



Supplement

Approach to Management of Atrial Fibrillation in the Indian Scenario

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Atrial fibrillation (AF) is characterized by irregular, disorganized and chaotic electrical activity of the atrium. It is a common arrhythmia and major cause of morbidity and mortality not only in the western world but in India as well. Rheumatic valvular heart disease (RVHD) continues to remain the most frequent cause of AF in a recent survey in public and private institutes in India (Fig. 1, unpublished). However as our population is aging many patients with AF have associated hypertension (HT) and ischemic heart disease (IHD).

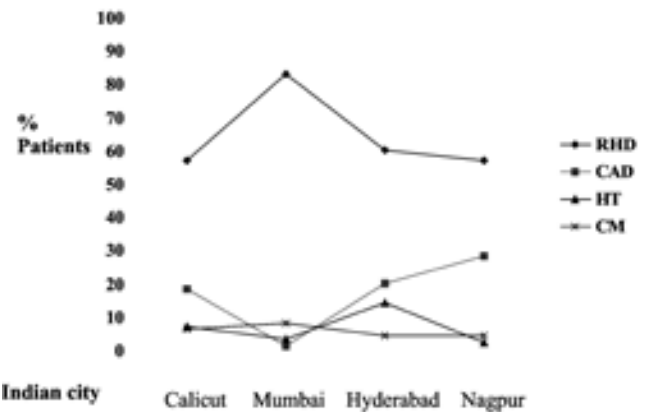
Management plan for AF - can be customized based on the etiology (Fig. 2).

The broad categories are -

1. Rheumatic valvular heart disease
2. Lone AF in the elderly
3. Paroxysmal AF in the young
4. AF in association with HT/IHD
5. Miscellaneous causes-
 - a. cardiomyopathy
 - b. chronic obstructive pulmonary disease
 - c. thyrotoxicosis
 - d. atrial septal defect
 - e. pulmonary embolism

DRUG THERAPY

Rate versus rhythm control: This has been the most debated issue in the western literature with randomized prospective trials like PIAF,¹ AFFIRM² and RACE.³ However, most of their patient population was elderly and without RVHD. These studies conclude that rate control is not inferior to rhythm control strategy. The CRRRAFT⁴ study is a recent prospective trial of 144 patients comparing rate control (diltiazem) versus rhythm control (amiodarone vs. placebo) in patients with RVHD and AF. Only those patients who had mild to moderate valve disease without a need for intervention or those with relieved hemodynamics post valvuloplasty or valve surgery were included. In the rhythm control arm if the drug failed to restore sinus rhythm (SR), up to three electrical cardioversions were permitted within one year to achieve and maintain SR. At one year those who were in SR had a significant decrease in mortality, improvement in NYHA class, quality of life score and exercise time. These results are in contrast to the western data. The disparity seems to be primarily because CRRRAFT study patients were of RVHD etiology and younger (mean age 39 years). The difference is also because only those who maintained SR at one year were compared with the rate control group in the CRRRAFT study whereas in AFFIRM the comparison was on the basis of intention to treat and not the actual outcome.⁵ On an additional follow-up of one year in the CRRRAFT study, omission of amiodarone led to a 50% relapse back in to atrial fibrillation.⁶ However, 50% of patients continued to be in SR despite omission of amiodarone, suggesting sinus rhythm begets sinus rhythm in some.



RHD - rheumatic heart disease; CAD - coronary artery disease; HT - hypertension; CM - cardiomyopathy

Fig. 1 : The figure illustrates the distribution (in percentage) of the etiology of atrial fibrillation in four different cities in India.

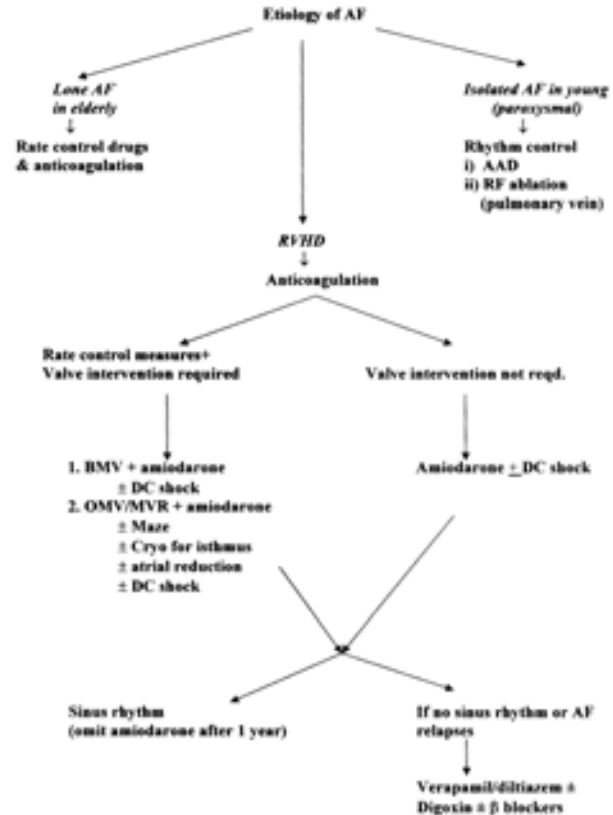


Fig. 2 : The flow chart gives an outline of management strategy for patients with atrial fibrillation due to rheumatic valvular heart disease.

The major limitation of CRAFT study is a relatively short follow-up and the possibility of adverse effects with longer use of amiodarone in these younger patients.

