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Atrial Fibrillation

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Rapid Resource

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The CHA_2DS_2-VASc Score:

A Clarification of Individual Components

excellence.acforum.org

Background: Despite a relatively simple tool for categorizing stroke risk in patients with atrial fibrillation, there still remains many questions regarding the definitions and inclusions of certain components of the CHA_2DS_2-VASc Score (Table 1). The validation trial of this score was published in 2010; therefore, the original definitions of the individual components as outlined in this trial have been modified throughout time and with subsequent anticoagulation trials as discussed below. This tool leaves much room for individual interpretation, and its use within anticoagulation decisions emphasizes a need for a joint discussion between patient and provider. Below is a summary of the more controversial components of the CHA_2DS_2-VASc score within nonvalvular atrial fibrillation (AF)[1-4] Landmark trials for approval of DOACs included up to 20% of patients who had some type of valvular defects[5].

TABLE 1 – The CHA_2DS_2-VASc Score[1]

Risk Factor	Score	Definition
Congestive Heart Failure/LV dysfunction	1	Left ventricular dysfunction or symptomatic heart failure
Hypertension	1	More than 140/90mmHg (use of 130/80mmHg is acceptable) or on antihypertensive therapy
Age ≥ 75 years old	2	
Diabetes Mellitus	1	Fasting blood glucose > 126 mg/dL, HgA1c > 6.5%, or receiving treatment for diabetes
Stroke/TIA/TE	2	Prior history of stroke, TIA, or systemic embolism
Vascular Disease	1	Prior myocardial infarction (MI), angina pectoris, percutaneous coronary intervention or coronary artery bypass surgery, intermittent claudication, previous surgery or percutaneous intervention of the abdominal aorta or lower extremity vessels, abdominal or thoracic surgery, arterial and venous thrombosis
Age 65-74 years old	1	
Sex **C**ategory (female gender)	1	

TABLE 2 – Heart Failure Definitions within DOAC Trials

Trial	Anticoagulant	Heart Failure Definition
RE-LY[2]	Dabigatran	Symptomatic heart failure 6 months prior to enrollment or a previous history of heart failure admission
ROCKET-AF[3]	Rivaroxaban	Previous history of heart failure or left ventricular dysfunction defined as an ejection fraction of <40%
ARISTOTLE[4]	Apixaban	Ejection fraction ≤40% or symptomatic heart failure within the 3 months prior to enrollment
ENGAGE-AF[5]	Edoxaban	Symptomatic heart failure or a history of heart failure admission regardless of ejection fraction

Detailed Definitions of CHA_2DS_2-VASc Components

Risk Factor	Detailed Definition
Heart Failure	The original definition was adopted from the $CHADS_2$ score and states that heart failure is "the presence of signs and symptoms of either right or left ventricular failure or both, confirmed by non-invasive or invasive measurements demonstrating objective evidence of cardiac dysfunction"[1]. When looking at more recent atrial fibrillation trials with direct-oral anticoagulants (DOAC), each trial had their own definition of heart failure (see Table 2). Looking at all of the definitions in totality, it is acceptable to include left ventricular dysfunction (an ejection fraction of <40%) and symptomatic heart failure with diagnostic evidence of ventricular failure regardless of ejection fraction within the CHA_2DS_2-VASc score.
Hypertension	The original definition of hypertension is a resting systolic blood pressure of >140mmHg and/or a diastolic blood pressure of >90 mmHg on at least 2 occasions, or currently on antihypertensive treatment[1]. In 2017, the definition and classification of hypertension changed as evidence emerged in favor of stricter blood pressure targets. Hypertension is now defined as a systolic blood pressure of >130 mmHg and/or a diastolic blood pressure of >80 mmHg, or currently on antihypertensive treatment[6]. Given this update, it is reasonable to include any patient with a diagnosis of hypertension (using a threshold of 130/80 mmHg or 140/90 mmHg) or on antihypertensive treatment.
Diabetes	The original definition was a fasting glucose of >126 mg/dL or actively receiving treatment for diabetes[1]. Hemoglobin A1c has emerged as another way of diagnosing diabetes. According to the ADA guidelines, a hemoglobin A1c of >6.5% is diagnostic of diabetes[7]. This is a reasonable method to be included into the CHA_2DS_2-VASc score.
Stroke/TIA/ Thromboembolism (TE)	The confusion within this component of the CHA_2DS_2-VASc score comes from the inclusion of TE. There are several areas within the original validation trial that would infer that deep vein thrombosis (DVT) or pulmonary embolism (PE) would be included within the score[1]. A key point in clarifying this component is to define "systemic embolism". The term "systemic" implies that the clot develops in the left-side of the heart and the embolism will be pushed "systemically" or via the arteries. Specifically, the ARISTOTLE trial defined systemic embolism as requiring "a clinical history consistent with an acute loss of blood flow to a peripheral artery (or arteries) supported by the evidence of embolism from surgical specimens, autopsy, angiography, vascular imaging, or other objective testing."[4] By these definitions, DVT and PE would not be included within the CHA_2DS_2-VASc score; however, a DVT and/or PE identifies a high-risk population for recurrent embolisms and might need to be evaluated independently in clinical decisions within anticoagulation therapy[8].
Vascular Disease	Within the definitions of the original trial, "coronary artery disease" was abbreviated to "prior MI," but it really includes "prior myocardial infarction (MI), angina pectoris, percutaneous coronary intervention or coronary artery bypass surgery." Another discrepancy seen within the validation trial was the use of "peripheral artery disease" within the score, but in the supplement, they defined peripheral vascular disease, which encompasses more conditions than peripheral artery disease. It was defined as "intermittent claudication [symptomatic peripheral artery disease], previous surgery or percutaneous intervention of the abdominal aorta or lower extremity vessels, abdominal or thoracic surgery, arterial and venous thrombosis"[1]. Given the broad definition of vascular disease, there is a lot of room for individual interpretation and a joint discussion between provider and patient regarding anticoagulation decisions might be needed.

Dosing for Non-Valvular Atrial Fibrillation

Drug	Dose
Dabigatran	• CrCL >30mL/min: 150mg BID • CrCL 15-30 mL/min: 75mg BID † • CrCL <15mL/min or patients on dialysis: not recommended
Rivaroxaban	To be given with evening meal: • CrCL > 50 mL/min: 20mg po daily • CrCL 15-50 mL/min: 15mg po daily • Avoid in patients with CrCL < 15 mL/min, not recommended in dialysis
Apixaban	5mg BID - OR - 2.5mg BID in patients with at least 2 of the following characteristics: • age ≥80 years, bodyweight ≤60kg, serum creatinine ≥1.5 mg/dL ESRD with dialysis: no dosage adjustment necessary unless age ≥80 years or bodyweight ≤60kg, then reduce dose
Edoxaban	• CrCL 51-95mL/min: 60mg daily • CrCL 15-50 mL/min: 30 mg daily • CrCL < 15 mL/min: not recommended Not used if CrCL > 95mL/min

*For dabigatran, rivaroxaban, and edoxaban, patients with CrCl <30 mL/min were excluded from clinical trials; for apixaban, patients with CrCl <25 mL/min (or Scr >2.5 mg/dL) were excluded.

