37th Annual Jose I. Ricard, MD
Family Medicine & Sports Medicine Conference

Management
of
Atrial fibrillation

11thth Nov 2023

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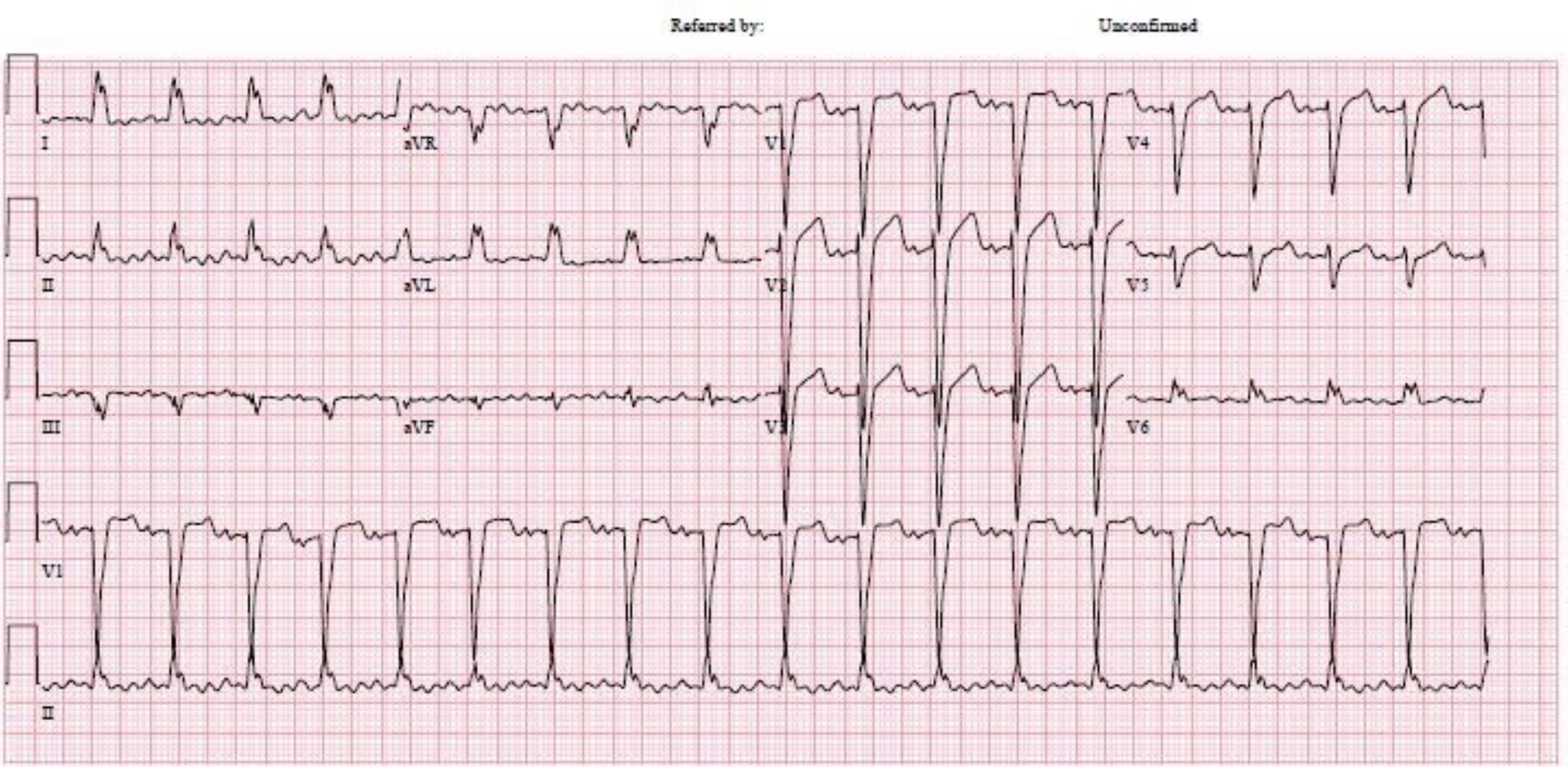
Financial Disclosure

None related to this presentation

Case 1

68 years old male
PM of COPD, DM type II, HTN and TIA
1 week H/O palpitation and cough
BP 100/62



Whats next?

A- Anticoagulation + TEE +/- cardioversion

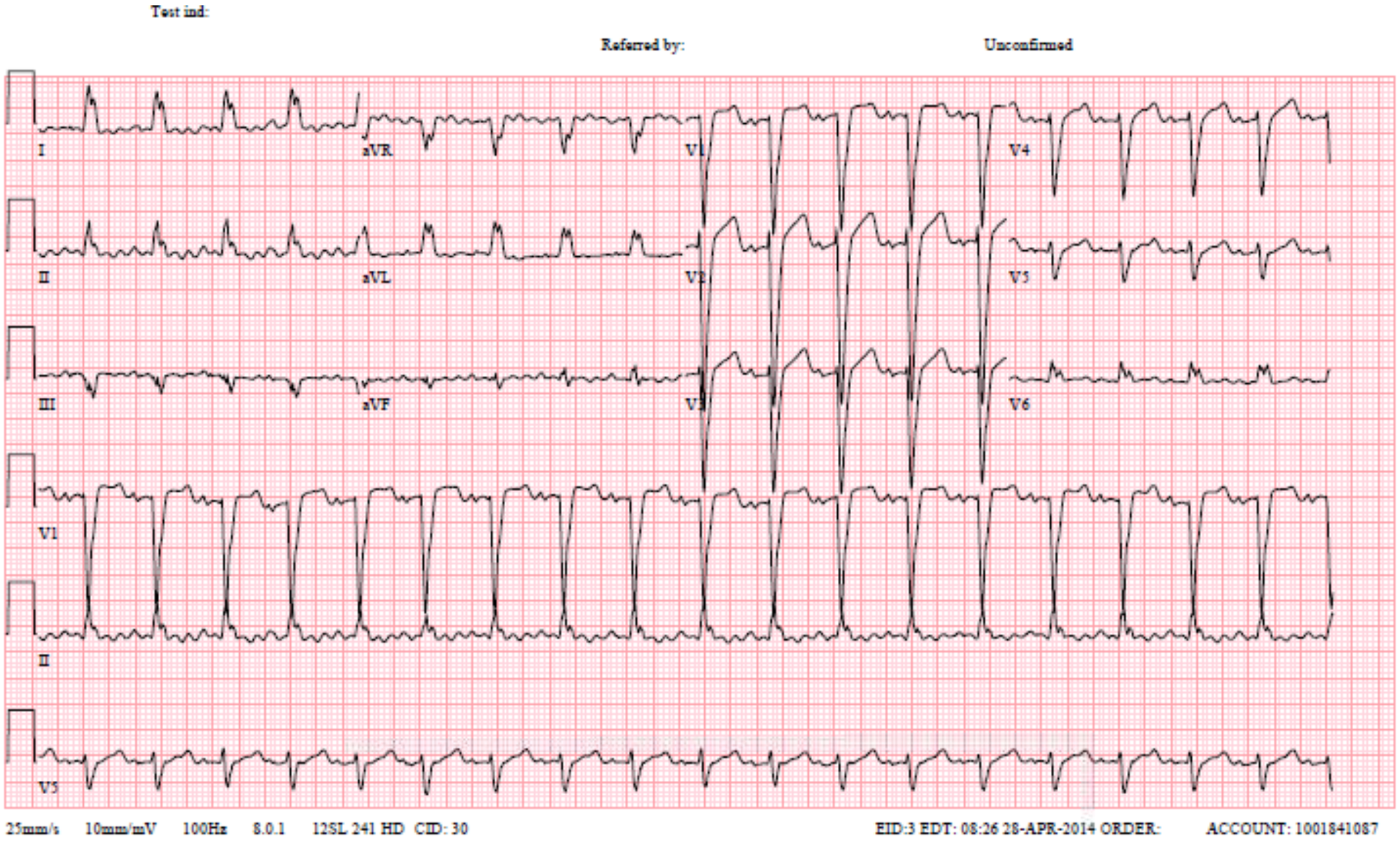
B- Anticoagulation + Rate Control

C- Anticoagulation + Amiodarone

D- Anticoagulation + Flecainide

E- None of the above

Case 1



A- Anticoagulation + TEE +/- cardioversion

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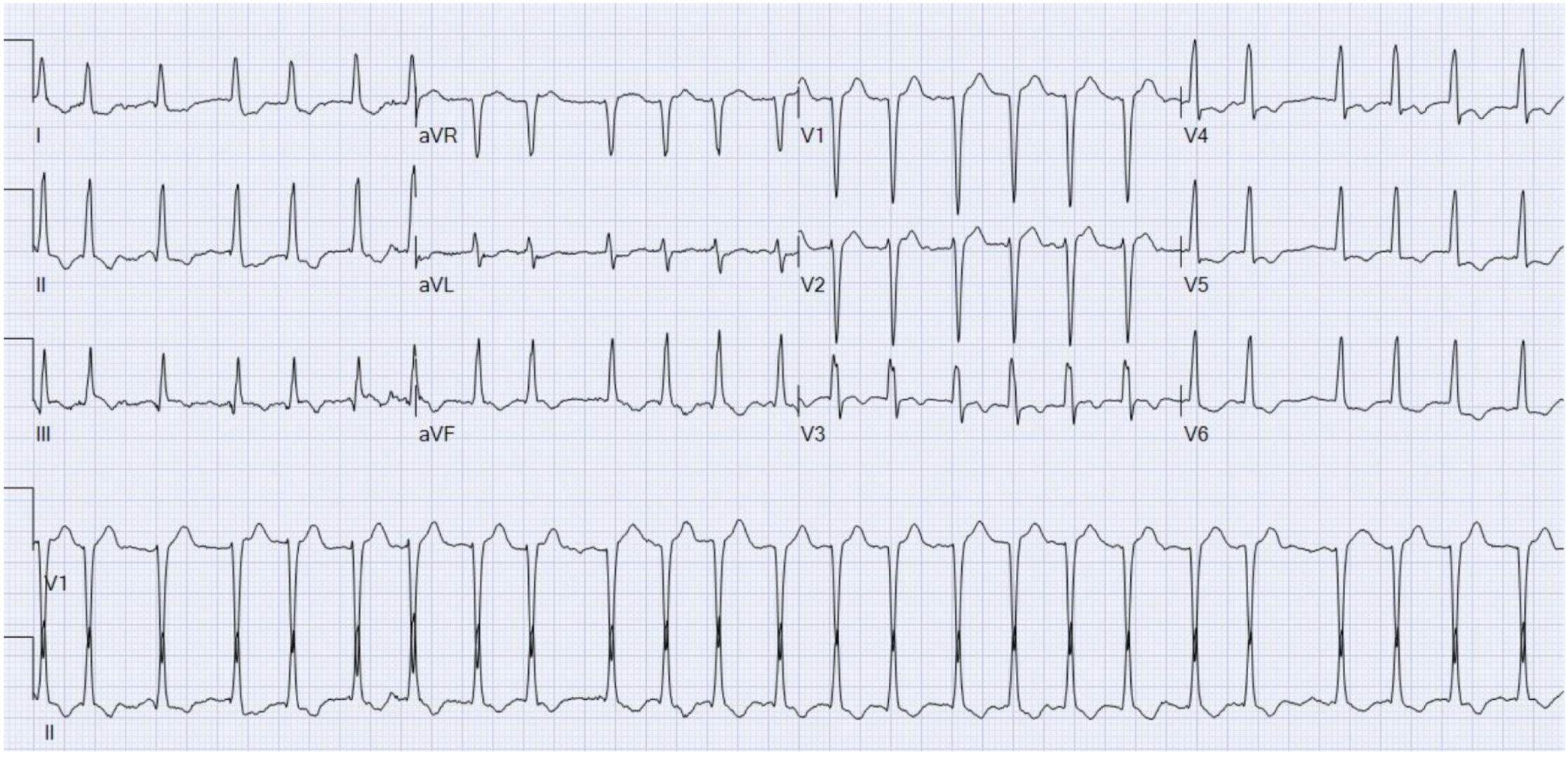
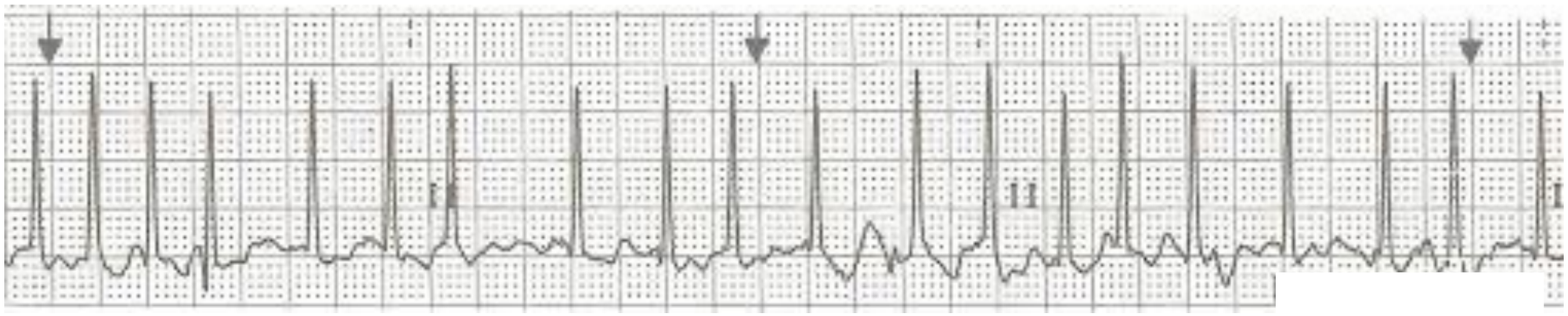
Diagnosis of Atrial Fibrillation

