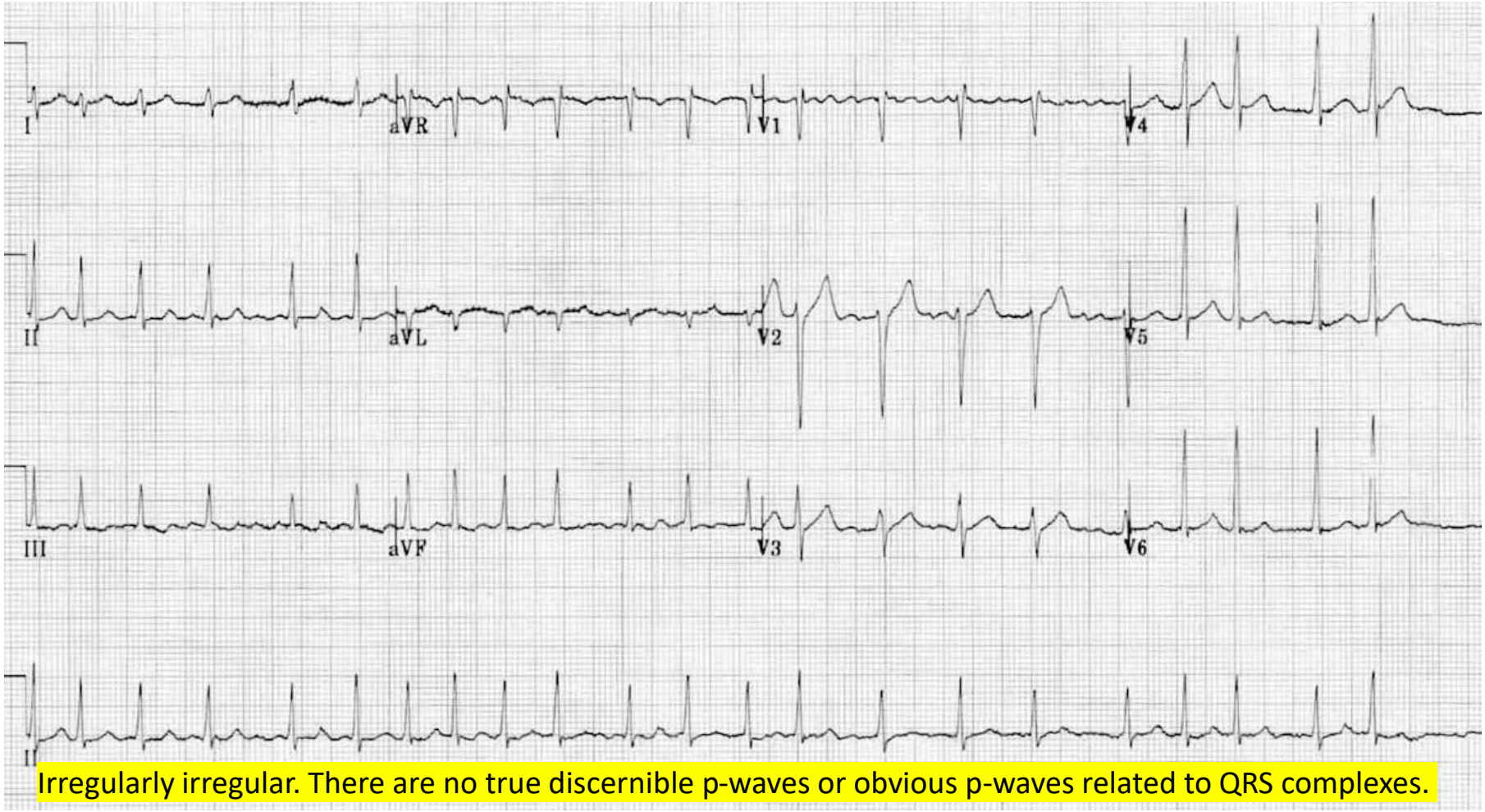
Do

- Transthoracic Echo
- CBC, BMP, TSH w/ Reflex T4
- Targeted testing to assess other medical conditions associate with AF to determine stroke and bleeding risk factors.

Don't

- Protocolized testing for ischemia, ACS and PE unless there are additional signs and symptoms to indicate those disorders.

Recommendations for Basic Clinical Evaluation Referenced studies that support the recommendations are summarized in the Online Data Supplement.		
COR	**LOE**	**Recommendations**
1	B-NR	1. In patients with newly diagnosed AF, a transthoracic echocardiogram[1–4] to assess cardiac structure, laboratory testing to include a complete blood count, metabolic panel, and thyroid function,[5–7] and when clinical suspicion exists, targeted testing to assess for other medical conditions associated with AF are recommended to determine stroke and bleeding risk factors, as well as underlying conditions that will guide further management.
3: No benefit	B-NR	2. In patients with newly diagnosed AF, protocolized testing for ischemia, acute coronary syndrome (ACS), and pulmonary embolism (PE) should not routinely be performed to assess the etiology of AF unless there are additional signs or symptoms to indicate those disorders.[8–10]



Irregularly irregular. There are no true discernible p-waves or obvious p-waves related to QRS complexes.

https://litfl.com/atrial-fibrillation-ecg-library/

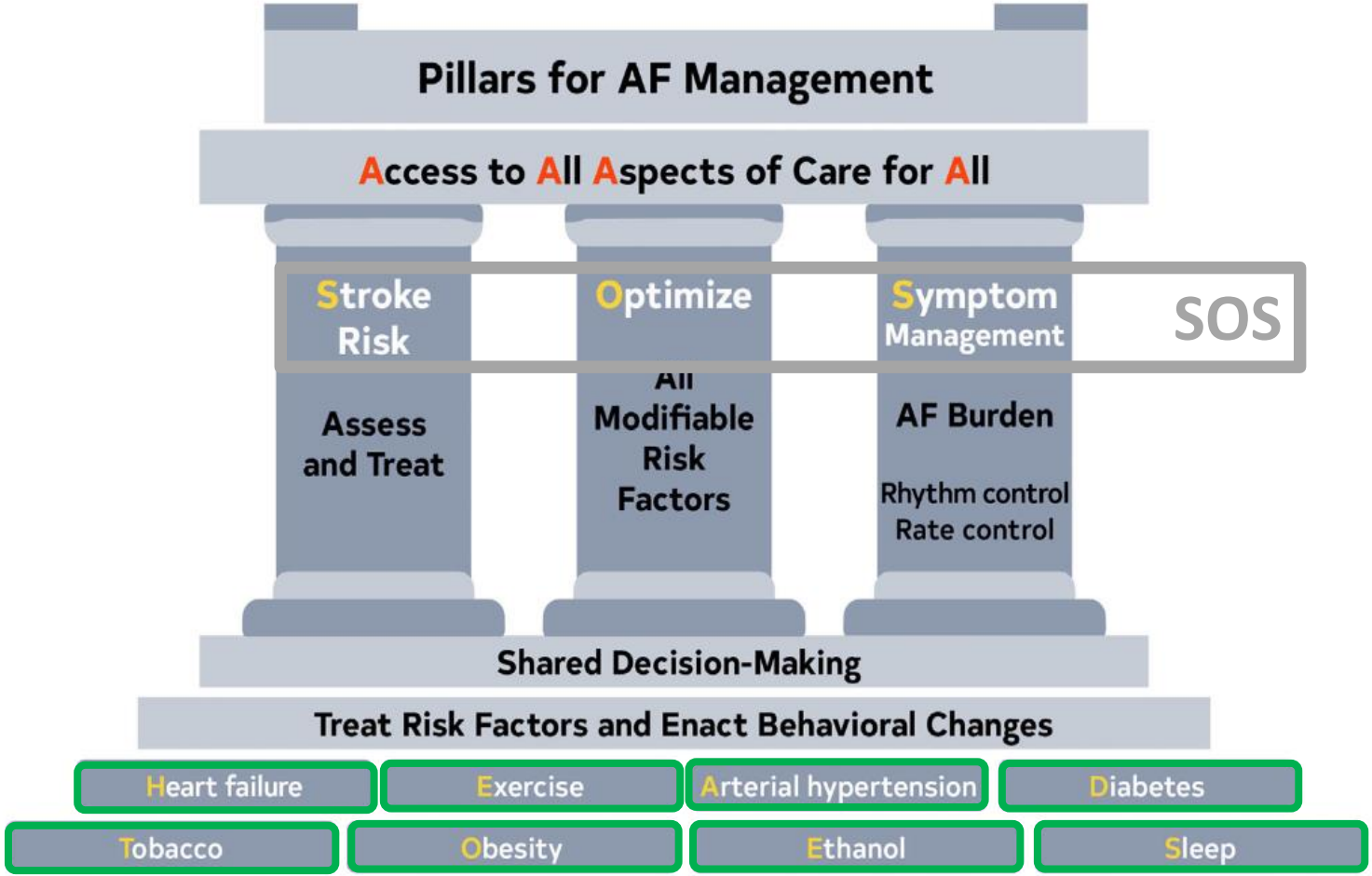
Atrial Fibrillation. A medical emergency?

Not always and not usually.

1. Often identified incidentally, e.g., annual wellness exam, pre-surgical exam, while being seen for other acute but non-emergent events (e.g., viral illness presentation, UTI, etc.), etc.
2. Deserves well-intentioned work-up and consideration for anti-coagulation in those with elevated risk score for embolism (e.g., CHADS2VASC) or being referred for cardioversion.
3. Discuss the early path of rhythm vs rate, and that anti-coagulation is a separate management feature.

Keys for urgent/emergent

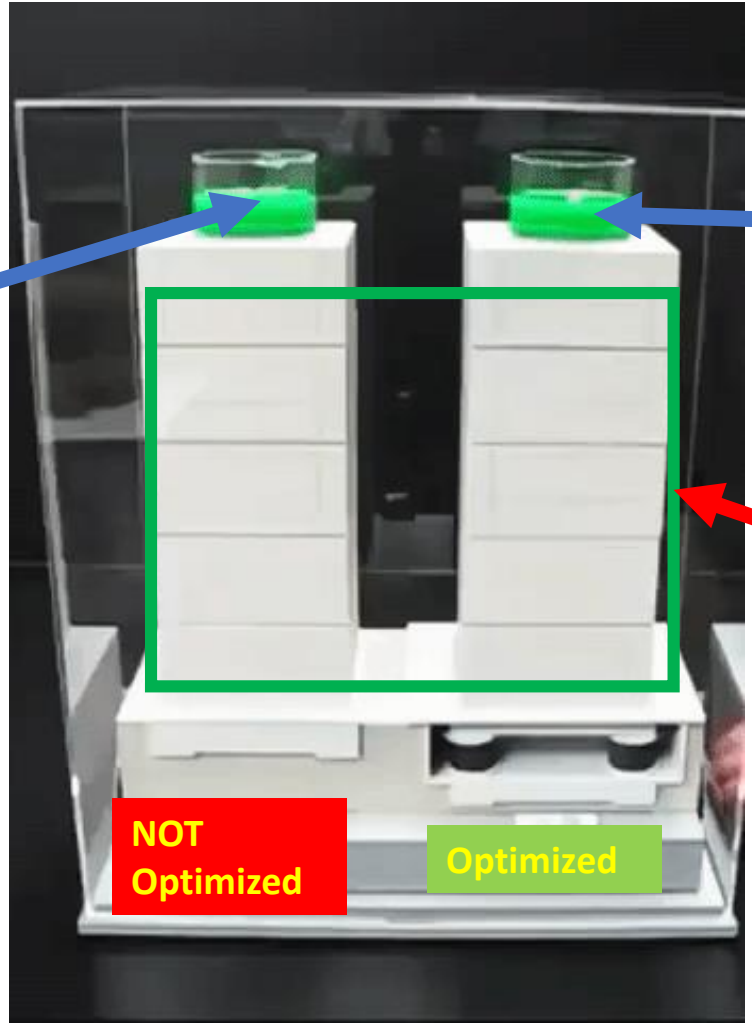
1. **Symptomatic**. With or without AF and rapid ventricular rate (RVR; Heart rate >100). Consider
   a) Hemodynamic compromised or stable
   b) Will they remain stable or become hemodynamically compromised
   c) Is there a high suspicion of frailty, multiple co-morbid conditions, etc.


Pillars for AF Management
Access to All Aspects of Care for All
Stroke Risk
Optimize
Symptom Management
SOS
Assess and Treat
All Modifiable Risk Factors
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

Atrial rhythm

Atrial Fibrillation:

- De Novo
- Paroxysmal
- Persistent
- Recurrent post AF Ablation



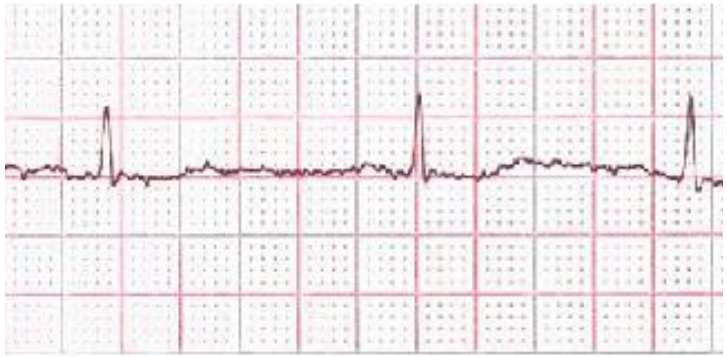
Atrial rhythm

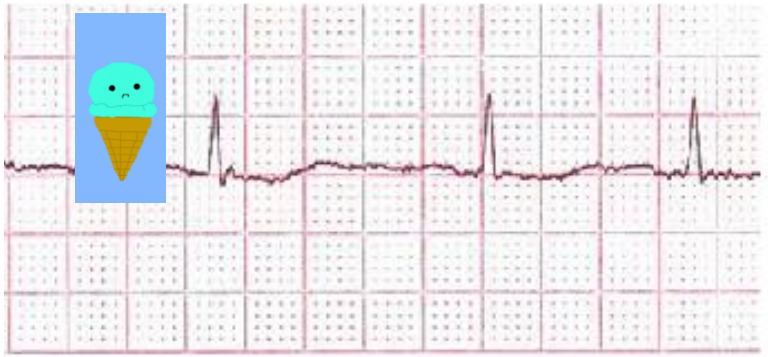
Sinus rhythm

RISK Factors:
Heart Failure, Exercise, Arterial Hypertension, Diabetes, Tobacco, Obesity, Ethanol, Sleep

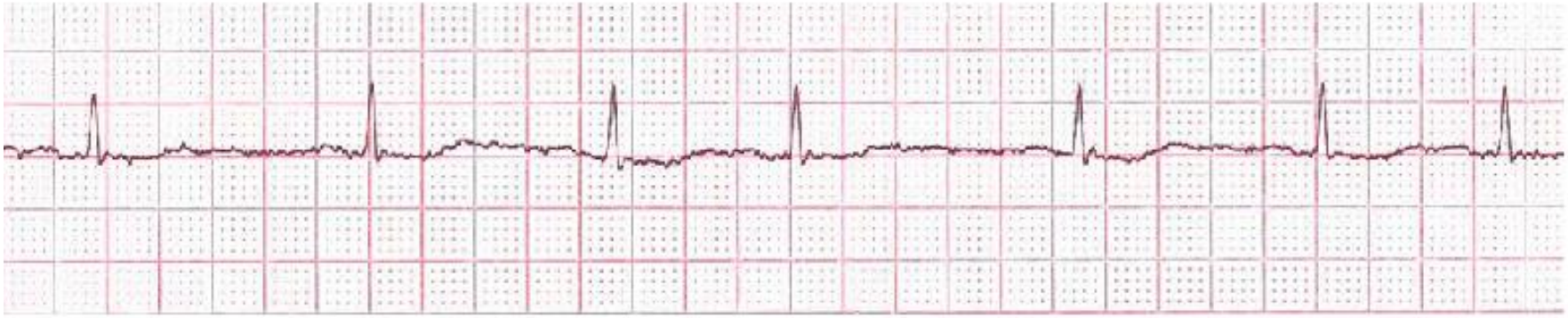
Atrial Fibrillation (AF)

Loaded diagnosis that brings fear. We need to be more precise about AF “BURDEN” – how often occurring, for how long, intermittent or continuous, requiring interve





Atrial Fibrillation (AF)



We can diagnose Sheryl with AFib.