†Was not evaluated in clinical trials, but is an FDA-approved dose

Direct Oral Anticoagulants

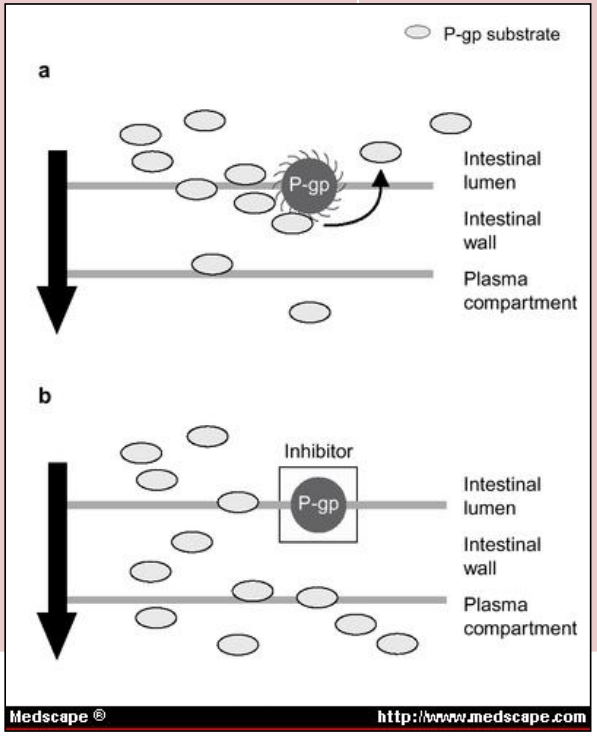
	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Other dosing information		Hepatic impairment	Hepatic impairment	Hepatic impairment
Adverse effects	• Bleeding, GI	• Bleeding	• Bleeding	• Bleeding, rash
Monitoring: Efficacy	• No routine monitoring	• No routine monitoring	• No routine monitoring	• No routine monitoring
Monitoring: Safety	• CBC • SCr	• CBC • SCr	• CBC • SCr	• CBC • SCr
Drug Activity	• Screen: TT • Quant: aPTT, ECT	• Screen: UFH or LMWH anti-Xa assay • Quant: drug-specific anti-Xa assay	• Screen: UFH or LMWH anti-Xa assay • Quant: drug-specific anti-Xa assay	• Screen: UFH or LMWH anti-Xa assay • Quant: drug-specific anti-Xa assay
Reversal	Idarucizumab	Andexanet alfa	Andexanet alfa	Andexanet alfa
Other information	• Storage			

Direct Oral Anticoagulants

- Black Box Warnings:
  - Stopping prematurely can increase ischemic events
  - If discontinued, consider using another anticoagulant
  - Epidural/spinal hematomas and spinal procedures
  - Edoxaban: CrCL > 95 mL/min for non-valvular atrial fibrillation
- Other Information:
  - Obesity
    - BMI > 40 or weight > 120 kg

Direct Oral Anticoagulants

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Drug Interactions	• P-gp inhibitors/ inducers	• Combined P-gp and CYP3A4 inhibitors • Decreased renal function with combined P-gp and weak or moderate CYP3A4 inhibitors • Combined P-gp and strong CYP3A4 inducers	• Combined CYP3A4 and P-gp inhibitors (decrease dose or avoid) • Combined strong inducers of CYP3A4 and P-gp (avoid)	• P-gp inhibitors/ inducers



http://www.medscape.com/viewarticle/406236_2

Drug Interactions with DOACs

Interaction Effect	Drugs
Strong CYP 3A4 **Inhibitors**	Boceprevir, clarithromycin, conivaptan, grapefruit juice, indinavir, itraconazole, ketoconazole, lopinavir/ritonavir, nefazodone, nelfinavir, posaconazole, saquinavir, telaprevfir, telithromycin, voriconazole
P-gp **Inhibitors**	Amiodarone, azithromycin, captopril, carvedilol, clarithromycin, conivaptan, cyclosporine, diltiazem, dronedarone, erythromycin, felodipine, itraconazole, ketoconazole, lopinavir/ritonavir, quercetin, quinidine, ranolazine, verapamil
Strong CYP 3A4 **Inducers**	Carbamazepine, phenytoin, rifampin, St John's wort
P-gp **Inducers**	Carbamazepine, phenytoin, rifampin, St John's wort, tipranavir/ritonavir
Combined strong CYP 3A4 & P-gp **Inhibitors**	Itraconazole, lopinavir/ritonavir, clarithromycin, ketoconazole, indinavir/ritonavir, conivaptan
Combined strong CYP 3A4 & P-gp **Inducers**	Carbamazepine, phenytoin, rifampin, St John's wort

Hellwig T et al. *Ann Pharmacother*. 2013;47:1478-1487.
FDA CYP Inhibitors, Inducers and Transport Proteins: Available from:
http://www.fda.gov/drugs/developmentapprovalprocess/developmentresources/druginteractionslabeling/ucm093664.htm

Direct Oral Anticoagulants: Drug Interactions

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Inducers	Avoid p-gp inducers	Avoid combined p-gp/strong CYP3A4 inducers	Avoid combined p-gp/strong CYP3A4 inducers	Avoid with rifampin
Inhibitors	Dronedarone or ketoconazole (PO) + CrCl 30-50 mL/min: Reduce dabigatran dose to 75 mg BID Avoid p-gp inhibitors IF: CrCl < 30 mL/min	Avoid p-gp/strong CYP3A4 inhibitors Avoid p-gp/ moderate CYP3A4 inhibitors "unless the potential benefit justifies the potential risk"	P-gp/strong CYP3A4 inhibitors: Reduce apixaban dose by 50% Avoid p-gp/strong CYP3A4 inhibitors if receiving 2.5 mg BID	

Pradaxa [Prescribing information]. Ridgefield, CT: Boehringer-Ingelheim Pharmaceuticals, Inc.; July 2017.
Xarelto [Prescribing information]. Titusville, NJ: Janssen Pharmaceuticals, Inc.; October 2017.
Eliquis [Prescribing information]. Princeton, NJ: Bristol-Myers Squibb Company, New York, NY: Pfizer Inc.; April 2017.
Savaysa [Prescribing information]. Parsippany, NJ: Daiichi Sankyo, Inc.; September 2017.
Bevyxxa [Prescribing information]. South San Francisco, CA: Portola Pharmaceuticals, Inc.; June 2017.