12 lead ECG



Diagnosis of Atrial Fibrillation

Single Lead- telemetry strip

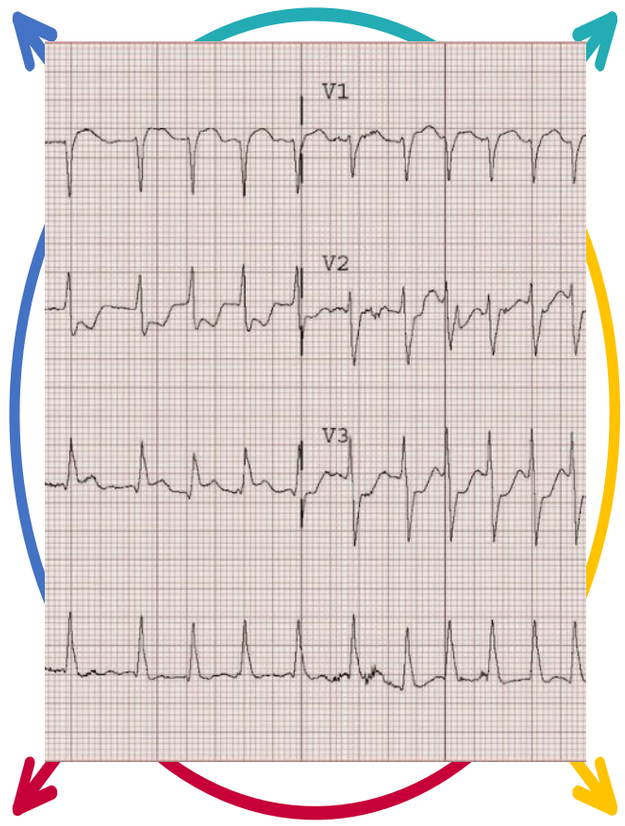


> 30 sec irregular irregular rhythm with no p wave

Differential diagnosis

Irregular NCT

Atrial Fibrillation

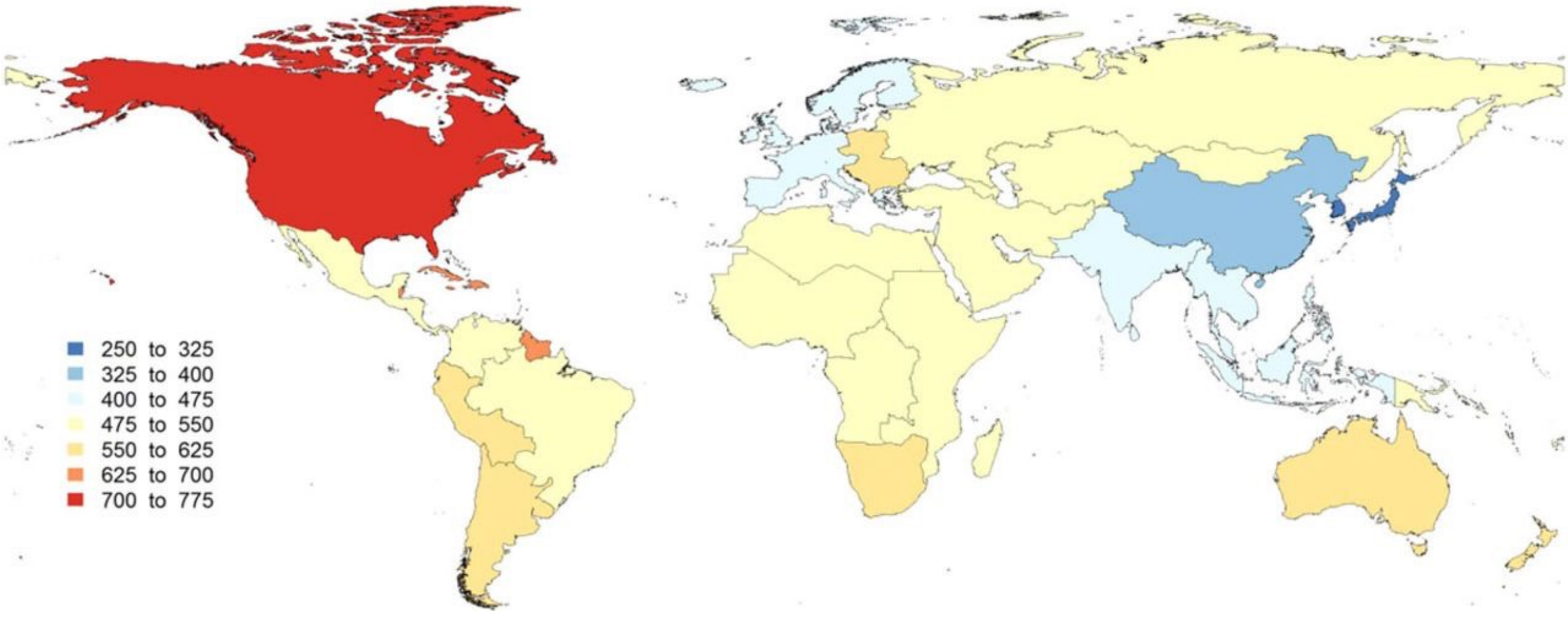


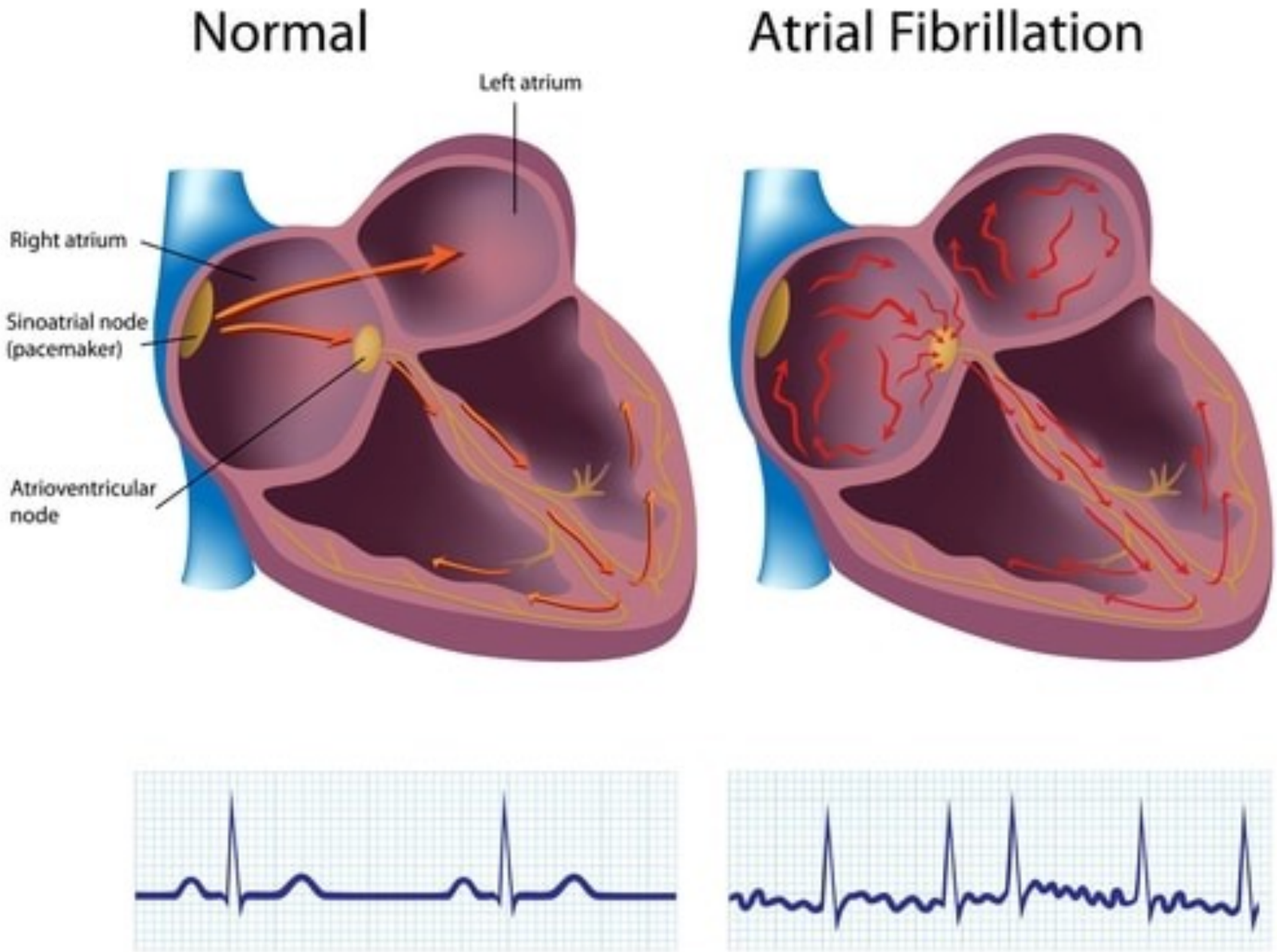
Atrial flutter/AT with variable block

Sinus Tachycardia with frequent PACs

Multi-focal atrial tachycardia

Prevalence of Atrial Fibrillation

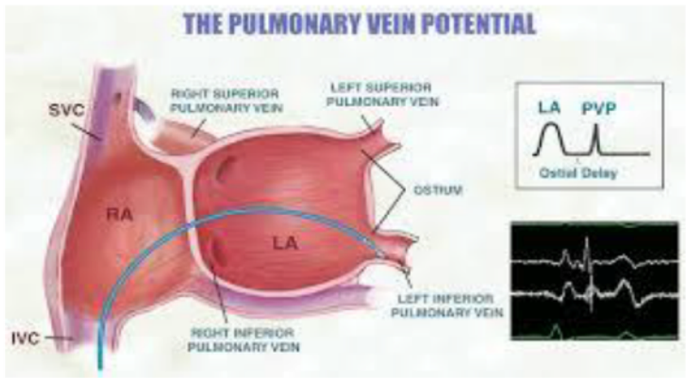



Normal
Atrial Fibrillation
Left atrium
Right atrium
Sinoatrial node
(pacemaker)
Atrioventricular
node

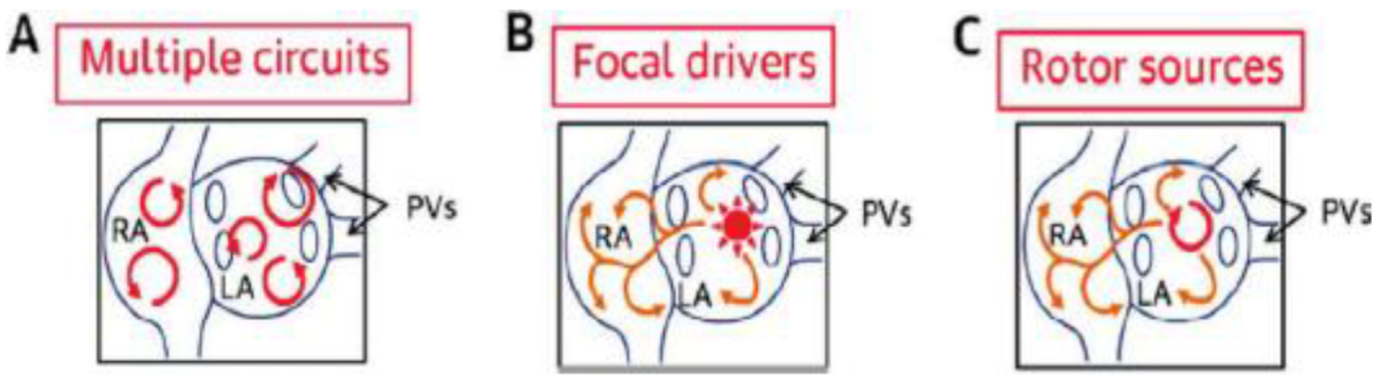
Mechanisms of AF

- AF requires both a trigger for initiation & anatomic substrate for maintenance

  - ➢ AF Triggers



  - ➢ AF Substrates



Risk Factors for Atrial Fibrillation

Atrial Fibrillation Symptoms

Heart palpitations

Fatigue

Shortness of breath

Difficulty exercising

Anxiety

Chest pain

Dizziness

Definitions

- Paroxysmal
- Persistent
- Long-standing persistent
- Permanent

January et al. JACC 2014.

New onset AF

Hemodynamically unstable new onset AF

↓

Immediate cardioversion
Followed by 4 weeks of OAC

Hemodynamically stable new onset AF

AF onset < 48 hrs

↓

DCCV followed by
4 weeks of OAC

AF ≥ 48 hours or unknown duration

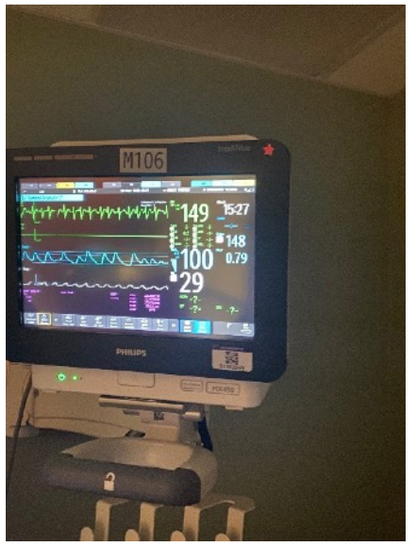
↓

TEE guided DCCV
followed by 4 weeks
of OAC

↓

OAC for at least 3
weeks before and 4
weeks after DCCV

Afib Management



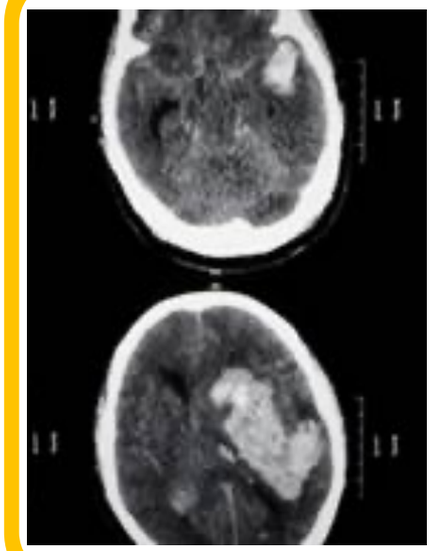
Initial Assessment

H&P
12 lead ECG
Blood work
Imaging
NPO

Rate vs Rhythm Control

IV vs Oral Medication

Electrical vs Chemical cardioversion



Risk assessment

CHADS-VASc score
HAS-BLED
Orbit score

Follow up

Cardiology

Assessment of Atrial Fibrillation at ED

Focus History & Physical Examination

12 lead ECG

Blood tests

CBC, electrolyte, Creatinine, eGFR, TSH, BNP, cTr

Imaging

CXR, echo

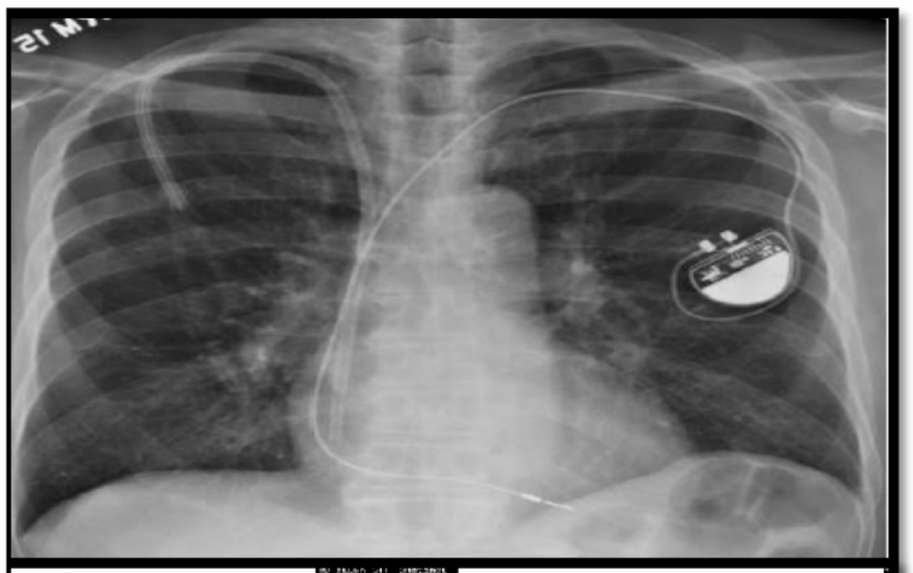
Rate Control Strategy

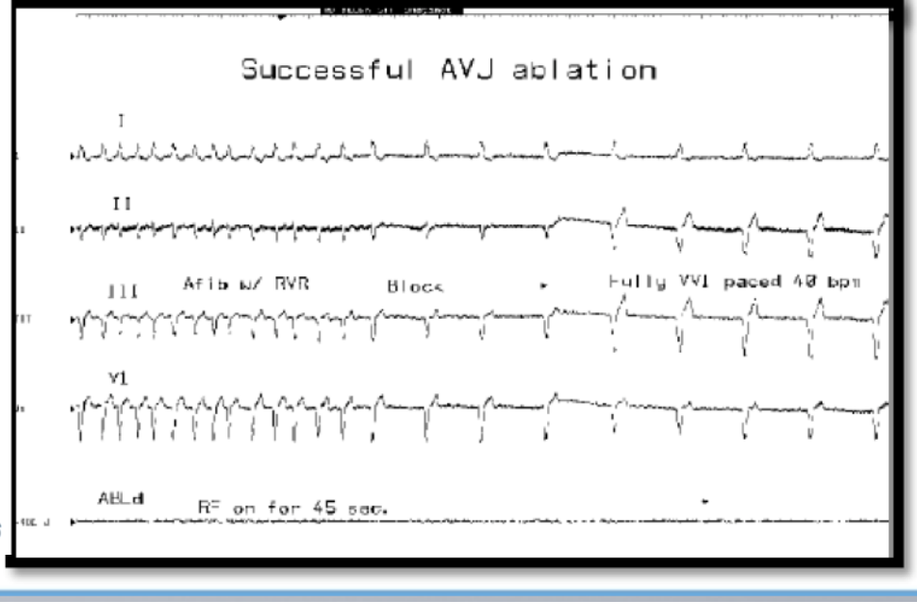
Pharmacologic Rate Control

Common Medication Dosage for Rate Control of AF

	Intravenous Administration	Usual Oral Maintenance Dose
Beta-Blockers		
Metoprolol tartrate	2.5-5.0 mg IV bolus over 2 minutes; 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 minute, then 50-300 mcg/kg/minute IV	N/A
Propanolol	1 mg IV over 1 minute, up to 3 doses at 2 minute 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 minutes, may give an additional 10.0 mg after 30 minutes if no response, then 0.005 mg/kg/minute infusion	180-480 mg qd (ER)
Diltiazem	0.25 mg/kg IV bolus over 2 minutes, then 5-15 mg/hours	120-360 mg qd (ER)
Digitalis Glycosides		
Digoxin	0.25 mg IV with repeat dosing to a maximum of 1.5 mg over 24 hours	0.125-0.25 mg qd
Others		
Amiodarone	300 mg IV over 1 hour, then 10-50 mg/hour over 24 hours	100-200 mg qd