One would recommend that in RVHD and AF if there is no significant valvular compromise necessitating intervention and if the left atrium size is not more than 6.0 cms, rhythm control with amiodarone facilitated by electrical cardioversions should be the strategy. If attempts to maintain SR fail over one year's time, rate control measures should suffice. Amiodarone is being suggested as a default drug because of lack of availability of other anti-arrhythmic medications in India.

Rate control drugs: In elderly patients, valvular heart disease patients awaiting interventions and those with left atrium larger than 6 cms should be managed with rate control strategy. Calcium channel blockers are preferred in the young and those with COPD status. In RVHD patients calcium channel blockers alone are effective in the vast majority and only about 10-15% need the addition of Digoxin for a better rate control.⁴ Beta-blockers are more often used in the non-valvular heart disease patients especially in patients with IHD and hyperthyroidism. Digoxin is most often reserved for the elderly.

Rhythm control drugs: In young patients and those with RVHD but no significant valve compromise, restoring and maintaining SR should be attempted. In absence of ischemic and structural heart disease, Class IC anti-arrhythmic drugs – propafenone and flecainide are preferred. Class III anti-arrhythmics i.e. amiodarone and sotalol are more often used in patients with structural heart disease and left ventricular dysfunction. In women and hypertrophied hearts sotalol should be used with caution in view of risk of long QT and torsades de pointes. Angiotensin II blockers as anti-hypertensives are recommended in patients with HT and paroxysmal AF, to reduce AF recurrence.

First episode of AF is always challenging to manage. Rate control measures and heparin is used as the first aid measure. Treatment is customized based on the etiology of AF and identification of the precipitating factors. Nearly one-fourth of the patients would have spontaneous termination of AF within the next 24 to 48 hours. Electric cardioversion should be considered if there is hemodynamic compromise or if trans-esophageal echocardiogram does not reveal any clot. Patients with recurrent, paroxysmal AF pill-in-pocket approach is advocated wherein 300-600 mg of flecainide orally help terminate episodes of AF in 30-50% patients.

Anticoagulation: The need for anticoagulation in AF is based on the presence of risk factors for thrombo-embolism. The risk factors include RVHD, age > 65 years, severe left ventricular hypertrophy, congestive heart failure, diabetes and prior transient ischemic attack or stroke. Presence of any of these would suggest the need for anticoagulation. In patients with RVHD and AF the risk for thrombo-embolism is 17-18% per year^{7, 8} and therefore very essential to ensure adequate anticoagulation. Adjusted dose warfarin to maintain international normalized ratio (INR) at 3-4 in patients with metallic prosthesis, between 2.5-3.5 in RVHD and AF without prosthesis and 2 to 3 in non-valvular heart disease patients is recommended. Often in the elderly the level maintained is at about 2. Regular INR check is a major problem and is often not widely available in rural areas. This results in major morbidity and mortality arising from choked prosthetic valves, thrombo-embolism or from excessive bleeding. There is a need for a better anticoagulant, not requiring regular monitoring and without many drug-drug interactions.

SURGERY

Surgery for AF in the Indian context should be utilized for patients with associated RVHD undergoing valve surgery. Maze surgery and its modifications are extremely promising and have been successfully attempted by many investigators to restore SR in RVHD and AF patients.^{9,10} Patwardhan *et al.*¹¹ pioneered the technique of radiofrequency bi-polar maze for AF during valve surgery. The additional maze procedure required only 12 minutes of extra cross-clamp time. There was 80% freedom from AF at 5 months and resurgence of atrial transport function. Guang Y *et al.*¹² have also had similar experience with radiofrequency maze during mitral valve

surgery, with a longer follow-up of 3 years wherein 77% of patients remained in sinus rhythm. There is an ongoing study comparing the various types of maze surgery (left versus bi-atrial) versus pulmonary vein isolation and no maze in RVHD patients with AF undergoing valve surgery. Peri-operative amiodarone with or without electric cardioversion, helps in SR maintenance.¹³

Left atrial size is an important determinant of long-term freedom from AF recurrence and left atrial reduction surgery should be considered in patients with large LA (> 6 centimeters)^{14,15} In RVHD both the atria are important substrates for maintenance of AF and therefore cryo-ablation of right and left atrial isthmus in addition to the maze surgery should be considered.¹⁶ The threshold for mitral valve surgery is lower in patients with RVHD and AF^{17, 18} as these patients become symptomatic earlier because of AF and the consequent loss of atrial kick. Surgery for AF is an additional incentive to the valve surgery in these patients.

Radiofrequency (RF) ablation is a promising, up-coming modality for curing atrial fibrillation. Young and markedly symptomatic patients with recurrent paroxysmal AF despite two or more anti-arrhythmic drugs are presently considered for RF ablation. Vast majority have the focus of origin in and around the pulmonary vein orifice and isolating them is known to cure AF. However the technique is as yet not standardized and is under evaluation and therefore restricted to select centers. In patients with permanent AF and a rapid ventricular response not controlled with atrio-ventricular (AV) nodal blocking agents and resulting in tachycardia induced cardiomyopathy, AV nodal ablation i.e. creating a complete AV block and implanting a permanent pacemaker is advised. This helps not only control the ventricular rate but also have a regular ventricular response without need for any medications. The role of RF ablation in patients with RVHD and AF is not evaluated. Pulmonary vein isolation using catheter RFA during balloon mitral valvuloplasty¹⁹ has been recently published. However, RVHD is essentially a bi-atrial disease and therefore only pulmonary vein isolation in this subset of patients needs to be validated in larger study population over a longer follow-up.

Management of AF remains a challenging problem despite the advances in the armamentarium of treatment options. This is more so in the Indian context with RVHD still constituting the major burden, non-availability of anti-arrhythmic drugs, RF ablation in its infancy and monitoring anticoagulation being the stumbling blocks.

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