ATRIAL FIBRILLATION

(*RATE VS RHYTHM CONTROL)*

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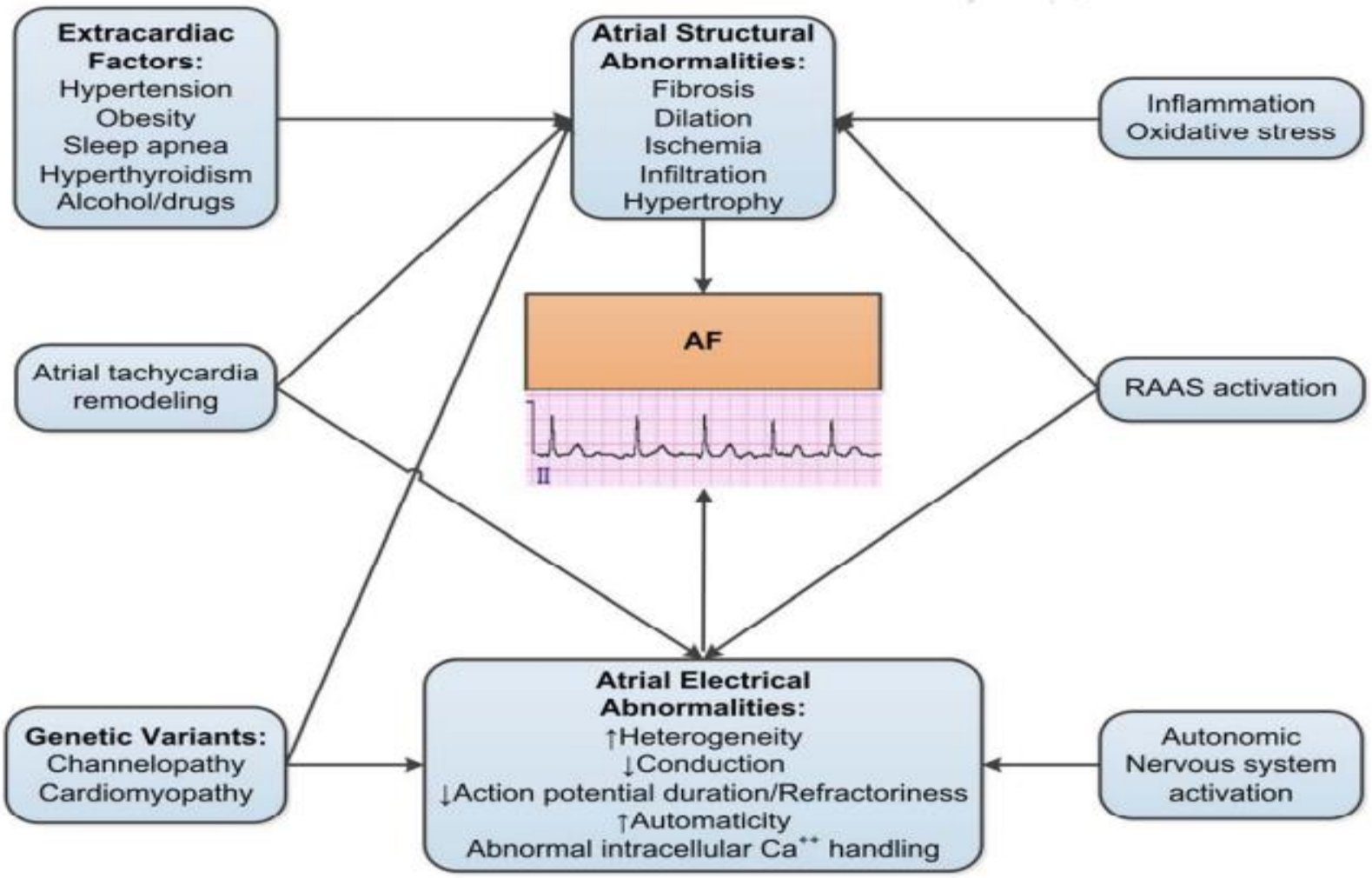
2014

AF Classification:

Term	Definition
Paroxysmal AF	• AF that terminates spontaneously or with intervention within 7 d of onset. • Episodes may recur with variable frequency.
Persistent AF	• Continuous AF that is sustained >7 d.
Longstanding persistent AF	• Continuous AF of >12 mo duration.
Permanent AF	• Permanent AF is used when there has been a joint decision by the patient and clinician to cease further attempts to restore and/or maintain sinus rhythm. • Acceptance of AF represents a therapeutic attitude on the part of the patient and clinician rather than an inherent pathophysiological attribute of the AF. • Acceptance of AF may change as symptoms, the efficacy of therapeutic interventions, and patient and clinician preferences evolve.
Nonvalvular AF	• AF in the absence of rheumatic mitral stenosis, a mechanical or bioprosthetic heart valve, or mitral valve repair.