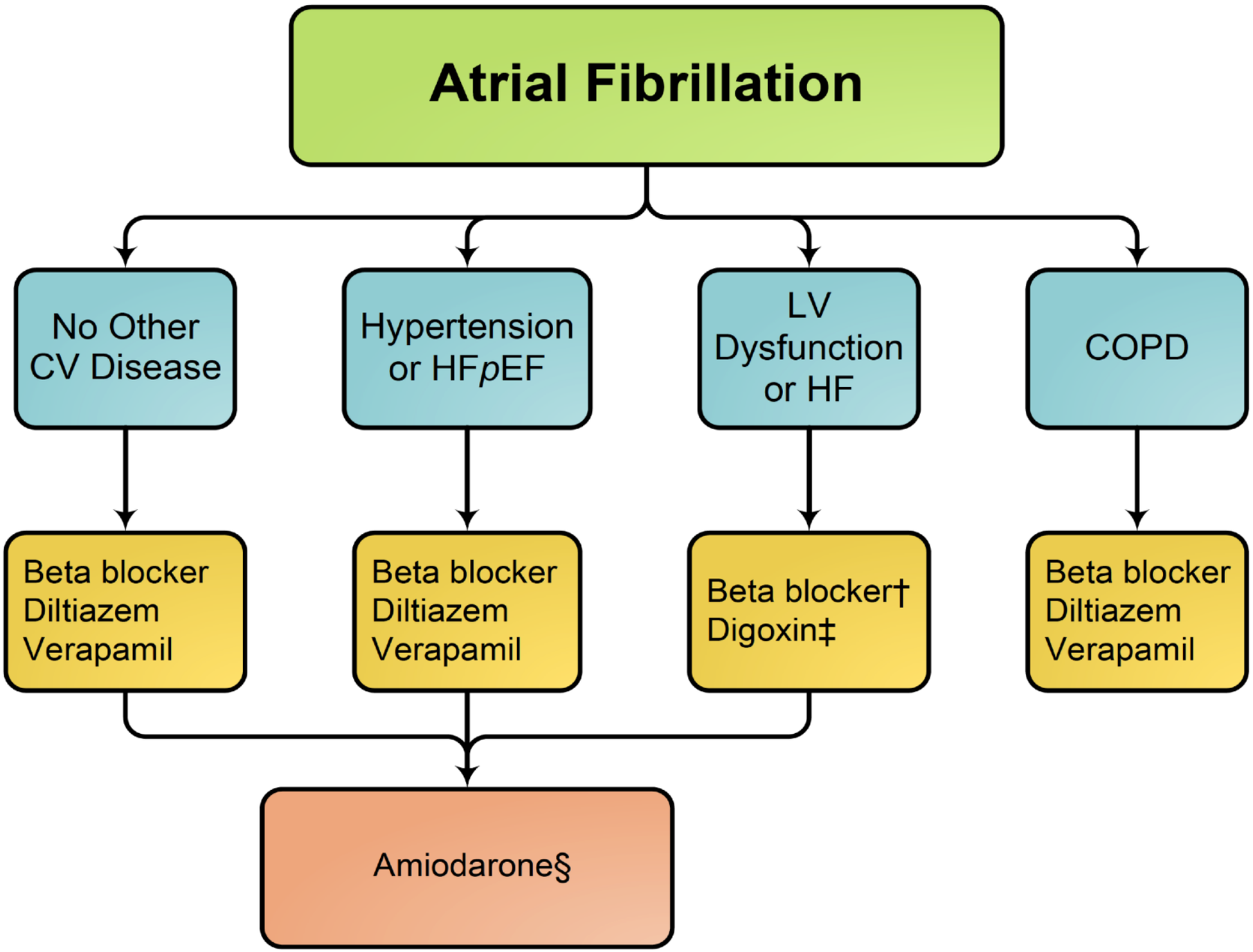
Pace & Ablate





J Am Coll Cardiol 2014;64:e1-76

Rate Control for AF



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Rhythm Control Strategy

Atrial Fibrillation

Chemical Cardioversion

Class Ic

Flecainide, Propafenone

Class III

Amiodarone, sotalol

Electrical Cardioversion

External Electrical Cardioversion

Internal Electrical Cardioversion

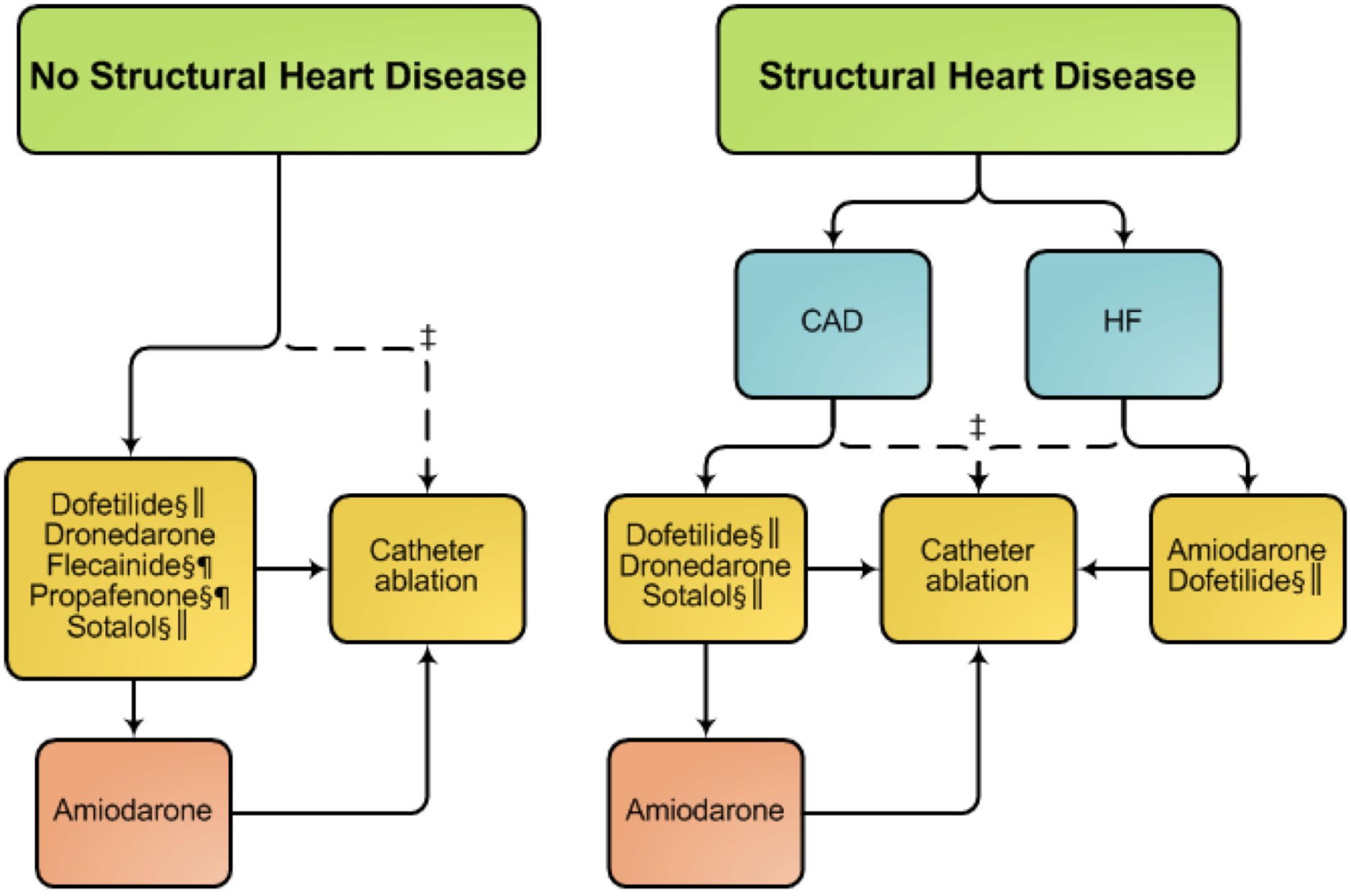
Catheter Ablation

Radiofrequency

Cryo

PFA

Rhythm Control for PAF and PsAF



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Chemical Cardioversion

Indications
1. *Pharmacological CV*; as an initial treatment may be considered in order to initiate a long-term rhythm control management strategy for patients with recent-onset AF within 48 h of onset by patient/physician choice **2.** *Pharmacological CV*; as an initial treatment may be considered in order to initiate a long-term rhythm control management strategy for patients with recent-onset AF over 48 h of onset when TOE has excluded left atrial appendage thrombus by patient/physician choice **3.** *Pharmacological CV*; should be considered in order to to initiate a long-term rhythm control management strategy after electrical CV failure to restore sinus rhythm in patients with recent-onset AF within 48 h of onset or over 48 h if thrombus exluded at TOE **4.** Pretreatment with antiarrhythmic drugs (amiodarone, flecainide, propafenone or ibutilide) in order to enhance success of electrical CV (*enhanced/facilitated elective electrical CV*) and prevent recurrent AF, in patients patients with recent-onset AF within 48 h of onset or over 48 h if thrombus excluded at TOE
Contraindications
1. Known atrial thrombus **2.** Severe electrolyte imbalance (e.g. hypokalemia) or hyperthyroidism

Chemical Cardioversion

Drug	Initial dose	Maintenance dose	Adverse effects	Contraindication and precautions
Amiodarone[a]	5 mg/kg i.v. over 1 h	50 mg/h	Phlebitis, hypotension, bradycardia, pulmonary toxicity, hepatotoxicity, photosensitivity, corneal deposits, skin discoloration, hypo/hyper -thyroidism, polyneuropathy, optic neuropathy, interaction with acenocoumarol/ warfarin, bradycardia, QT/QTc prolongation, torsades de pointes (rare)	Hypo or hyper thyroidism, QTc interval > 500 msec, when using concomitant therapy with QT-prolonging drugs, dose og VKAs and of digitoxin/digoxin should be reduced
Flecainide b	2 mg/kg i.v. over 10 min, or 200-300 mg p.o. (pill in the pocket)[c]	100-150 mg/ 12 h	Decrease in BP, may prolong QRS duration, and hence the QT interval; and may inadvertently increase the ventricular rate due to CV to AFL and 1:1 conduction to the ventricles	Not suitable for patients with marked structural heart disease; branch block or wide QRS complex, postinfarction scar, heart failure
Ibutilide	1 mg i.v. over 10 min	1 mg i.v. over 10 min after waiting for 10 min (If AF persists)	Can cause prolongation of the QT interval and torsades de pointes; watch for abnormal T-U waves or QT prolongation. Will slow the ventricular rate, AV block	LV hypertrophy (WT ≥ 1.4 cm), Severe LV systolic dysfunction (EF < 20%), ACS, Concurrent use of Class IA or III antiarrhythmics within 4 hours after ibutilide, QTc interval > 440 msec.
Propafenone b	2 mg/kg i.v. over 10 min or 450-600 mg (oral) (pill in the pocket)[c]	150-300 mg/ 8 h p.o.	Decrease in BP, not suitable for patients with marked structural heart disease; may prolong QRS duration; will slightly slow the ventricular rate, but may inadvertently increase the ventricular rate due to CV to AFL and 1:1 conduction to the ventricles	Contraindicated in coronary artery disease, reduced LV ejection fraction and heart failure, LV hypertrophy (WT ≥ 1.4 cm), Caution in the presence of conduction system Disease (branch block or wide QRS complex) and renal impairment.
Vernakalant	3 mg/kg i.v. over 10 min	Second infusion of 2 mg/kg i.v. over 10 min after 15 min first infusion (If AF persists)	Sneezing, dysgeusia, paraesthesia, nausea, cough, pruritus, dizziness, hyperhidrosis, hypotension or decrease in BP (R39)	Contraindicated in moderate or severe HF, severe AS, ACS (in the last 30 days) or hypotension (SBP < 100 mmHg) Caution in mild HF

Dosage and Safety Considerations for Maintenance of Sinus Rhythm in Atrial Fibrillation (1 of 3)

Drug	Usual Doses	Exclude/Use With Caution	Major Pharmacokinetic Drug Interactions
Vaughan Williams class IA			
Disopyramide	• Immediate release: 100-200 mg once every 6 hours • Extended release: 200-400 mg once every 12 hours	• HF • Prolonged QT interval • Prostatism, glaucoma • Avoid other QT interval-prolonging drugs	• Metabolized by *CYP3A4:* caution with inhibitors (e.g., verapamil, diltiazem, ketoconazole, macrolide antibiotics, protease inhibitors, grapefruit juice) and inducers (e.g., rifampin, phenobarbital, phenytoin)
Quinidine	• 324-648 mg every 8 hours	• Prolonged QT interval • Diarrhea	• Inhibits *CYP2D6:* ↑concentrations of tricyclic antidepressants, metoprolol, antipsychotics; ↓ efficacy of codeine • Inhibits P-glycoprotein: ↑ digoxin concentration
Vaughan Williams class IC			
Flecainide	• 50-200 mg once every 12 hours	• Sinus or AV node dysfunction • HF • CAD • Atrial flutter • Infranodal conduction disease • Brugada syndrome • Renal or liver disease	• Metabolized by *CYP2D6* (inhibitors include quinidine, fluoxetine, tricyclics; also genetically absent in 7%-10% of population) and renal excretion (dual impairment can ↑↑ plasma concentration)
Propafenone	• Immediate release: 150-300 mg once every 8 hours • Extended release: 225-425 mg once every 12 hours	• Sinus or AV node dysfunction • HF • CAD • Atrial flutter • Infranodal conduction disease • Brugada syndrome • Liver disease • Asthma	• Metabolized by *CYP2D6* (inhibitors include quinidine, fluoxetine, tricyclics; also genetically absent in 7-10% of population)-poor metabolizers have ↑ beta blockade • Inhibits P-glycoprotein: ↑ digoxin concentration • Inhibits *CYP2C9*: ↑ warfarin concentration (↑ INR 25%)

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Dosage and Safety Considerations for Maintenance of Sinus Rhythm in Atrial Fibrillation (2 of 3)