However, we don't know BURDEN—how often it occurs, and for how long?

Consider initial monitoring for evaluation of burden, e.g., patch, Holter, etc.

Rate versus Rhythm

Rate

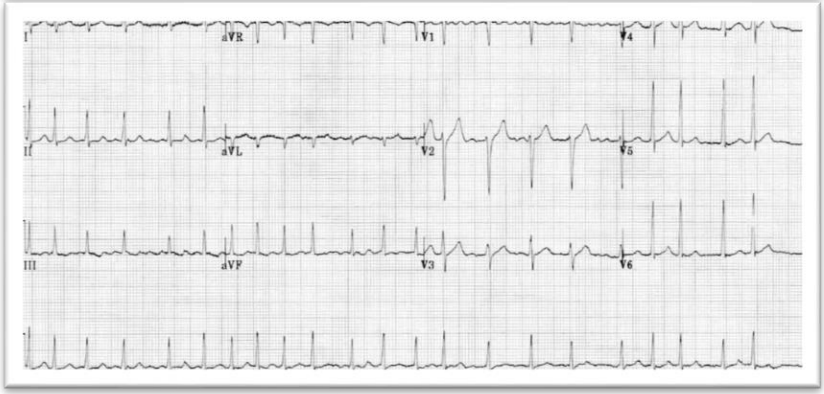
1	2	3				4
At risk for AF	**Pre-AF**	**AF**				**Permanent AF**
		Patients may transition among different substages of AF				
Presence of modifiable and nonmodifiable risk factors associated with AF. Modifiable risk factors: • Obesity • Lack of fitness • Hypertension • Sleep apnea • Alcohol • Diabetes Nonmodifiable risk factors: • Genetics • Male sex • Age	Evidence of structural or electrical findings further predisposing a patient to AF: • Atrial enlargement • Frequent atrial ectopy • Short bursts of atrial tachycardia • Atrial flutter • Other high AF risk scenarios*	Paroxysmal AF (3A) AF that is intermittent and terminates within ≤7 d of onset	Persistent AF (3B) AF that is continuous and sustains for >7 d and requires intervention	Long-standing persistent AF (3C) AF that is continuous for >12 mo in duration	Successful AF ablation (3D) Freedom from AF after percutaneous or surgical intervention to eliminate AF	No further attempts at rhythm control after discussion between patient and clinician
Treat Modifiable Risk Factors						
	Consider heightened surveillance	**Ongoing monitoring as clinically appropriate for AF burden**				
		Is AF associated with pathophysiological changes?				
		Stroke risk assessment and therapy if appropriate				
		Treat symptoms				

Case

- Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

What AF stage is Sheryl in?

- Stage 1, “At risk for AF”
- Stage 2, “Pre-AF”
- Stage 3, “AF”
- Stage 4, “Permanent AF”



Atrial Fibrillation

- Etiology and Risk Factors (**the how will help with the why, e.g., valve dz→AF**)
  - More prevalent in men, but only a little.
  - More prevalent with advancing age.
  - Hypertensive heart disease and Coronary Artery Disease are the two most common conditions that increase risk in developed countries.
  - Rheumatic Heart Disease is a strong risk factor, although less common in developed nations now. Still a strong factor in developing nations.
  - Other cardiac conditions associated with A-Fib include Valvular Heart Disease (especially Mitral disease), Dilated Cardiomyopathy, Hypertrophic Cardiomyopathy, Heart Failure, and Congenital Heart Diseases (especially atrial septal defect).

"Epidemiology of and Risk Factors for Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- Etiology and Risk Factors (continued)-
  - A-Fib can also occur in patients with otherwise healthy hearts with the following conditions or situations (**acute, self-limited vs. more chronic impact**):
    - Acute alcohol excess - Usually transient, self-limited
    - Holiday Heart - Related to sudden withdrawal (“holiday”)
    - Pericarditis
    - Chest trauma or thoracic surgery
    - Thyroid disorders (thyrotoxicosis)
    - Obstructive Sleep Apnea
    - Pulmonary Embolism
    - COPD
    - Obesity
    - Some medications (theophylline, adenosine, digitalis, etc.)
  - A-Fib can rarely occur in patients with healthy hearts with no known cause.

“Epidemiology of and Risk Factors for Atrial Fibrillation,” UpToDate, www.uptodate.com.

“CURRENT Medical Diagnosis and Treatment 2021,” Papadakis and McPhee.

Atrial Fibrillation

- Etiology and Risk Factors (continued)-

Highest attributable risk factors (ARIC Study) in order:

- Hypertension (22% of all AF cases, adjusted for age, too)
- BMI (~28% risk with each increase of 5 kg/m2, nonlinear though)
- Smoking (~32% for current, 9% former, 21% ever - dose/response too)
- Cardiac Disease (all those above lumped together)
- Diabetes (~28% DM, 20% pre-DM)

"Epidemiology of and Risk Factors for Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- Pathophysiology-
  - Stretch Cardiomyocyte tissue = electrical issues
  - It will become apparent when discussing pulmonary veins.

"Epidemiology of and Risk Factors for Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

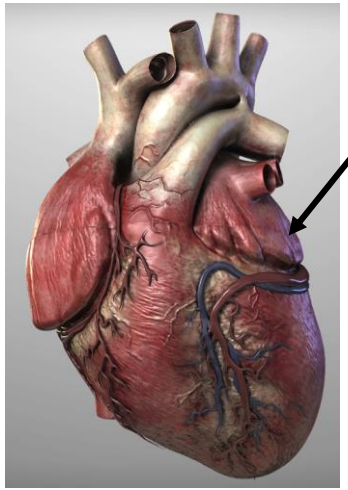
- Pathophysiology-
  - Regardless of the underlying risk factors, the underlying pathology is anatomic and electrophysiologic changes occuring in the atrial myocardium (hence, there is commonly an underlying heart disease).
    - Most commonly, it has to do with atrial enlargement, increase in atrial pressure, or atrial inflammation/infiltration.
    - These conditions cause increased atrial cell automaticity or increased trigger activity due to injury.
      - Several firing cells mean there are several areas of the atria trying to act as the pacemaker, overriding the SA node

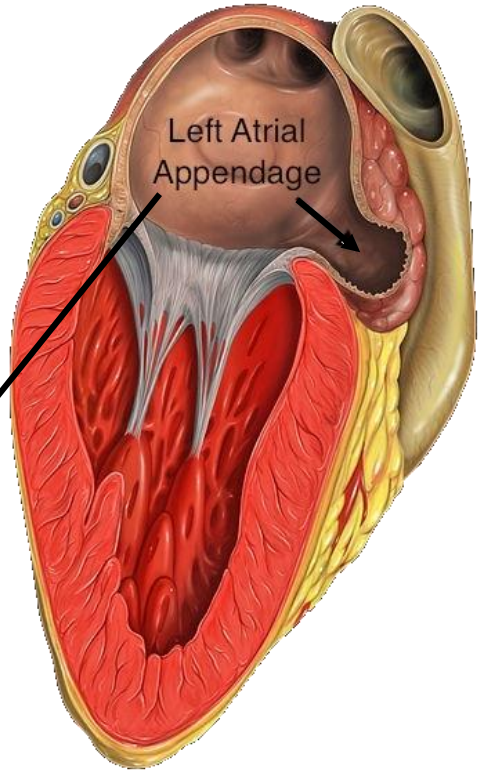
"Epidemiology of and Risk Factors for Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- Pathophysiology (continued)-
  - During A-Fib, stasis within the atria (especially the left atrial appendage) increases the propensity for thrombus formation and subsequent embolization.
    - This can result in cerebral infarction (stroke) or infarction of peripheral extremities





"Epidemiology of and Risk Factors for Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- General Classification or types of A-Fib- (**Think, when do you encounter AF?**)
  - Any of the forms below can be “subclinical,” meaning asymptomatic
    - **Paroxysmal AF**: Terminates spontaneously or with intervention within 7 days of onset (can recur).
    - **Persistent AF**: Fails to self-terminate within 7 days. Often requires pharmacologic or electrical cardioversion to restore NSR.
    - **Long-Standing Persistent AF**: Has lasted for more than 12 months.
    - **Successful AF ablation**: Successful termination of AF by catheter or surgical means
    - **Permanent AF**: Those individuals with persistent AF who, in a joint decision between provider and patient, are no longer pursuing a rhythm control strategy.

“Overview of Atrial Fibrillation,” UpToDate, www.uptodate.com.

“CURRENT Medical Diagnosis and Treatment 2021,” Papadakis and McPhee.

Atrial Fibrillation

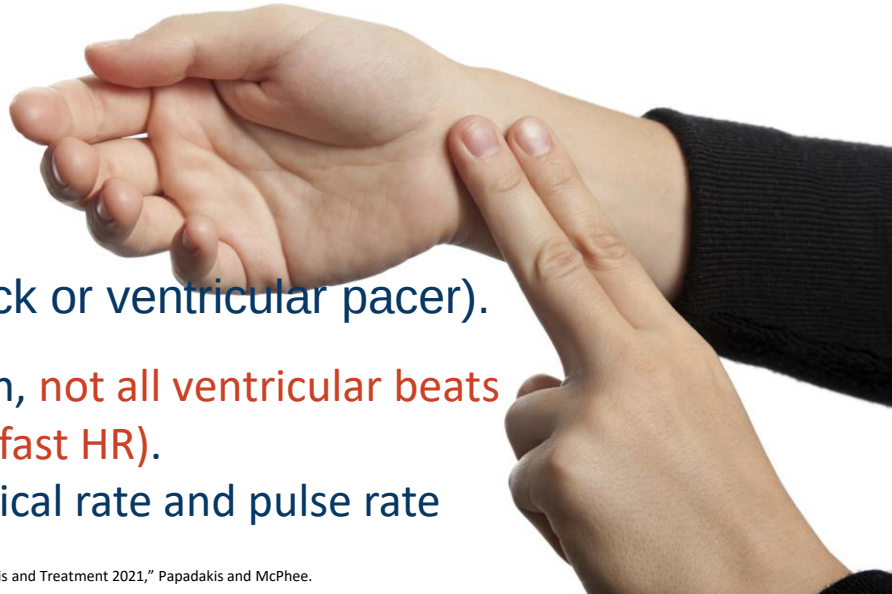
- Signs and Symptoms-
  - Many patients are asymptomatic – estimated to be over 50%
  - If symptoms are present, they are variable and often vague.
    - Presentation may involve:
      - Palpitations
      - Tachycardia
      - Hypotension
      - Fatigue (common) or weakness
      - Dizziness/lightheadedness
      - Dyspnea
      - Angina
      - Presyncope or (infrequently) syncope

"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- Signs and Symptoms (continued)-
  - A-Fib can present with slow, normal, or fast rates; If the HR is greater than 100, we would call it A-Fib with Rapid Ventricular Response (RVR).
    - If sufficiently rapid, can cause hypotension, MI, or tachy-induced myocardial dysfunction
  - Although the HR can range from slow to extremely rapid, it is almost always irregular (except in complete heart block or ventricular pacer).
  - Because of varying diastolic filling duration, not all ventricular beats produce a palpable pulse (especially with fast HR).
    - **Pulse deficit** - difference between apical rate and pulse rate



"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

- Diagnostic Evaluation (continued)-
  - EKG also provides information about the ventricular response.
    - A-Fib often presents with Rapid Ventricular Response, with a ventricular heart rate of up to 180 bpm (commonly around 120)
  - **Echocardiogram** provides valuable information about the size and function of the atria and ventricles. Order for all cases of new A-Fib.
    - It can also detect valvular disease, ventricular hypertrophy, and pericardial disease
    - Transthoracic Echo (TTE) is more commonly ordered.
    - Transesophageal Echo (TEE) is more sensitive for detection of thrombi formation in the left atrium or left atrial appendage

"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

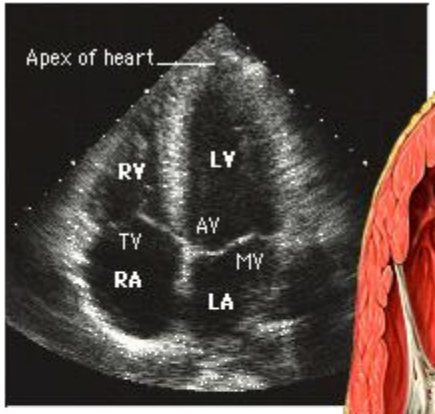
Atrial Fibrillation

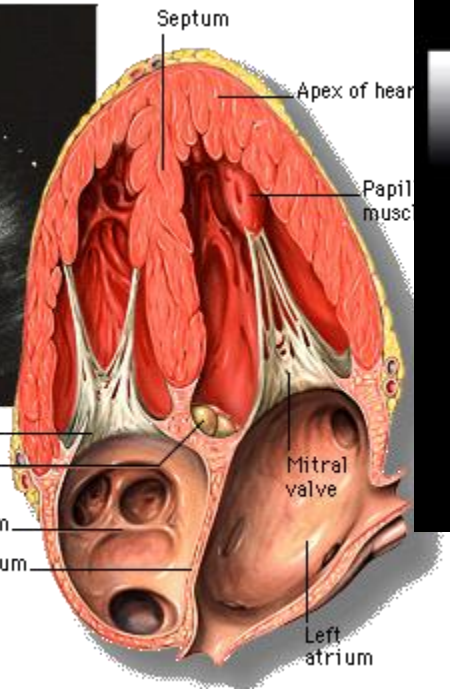
- Diagnostic Evaluation (continued)-
  - **Ambulatory Cardiac Monitoring** with holter monitors or implantable loop monitors can be used to find intermittent A-Fib (if clinically suspected but not captured on a routine, in-office 12-lead).
  - **Baseline Laboratory Testing** is also important to rule out or evaluate for metabolic causes of A-Fib. This includes:
    - TSH and fT4
    - CBC
    - CMP or BMP
    - HgbA1C