Mechanisms of AF :



Selected Risk Factors and Biomarkers for AF:

Clinical Risk Factors
Increasing age
Hypertension
Diabetes mellitus
MI
VHD
HF
Obesity
Obstructive sleep apnea
Cardiothoracic surgery
Smoking
Exercise
Alcohol use
Hyperthyroidism
Increased pulse pressure
European ancestry
Family history
Genetic variants

Electrocardiographic
LVH
Echocardiographic
LA enlargement
Decreased LV fractional shortening
Increased LV wall thickness
Biomarkers
Increased CRP
Increased BNP

WHY AF ?

- 1. Atrial fibrillation is the most common sustained cardiac arrhythmia occurring in 1-2% of the general population

- 2. AF confers a 5-fold risk of stroke and one in five of all strokes is attributed to this arrhythmia.

- 3. In the majority of patients there appear to be an exorable progression of AF to persistent or permanent forms, associated with further development of the disease that underlie the arrhythmia.

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- 5. Some advance has been made in the understanding of the dynamic development of AF from its preclinical state as an arrhythmia-in-waiting to its final expression as an irreversible and end-stage cardiac arrhythmia associated with serious adverse cardiovascular events.

Clinical events (outcomes) affected by AF

Outcome parameter	Relative change in AF patients
1. Death	Death rate doubled.
2. Stroke (includes haemorrhagic stroke and cerebral bleeds)	Stroke risk increased; AF is associated with more severe stroke.
3. Hospitalizations	Hospitalizations are frequent in AF patients and may contribute to reduced quality of life.
4. Quality of life and exercise capacity	Wide variation, from no effect to major reduction. AF can cause marked distress through palpitations and other AF-related symptoms.
5. Left ventricular function	Wide variation, from no change to tachycardiomyopathy with acute heart failure.

Cardiovascular and other conditions associated with AF:

- 1. Ageing
- 2. Hypertension
- 3. Heart failure (NYHA class II-IV) 30-40% of HF patients.
- 4. Tachycardiomyopathies.

- 5. Valvular heart disease :30% of AF patients
- 6. Cardiomyopathies
- 7. Cardiac syndromes:
  - Short and lon Q-T syndromes
  - Brugada syndrome
  - Hypertrophic cardiomyopathy
  - Abnormal LV hypertrophy

- 8. Atrial septal defect (ASD)
- 9. Other congenital defects
  e.g. single ventricle after Mustard operation
  or after fontain surgery.
- 10. Coronary artery disease: 20% of AF patients
- 11. Thyroid dysfunction:
  hyperthyroidism and hypothyroidism.

- 12.Obesity in 25% of AF patients.
- 13.Diabetes mellitus: in 20% of AF patients
- 14.COPD in 10-15% of AF patients
- 15.Sleep apnoea
- 16.Chronic renal disease: in 10-15% of AF patients.

CONDITIONS PREDISPOSING TO, OR ENCOURAGING PROGRESSION OF AF

- Hypertension
- Symptomatic heart failure (NYHA II - IV) including tachycardiomyopathy
- Valvular heart disease
- Cardiomyopathies including primary electrical cardiac disease
- Atrial septal defect and other congenital heart defects
- Coronary artery disease
- Thyroid dysfunction and possibly subclinical thyroid dysfunction
- Obesity
- Diabetes mellitus
- Chronic obstructive pulmonary disease (COPD) and sleep apnoea
- Chronic renal disease

GENERAL MANAGEMENT OF THE AF PATIENT

Clinical management of patients with AF involves the following five objectives:

1. Prevention of thromboembolism
2. Optimal management of concomitant cardiovascular disease
3. Symptom relief
4. Rate control
5. Correction of the rhythm disturbance

General rules in control of AF

- In patient with chronic or paroxysmal AF with rapid ventricular response → pharmacological therapy
- In patient with chronic or paroxysmal AF who don't respond to or are intolerant of pharmacological therapy → AV nodal ablation and pacing
- CRT should be considered in other conditions

AF DECISION TREE AND STRATEGY

- ***PAROXYSMAL AF :*** ***RHYTHM*** ***CONTROL***
- ***PERSISTENT AF :*** ***RATE*** ***OR*** ***RHYTHM CONTROL***
- ***PERMANENT AF :*** ***RATE*** ***CONTROL***
- ***RATE CONTROL more likely if :***
  - ***–Older – CAD – CI to AAD – Unsuitable CV***
- ***RHYTHM CONTROL more likely if:***
  - ***Symptomatic – Younger – First of Lone AF***
  - ***Secondary to correctable cause – Heart Failure***

RATE Vs RHYTHM CONTROL

2012 ESC guidelines Rhythm Vs Rate control

- Rate control **strongly preferred** as the initial approach in elderly patients with minor symptoms
- Rhythm control is strongly preferred in patient with symptoms despite rate control including those with HF
- Rhythm control is weakly preferred in young asymptomatic patient
- Rhythm control is weakly preferred in AF 2ry to a trigger or substrate that has been corrected
-

Why a Rate control?