Antithrombotics During Procedures

- Estimate thromboembolic risk
- Estimate bleeding risk
- Determine whether anticoagulation needs to be interrupted
- If interrupted, determine timing of when to stop/restart
- To bridge … or not to bridge with LMWH
  - Warfarin
  - BRIDGE study

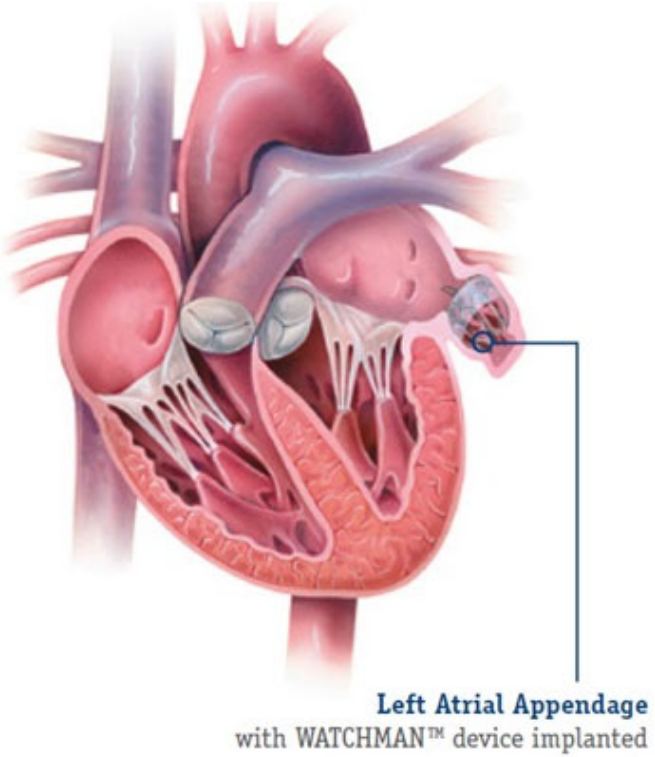
Risk Stratification for Perioperative Thromboembolism

RISK	MECHANICAL HEART VALVE	ATRIAL FIBRILLATION	VTE
High	Mitral prosthesis Caged-ball/tilting disc aortic CVA or TIA ≤ 6 mos.	$CHADS_2$ 5 or 6 CVA or TIA ≤ 3 mos Rheumatic valvular heart Dz	• ≤ 3 mos • Severe thrombophilia • Active cancer with high risk type • H/O recurrent VTE during short-term interruption in past
Moderate	Bileaflet aortic prosthesis plus ≥ 1 risks: AF, prior CVA or TIA, HTN, DM, CHF, age > 75	$CHADS_2$ 3 or 4	• Within 3-12 mos • Nonsevere thrombophilia • Recurrent VTE • Active cancer
Low	Bileaflet aortic prosthesis w/o AF or other CVA risk	$CHADS_2$ 0 to 2	• VTE > 12 mo. previous and no other risks

Chest 2012 Feb; 141(2 suppl): e329S – e330S

Non-Pharmacological Stroke Prevention

- Occlusion of the left atrial appendage (LAA)
- Percutaneous Approaches:
  - Implantable devices that are inserted percutaneously
    - WATCHMAN device, Amplatzer cardiac plug
  - Tie off the LAA
    - LARIAT device
- Cardiac Surgery:
  - Surgical excision of the LAA – considered in patients undergoing cardiac surgery (class IIb)



Patient Case

- What medication is most appropriate for stroke prevention in 73 yo male with a history of HTN, DM, and recurrent AF?
  a) No antithrombotic therapy
  b) Aspirin 325mg daily
  c) Aspirin 81mg + clopidogrel 75mg daily
  d) Dabigatran 150mg BID
  e) Warfarin (INR 2-3)

Patient Case

- What medication is most appropriate for stroke prevention in 76 yo female with a history of PAD, HTN, VTE, renal failure on dialysis, and recurrent AF?
  a) Aspirin 325mg daily
  b) Dabigatran 150mg BID
  c) Warfarin (INR 2-3)
  d) Apixaban

Treatment Strategy #2: Rate Control

- Goal: improve symptoms
- Goal heart rates:
  - Resting: < 80 bpm for symptom management
    - Lenient strategy: < 110 bpm – asymptomatic and LV function is preserved (EF ≥40%)

Ventricular Rate Control Agents

- Beta-blockers (BB)
  - All equally effective
- Non-dihydropyridine calcium channel blockers (non-DHP CCB)
  - Diltiazem and verapamil
- Digoxin
  - May be combined with BB or non-DHP CCB
  - Renally dosed, drug levels
- Amiodarone
  - Caution: can convert to normal sinus rhythm

Ventricular Rate Control Agents

- Acutely:
  - Normal LV function (EF >40%):
    - IV BB (propranolol, metoprolol, esmolol)
    - IV non-DHP CCB (verapamil or diltiazem)
  - HFrEF (EF ≤40%)
    - Avoid IV verapamil and diltiazem
    - Use IV BB with caution
    - If exacerbation, digoxin or amiodarone are 1st line
  - HFpEF
    - IV diltiazem or IV verapamil unless decompensated HF

Ventricular Rate Control Agents

	Intravenous Administration	Usual Oral Maintenance Dose
Beta blockers		
Metoprolol tartrate	2.5–5.0 mg IV bolus over 2 min; up to 3 doses	25–100 mg BID
Metoprolol XL (succinate)	N/A	50–400 mg QD
Atenolol	N/A	25–100 mg QD
Esmolol	500 mcg/kg IV bolus over 1 min, then 50–300 mcg/kg/min IV	N/A
Propranolol	1 mg IV over 1 min, up to 3 doses at 2-min intervals	10–40 mg TID or QID
Nadolol	N/A	10–240 mg QD
Carvedilol	N/A	3.125–25 mg BID
Bisoprolol	N/A	2.5–10 mg QD
Nondihydropyridine calcium channel antagonists		
Verapamil	0.075–0.15 mg/kg IV bolus over 2 min; may give an additional 10.0 mg after 30 min if no response, then 0.005 mg/kg/min infusion	180–480 mg QD (ER)
Diltiazem	0.25 mg/kg IV bolus over 2 min, then 5–15 mg/h	120–360 mg QD (ER)
Digitalis glycosides		
Digoxin	0.25 mg IV with repeat dosing to a maximum of 1.5 mg over 24 h	0.125–0.25 mg QD
Others		
Amiodarone*	300 mg IV over 1 h, then 10–50 mg/h over 24 h	100–200 mg QD

*Multiple dosing schemes exist for the use of amiodarone.