Drug	Usual Doses	Exclude/Use With Caution	Major Pharmacokinetic Drug Interactions
Vaughan Williams class III			
Amiodarone	• Oral: 400-600 mg daily in divided doses for 2-4 weeks; maintenance typically 100-200 mg daily • IV: 150 mg over 10 minutes; then 1 mg/minute for 6 hours; then 0.5 mg/minute for 18 hours or change to oral dosing; after 24 hours, consider decreasing dose to 0.25 mg/minute	• Sinus or AV node dysfunction • Infranodal conduction disease • Lung disease • Prolonged QT interval	• Inhibits most CYPs to cause drug interaction: ↑ concentrations of warfarin (↑ INR 0%-200%), statins, many other drugs • Inhibits P-glycoprotein: ↑ digoxin concentration
Dofetilide	• 125-500 mcg once every 12 hours	• Prolonged QT interval • Renal disease • Hypokalemia • Hypomagnesemia • Diuretic therapy • Avoid other QT interval prolonging drugs	• Primary renal elimination involving glomerular filtration and active tubular secretion: verapamil, HCTZ, cimetidine, ketoconazole, trimethoprim, prochlorperazine, and megestrol are contraindicated; discontinue amiodarone at least 3 mo before initiation
Dronedarone	• 400 mg once every 12 hours	• Bradycardia • HF • Long-standing persistent AF/flutter • Liver disease • Prolonged QT interval	• Metabolized by *CYP3A:* Caution with inhibitors (e.g., verapamil, diltiazem, ketoconazole, macrolide antibiotics, protease inhibitors, grapefruit juice) and inducers (e.g., rifampin, phenobarbital, phenytoin) • Inhibits *CYP3A, CYP2D6,* P-glycoprotein: ↑ concentrations of some statins, sirolimus, tacrolimus, beta blockers, digoxin

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Dosage and Safety Considerations for Maintenance of Sinus Rhythm in Atrial Fibrillation (2 of 3)

Drug	Usual Doses	Exclude/Use With Caution	Major Pharmacokinetic Drug Interactions
Vaughan Williams class III			
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Dosage and Safety Considerations for Maintenance of Sinus Rhythm in Atrial Fibrillation (3 of 3)

Drug	Usual Doses	Exclude/Use With Caution	Major Pharmacokinetic Drug Interactions
Vaughan Williams class III			
Sotalol	• 40-160 mg once every 12 hours	• Prolonged QT interval • Renal disease • Hypokalemia • Hypomagnesemia • Diuretic therapy • Avoid other QT interval prolonging drugs • Sinus or AV nodal dysfunction • HF • Asthma	• None (renal excretion)

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Pill-in-the Pocket Approach for PAF

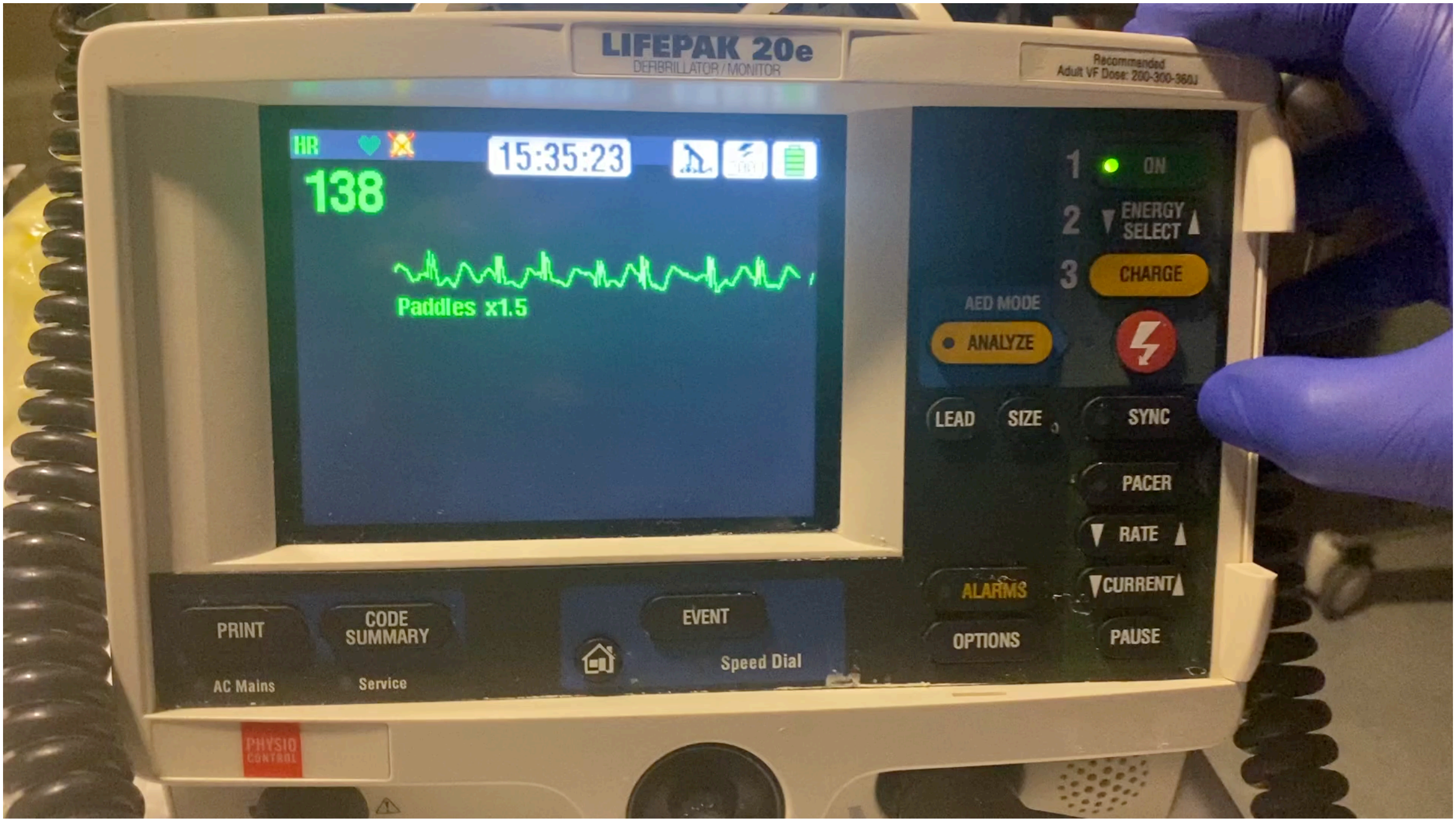
- In selected patients with infrequent symptomatic episodes of PAF, a single bolus of oral flecainide 300 mg or propafenone 450 can be self-administered by the patient at home (‘pill in the pocket’ therapy) to restore sinus rhythm.

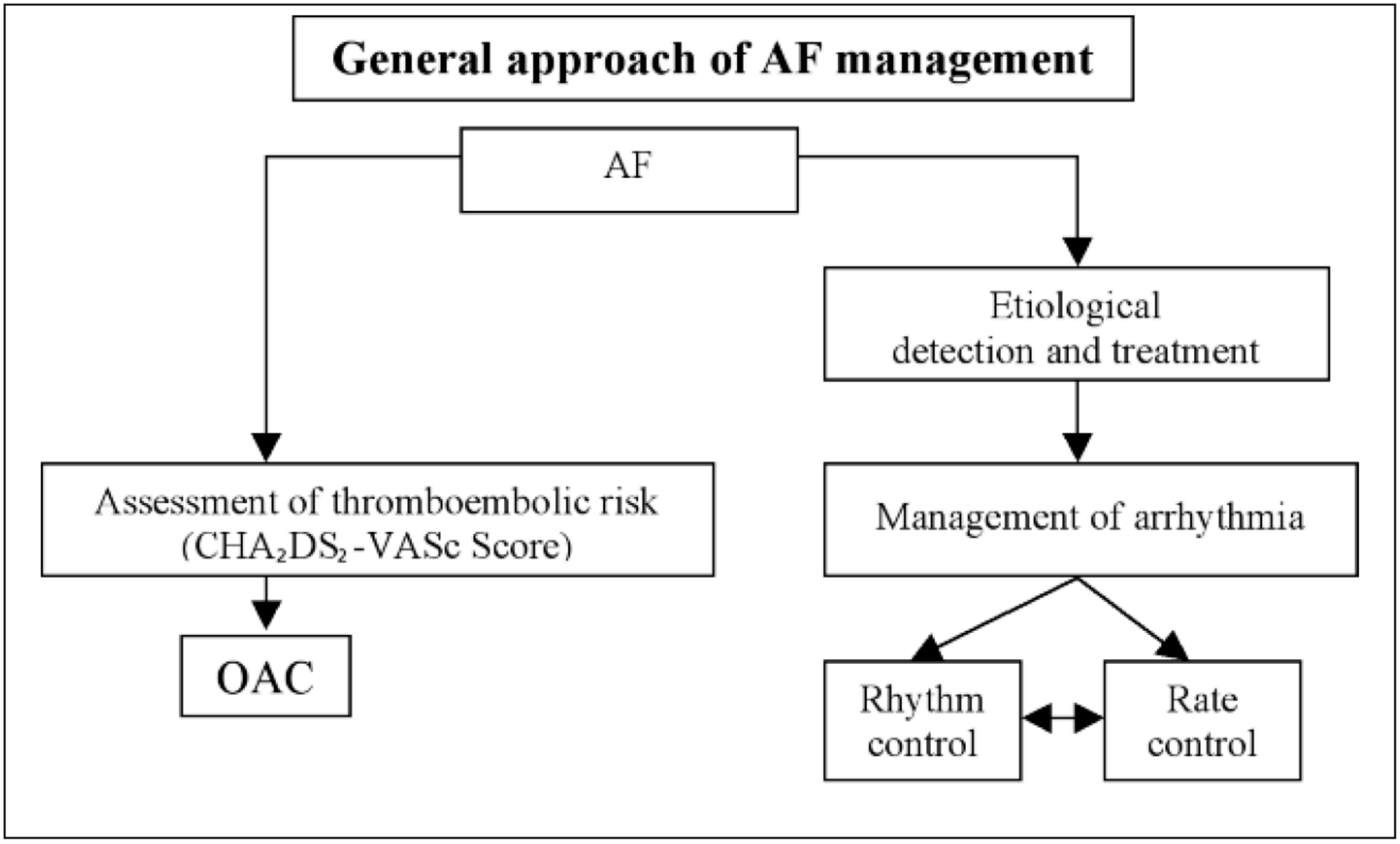
- In addition, patients instructed to take beta-blocker or calcium channel blocker for rate control

Electrical Cardioversion

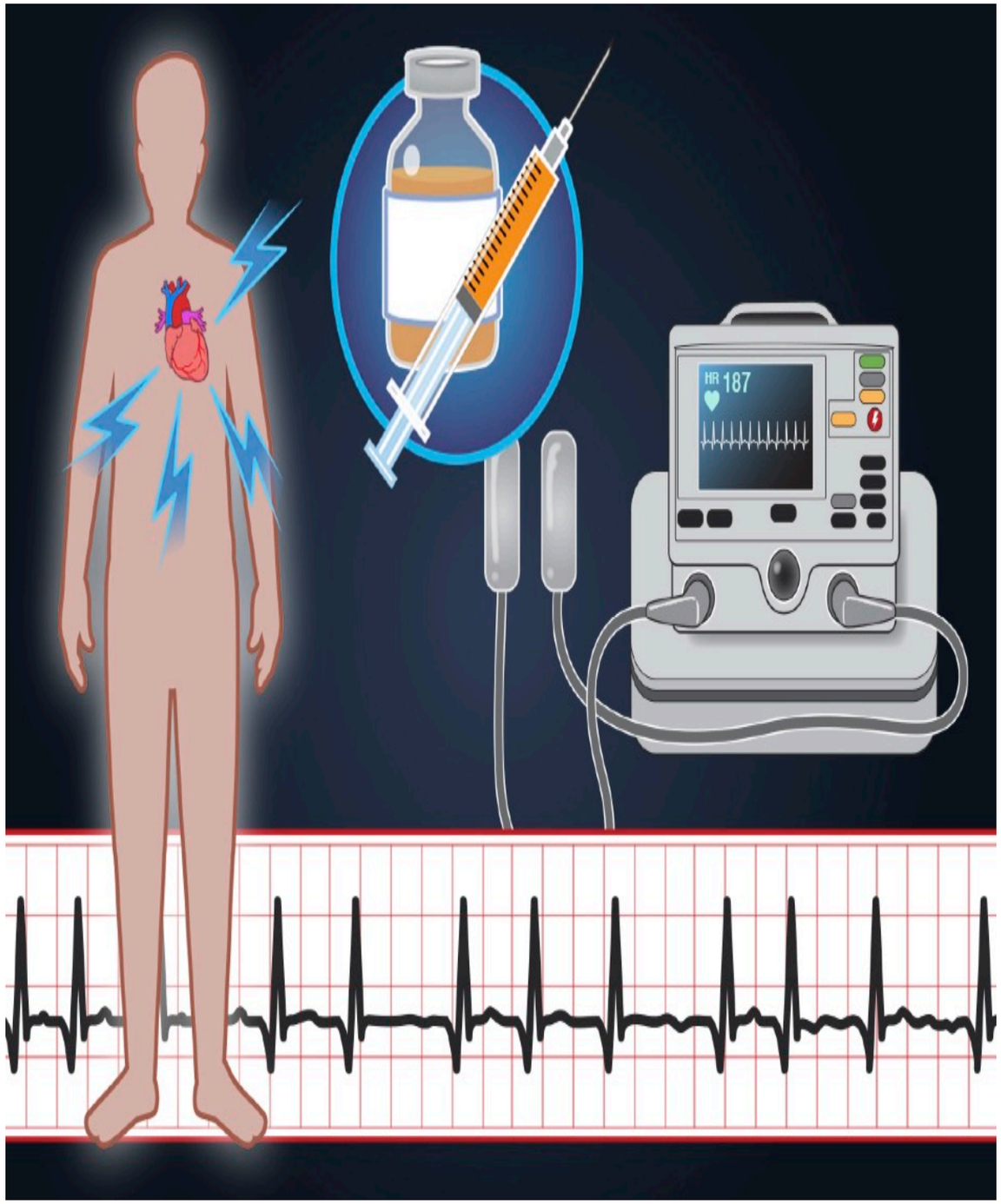
Indications
1. *Emergent electrical CV;* for patients with recent-onset AF and rapid ventricular rate who has hemodynamic instability (ongoing myocardial ischemia, symptomatic hypotension, heart failure) that does not respond promptly to pharmacological drugs **2.** *Emergent electrical CV;* for patients with recent-onset AF involving preexcitation when very rapid tachycardia or hemodynamic instability occurs **3.** *Urgent electrical CV;* for patients without hemodynamic instability when symptoms of AF are unacceptable to the patient. In case of early relapse of AF after CV, repeated electrical CV may be made following administration of antiarrhythmic medication **4.** Elective electrical CV as an initial treatment may be considered in order to initiate a long-term rhythm control management strategy for patients with recent-onset AF within 48 h of onset by patient/physician choice **5.** Elective electrical CV as an initial treatment may be considered in order to initiate a long-term rhythm control management strategy for patients with recent-onset AF over 48 h of onset when TOE has excluded left atrial appendage thrombus by patient/physician choice **6.** Enhanced/facilitated elective electrical CV which is electrical CV after pretreatment with antiarrhythmic drugs (amiodarone, flecainide, propafenone or ibutilide) in order to enhance success of electrical CV and prevent recurrent AF, should be considered for patients with recent-onset AF within 48 h of onset or over 48 h if thrombus exluded at TOE **7.** Electice electrical CV should be considered in order to to initiate a long-term rhythm control management strategy after antiarrhythmic drug failure to restore sinus rhythm in patients with recent-onset AF within 48 h of onset or over 48 h if thrombus exluded at TOE
Contraindications
1. Known atrial thrombus and no emergent indication for CV **2.** In the presence of digitalis toxicity **3.** Severe electrolyte imbalance (e.g. hypokalemia) or hyperthyroidism and no emergent indication for CV **4.** Frequent repetition of direct-current cardioversion is not recommended for patients who have relatively short periods of sinus rhythm between relapses of AF after multiple CV procedures despite prophylactic antiarrhythmic drug therapy **5.** In the presence of doubt about underlying rhythm (e.g multifocal atrial tachycardia) and no emergent indication for CV R43-45 **6.** Elective electrical CV without anticoagulation **7.** Elective electrical CV in patients who can not be safely sedated