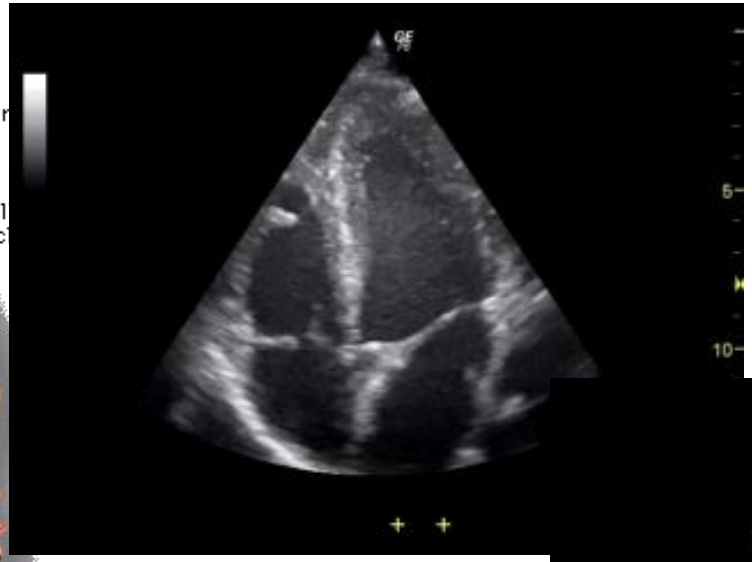
"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

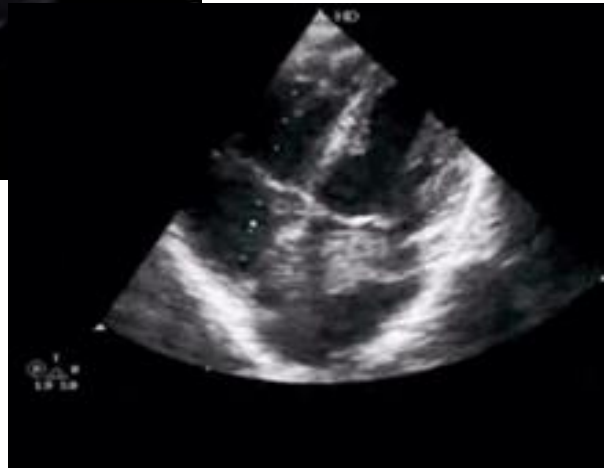
"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Echocardiogram









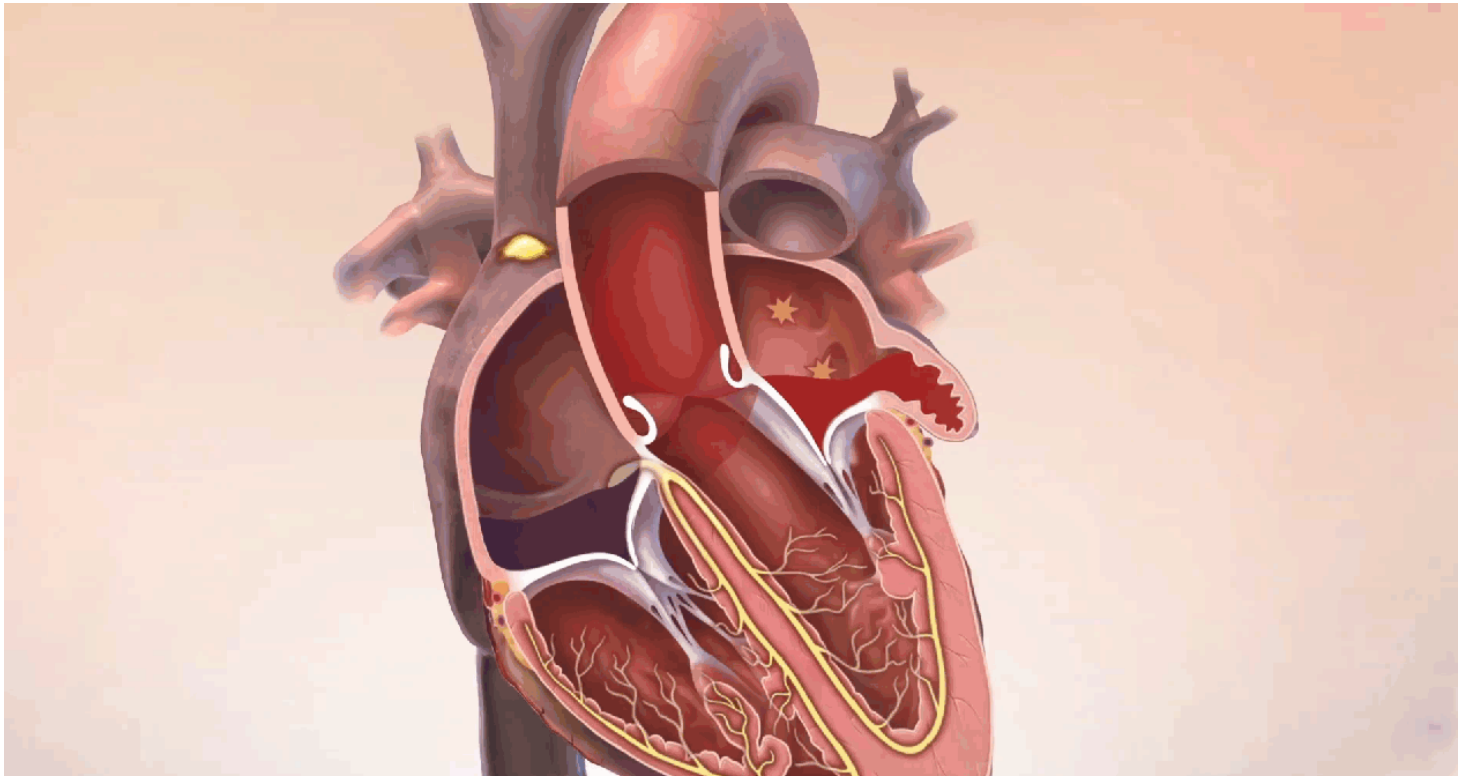
Atrial Fibrillation

- Treatment/Management-
  - Clinical management of A-Fib can be complicated and multifactorial.
    - The plan is tailored to the patient in the context of stability
    - For all those with A-Fib, the three principal goals of treatment are…
      - **Control of symptoms**
      - **Prevention of thromboembolism**
      - **Reduce recurrence or progression via optimizing risk factors**

"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation and Stroke



Anti-coagulants – When to consider?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

- Any patient with AF where the annual risk of stroke is **≥2%**
- If not started, reassess patient risk and desire (shared decision-making) to start
- Use risk calculators: Chads2, Atria, Chads2vasc, Garfield etc.

Recommendations for Risk-Based Selection of Oral Anticoagulation: Balancing Risks and Benefits
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-R	1. In patients diagnosed with AF who have an estimated annual risk of stroke or thromboembolic events ≥2%, selection of therapy to reduce the risk of stroke should be based on the risk of thromboembolism, regardless of whether the AF pattern is paroxysmal, persistent, long-standing persistent, or permanent.[1-3]
1	B-NR	2. In patients with AF at risk for stroke, reevaluation of the need for and choice of stroke risk reduction therapy at periodic intervals is recommended to reassess stroke and bleeding risk, net clinical benefit, and proper dosing.[4,5]

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Anti-coagulants – When to consider?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

- Any patient with AF where the annual risk of stroke is ≥2%
- Annual stroke ≥1 and <2% - may **consider** anticoagulation
- DOACs > VKA if there is NO moderate or severe rheum mitral stenosis or mechanical heart valves

Recommendations for Antithrombotic Therapy
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	A	1. For patients with AF and an estimated annual thromboembolic risk of ≥2% per year (eg, CHA_2DS_2-VASc score of ≥2 in men and ≥3 in women), anticoagulation is recommended to prevent stroke and systemic thromboembolism.[1-7]
1	A	2. In patients with AF who do not have a history of moderate to severe rheumatic mitral stenosis or a mechanical heart valve, and who are candidates for anticoagulation, DOACs are recommended over warfarin to reduce the risk of mortality, stroke, systemic embolism, and ICH.[1-7]
2a	A	3. For patients with AF and an estimated annual thromboembolic risk of ≥1% but <2% per year (equivalent to CHA_2DS_2-VASc score of 1 in men and 2 in women), anticoagulation is reasonable to prevent stroke and systemic thromboembolism.[1,3]
3: Harm	B-R	4. In patients with AF who are candidates for anticoagulation and without an indication for antiplatelet therapy, aspirin either alone or in combination with clopidogrel as an alternative to anticoagulation is not recommended to reduce stroke risk.[8,9]
3: No Benefit	B-NR	5. In patients with AF without risk factors for stroke, aspirin monotherapy for prevention of thromboembolic events is of no benefit.[10,11]

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Anti-coagulants – When to consider?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

- In AF, who are candidates for anticoagulation, without indication for antiplatelet (aspirin or p2y12i, e.g., clopidogrel) → It is NOT recommended to use **alone** or in **combination** to reduce stroke. i.e., they are NOT alternatives to DOACs/VKA!
- If there is no risk of stroke, ASA alone is of NO BENEFIT

3: Harm	B-R	4. In patients with AF who are candidates for anticoagulation and without an indication for antiplatelet therapy, aspirin either alone or in combination with clopidogrel as an alternative to anticoagulation is not recommended to reduce stroke risk.[8,9]
3: No Benefit	B-NR	5. In patients with AF without risk factors for stroke, aspirin monotherapy for prevention of thromboembolic events is of no benefit.[10,11]

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Anti-coagulants – When to consider?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

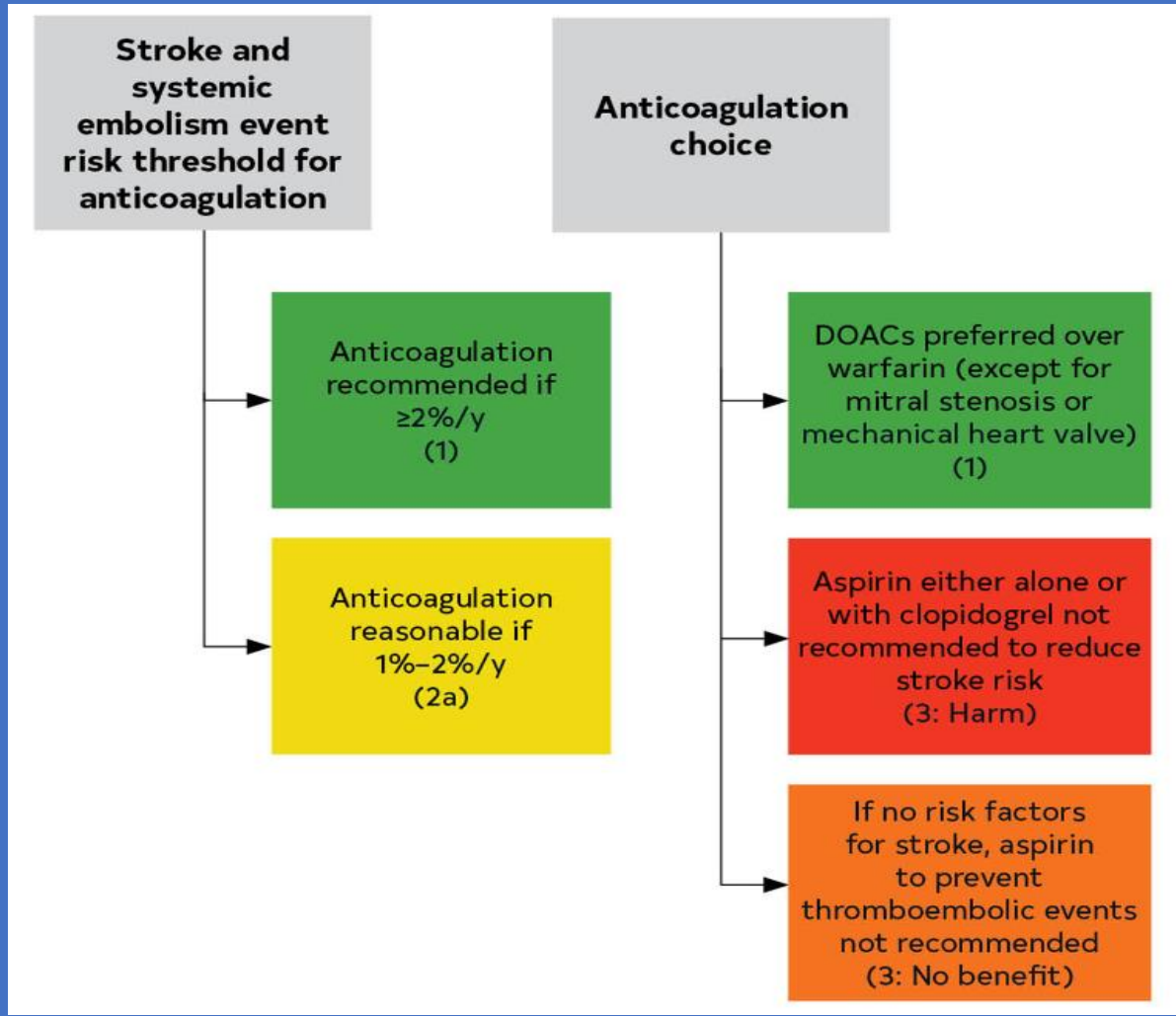

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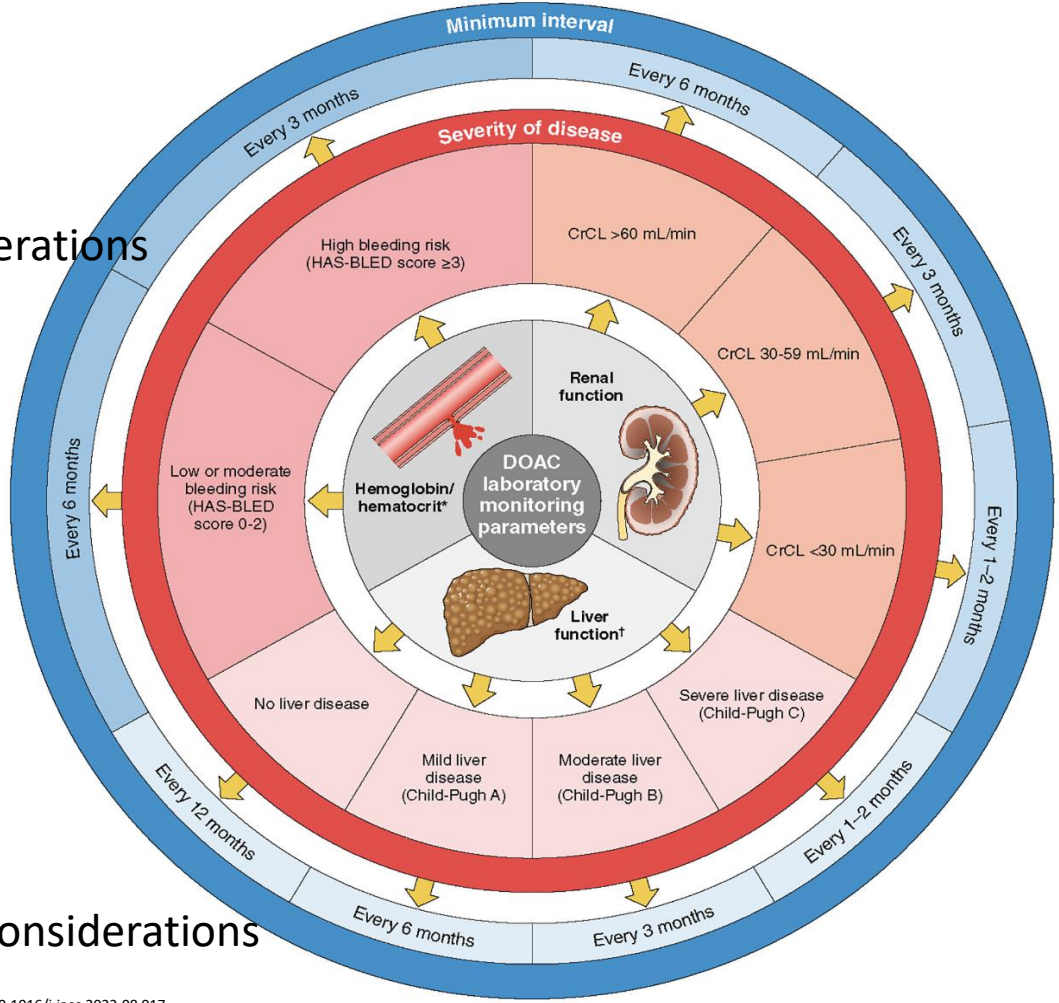
TABLE 13 OACs Pharmacokinetic Characteristics and Dosing