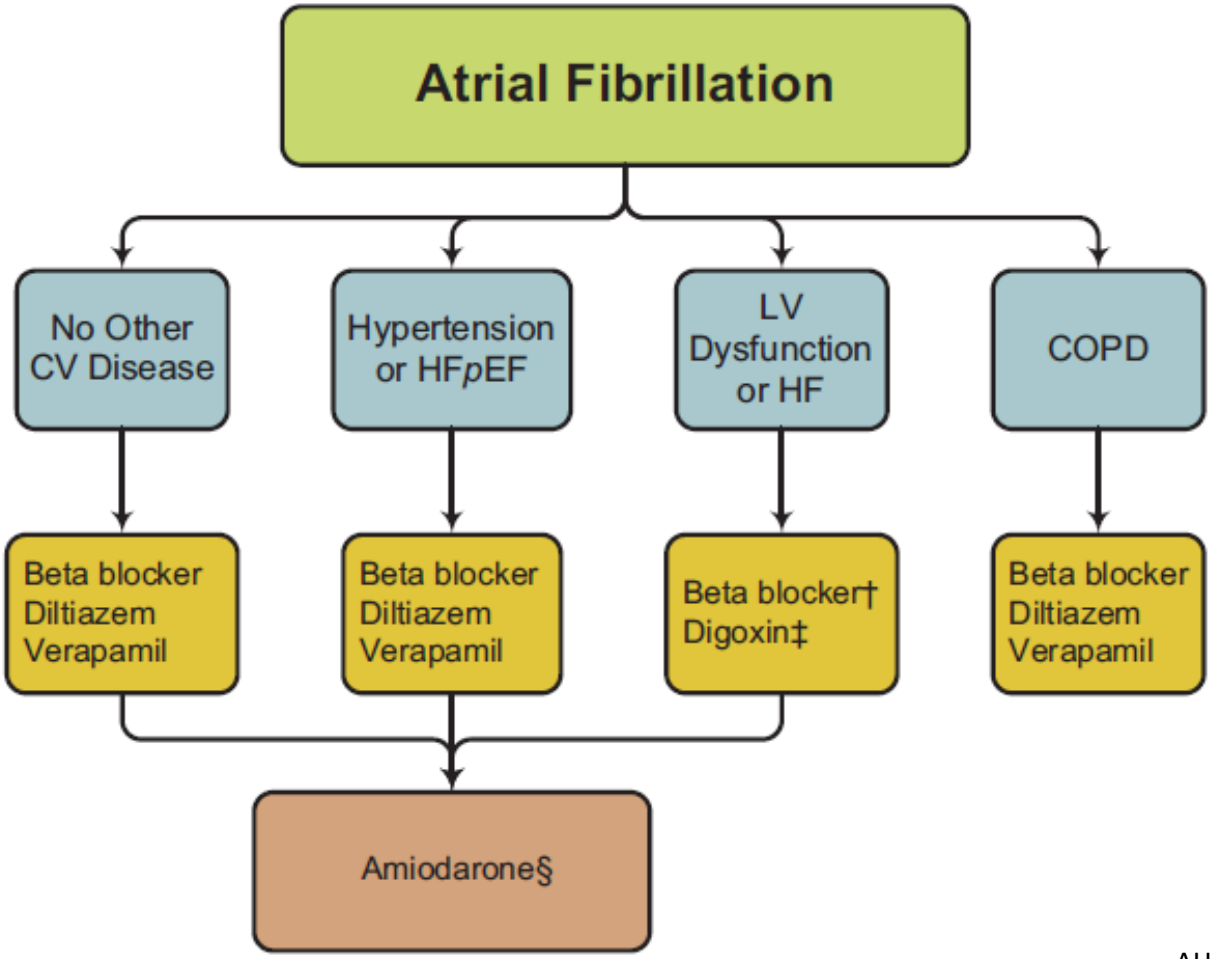
AF indicates atrial fibrillation; BID, twice daily; ER, extended release; IV, intravenous; N/A, not applicable; QD, once daily; QID, 4 times a day; and TID, 3 times a day.

AHA/ACC AF Guidelines 2014

Ventricular Rate Control Agents – Major Side Effects

- Beta-blockers (BB)
  - Hypotension, heart block, bradycardia, asthma, HF
- Non-dihydropyridine calcium channel blockers (non-DHP CCB)
  - Hypotension, heart block, HF
- Digoxin
  - Digitalis toxicity, heart block, bradycardia
- Amiodarone
  - Pulmonary toxicity, skin discoloration, hypo/hyperthyroidism, optic neuropathy, photosensitivity, corneal deposits, proarrhythmia, hepatotoxicity, tremor, ataxia, LFT abnormalities, warfarin interaction

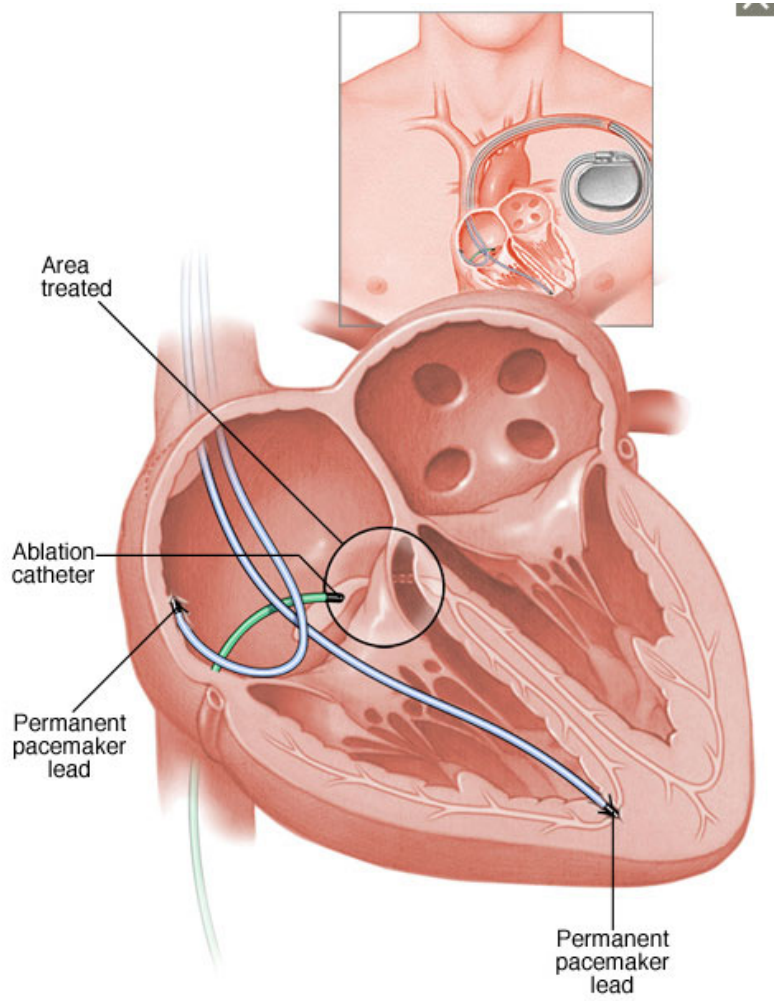
Ventricular Rate Control – Drug Selection