DCCV


LIFEPAK 20e
DEFIBRILLATOR / MONITOR
Recommended
Adult VF Dose: 200-300-360J
HR
138
15:35:23
Paddles x1.5
1
ON
2
ENERGY SELECT
3
CHARGE
AED MODE
ANALYZE
LEAD
SIZE
SYNC
PACER
RATE
CURRENT
ALARMS
OPTIONS
PAUSE
PRINT
CODE SUMMARY
EVENT
Speed Dial
AC Mains
Service
PHYSIO CONTROL


General approach of AF management
AF
Etiological
detection and treatment
Assessment of thromboembolic risk
(CHA2DS2-VASc Score)
OAC
Management of arrhythmia
Rhythm
control
Rate
control

Management of Atrial Fibrillation



Reversible Causes

- Detection
- Management

Rate Control

- Medication
BB, CCB, Digoxin, Amiodarone

- Pace & Ablate
Pacemaker & AV node ablation

Rhythm Control

- Electrical Cardioversion

- Chemical Cardioversion
Class Ic or III AAD

- Afib Ablation
RF, Cryo or PFA

Stroke Prevention

- Anticoagulation
Warfarin, Apixaban, Edoxaban, Rivaroxaban and Dabigatran

- LAA Occlusion
Watchman, Amulet, Lariat and surgical ligation

AF Anticoag Guideline Comparison

CHEST 2018 vs AHA/ACC/HRS 2019

CHA_2DS_2-VASc Score	
CHF (heart failure)	1
Hypertension	1
Age ≥ 75	2
Diabetes	1
Stroke	2
Vascular Disease	1
Age 65-74	1
Sex Category (female)	*1*

First-Line (for both):
DOAC therapy over warfarin

Anticoagulate based on CHA_2DS_2-VASc score

CHEST 2018
≥1 for males or
≥2 for females
(i.e. at least 1 non-sex risk factor)

AHA/ACC/HRS 2019
≥2 for males
or ≥3 for females
(i.e. at least 2 non-sex risk factors)

HAS-BLED score

Condition	Points
H - Hypertension	1
A - Abnormal renal or liver function (1 point each)	1 or 2
S - Stroke	1
B - Bleeding	1
L - Labile INRs	1
E - Elderly (> 65 years)	1
D - Drugs or alcohol (1 point each)	1 or 2

HAS-BLED score	Bleeds per 100 patient-years
0	1.13
1	1.02
2	1.88
3	3.74
4	8.70
5	12.5

Note: HAS-BLED has been validated for warfarin, but not for the new anticoagulants.

Pisters R et al. Chest 2010;138(5):1093-1100.

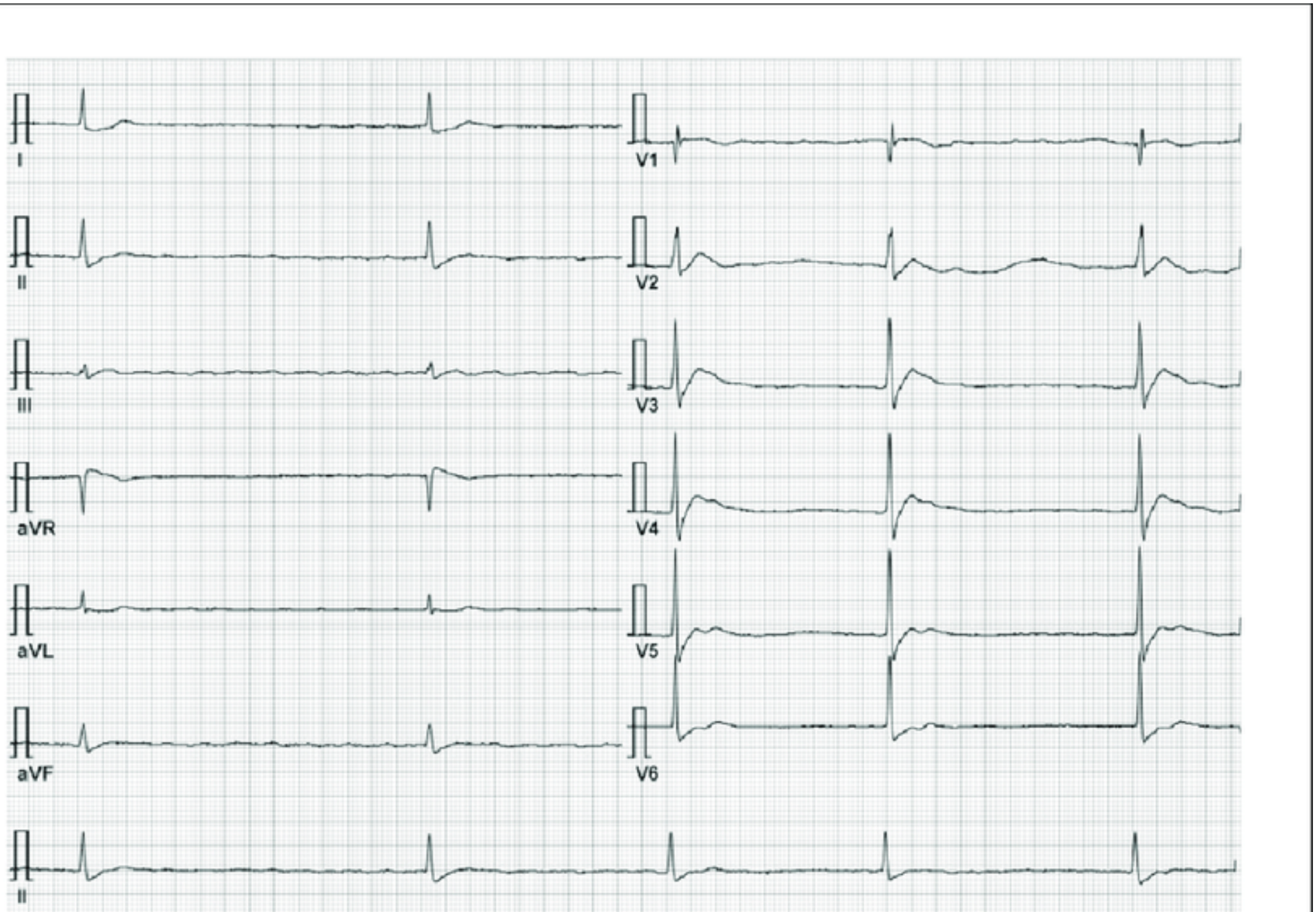
Variable		Points
Hemoglobin <13 g/dL or hematocrit <40% for males Hemoglobin <12 g/dL or hematocrit <36% for females	No	0
	Yes	2
Age > 74 years	No	0
	Yes	1
Bleeding history (Any history of GI bleeding, intracranial bleeding, or hemorrhagic stroke)	No	0
	Yes	2
eGFR <60 mL/min/1.73 m^2	No	0
	Yes	1
Treatment with antiplatelet agents	No	0
	Yes	1

ORBIT Score	Risk group	Bleeds per 100 patient-years
0 - 2	Low	2.4
3	Medium	4.7
4 - 7	High	8.1

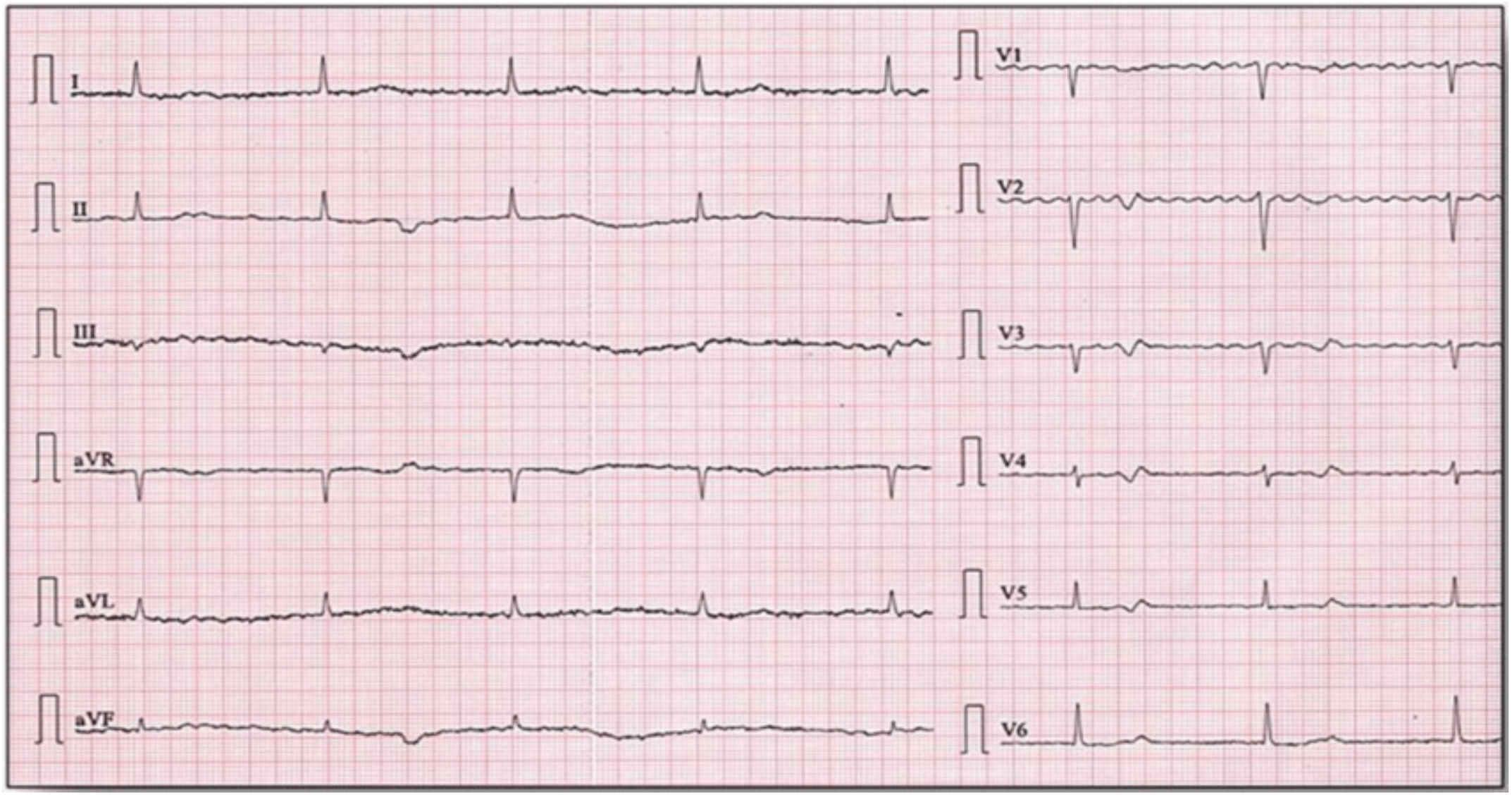
ORBIT-AF Scoring system

New Scoring system to predict the absolute bleeding risk before starting oral anticoagulant

Atrial Fibrillation
Slow Ventricular Rate



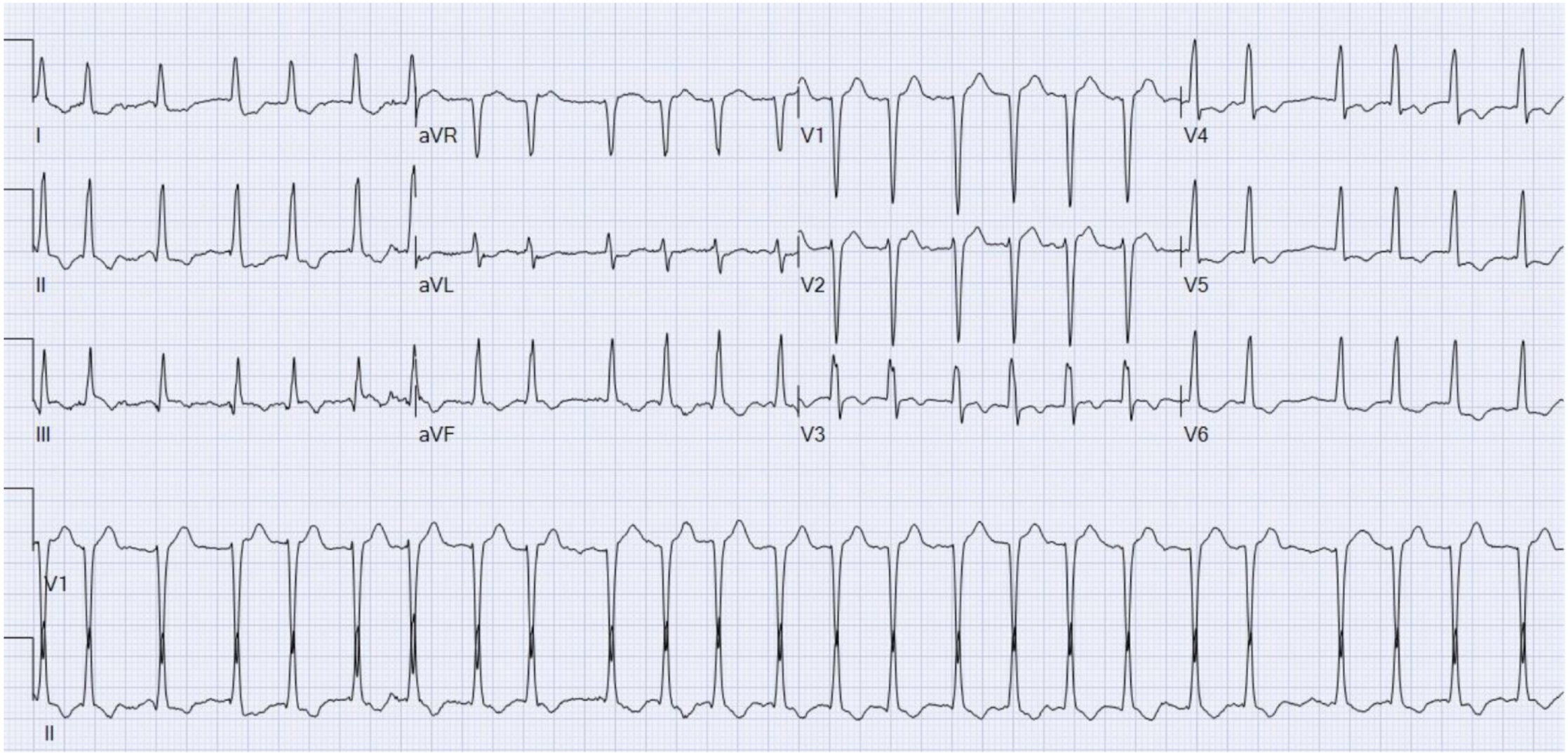
Atrial Fibrillation
Complete Heart Block



Case 2

- 68 years old female
- 1 week H/O palpitation
- PMH of HTN and Diabetes type II
- BP 100/60