Class	VKA	Direct Thrombin Inhibitor	Factor Xa Inhibitor		
Name	**Warfarin**	**Dabigatran**	**Rivaroxaban**	**Apixaban**	**Edoxaban**
Metabolism	S-isomer: CYP2C9 R-isomer: CYP1A2, CYP2C19, CYP3A4	Minimal	CYP3A4/5	CYP3A4	Minimal CYP3A4
P-glycoprotein substrate	No	Yes	Yes	Yes	Yes
Excretion	0% renal; very little warfarin excreted unchanged in urine	80% renal	66% renal, 28% feces	27% renal, 73% biliary and intestinal	50% renal, 50% liver and biliary/intestinal
Half-life	20-60 h	12-17 h	5-9 h	12 h	10-14 h
Renal dosing adjustment based on actual body weight	N/A	CrCl >30 mL/min 150 mg twice daily	CrCl >50 mL/min 20 mg daily with the biggest meal*	5 mg twice daily	CrCl >50-≤95 mL/ min 60 mg once daily
		CrCl 15-30 mL/ min 75 mg twice daily	CrCl 15-50 mL/min 15 mg daily with the biggest meal*	If any 2 of the following: age ≥80y, body weight ≤60 kg, SCr ≥1.5 mg/dL 2.5 mg twice daily	CrCl 15-50 mL/min 30 mg once daily
Drug interaction management based on concomitant therapy of CYP3A4 inhibitors/ p-glycoprotein inhibitors	Adjust dose based on INR trends	CrCl 30-50 mL/min with concomitant use of dronedarone or systemic ketoconazole: 75 mg twice daily CrCl <30 mL/min: avoid dabigatran use concomitantly with dronedarone or systemic ketoconazole	Avoid rivaroxaban use with concomitant therapy of combined p-glycoprotein and strong CYP3A4 inhibitors (eg, systemic ketoconazole and ritonavir) No dose adjustment required with clarithromycin Avoid rivaroxaban use in patients with CrCl 15-<80 mL/min receiving combined p-glycoprotein and moderate CYP3A4 inhibitors (eg, erythromycin)	In patients receiving apixaban 5 mg twice daily, reduce dose to 2.5 mg twice daily when combined p-glycoprotein and strong CYP3A4 inhibitors (eg, itraconazole, systemic ketoconazole, ritonavir) are used concomitantly If patients already receiving apixaban 2.5 mg twice daily, avoid apixaban use if combined p-glycoprotein and strong CYP3A4 inhibitors are concomitantly used	No dose adjustment is required
Drug interaction management based on concomitant therapy of p-glycoprotein/ CYP3A4 inducers (eg, carbamazepine, phenytoin, rifampin, St. John's wort)	Adjust dose based on INR trends	Avoid use	Avoid use	Avoid use	Avoid use with rifampin. No study evaluated the effect of other p-glycoprotein/ CYP3A4 inducers on edoxaban drug levels
Appropriate use based on liver function (Child-Pugh score)†	Not mentioned in the labeling	No dose adjustment needed	No dose adjustment needed	No dose adjustment needed	No dose adjustment needed
Child-Pugh A (mild)					
Child-Pugh B (moderate)		Use with caution	Avoid use	Use with caution	Use with caution
Child-Pugh C (severe)		Avoid use	Avoid use	Avoid use	Avoid use

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Bleeding Considerations

Kidney Considerations



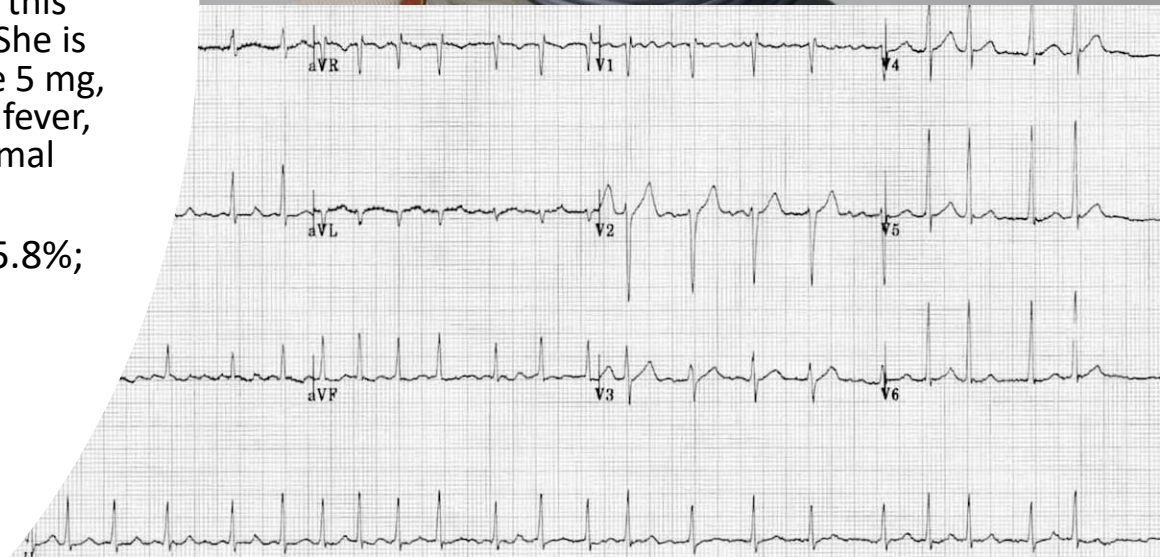
Liver Considerations

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Case

- Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

LABS: Serum Cr 1.1; AST 23; ALT 32; A1c 5.8%; TSH 2.23



- What is Sheryl’s risk for stroke?

Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

What is Sheryl’s risk for stroke?

Age	<65 0	**65-74 +1**	≥75 +2
Sex	**Female +1**	Male 0	
CHF history	**No 0**	Yes +1	
Hypertension history	No 0	**Yes +1**	
Stroke/TIA/thromboembolism history	**No 0**	Yes +2	
Vascular disease history (prior MI, peripheral artery disease, or aortic plaque)	**No 0**	Yes +1	
Diabetes history	**No 0**	Yes +1	

3 points

Stroke risk was 3.2% per year in >90,000 patients (the Swedish Atrial Fibrillation Cohort Study) and 4.6% risk of stroke/TIA/systemic embolism.

FACTS & FIGURES

Interpretation:

CHA_2DS_2-VASc Score	Risk of ischemic stroke	Risk of stroke/TIA/systemic embolism
0	0.2%	0.3%
1	0.6%	0.9%
2	2.2%	2.9%
3	3.2%	4.6%
4	4.8%	6.7%
5	7.2%	10.0%
6	9.7%	13.6%
7	11.2%	15.7%
8	10.8%	15.2%
9	12.2%	17.4%

≥2% annual risk

= Anticoagulation

Age 66; HTN; Serum Cr 1.1; AST 23; ALT 32; A1c 5.8%; TSH 2.23

HAS-BLED SCORING

Each checkmark = 1 point:

- ☑ **H**ypertension (SBP >160 mm Hg)
- **A**bnormal: ☐ Kidney function: serum creatinine >2.26
  - ☐ Liver function: Bili >2X ULN *and* LFTs >3X LN
- ☐ **S**troke history
- ☐ **B**leeding history or predisposition
- ☐ **L**abile INRs: TTR 60%
- ☑ **E**lderly: >65 years
- **D**rugs: ☐ ETOH abuse
  - ☐ ASA or NSAID use

USING THE SCORE

Score = 0–1: Low risk

Score = 2: Moderate risk

Score = 3: High risk

For patients at high bleeding risk, consider:

- ☐ Optimizing blood pressure control
- ☐ More frequent INRs in first 3 months of warfarin
- ☐ Anticoagulation clinic management
- ☐ Fall prevention interventions, if needed
- ☐ Use of NOAC

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Class	Antithrombin	Factor Xa inhibitor	Factor Xa inhibitor	Factor Xa inhibitor
Bleeding risk compared to warfarin	Less intracranial bleeding Higher incidence of gastrointestinal bleeding	Less intracranial bleeding Higher incidence of gastrointestinal bleeding	Substantially lower risk of major bleeding Less intracranial bleeding	Lower risk of major bleeding Less intracranial bleeding
Dosage	110 mg twice daily 150 mg twice daily	20 mg once daily (give with food)	5 mg twice daily	60 mg once daily
Dosage adjustments	75 mg twice daily for creatinine clearance[1] 15–30 mL/min (approved in the United States but not tested in clinical trials)	15 mg once daily for creatinine clearance[1] < 50 mL/min	2.5 mg twice daily for patients with at least two of three risk factors: 1. Age ≥ 80 years 2. Body weight ≤ 60 kg 3. Serum creatinine ≥ 1.5 mg/dL	30 mg once daily for creatinine clearance[1] ≤ 50 mL/min FDA recommends not to use if creatinine clearance[1] > 95 mL/min

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

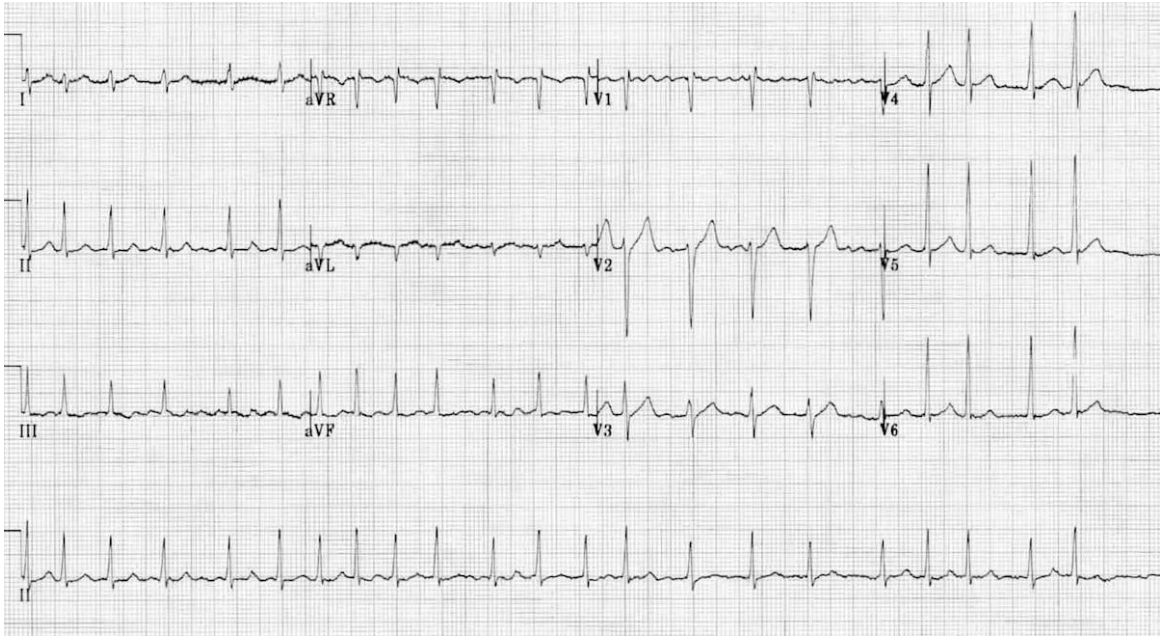
Case

Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

She is Stage 3 – AF.

Not sure yet whether it is Paroxysmal, Persistent, or Long-standing Persistent.

She meets guideline criteria at CHADS2Vasc 3, for stroke prophylaxis (anticoagulant).



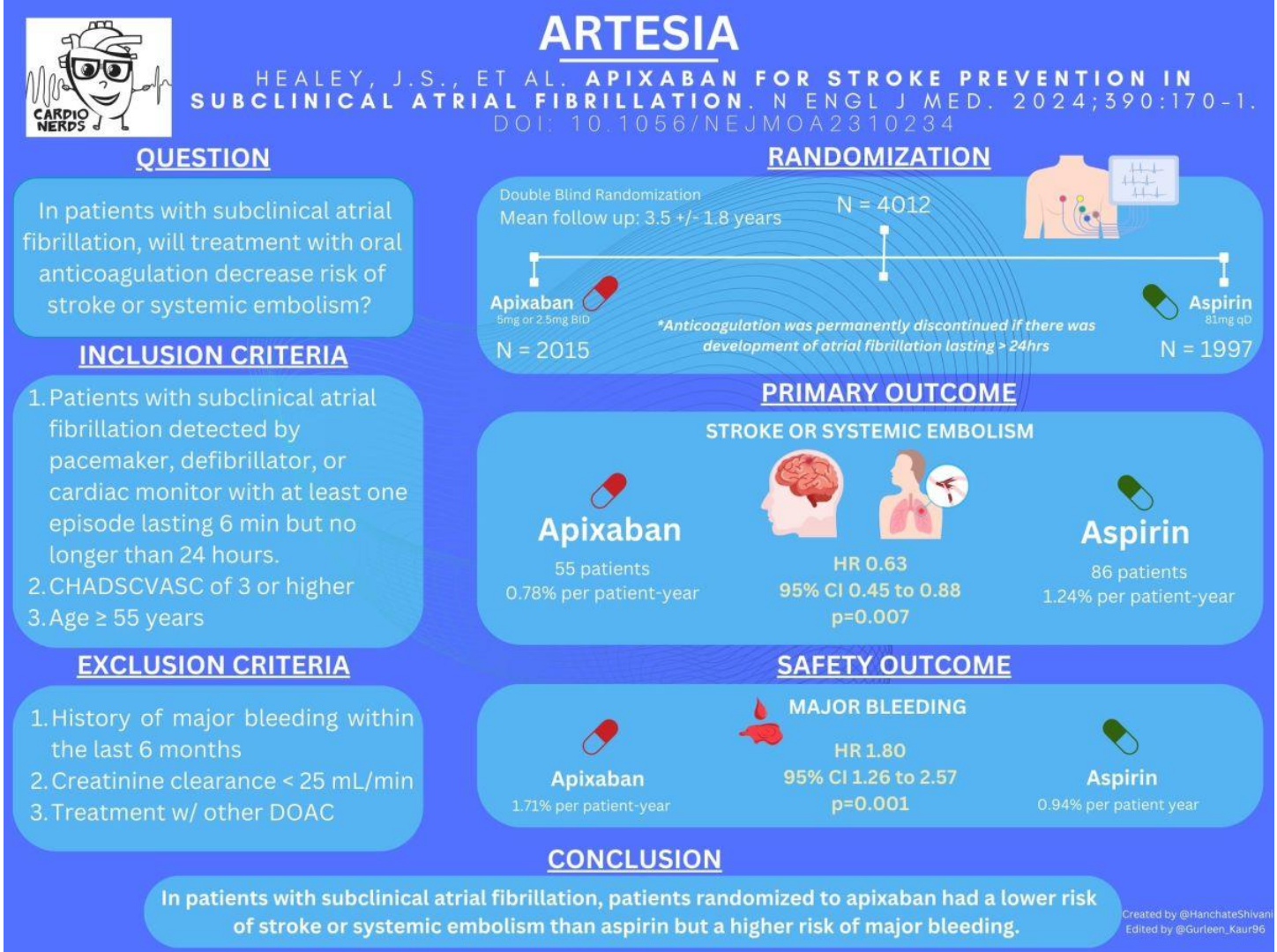
Caveats for anti-coagulation

Remember, “Atrial Fibrillation” needs to have patient context, duration/burden, and symptom context