AHA/ACC AF Guidelines 2014

Ventricular Rate Control – AV Nodal Ablation

- AV nodal ablation with permanent ventricular pacing (pacemaker)
- Used when pharmacological therapy is inadequate (class IIa)
- No rate-control meds needed
- Antithrombotic therapy



Treatment Strategy #3: Rhythm Control

- Goal: to improve symptoms
- Restore and maintain normal sinus rhythm
  - Cardioversion – direct-current or pharmacological
  - Antiarrhythmic drugs
  - Radiofrequency catheter ablation or other procedure

Cardioversion

- Direct-current cardioversion (DCC) delivery of an electrical shock
- Pharmacologic cardioversion
  - Flecainide
  - Deofetilide
  - Propafenone
  - Ibutilide (IV)
  - Amiodarone (class IIa)

Who Should Be Cardioverted?

- Hemodynamic instability
- Long-term rhythm control
- Symptomatic persistent atrial fibrillation
- First episode
- Infrequent symptomatic episodes
- Potentially reversible cause

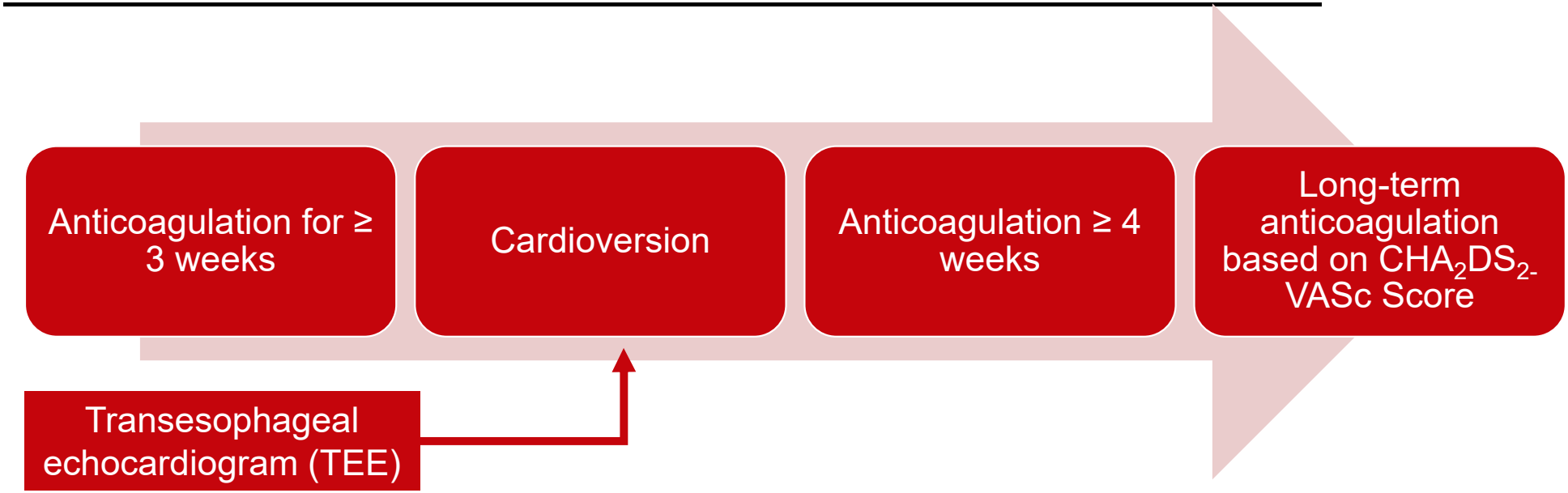
<u>Who shouldn't be cardioverted?</u>

- Asymptomatic or minimally symptomatic
- Low likelihood of successful cardioversion or maintenance of sinus rhythm

Antithrombotic Considerations with Cardioversion

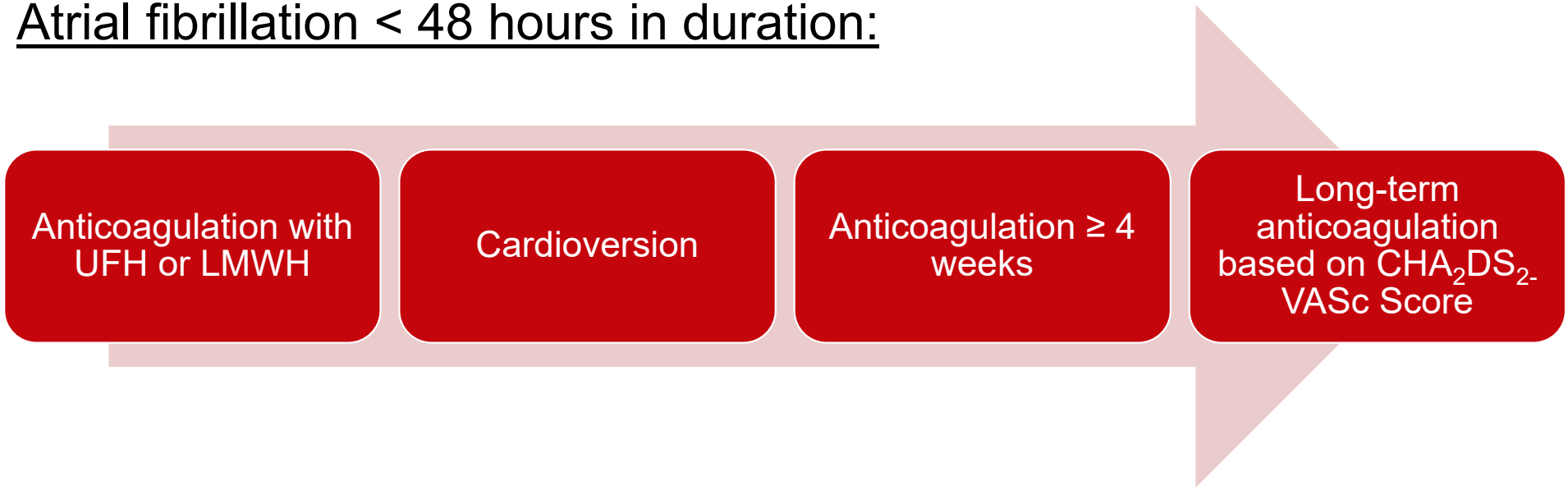
- Risk for thromboembolism
- Highest in the first 72 hours post cardioversion