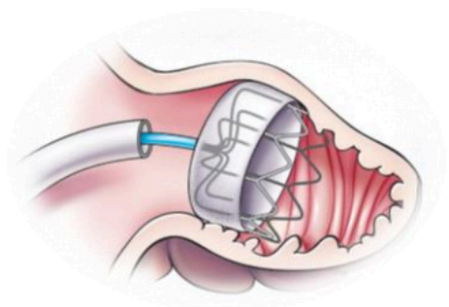
Atrial Fibrillation with RVR

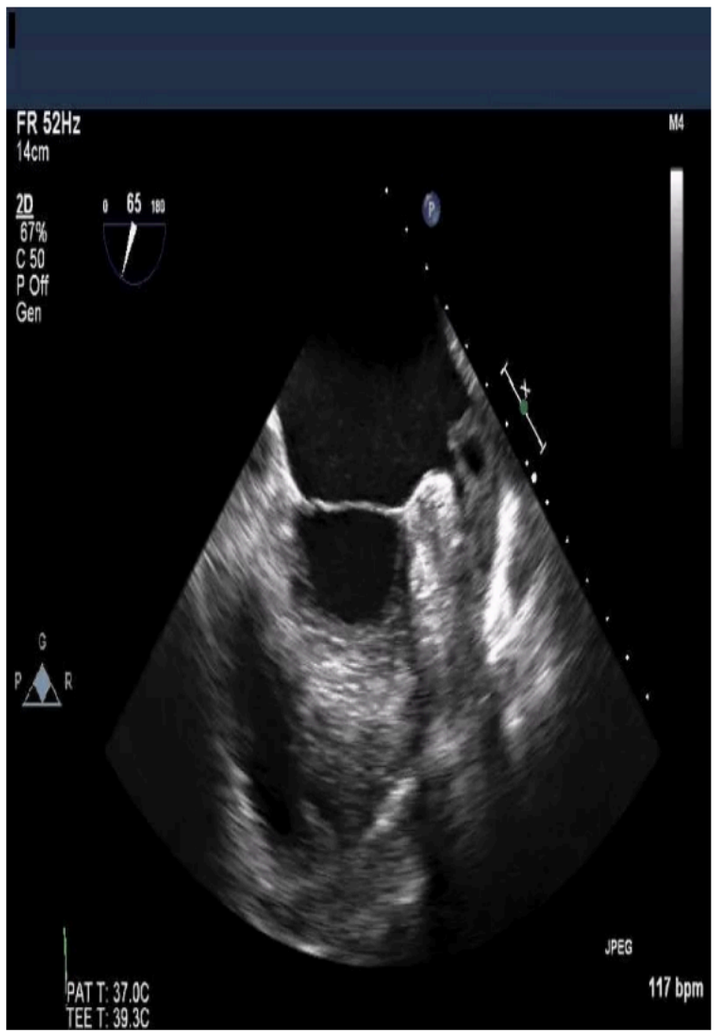


Prevention of Thromboembolism

1. Anticoagulation therapy
   - Vitamin K antagonist
   - Novel oral anticoagulants

2. Left atrial appendage occlusion
   - Watchman
   - Amulet
   - Lariat
   - Surgical ligation, exclusion



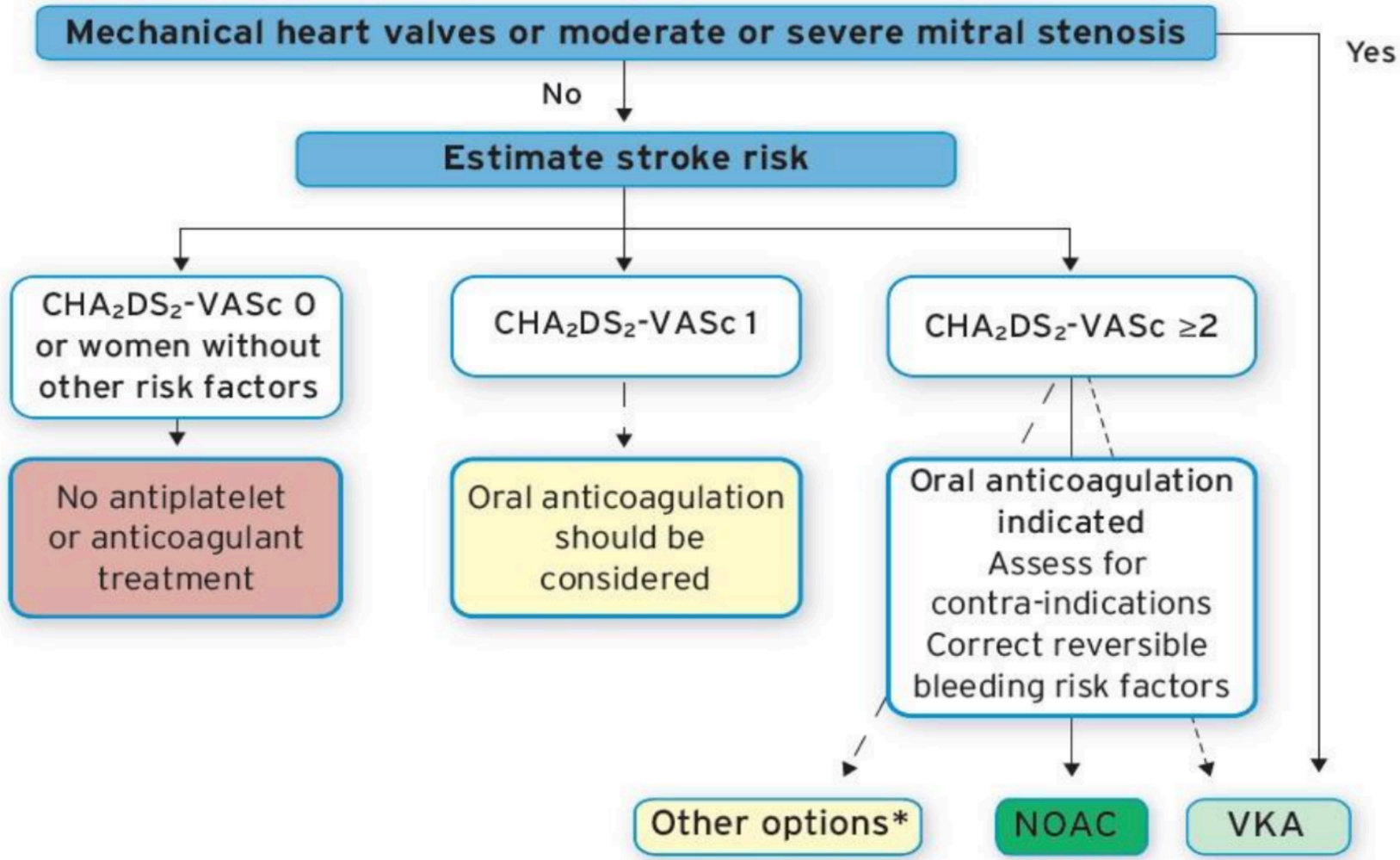


Stroke Risk in Non-valvular AF

Definition and Scores for $CHADS_2$ and CHA_2DS_2-VASc	
	Score
$CHADS_2$	
Congestive HF	1
Hypertension	1
Age ≥75 y	1
Diabetes mellitus	1
Stroke/TIA/TE	2
Maximum score	6
CHA_2DS_2-VASc	
Congestive HF	1
Hypertension	1
Age ≥75 y	2
Diabetes mellitus	1
Stroke/TIA/TE	2
Vascular disease (prior MI, PAD, or aortic plaque)	1
Age 65–74 y	1
Sex category (i.e., female sex)	1
Maximum score	9

Stroke Risk Stratification With the $CHADS_2$ and CHA_2DS_2-VASc Scores	
	Adjusted stroke rate (% per y)
$CHADS_2$*	
0	1.9
1	2.8
2	4.0
3	5.9
4	8.5
5	12.5
6	18.2
CHA_2DS_2-VASc†	
0	0
1	1.3
2	2.2
3	3.2
4	4.0
5	6.7
6	9.8
7	9.6
8	6.7
9	15.20

Stroke Prevention in AF



2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
Eur Heart J 2020 Aug 29

Bleeding Risk: HAS-BLED Score

Risk factors and definitions		Points awarded
H	**Uncontrolled hypertension** Systolic BP >160 mmHg	1
A	**Abnormal renal and/or hepatic function** Dialysis, transplant, serum creatinine >200 µmol/L, cirrhosis, bilirubin > × 2 upper limit of normal, AST/ALT/ALP >3 × upper limit of normal	1 point for each
S	**Stroke** Previous ischaemic or haemorrhagic[a] stroke	1
B	**Bleeding history or predisposition** Previous major haemorrhage or anaemia or severe thrombocytopenia	1
L	**Labile INR[b]** TTR <60% in patient receiving VKA	1
E	**Elderly** Aged >65 years or extreme frailty	1
D	**Drugs or excessive alcohol drinking** Concomitant use of antiplatelet or non-steroidal anti-inflammatory drugs; and/or excessive[c] alcohol per week	1 point for each
Maximum score		**9**

Dose selection criteria for NOACs

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Standard dose	150 mg b.i.d.	20 mg o.d.	5 mg b.i.d.	60 mg o.d.
Lower dose	110 mg b.i.d.			
Reduced dose		15 mg o.d.	2.5 mg b.i.d.	30 mg o.d.
Dose-reduction criteria	Dabigatran 110 mg b.i.d. in patients with: • Age ≥80 years • Concomitant use of verapamil, or • Increased bleeding risk	CrCl 15–49 mL/min	At least 2 of 3 criteria: • Age ≥80 years, • Body weight ≤60 kg, or • Serum creatinine ≥1.5 mg/dL (133 µmol/L)	If any of the following: • CrCl 15–50 mL/min, • Body weight ≤60 kg, • Concomitant use of dronedarone, ciclosporin, erythromycin, or ketoconazole