ATRESIA

Sub-clinical AF – “Atrial High Rate Episodes” by implanted devices (e.g., pacemaker, defibrillator, loop recorder) ≥6 to ≤24 minutes

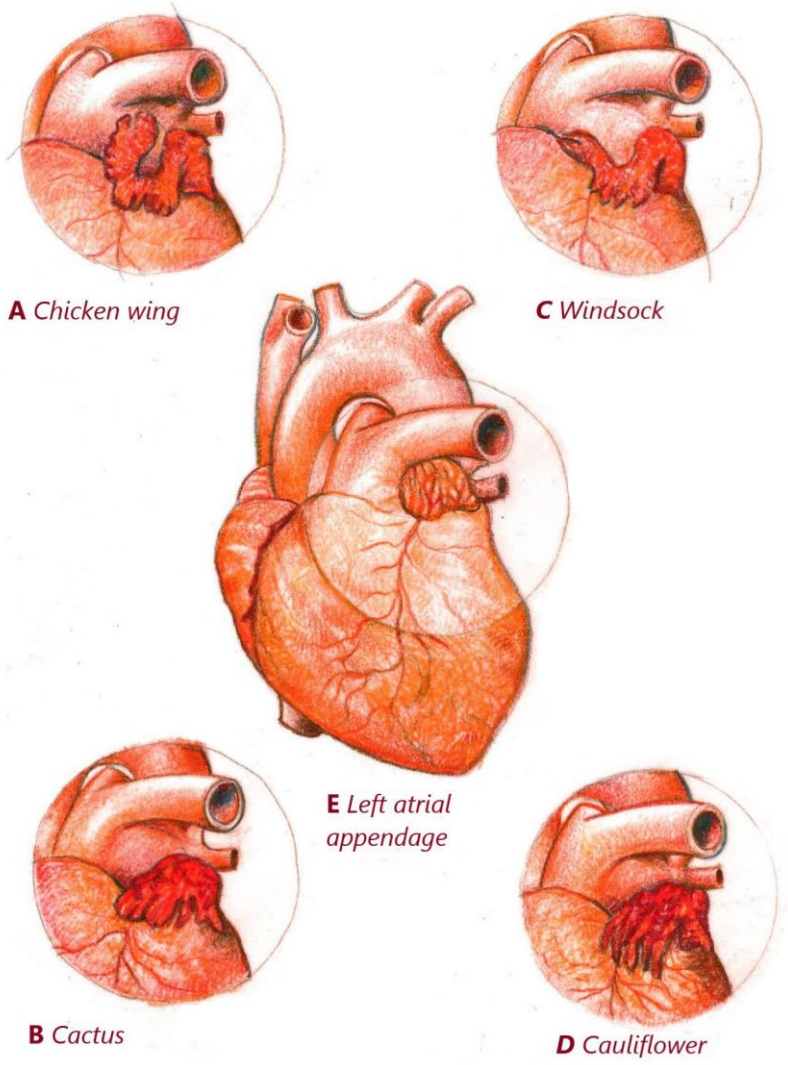
EXCLUDED: Afib by EKG, telemetry or Holter > 6 min regardless of symptoms.



Atrial Fibrillatic

What about devices to reduce stroke in AF?

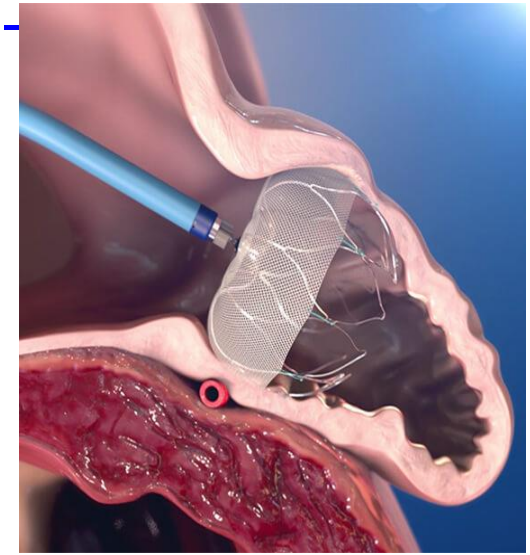
The left atrial appendage

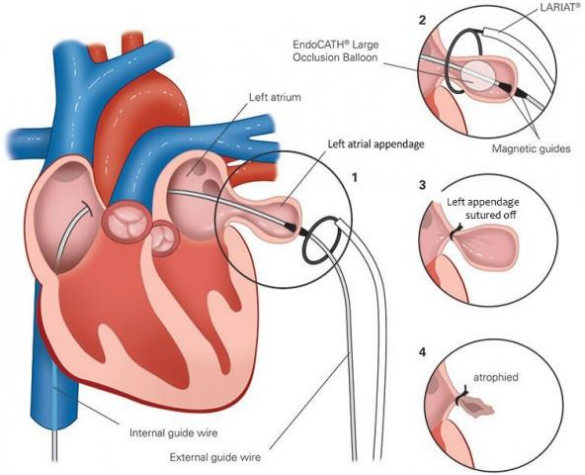


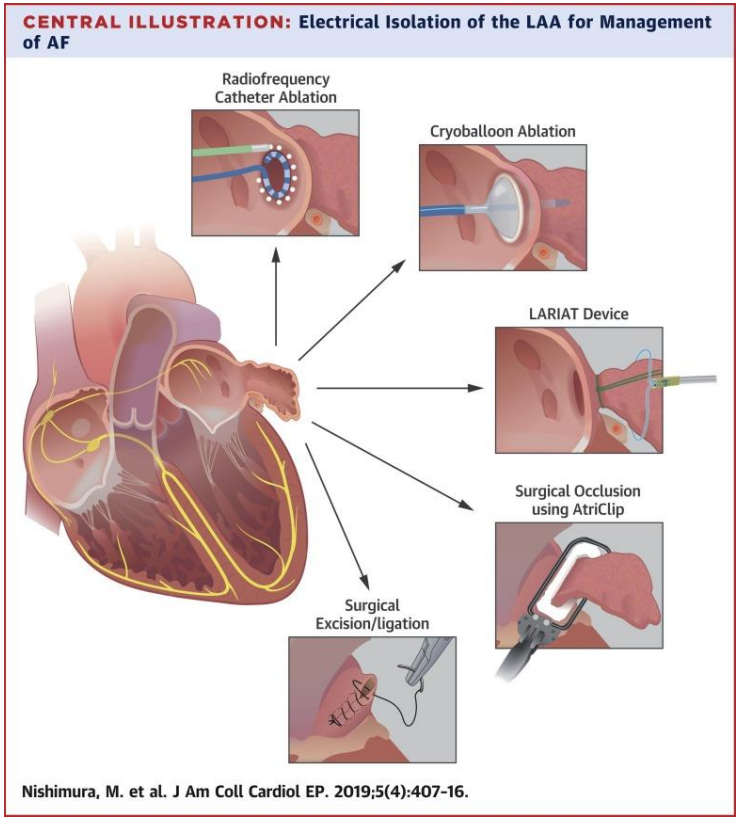
Atrial Fibrillation

What about devices to reduce stroke in AF?

- Lariat
-







"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

RATE VS RHYTHM –
No clear choice, but some variables to help decide

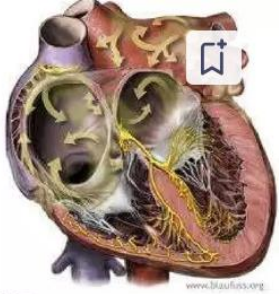
Gif Napoleon Dynamite, 2004

Major Trials Involving Rhythm and Rate Control in Atrial Fibrillation			
Randomized Control Trial	Population	Treatments	Outcomes
AFFIRM (2002)	Patients with AF and additional stroke risk factors • n = 4060	**Rate:** BB, CCB, digoxin **Rhythm:** amiodarone, sotalol, propafenone, procainamide, quinidine, flecainide, disopyramide, moricizine	No difference in survival • Lower risk of adverse drug effects with rate control
RACE (2002)	Persistent AF after previous electrical cardioversion • n = 522	**Rate**: digoxin, BB, CCB, or combination **Rhythm:** cardioversion, sotalol, flecainide, amiodarone	Rate control non-inferior to rhythm control

AFFIRM, PMID 12466506; **RACE**, PMID 12466507

Abbreviations: AF = atrial fibrillation; BB = beta blocker; CCB = calcium channel blocker

N Engl J Med 2002; 347:1825-1833

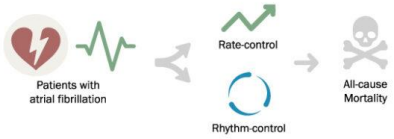


Cumulative Mortality from Any Cause in the Rhythm-Control Group and the Rate-Control Group.

AFFIRM Trial: A Comparison of Rate Control and Rhythm Control in Patients with Atrial Fibrillation

Multicenter, parallel-group, randomized, controlled trial

Objective: Among patients with atrial fibrillation and a high risk of stroke or death, what are the effects of rate control versus rhythm control on mortality?



4,060 patients with nonvalvular atrial fibrillation

Follow-up: 5 years

Rate-control strategy (n=2,027)

Rhythm-control strategy (n=2,033)

25.9% **Primary End Point** 5-year mortality (P=0.08) **26.7%**

32.7% **Secondary Outcomes** Composite of death, stroke, major bleeding, or cardiac arrest **32.0%**

In patients with nonvalvular AF, there is no survival benefit between rate and rhythm control, but rhythm trends toward increased mortality.

Wyse DG, et al. "A Comparison of Rate Control and Rhythm Control in Patients with Atrial Fibrillation". The New England Journal of Medicine. 2002. 347(23):1825-1833.

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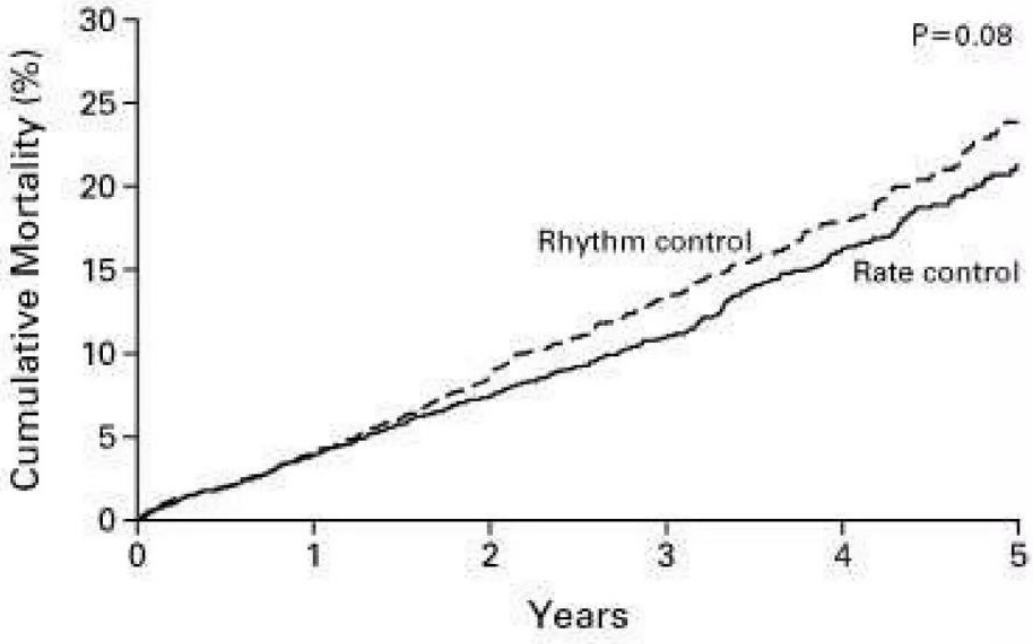


No. of Deaths		number (percent)				
Rhythm control	0	80 (4)	175 (9)	257 (13)	314 (18)	352 (24)
Rate control	0	78 (4)	148 (7)	210 (11)	275 (16)	306 (21)

TABLE 2. DRUGS USED IN THE RATE-CONTROL GROUP AND THE RHYTHM-CONTROL GROUP.*

DRUG	RATE-CONTROL GROUP		RHYTHM-CONTROL GROUP	
	USED DRUG FOR INITIAL THERAPY	USED DRUG AT ANY TIME	USED DRUG FOR INITIAL THERAPY	USED DRUG AT ANY TIME
	no. of patients (%)			
Rate control				
Data available	1957	2027	1266	2033
Digoxin	949 (48.5)	1432 (70.6)	417 (32.9)	1106 (54.4)
Beta-blocker	915 (46.8)	1380 (68.1)	276 (21.8)	1008 (49.6)
Diltiazem	583 (29.8)	935 (46.1)	198 (15.6)	610 (30.0)
Verapamil	187 (9.6)	340 (16.8)	56 (4.4)	204 (10.0)
Rhythm control				
Data available	1265	2027	1960	2033
Amiodarone	2 (0.2)†	207 (10.2)	735 (37.5)	1277 (62.8)
Sotalol	1 (0.1)†	84 (4.1)	612 (31.2)	841 (41.4)
Propafenone	2 (0.2)†	45 (2.2)	183 (9.3)	294 (14.5)
Procainamide	0	30 (1.5)	103 (5.3)	173 (8.5)
Quinidine	2 (0.2)†	14 (0.7)	92 (4.7)	151 (7.4)
Flecainide	0	29 (1.4)	88 (4.5)	169 (8.3)
Disopyramide	0	7 (0.3)	42 (2.1)	87 (4.3)
Moricizine	0	2 (0.1)	14 (0.7)	35 (1.7)
Dofetilide	0	5 (0.2)	0	13 (0.6)

At least 10%, up to 20% use of rhythm control agent at any time in the 5 years, no idea for how long or if in the same patient

RATE VS RHYTHM –
I may sneak off with rhythm control first though… ;)

Gif Napoleon Dynamite, 2004

EAST-AFNET 4 TRIAL

Kirchhof P. et al. Early Rhythm-Control Therapy in Patients With Atrial Fibrillation. N Engl J Med 2020;383:1305-16..

OBJECTIVE

Is Early Rhythm-Control Therapy associated with lower risk of CV Outcomes in patients with early AFIB?