<u>Atrial fibrillation > 48 hours in duration or unknown duration:</u>



Antithrombotic Considerations with Cardioversion

Atrial fibrillation < 48 hours in duration:



Atrial fibrillation >48 hours or unknown duration and hemodynamic instability:

TABLE 12 Recommended Drug Doses for Pharmacological Cardioversion of AF

Drug	Route of Administration	Dosage	Potential Adverse Effects
Amiodarone*	Oral	600–800 mg daily in divided doses to a total load of up to 10 g, then 200 mg QD as maintenance	Phlebitis (IV), hypotension, bradycardia, QT prolongation, torsades de pointes (rare), GI upset, constipation, increased INR
	IV	150 mg over 10 min, then 1 mg/min for 6 h, then 0.5 mg/min for 18 h or change to oral dosing	
Dofetilide	Oral	CrCl (mL/min) → Dose (mcg BID) >60 → 500 40–60 → 250 20–40 → 125 <20 → Not recommended	QT prolongation, torsades de pointes; adjust dose for renal function, body size, and age **Dose modified base on response to initial dose (monitor QTc)**
Flecainide	Oral	200–300 mg × 1†	Hypotension, atrial flutter with 1:1 AV conduction, ventricular proarrhythmia; avoid in patients with CAD and significant structural heart disease
Ibutilide	IV	1 mg over 10 min; may repeat 1 mg once if necessary (if weight <60 kg, use 0.01 mg/kg)	QT prolongation, torsades de pointes, hypotension
Propafenone	Oral	450–600 mg × 1†	Hypotension, atrial flutter with 1:1 AV conduction, ventricular proarrhythmia; avoid in patients with CAD and significant structural heart disease

Patient Case

- 78yo 65kg male with recurrent AF is that is refractory to amiodarone. MD decides to initiate dofetilide. Most recent labs include SCr=1.2, Mg++ = 2.2, K = 4.5. Baseline QTc interval = 415 msec. What dose of dofetilide should be initiated?
  a) 500mcg po q12hr
  b) 250mcg po q12hr
  c) 125mg po q12h4
  d) contraindicated

Antiarrhythmic Drugs to Maintain Sinus Rhythm

- Amiodarone
- Dofetilide
- Dronedarone
- Flecainide
- Propafenone
- Sotalol

Antiarrhythmic Drugs to Maintain Sinus Rhythm

- Vaughan Williams class IC

Drug	Usual Doses	Exclude/Use with Caution	Major PK Drug Interactions
Flecainide	50-200 mg q12hr	• Sinus or AV node dysfunction • HF • CAD • Atrial flutter • Infranodal conduction disease • Brugada syndrome • Renal or liver disease	• Metabolized by CYP2D6 • Renal excretion • Dual impairment can increase concentration
Propafenone	• IR: 150-300 mg q8hr • ER: 225-425 mg q12hr	• Sinus or AV node dysfunction • HF • CAD • Atrial flutter • Infranodal conduction disease • Brugada syndrome • Liver disease • Asthma	• Metabolized by CYP2D6 • Inhibits P-gp • Inhibits CYP2C9

Antiarrhythmic Drugs to Maintain Sinus Rhythm

- Vaughan Williams class III

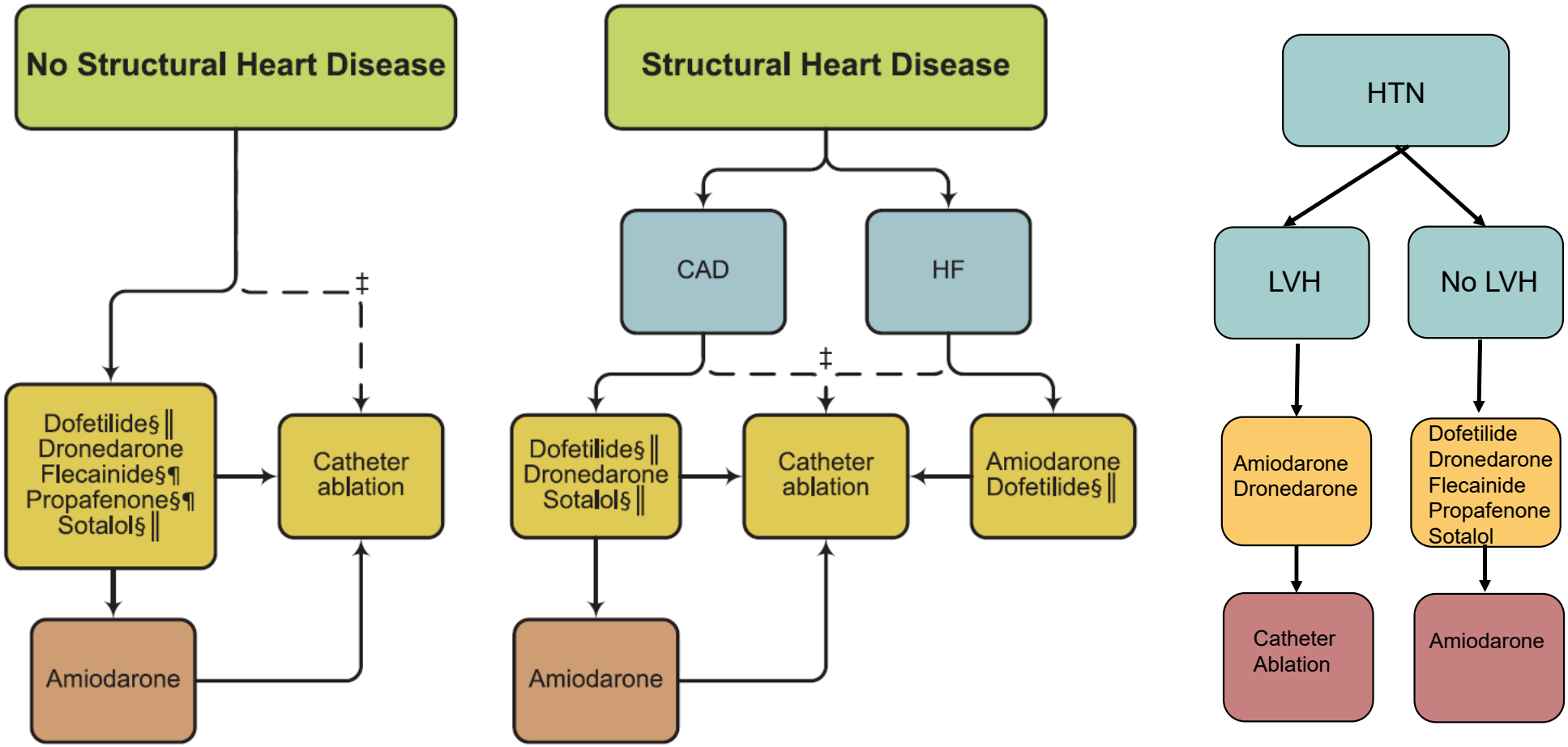
Drug	Usual Doses	Exclude/Use with Caution	Major PK Drug Interactions
Amiodarone	Oral: 400-600 mg daily in divided doses for 2-4 wks; maintenance typically 100-200 mg daily IV: 150 mg over 10min; then 1 mg/min for 6 hrs; then 0.5mg/min for 18 hrs or change to oral dosing; after 24 hr consider decreasing to 0.25 mg/min	• Sinus or AV node dysfunction • Infranodal conduction disease • Lung disease • Prolonged QT interval	• Inhibits most CYPs to cause drug interaction (warfarin, statins, many others) • Inhibits p-gp
Dofetilide	120-500 mcg q 12hr	• Prolonged QT interval • Renal disease • Hypokalemia • Hypomagnesemia • Diuretic therapy • Avoid other QT-prolonging med	• Primary renal elimination involving glomerular filtration and active tubular secretion: verapamil, HCTZ, cimetidine, ketoconazole, trimethoprim, prochlorperazine, megesterol all CI; d/c amio 3 mo before starting