New onset AF

Hemodynamically unstable new onset AF

↓

Immediate cardioversion
Followed by 4 weeks of OAC

Hemodynamically stable new onset AF

AF onset < 48 hrs

↓

DCCV followed by
4 weeks of OAC

AF ≥ 48 hours or unknown duration

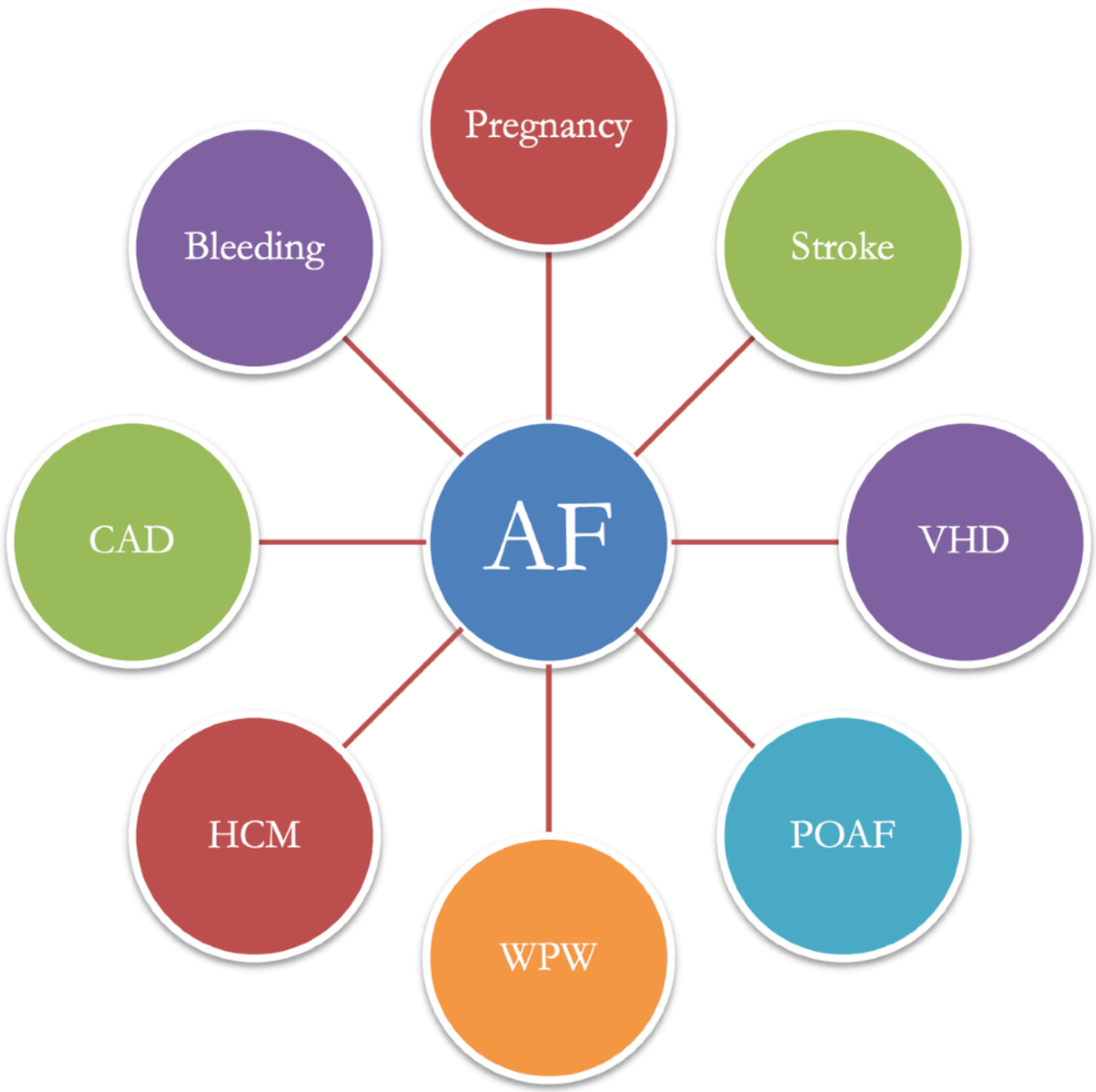
↓

TEE guided DCCV
followed by 4 weeks
of OAC

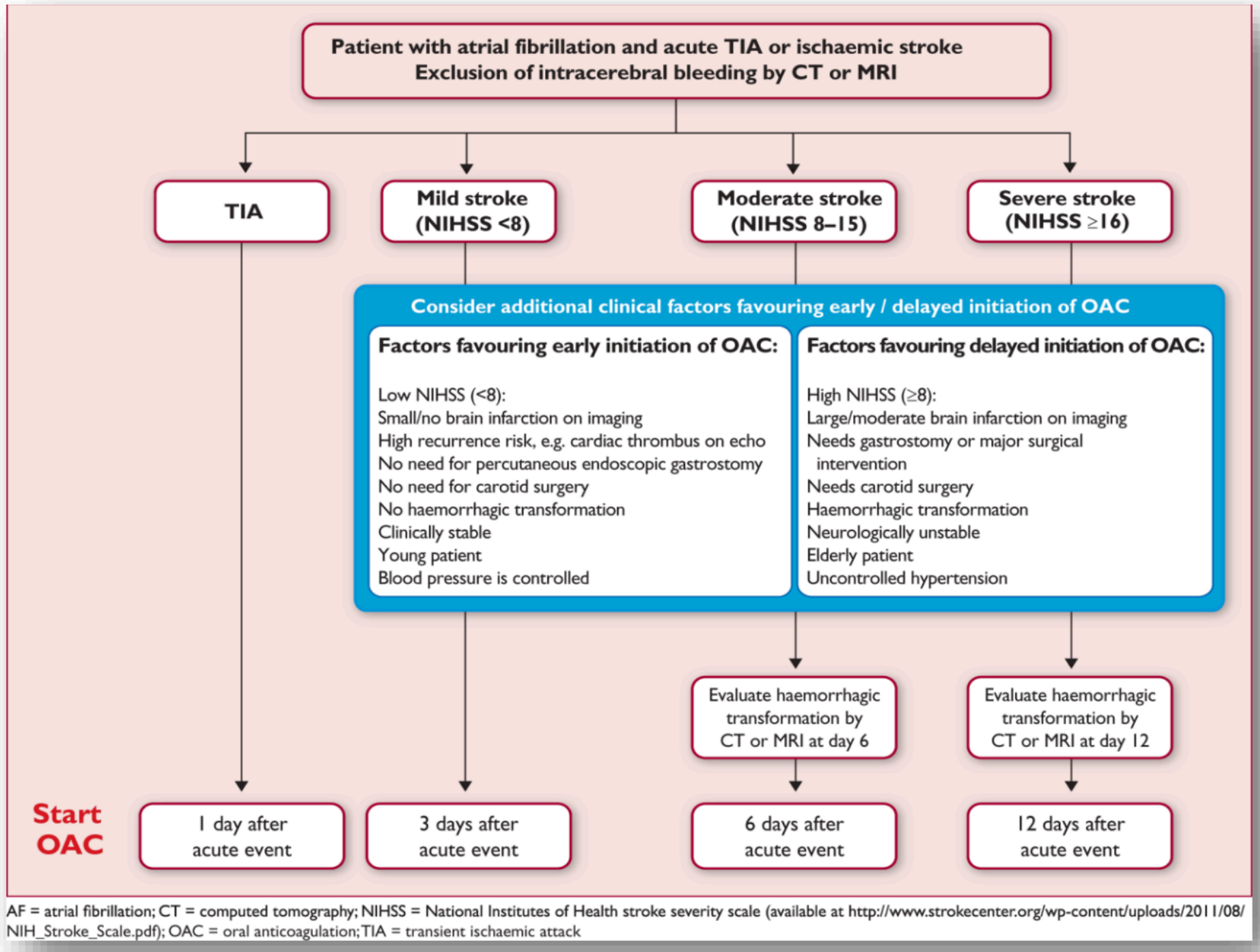
↓

OAC for at least 3
weeks before and 4
weeks after DCCV

AF in Specific Groups



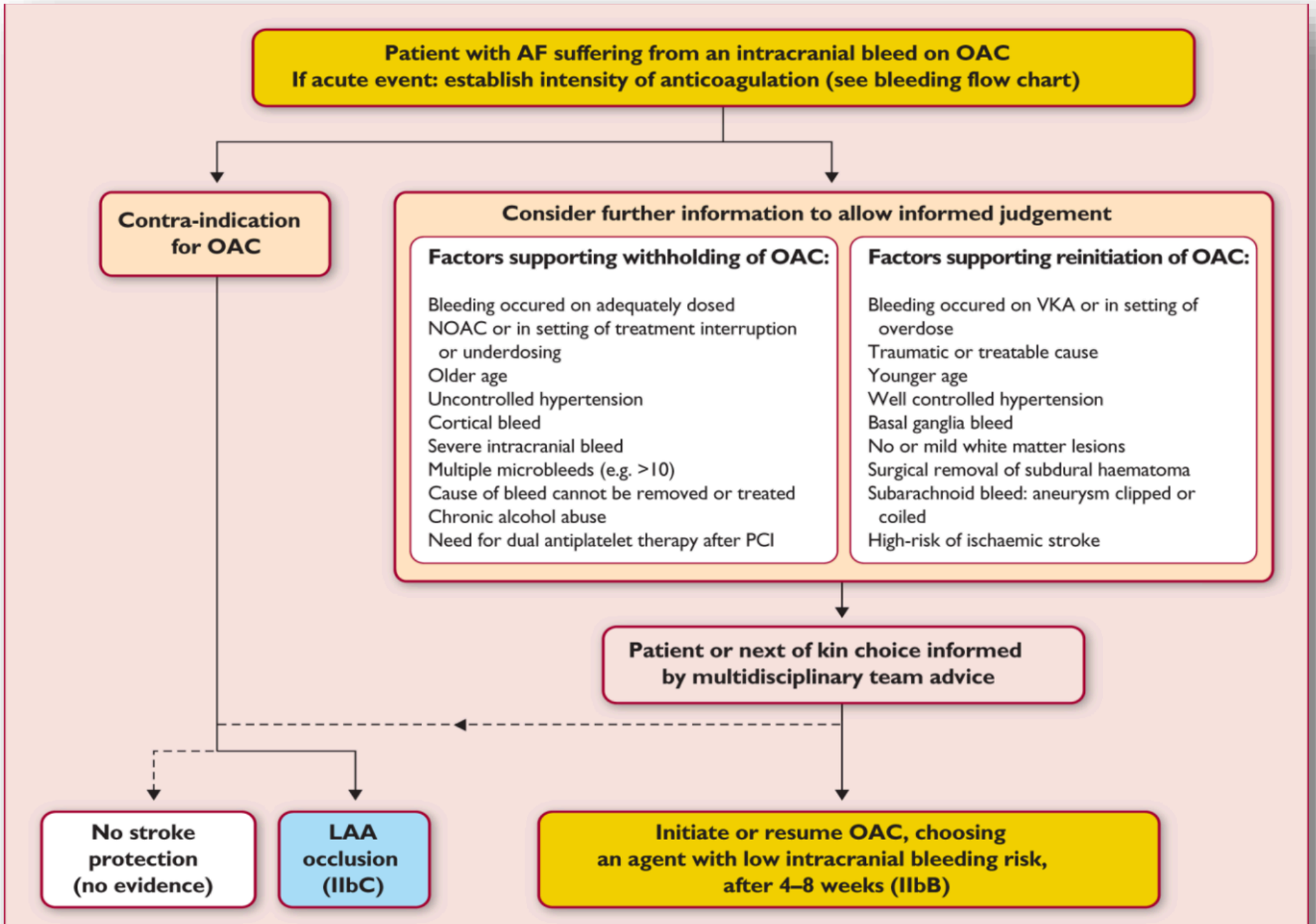
AF in the Setting of Acute Stroke



AF = atrial fibrillation; CT = computed tomography; NIHSS = National Institutes of Health stroke severity scale (available at http://www.strokecenter.org/wp-content/uploads/2011/08/NIH_Stroke_Scale.pdf); OAC = oral anticoagulation; TIA = transient ischaemic attack

European Heart Journal, Volume 37, Issue 38, 7 October 2016, Pages 2893–2962

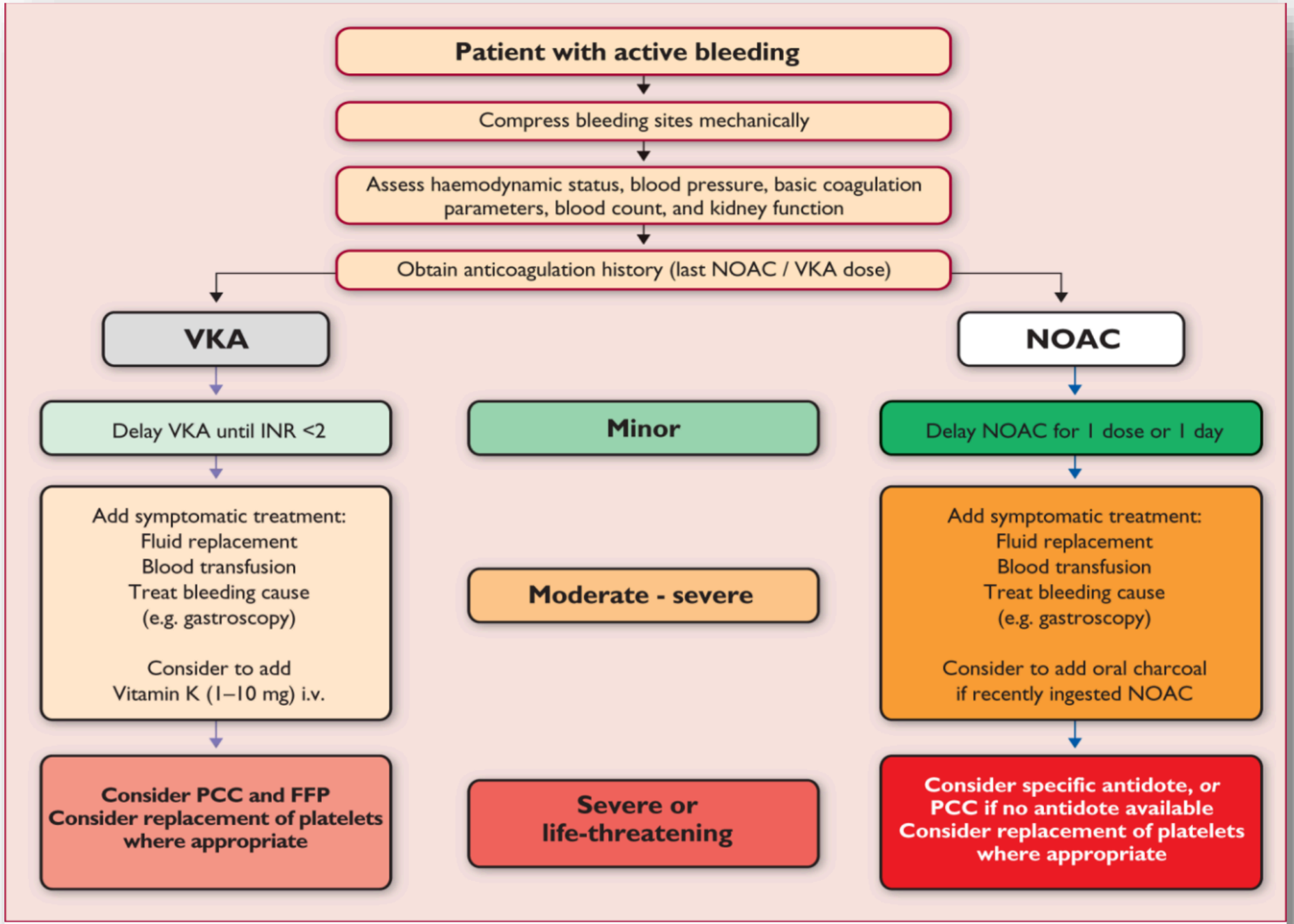
AF in the Setting of Intracranial Bleed



AF = atrial fibrillation; LAA = left atrial appendage; NOAC = non-vitamin K antagonist oral anticoagulant; OAC = oral anticoagulation; PCI = percutaneous coronary intervention; VKA = vitamin K antagonist.

European Heart Journal, Volume 37, Issue 38, 7 October 2016, Pages 2893–2962

AF in the Setting of Active Bleeding



FFP = fresh frozen plasma; INR = international normalized ratio; i.v. = intravenous; NOAC = non-vitamin K antagonist oral anticoagulant; OAC = oral anticoagulation; PCC = prothrombin complex concentrates; VKA = vitamin K antagonist.

AF in Pregnancy

AF is rare in pregnancy, look for underlying cause

1) Rate control

Beta-blocker, digoxin & verapamil are OK

- Metoprolol & Bisoprolol are 1st choice
- Avoid Atenolol, FDA class D drug

2)Rhythm control Flecainide and procainamide

3)Anticoagulation, If CHA2DS2-Vasc >1

- Heparin
- Warfarin is safe after 1st trimester (dose < 5 mg)
- Use of NOACs is prohibited due to lack of safety data

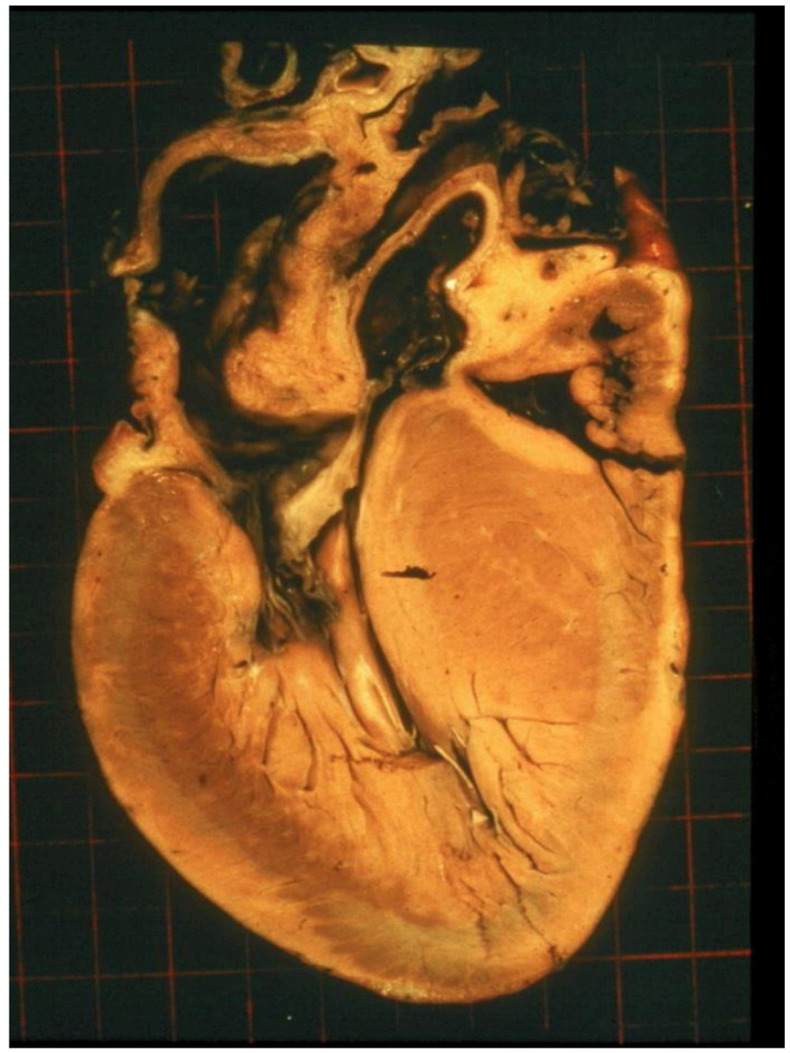
AF Drugs in Pregnancy and Lactation

Drug	Pregnancy	Breastfeeding
Amiodarone	Not recommended Serious adverse effects reported	Not recommended Hypothyroidism in neonate
Beta blockers	Safe to use, **avoid Atenolol**	Safe to use, avoid Atenolol Observe newborns for signs of bradycardia
Sotalol	Safe to use, though associated with newborn bradycardia	Sotalol is concentrated in breast milk, so close monitoring for low HR/BP, respiratory distress & hypoglycemia
Adenosine	Safe, no evidence of teratogenesis	Safe to use, ultra-short half-life
Digoxin	Safe, no evidence of teratogenesis	AAP considers Digoxin compatible with breastfeeding
Verapamil	Safe, no evidence of teratogenesis	AAP considers Digoxin compatible with breastfeeding
Diltiazem	FDA class C drug, teratogenicity in animal studies, but has not been studied in pregnancy	AAP considers Digoxin compatible with breastfeeding
Flecainide	Safe, no evidence of teratogenesis	AAP considers Digoxin compatible with breastfeeding
Procainamide	Safe, no evidence of teratogenesis	AAP considers Digoxin compatible with breastfeeding

Adapted from: Briggs GG, Freeman Rk, Yafffe sJ. Drugs in Pregnancy and Lactation, 8th edition. Philadelphia.: Lippincott Williams & Wikins.