Rhythm control strategies: antiarrhythmic drugs or ablation and/or cardioversion of persistent AF

Both groups were in their first year of AFib diagnosis with at least two CV conditions

METHODS

Parallel-group, open, blinded-outcome trial

n=2789

1395

1394

VS

Early Rhythm Control
Antiarrhythmic drug or AF ablation

Usual Care
Rate-control therapy without rhythm-control therapy

RESULTS

Early Rhythm Control		Usual Care
3.9	CV death / Stroke / Hospitalization with worsening HF/ACS	5.8
	Incidence/100 person-yrs. P=.0005	
5.0	# of nights in hospital/year	5.1
	Incidence/100 person-yrs. P=.23	

Safety outcome: Serious adverse events related to rhythm-control therapy occurred in 4.9% vs 1.4% of the patients assigned to usual care

Conclusion: Early rhythm control was associated with a lower risk of CV outcomes than usual care among patients with early AF and CV conditions

CREATED BY @MADHATTANS

CV death

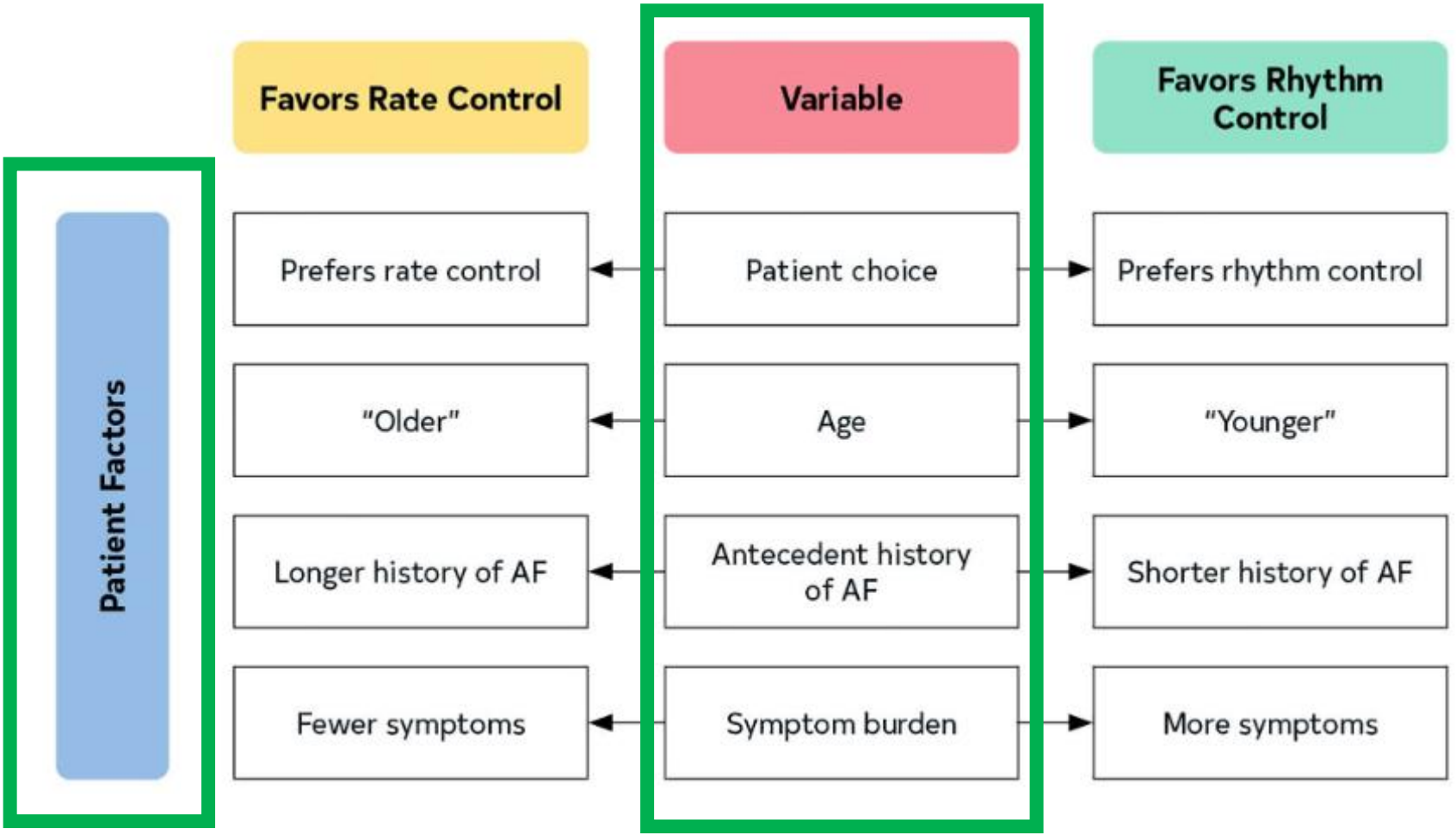
Stroke

Hospitalization with worsening HF/ACS

Incidence/100 person-yrs: P=.0005

# of nights in hospital/year

Incidence/100 person-yrs: P=.23



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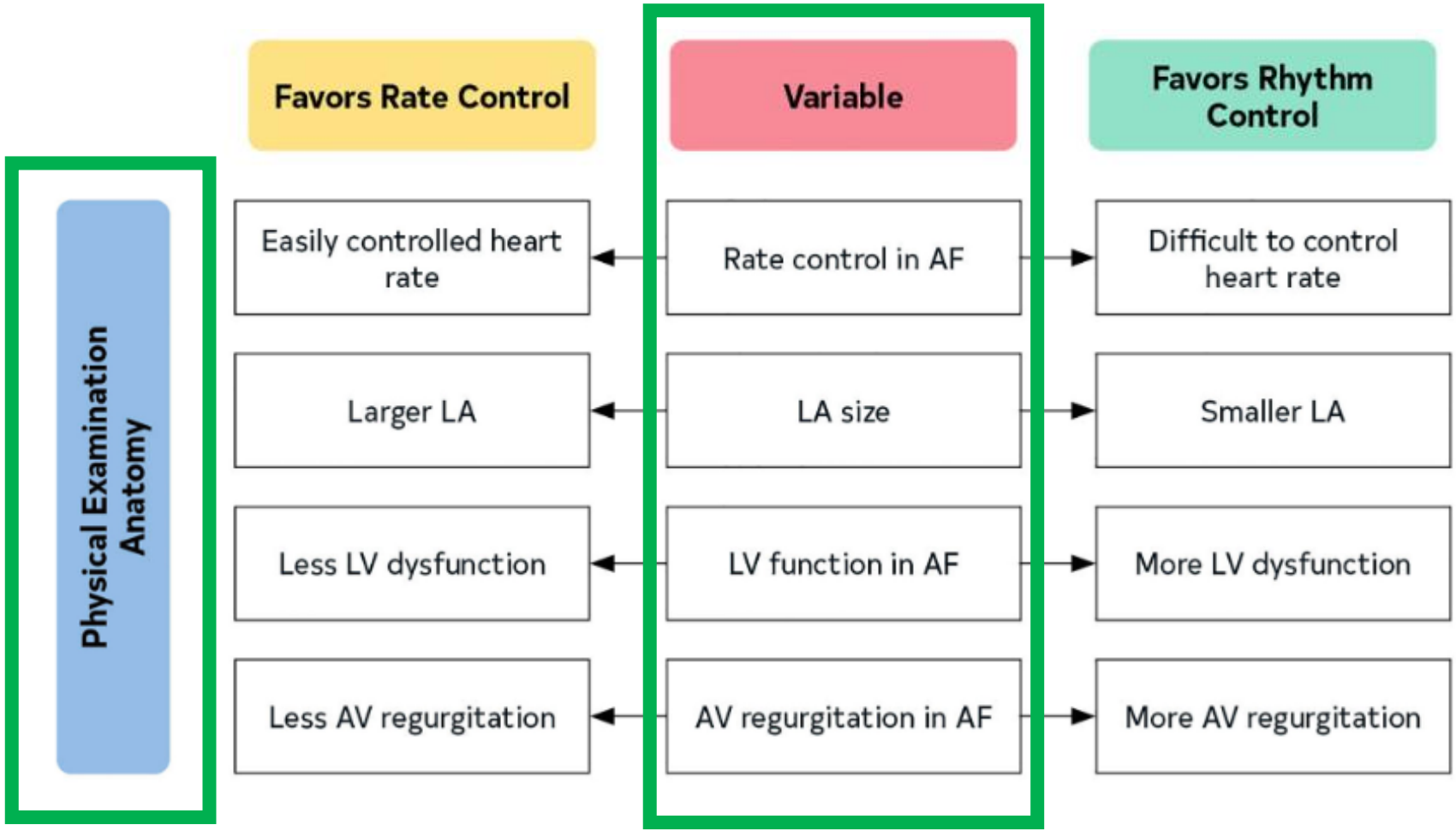

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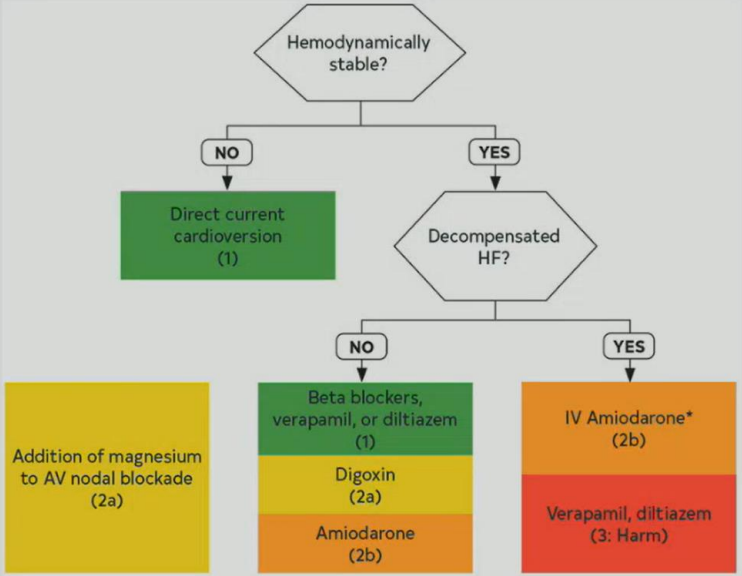
Atrial Fibrillation Management – Rate Control

Acute Rate Control



Atrial Fibrillation

Newly diagnosed A-Fib: initial management depends on whether they are hemodynamically unstable or stable.

- **Hemodynamically Unstable Patient**-
  - Hospitalization and immediate treatment of A-Fib are required.
  - Instability is generally a result of rapid ventricular rate or associated cardiac or noncardiac conditions.
  - In the acute setting, IV beta blockers (ie. Metoprolol) or IV calcium channel blockers (ie. Diltiazem) are usually effective at rate control.
  - What about urgent electrical cardioversion?
    - indicated in patients with shock/severe hypotension, pulmonary edema, or ongoing MI/ischemia.

"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

Atrial Fibrillation

Newly diagnosed A-Fib: initial management depends on whether they are hemodynamically unstable or stable.

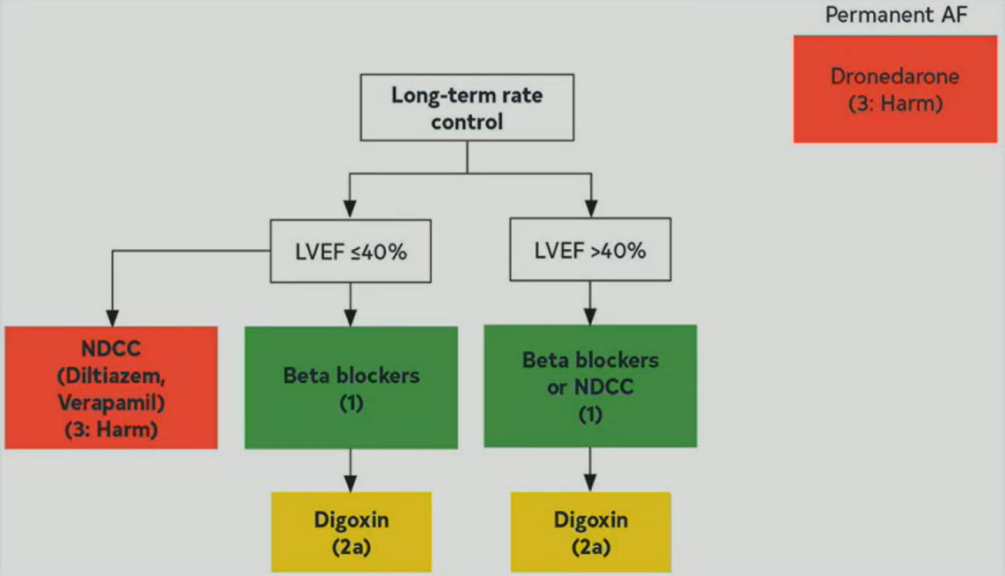
- **Hemodynamically Stable Patient**-
  - If the newly diagnosed patient is clinically stable and at least relatively asymptomatic, hospitalization is generally not necessary.
  - A strategic approach to rate control and anticoagulation is appropriate.
    - This is true whether the condition that precipitated the A-Fib is likely to persist or might resolve spontaneously over hours to days
  - In stable patients, IV or PO beta blockers or calcium channel blockers are considered first-line agents for controlling ventricular rate.
  - Up to 66% of those with acute onset (< 36 hrs) of A-Fib spontaneously revert to NSR without cardioversion; If A-Fib has been present for more than a week, spontaneous conversion is unlikely.

"Overview of Atrial Fibrillation," UpToDate, www.uptodate.com.

"CURRENT Medical Diagnosis and Treatment 2021," Papadakis and McPhee.