Antiarrhythmic Drugs to Maintain Sinus Rhythm

- Vaughan Williams class III (continued)

Drug	Usual Doses	Exclude/Use with Caution	Major PK Drug Interactions
Dronedarone	400 mg q12hr	• Bradycardia • HF • Long-standing persistent AF/flutter • Liver disease • Prolonged QT interval	• Metabolized by CYP3A: caution with inhibitors and inducers • Inhibitis CYP3A, CYP2D6, P-gp
Sotalol	40-160 mg q12hr	• Prolonged QT interval • Renal disease • Hypokalemia • Hypomagnesemia • Diuretic therapy • Avoid other QT-prolonging med • Sinus or AV node dysfunction • HF • Asthma	• None (renal excretion)

Antiarrhythmic Drug Selection

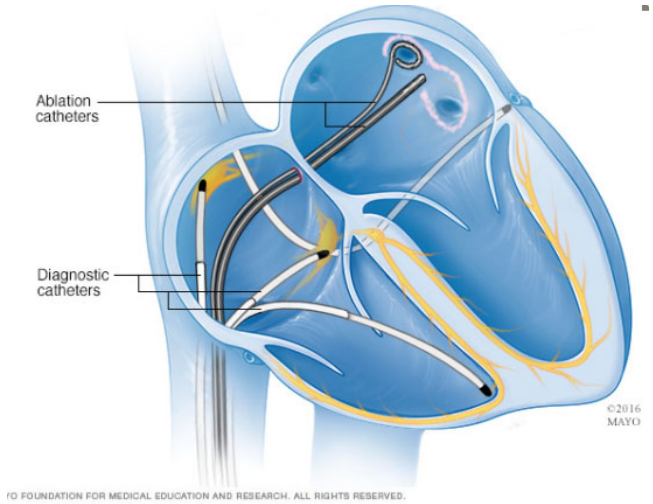


Rate vs. Rhythm Control

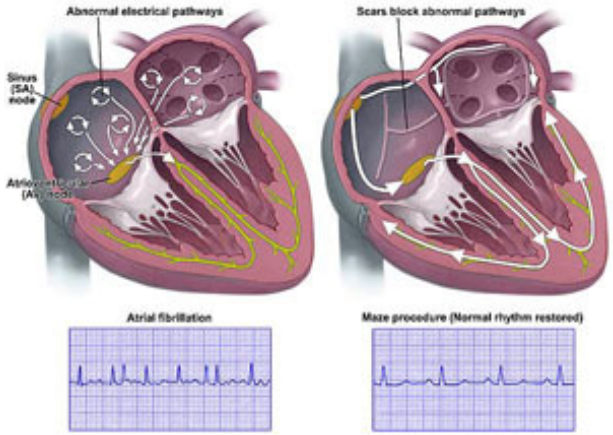
Trial	Patients	End Point	Conclusion
AFFIRM n=4060	Recurrent AF, > 64 yo, High stroke risk	All-cause mortality, f/u = 5 years	Rate control = 21.3% Rhythm control = 23.8% (p=0.08)
RACE n=522	Persistent AF, Previous cardioversion	CV death, heart failure, thrombus, bleed, pacemaker, severe drug reaction Avg f/u = 2.3 years	Rate control = 17.2% Rhythm control = 22.6% (p>0.05)
AF-CHF n=1376	AF and LEVF ≤ 35%	Time to death from cardiovascular causes	Rate control = 25% Rhythm control = 27% (p=0.59)