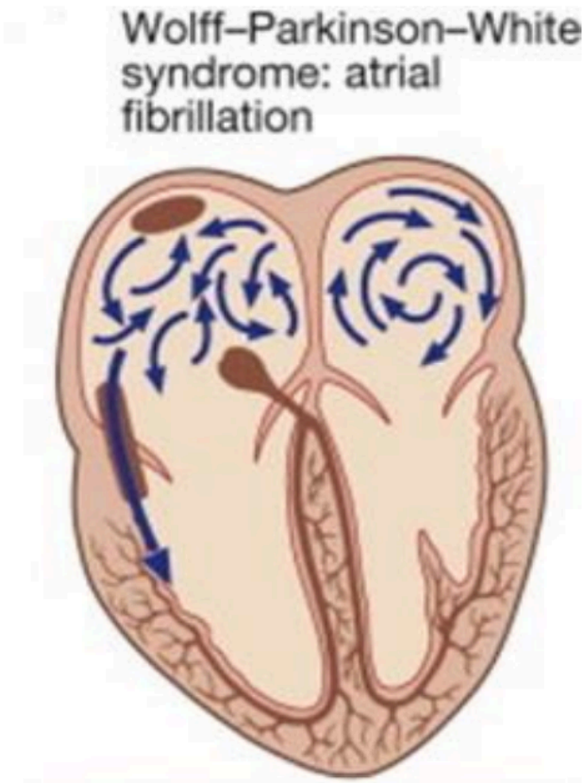
AF in Hypertrophic Cardiomyopathy

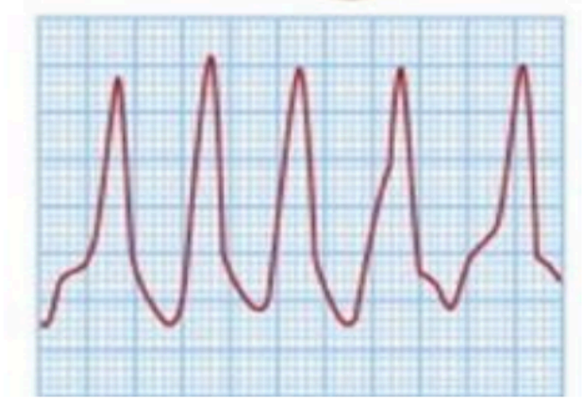
- Rhythm control is preferred strategy
- Classical agents: Disopyramide & amiodarone
- Catheter ablation is class IIa indication
- Anticoagulation is indicated regardless of CHA2DS2-Vasc score



AF in WPW Syndrome

- Rhythm control is preferred strategy
- Classical agent: IV Procainamide or ibutilide, or DCCV if hemodynamically unstable
- Avoid: Adenosine, amiodarone, beta-blocker, digoxin, diltiazem, & verapamil
- Catheter ablation is Class I recommendation





AF in Hyperthyroidism

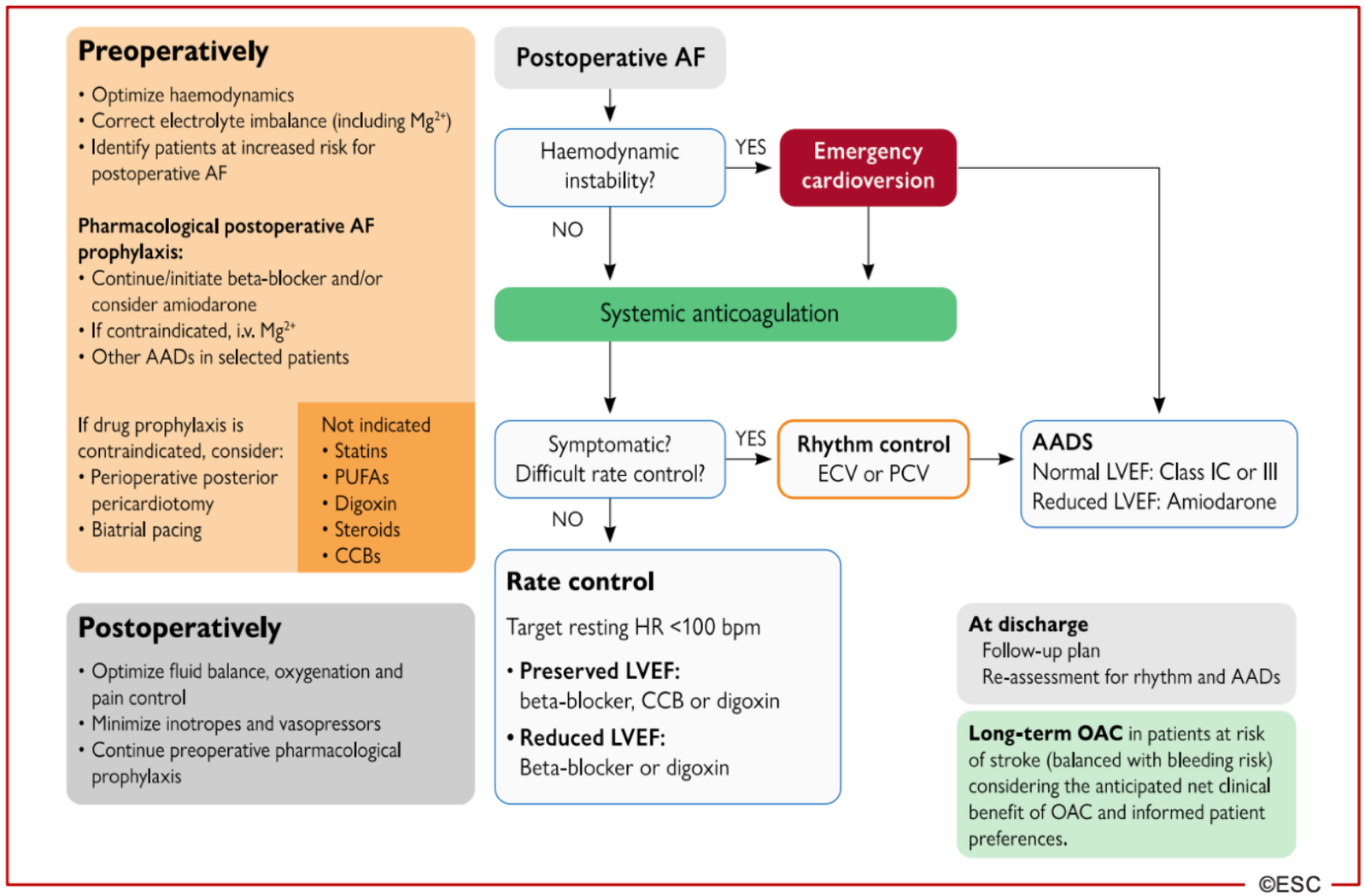
- Spontaneous conversion to sinus often occurs when euthyroid state is achieved

- Beta-blocker is first line for rate control
  - ✓ Classical agent: Propranolol
  - ✓ Avoid amiodarone due to thyroid toxicity

- Anticoagulated at least until euthyroid

Postoperative AF

Figure 23 Management of postoperative AF



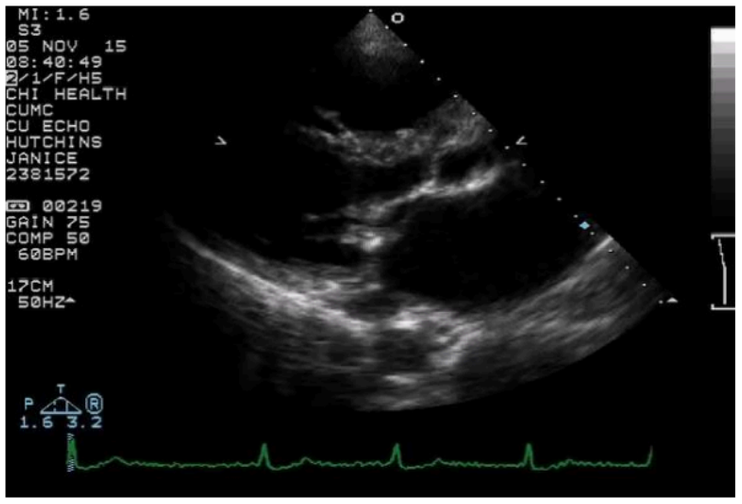
ESC European Society of Cardiology

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation (European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

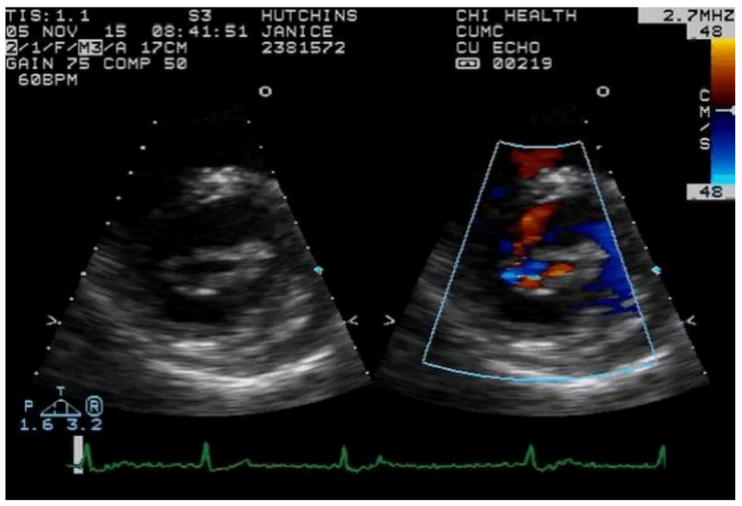
AF in Valvular Heart Disease

- VHD is independent risk factor for AF

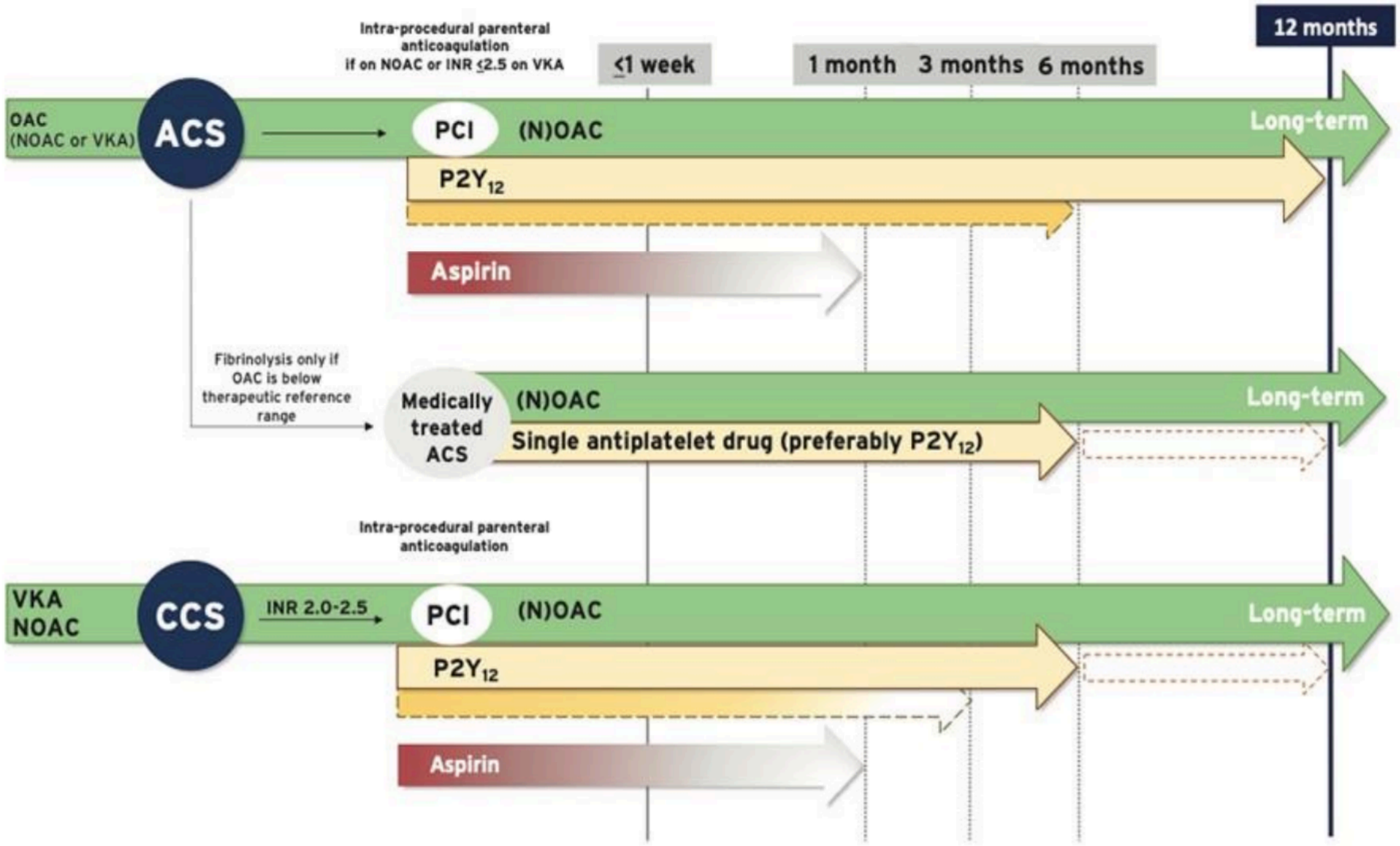
- **VHD type 1**
  - AF pts with VHD needing therapy with VKA
  - Moderate-to-severe mitral stenosis and mechanical prosthetic heart valves



- **VHD type 2:**
  - AF pt with VHD needing therapy with VKA or NOACs
  - All other valve lesions, bioprosthetic valves, & annuloplasty ring

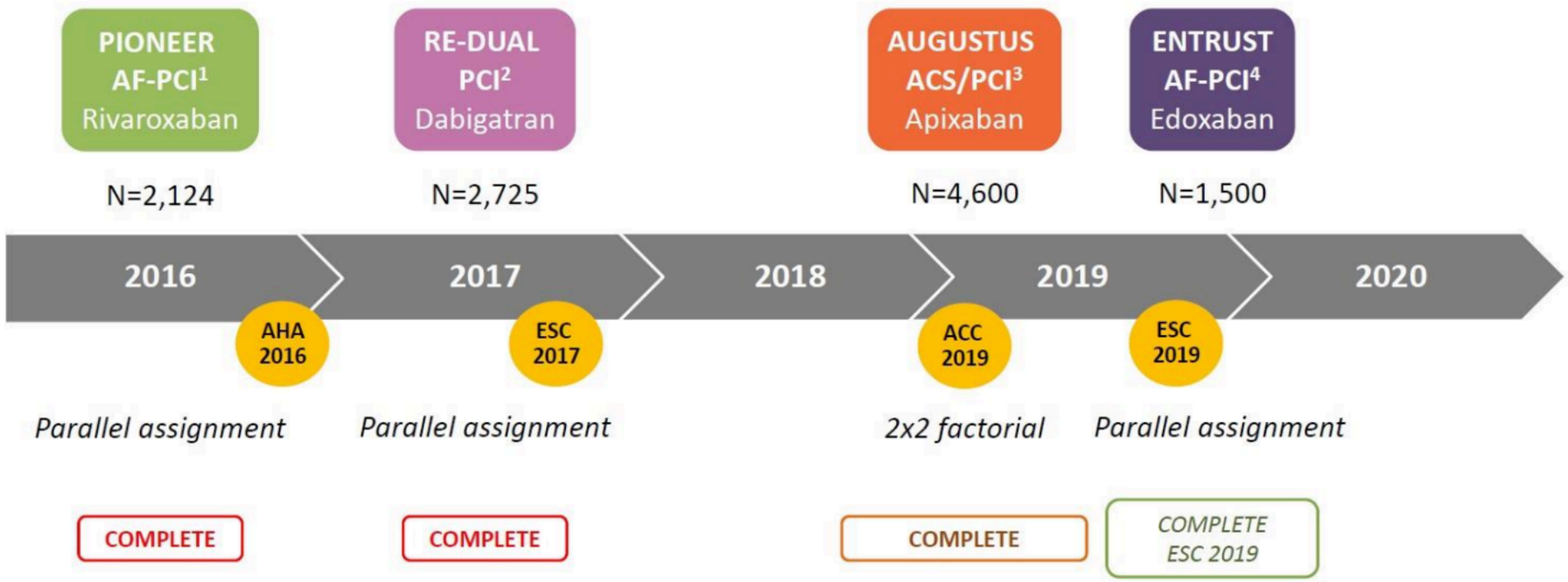


Antithrombotic Strategy in AF and CAD




PIONEER AF-PCI[1] Rivaroxaban
N=2,124
RE-DUAL PCI[2] Dabigatran
N=2,725
AUGUSTUS ACS/PCI[3] Apixaban
N=4,600
ENTRUST AF-PCI[4] Edoxaban
N=1,500
2016
2017
2018
2019
2020
AHA 2016
ESC 2017
ACC 2019
ESC 2019

Evidence for NOACs in AF + ACS/PCI



1. Gibson CM, et al. N Engl J Med 2016;375:2423–2434
2. Cannon CP, et al. N Engl J Med 2017;377:1513–1524
3. Lopes RD, et al. N Engl J Med 2019; 380:1509-1524
4. Vranckx P, et al. Lancet September 2019

Differential Diagnosis of AF

Irregular narrow complex tachycardia

- 1. AF, AF, AF, AF, AF
- 2. AFL/AT with variable AV block
- 3. Sinus tachycardia with frequent PACs
- 4. Multifocal atrial tachycardia

Goals of Clinical Management of AF

- Reduce risk of stroke
- Preserve ventricular function
- Minimize symptoms
- Improve quality of life

Thank you

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