- To avoid
  - Hemodynamic instability
  - Tachycardia mediated CM

- General priciples
- 2 decisions
  - Determine the urgency of treatment
  - Choose between rate and rhythm control

Rate or Rhythm control

- **Preference of rate control**
- The result of AFFIRM & RACE trials showed better outcome with rate control
- Proarrythmia associated with anti-arrhythmic drugs

- Rate of recurrent AF and frequent crossover to a rate control strategy when anti arrhythmic are used to maintain a sinus rhythm

- Rate control is preferred in
  - HF
  - Newly detected AF
  - Elderly with AF

Preference for Rhythm control

- Should be considered
  - Limited efficacy
  - Side effects specially proarhtyhmia

Failure of Rate Control

- 2 manifestations
  - Persistent symptoms
  - Inability to attain adequate rate control:
    - Resting HR < 80
    - During exercise < 110
    - 6MWT

Control of Ventricular rate in AF

- I) Non pharmacological methods
  - **AV nodal ablation**
  - **AV nodal conduction modification**
  - **Investigational methods**
    - Parahissian Pacing
    - Low atrial isolation
    - Ventricular rate regularization
    - Gene therapy

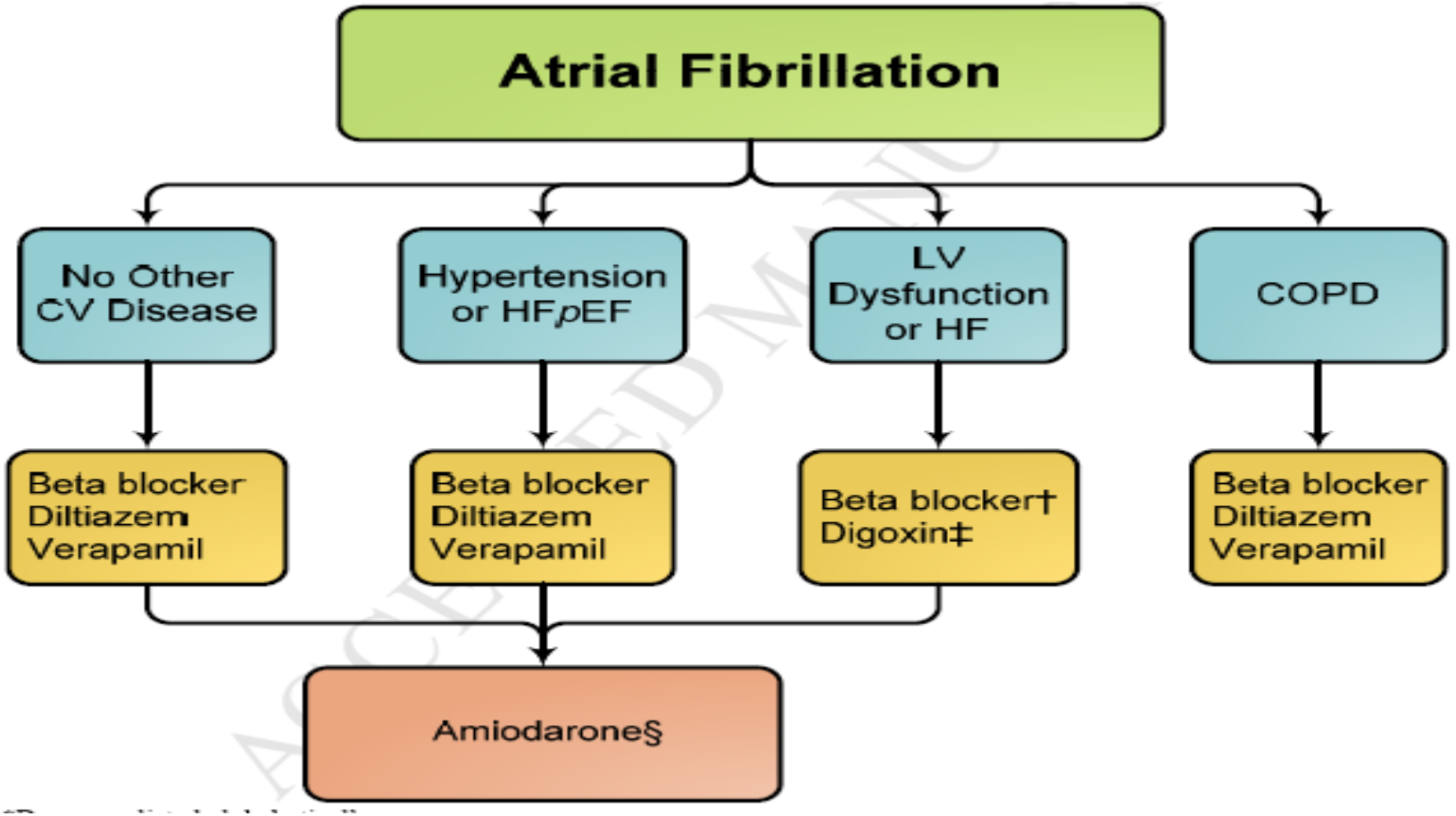
CRT in AF

- It improves some potential risk factor as LA size & LV systolic function
- However incident of new AF is not decreased
- Indication in
  - AF with EF < 35%, QRS > 0.12 sec & NYHA III or ambulatory NYHA IV
  - Most patient who satisfy either of the above criteria are also candidate for ICD & should receive a combined device

Control of Ventricular rate in AF

- II) Pharmacological methods

Approach to Selecting Drug Therapy for Ventricular Rate Control

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يا متعلمين يا بتوع المدارس

New drugs for rate control of AF

I) Adenosine A1 receptor agonist.

Tecadenson:

- It is an adenosine derivative with high specificity to A1 receptors and a potency to prolong AVN conduction at dose that does that do not reduce BP or cause bronchospasm by stimulation of A2 receptors.
- It has no effect on ventricular conduction and very little effect on atrial action potential duration.

- It is used as an urgent rate control of possibly cardio version of AF.
- It is successful in terminating about 87% in SVT.

Selodenson:

- It is an adenosine like agent which differ from Tecadenson in that it has a longer half life (150 min)

Other new Drugs:

- **New Class III agents:**
  - Azimilide.
  - Dronedaron.
  - Tedisamid.
  - Celivarone.
  - Other Amiodaron derivatives.
  - Nitekalmt.

Novel drugs:

New Class III agents:

- Adenosine agonist.
- Ranolazine.
- Connexin modulators.
- SAC Blockers.
- 5-HT4.
- Na+/H+ Inhibitors.