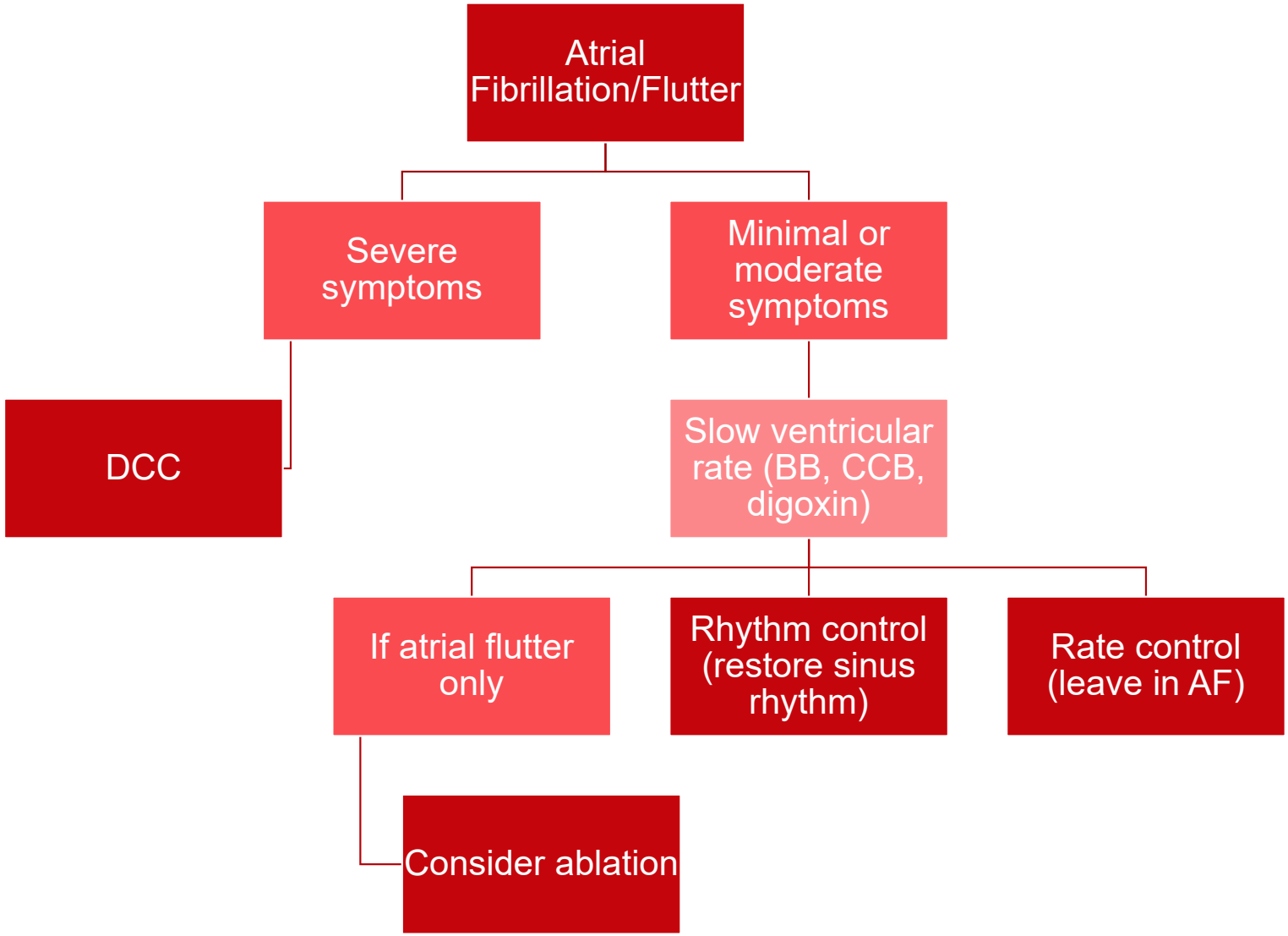
Nonpharmacologic Therapies for Rhythm Control

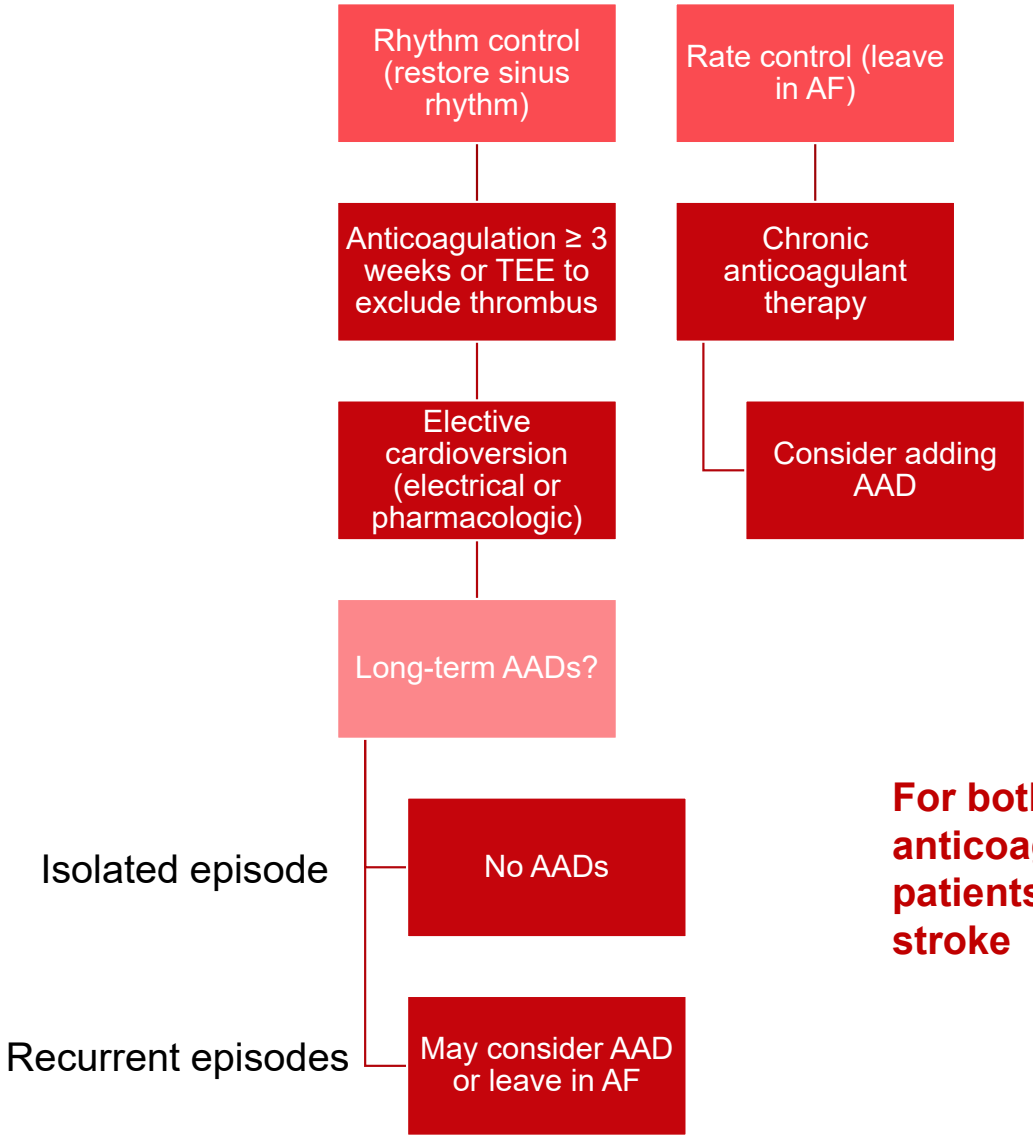
- Catheter Ablation
  - Anticoagulation prior to procedure and for ≥ 2 months after



- Surgical Maze Procedure
  - Appropriate for selected patients undergoing cardiac surgery for other indications




Atrial Fibrillation/Flutter
Severe symptoms
Minimal or moderate symptoms
DCC
Slow ventricular rate (BB, CCB, digoxin)
If atrial flutter only
Rhythm control (restore sinus rhythm)
Rate control (leave in AF)
Consider ablation



For both: consider chronic anticoagulant therapy for patients with risk factors for stroke

Questions?

- Don’t hesitate to reach out with any questions or concerns:
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