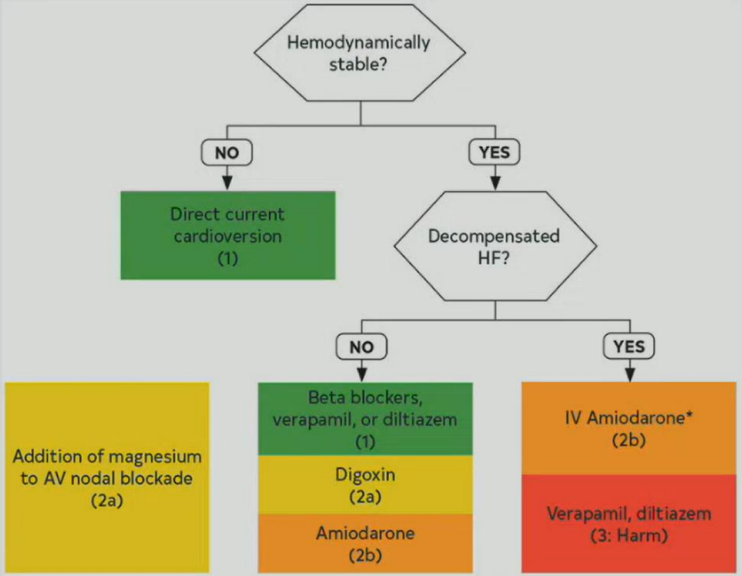
Atrial Fibrillation Management – Rate Control

Chronic Rate Control

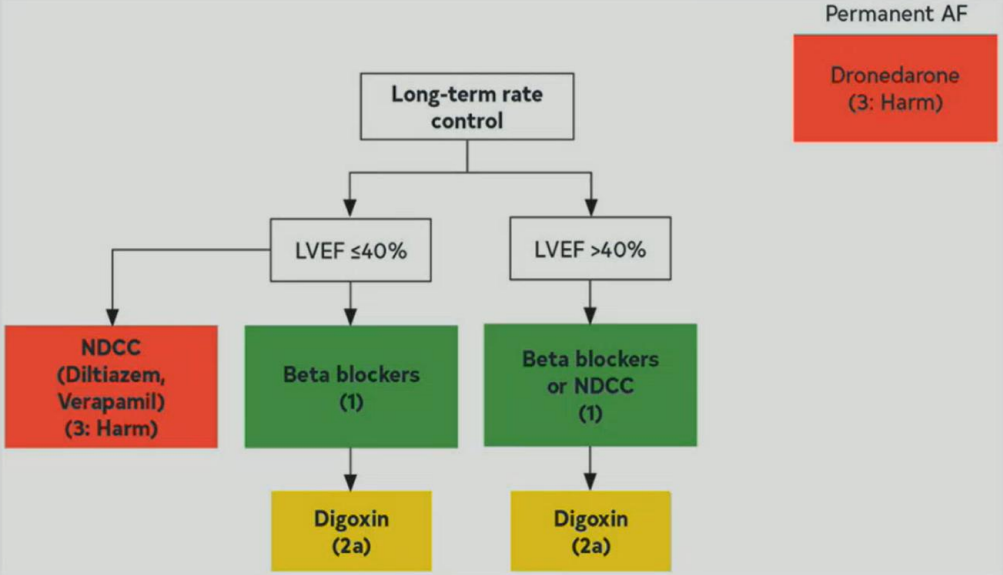


Atrial Fibrillation Management – Rate Control

Acute Rate Control



Chronic Rate Control



Rate Control – What heart rate parameters?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

- A decision to remain in AF also means reasonable heart rate parameters to avoid tachycardic cardiomyopathy or avoidable symptoms from tachycardia.
- Absent a co-morbid diagnosis of Heart Failure, resting heart rates of **<100 to 110 is reasonable**

Recommendations for Broad Considerations for Rate Control
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with AF, SDM with the patient is recommended to discuss rhythm- versus rate-control strategies (taking into consideration clinical presentation, comorbidity burden, medication profile, and patient preferences), discuss therapeutic options, and for assessing long-term benefits.[1-3]
2a	B-R	2. In patients with AF without HF who are candidates for select rate-control strategies, heart rate target should be guided by underlying patient symptoms, in general aiming at a resting heart rate of <100 to 110 bpm.[2,4-6]

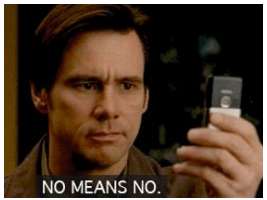
*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Rate Control – What heart rate parameters?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

Recommendations for Long-Term Rate Control
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with AF, beta blockers or nondihydropyridine calcium channel blockers (diltiazem, verapamil) are recommended for long-term rate control with the choice of agent according to underlying substrate and comorbid conditions.[1,2]
2a	B-NR	2. For patients with AF in whom measuring serum digoxin levels is indicated, it is reasonable to target levels <1.2 ng/mL.[3-6]
2a	B-R	3. In patients with AF and HF symptoms, digoxin is reasonable for long-term rate control in combination with other rate-controlling agents, or as monotherapy if other agents are not preferred, not tolerated, or contraindicated.[7-9]
3: Harm	C-LD	4. In patients with AF and LVEF <40%, nondihydropyridine calcium channel-blocking drugs should not be administered given their potential to exacerbate HF.[10,11]
3: Harm	B-R	5. In patients with permanent AF who have risk factors for cardiovascular events, dronedarone should not be used for long-term rate control.[12]



*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017. Gif Yes Man, 2008

Atrial Fibrillation Management – AV Node Ablation

7.3. Atrioventricular Nodal Ablation (AVNA)

Recommendations for AVNA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
1	C-LD	1. In patients with AF and a persistently rapid ventricular response who undergo AVNA, initial pacemaker lower rate programming should be 80 to 90 bpm to reduce the risk of sudden death.[1,2]
2a	B-R	2. In patients with AF and uncontrolled rapid ventricular response refractory to rate-control medications (who are not candidates for or in whom rhythm control has been unsuccessful), AVNA can be useful to improve symptoms and QOL.[3–6]
1	B-NR	3. In patients with AF who are planned to undergo AVNA, implantation of a pacemaker before the ablation (ie, before or same day of ablation) is recommended to ensure adequacy of the pacing leads before performing ablation.[7–9]
2b	C-LD	4. In patients with AF with normal EF undergoing AVNA, conduction system pacing of the His bundle[10–13] or left bundle area[12,13] may be reasonable.

- **AV node ablation can be useful to improve symptoms and quality of life in patients with AF and uncontrolled rapid ventricular response refractory to medical management (Level 2a)**
- **Patients with AF and plan for AV node ablation, implantation of a pacemaker before the ablation is recommended to ensure adequacy of pacing leads prior to ablation. (Level 1)**
- **Initial pacemaker lower rate programming should be 80 to 90 bpm to reduce the risk of sudden death. (Level 1)**
- **Conduction system pacing may be reasonable in AF patients with normal LVEF undergoing AV node ablation.**

Rate Control – What heart rate parameters?

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

- Tachy-Brady Syndrome – Be careful of the iatrogenic variety of bradycardia
- Too slow (rate control dose too high), <60 + symptomatic; or too fast (not enough dosing), >110 sustained

Gif Incredibles, 2004 – Pixar Animation Studios

Rhythm Control

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

All very reasonable, laudable even, goals. Clinical trials have not addressed these directly to date

Recommendations for Goals of Therapy With Rhythm Control
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-R	1. In patients with reduced LV function and persistent (or high burden) AF, a trial of rhythm control should be recommended to evaluate whether AF is contributing to the reduced LV function.[1-6]
2a	B-R	2. In patients with symptomatic AF, rhythm control can be useful to improve symptoms.[7-11]
2a	B-R	3. In patients with a recent diagnosis of AF (<1 year), rhythm control can be useful to reduce hospitalizations, stroke, and mortality.[12-14]
2a	B-R	4. In patients with AF and HF, rhythm control can be useful for improving symptoms and improving outcomes, such as mortality and hospitalizations for HF and ischemia.[15-19]
2a	B-NR	5. In patients with AF, rhythm-control strategies can be useful to reduce the likelihood of AF progression.[20-27]
2b	C-LD	6. In patients with AF where symptoms associated with AF are uncertain, a trial of rhythm control (eg, cardioversion or pharmacological therapy) may be useful to determine what if any symptoms are attributable to AF.[28-32]
2b	B-NR	7. In patients with AF, rhythm-control strategies may be useful to reduce the likelihood of development of dementia or worsening cardiac structural abnormalities.[33-45]

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Rhythm Control

Paroxysmal, Persistent, Long-standing Persistent, and Permanent AF.

For rhythm control

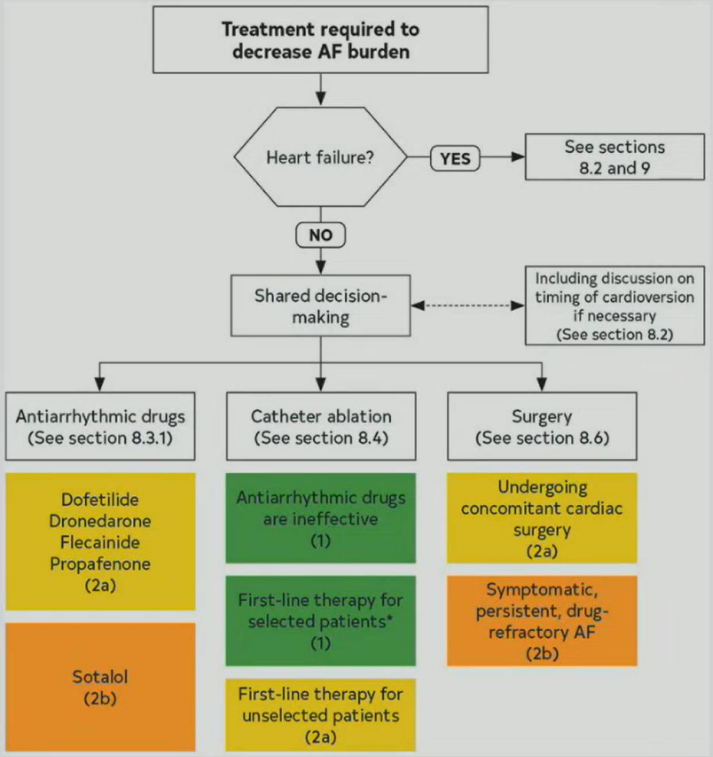
1) If HFrEF ≤40% = amiodarone or dronedarone
2) Uncomplicated AF = flecainide or propafenone
3) Uncomplicated AF = if failed flecainide or propafenone, consider dofetilide, amiodarone, or sotalol

Recommendations for Specific Drug Therapy for Long-Term Maintenance of Sinus Rhythm
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
2a	A* B-NR†	1. For patients with AF and HFrEF (≤40%), therapy with dofetilide*[1] or amiodarone†[2] is reasonable for long-term maintenance of sinus rhythm.
2a	A	2. For patients with AF and no previous MI, or known or suspected significant structural heart disease, or ventricular scar or fibrosis, use of flecainide[3-5] or propafenone[5-12] is reasonable for long-term maintenance of sinus rhythm.
2a	A	3. For patients with AF without recent decompensated HF or severe LV dysfunction, use of dronedarone[5,13-15] is reasonable for long-term maintenance of sinus rhythm.
2a	A	4. For patients with AF without significant baseline QT interval prolongation or uncorrected hypokalemia or hypomagnesemia, use of dofetilide[1,5,16 5-7,10,17,18] is reasonable for long-term maintenance of sinus rhythm, with proper dose selection based on kidney function and close monitoring of the QT interval, serum potassium and magnesium concentrations, and kidney function.
2a	A	5. For patients with AF and normal LV function, use of low-dose amiodarone (100-200 mg/d) is reasonable for long-term maintenance of sinus rhythm[2,5,17-22] but, in view of its adverse effect profile,[5,23,24] should be reserved for patients in whom other rhythm control strategies are ineffective, not preferred, or contraindicated.
2b	A	6. For patients with AF without significant baseline QT interval prolongation, hypokalemia, hypomagnesemia, or bradycardia, use of sotalol[5-7,10,17,18] may be considered for long-term maintenance of sinus rhythm, with proper dose selection based on kidney function and close monitoring of the QT interval, heart rate, serum potassium and magnesium concentrations, and kidney function.
3: Harm	B-R	7. In patients with previous MI and/or significant structural heart disease, including HFrEF (LVEF ≤40%), flecainide and propafenone[25] should not be administered due to the risk of worsening HF, potential proarrhythmia, and increased mortality.[26,27]
3: Harm	B-R	8. For patients with AF, dronedarone should not be administered for maintenance of sinus rhythm to those with NYHA class III and IV HF or patients who have had an episode of decompensated HF in the past 4 weeks, due to the risk of increased early mortality associated with worsening HF.[28]

*J Am Coll Cardiol. Nov 30, 2023. Epublished DOI: 10.1016/j.jacc.2023.08.017

Atrial Fibrillation Management – Rhythm Control



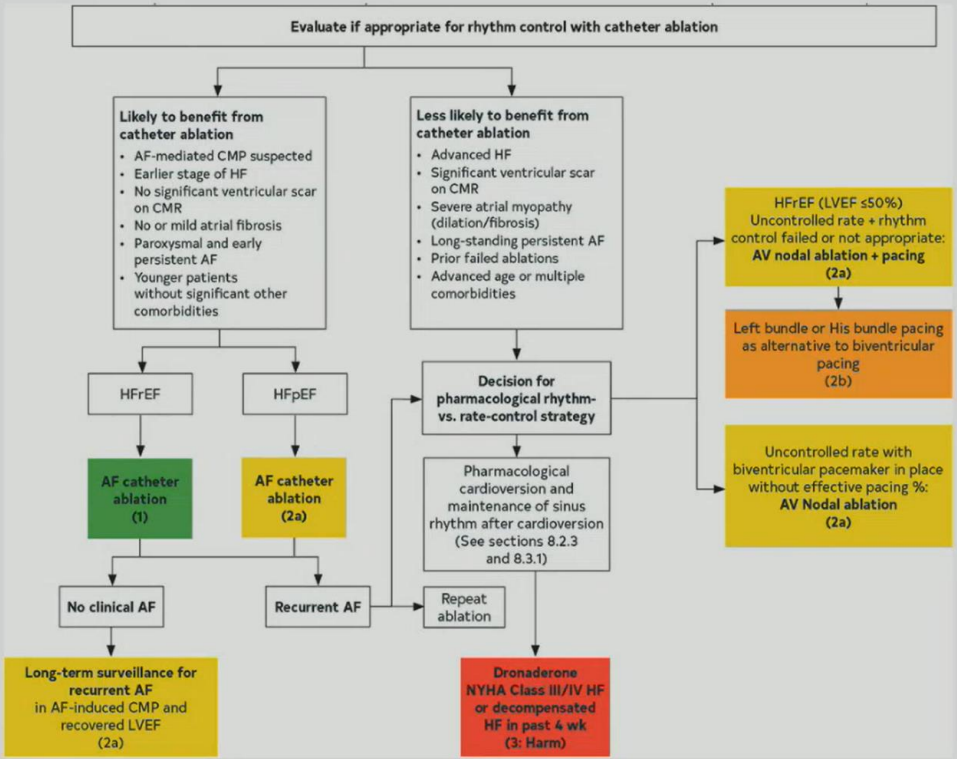
Rate vs Rhythm Control

- Basic principles of the Rhythm Control strategy:
  - **Initial conversion to normal sinus** may involve antiarrhythmic medications or external electrical therapy.
    - AKA pharmacological or electrical cardioversion
  - STOP. THINK. -> What is the most pressing issue/complication of atrial fibrillation if you are going to “cardiovert” a patient?
  - If unknown onset of AF, initiate anticoagulation before cardioversion. In the least, perform immediate TEE prior to attempted chemical or electrical cardioversion. See anticoagulation guidelines.

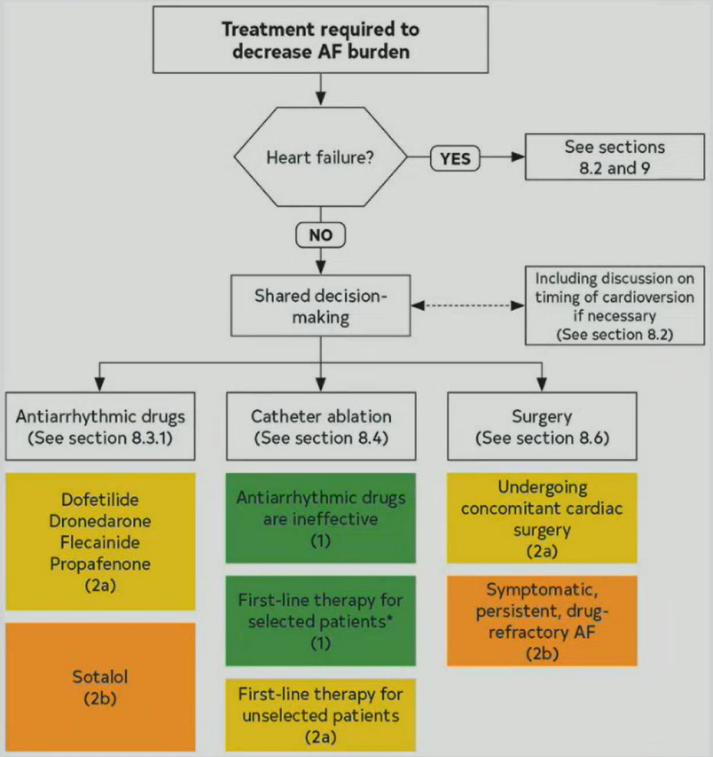
“Rhythm Control versus Rate Control in Atrial Fibrillation,” UpToDate, www.uptodate.com.