- Na+/Ca++ inhibitors.
- Ry p2 modifiers.

Gap junction modifiers.

Choice of Pharmacological treatment of AF (2012)

- A) Acute Rate control
  - IV medications
    - IV diltiazem, Bblockers or amiodarone should be considered in the following order
    - IV digoxin should be considered if there is
      - Hypotension or HF
      - Inadequate response to 1st line drugs
    - Not tolerated previous combination → IV amiodarone should be considered

Choice of Pharmacological treatment of AF (2012)

- B) Chronic rate control
  - Oral therapy with B Blokers or CCBs in such patient
  - Oral digoxin may be combined if the response to 1st line inadequate
  - Triple therapy of B Blokers or CCBs and digoxin if response to BB or CCB alone is inadequate

AF Rate Control Common Medication Dosage

	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

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

Summary of Recommendations for Rate Control

Summary of Recommendations for Rate Control

Recommendations	COR	LOE	References
Control ventricular rate using a beta blocker or nondihydropyridine calcium channel antagonist for paroxysmal, persistent, or permanent AF	I	B	(93-95)
IV beta blockers or nondihydropyridine calcium channel blocker recommended to slow ventricular heart rate in the acute setting in patients without pre-excitation. In hemodynamically unstable patients, electrical cardioversion is indicated	I	B	(96-99)
For AF, assess heart rate control during exertion, adjusting pharmacological treatment as necessary	I	C	N/A
A heart rate control (resting heart rate <80 bpm) strategy is reasonable for symptomatic management of AF	IIa	B	(95, 100)
IV amiodarone can be useful for rate control in critically ill patients without pre-excitation	IIa	B	(101-103)
AV nodal ablation with permanent ventricular pacing is reasonable when pharmacological management is inadequate and rhythm control is not achievable	IIa	B	(104-106)
Lenient rate control strategy (resting heart rate <110 bpm) may be reasonable with asymptomatic patients and LV systolic function is preserved	IIb	B	(100)
Oral amiodarone may be useful for ventricular rate control when other measures are unsuccessful or contraindicated	IIb	C	N/A
AV nodal ablation should not be performed without prior attempts to achieve rate control with medications	III: Harm	C	N/A
Nondihydropyridine calcium channel antagonists should not be used in decompensated HF	III: Harm	C	N/A
With pre-excitation and AF, digoxin, nondihydropyridine calcium channel antagonists, or amiodarone, should not be administered	III: Harm	B	(107)
Dronedarone should not be used to control ventricular rate with permanent AF	III: Harm	B	(108, 109)

THANK YOU