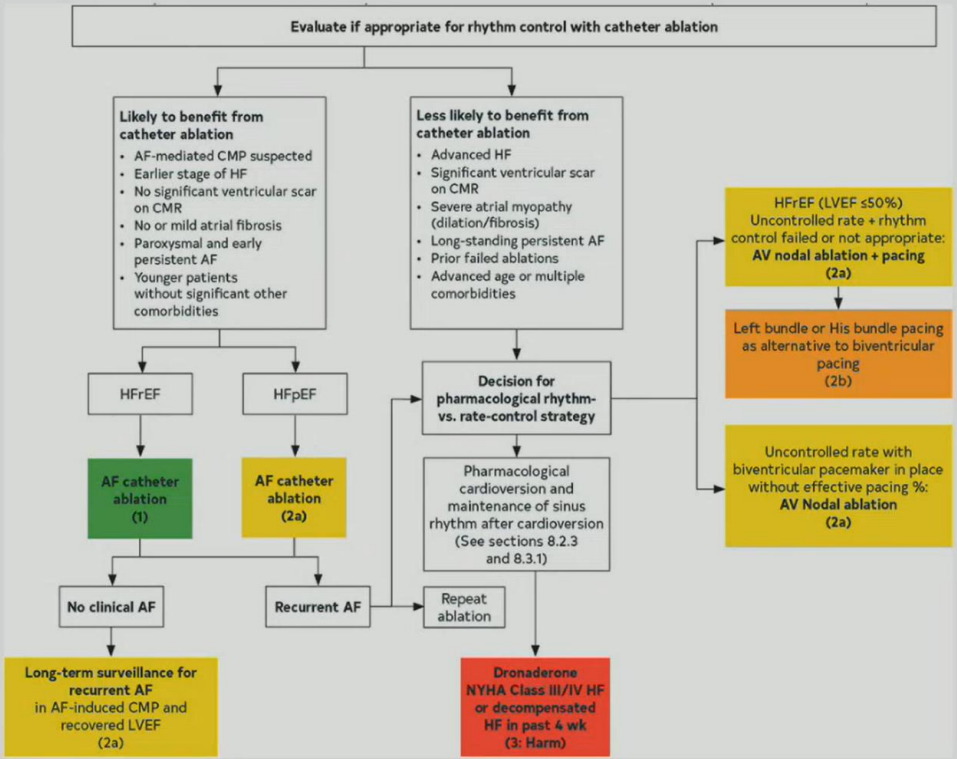
“CURRENT Medical Diagnosis and Treatment 2021,” Papadakis and McPhee.

Atrial Fibrillation Management – Rhythm Control



Atrial Fibrillation Management – Rhythm Control





Made by: Omid Amidi MD (@OAmidiMD),
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EARLY-AF

Andrade JG, Wells GA, Deyell MW, et al. Cryoablation or drug therapy for initial treatment of atrial fibrillation. New England Journal of Medicine. 2021;384(4):305-315.

Objective

Is first-line ablation more effective than antiarrhythmic drugs in preventing recurrence of atrial tachyarrhythmia?

Inclusion criteria:

>18 years of age
At least one episode of AF on ECG in the past 24 months

Primary endpoint:

AF recurrence (after 91-365 days)

Secondary endpoints:

Free of symptomatic arrhythmias
AF burden
Quality of life
Health care utilization

Methods

Prospective, multicenter, open-label, randomized trial

303 patients

Cryoballoon ablation n=154

Antiarrhythmic drug n=149

Monitored via Implantable cardiac monitor

Results

Follow up: 1 year

Recurrence of AF

Ablation:	Antiarrhythmic
66/154 (42.9%)	101/149 (67.8%)

HR 0.48 (0.35-0.66)

Symptomatic arrhythmia	Safety endpoint
Ablation: 17/154 (11%)	Ablation: 5/154 (3.2%)
Antiarrhythmic: 39/149 (26%)	Antiarrhythmic: 6/149 (4%)
HR 0.39 (0.22-0.68)	HR 0.81 (0.25-2.59)

Conclusion:

Catheter cryoballoon ablation was associated with a significantly lower rate of AF recurrence when used as initial treatment for symptomatic paroxysmal AF compared to antiarrhythmic therapy.

Recurrence of AF

Ablation: 66/154 (42.9%)

Antiarrhythmic 101/149 (67.8%)

HR 0.48 (0.35-0.66)

P<0.001

Symptomatic arrhythmia

Ablation: 17/154 (11%)
Antiarrhythmic: 39/149 (26%)

HR 0.39 (0.22-0.68)

Safety endpoint

Ablation: 5/154 (3.2%)
Antiarrhythmic: 6/149 (4%)

HR 0.81 (0.25-2.59)

Made by: Omid Amidi MD (@OAmidiMD),
Edited by: Evelyn Song MD (@EvelynSongMD)

STOP AF

Wazni OM, Dandamudi G, Sood N, et al. Cryoballoon ablation as initial therapy for atrial fibrillation. New England Journal of Medicine. 2021;384(4):316-324.

Objective

Is first-line cryoballoon ablation more effective than antiarrhythmic drugs in restoring sinus rhythmm in patients with symptomatic paroxysmal AF?

Inclusion criteria:

18-80 years of age
Recurrent symptomatic paroxysmal AF

Primary endpoint:

Treatment success*

Secondary endpoints:

Quality of life
Safety endpoints
(specific procedural complications)

*freedom from initial failure of the procedure or atrial arrhythmia recurrence after a 90-day blanking period to allow recovery from the procedure or drug dose adjustment, evaluated in a Kaplan– Meier analysis

Methods

Parallel, multicenter, open-label, randomized trial

203 patients

Cryoballoon ablation n=104

Antiarrhythmic drug n=99

Monitored via
12-lead EKG at 1, 3, 6, 12 mo.
24-hr holter at 6 & 12 mo

Results

Follow up: 1 year

Treatment success

Ablation:	Antiarrhythmic
78/104 (74.6%)	48/99 (45%)

P<0.001

Arrhythmia Reoccurrence	Serious Adverse event
Ablation: 21/104 (20%)	Ablation: 15/104 (14%)
Antiarrhythmic: 35/99 (35%)	Antiarrhythmic: 14/99 (14%)

Conclusion:

Cryoballoon ablation as initial therapy was superior to drug therapy for the prevention of atrial arrhythmia recurrence in patients with symptomatic paroxysmal AF

Treatment success

Ablation: 78/104 (74.6%)

Antiarrhythmic 48/99 (45%)

P<0.001

Arrhythmia Reoccurrence

Ablation: 21/104 (20%)

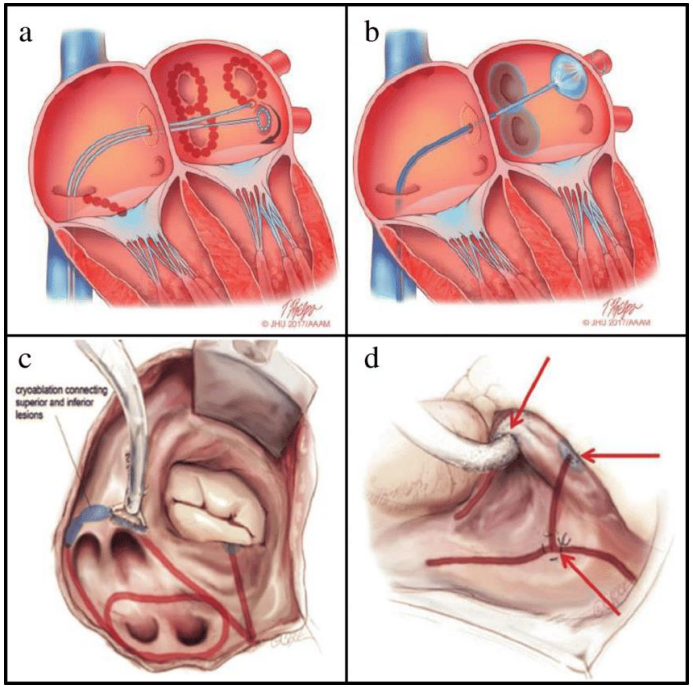
Antiarrhythmic: 35/99 (35%)

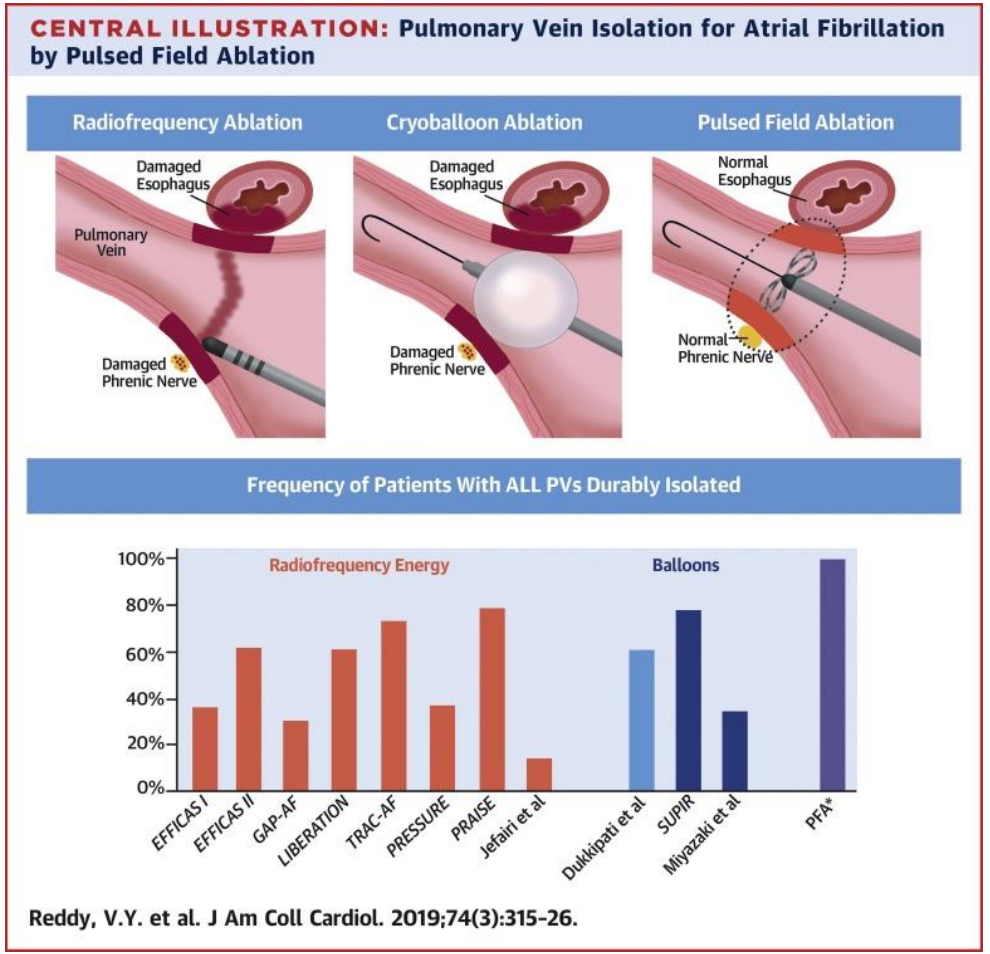
Serious Adverse event

Ablation: 15/104 (14%)

Antiarrhythmic: 14/99 (14%)

Radiofrequency and cryoablation (Pulmonary Vein Isolation)





Patel, N.J., Maradey, J.A. & Bhave, P.D. Atrial Fibrillation Ablation: Indications and Techniques. Curr Treat Options Cardio Med 21, 43 (2019)

Case

Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

Rate or Rhythm control for Sheryl?

A. Rate

B. Rhythm

C. No idea yet – need to assess her goals/preferences and the context of her AF (symptoms, length of time, etc.) and anatomical features (large atrium, LV function, etc.).

Case

Sheryl, a 66-year-old woman, is a well-established patient who presents with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

After the discussion, she chose to start apixaban 5 mg twice daily.

At her echocardiogram, her atria sizes are normal and she has mild concentric LVH (long-standing hypertension), and EF 55% (“normal” 50-75%) and is in NSR, ventricular rate 65.

She is now anticoagulated (stroke prophylaxis). Appear to have Paroxysmal AF (comes and goes).

Rate versus Rhythm control? Perhaps we need more data – expensive single assessment Holter, Ambulatory Telemetry Monitoring (ATM)…

OR Patient owned continuous and ongoing FDA cleared wearables?

Case

Sheryl, a 66-year-old woman, is a well-established patient with a 3-month history of being **“tired a lot more.”** She has had moments where **“my heart beats fast,”** and this causes her to feel **“dizzy and lightheaded.”** She is on losartan-HCT 25-12.5 mg and amlodipine 5 mg, “I’ve had high blood pressure for years.” No fever, chills, or sweats. Does not report any abnormal bleeding.

She has AF stage 3, paroxysmal. She is now on apixaban 5 mg twice daily. She has metoprolol tartrate 50 mg ½ to 1 tab PRN for heart rates >110. Her heart anatomy suggests that the rhythm control strategy is reasonable.

In the absence of LV dysfunction and symptomatic coronary disease, she elects flecainide 50 mg po BID. She likes the idea of using a wearable to identify whether symptomatic palpitations are AF.

Case

Sheryl, a 66-year-old woman. She has stage 3 AF, paroxysmal AF. She is now on apixaban 5 mg twice daily. She has metoprolol tartrate 50 mg ½ to 1 tab PRN for heart rates >110. Her heart anatomy suggests rhythm control strategy is reasonable.

In the absence of LV dysfunction and symptomatic coronary disease, she elects flecainide 50 mg po BID (100 mg daily) and likes the idea of using a wearable to identify whether symptomatic palpitations are AF.

Potential INSTRUCTIONS:

1. For AF recurrences, if HR >110, may use a ½ tab Metoprolol tartrate 50 mg.
2. May use an extra tab of flecainide 50 mg (up to 300 mg daily maximum) to “chemically cardiovert”
3. Sheryl is provided contact numbers of the clinic and specific RN/Mas supporting me and has my direct cell for texts/calls for clarification.
4. Always, she is directed that ED is reasonable when symptoms are severe.

Summary

1. Identify and reduce elevated stroke risk with anti-coagulation. Use risk calculators WITH your patient.
2. Patient-owned devices can help assess the burden of AF and help inform the choice for rate or rhythm control strategies.
3. Additionally, A rate or rhythm control strategy can leverage patient-owned devices to improve therapeutics' choice and "success" to achieve mutually agreed-upon goals.
4. Patient-owned devices may help guide patients on PRN delivery of therapeutics on top of chronic daily medications.
5. Patient-owned devices may help patients become more engaged and improve patient understanding of their disease and the therapies they are using.

QUESTIONS?