



CLINICAL PROFILE OF PATIENTS WITH ATRIAL FIBRILLATION - A TERTIARY CARE CENTRE BASED STUDY

Dr Melvin Michael Gonsalves	DNB Trainee (General Medicine) Jaslok Hospital And Research Centre, Mumbai, India Ex Asst Professor Of Medicine TNMC&BYL Nair Hospital, Mumbai
Dr Amit Katyal*	Physician And Nephrologist, Department Of Internal Medicine, AHRR, New Delhi *Corresponding Author
Dr R P Ram	Head Of Department Of General Medicine, Jaslok Hospital And Research Centre, Mumbai, India

ABSTRACT **BACKGROUND:** Atrial fibrillation is the most common sustained cardiac arrhythmia. The diagnostic modalities and therapeutic options for Atrial fibrillation have improved over the years. Ongoing research and clinical trials are adding to the knowledge and understanding of its pathogenesis and its management. **OBJECTIVE:** To study the risk factors, various presentations, echocardiographic profile, anticoagulation, and rate and rhythm control agents and methods used in the treatment of Atrial fibrillation. **METHODS:** This prospective observational study included 100 patients above 18 years of age with atrial fibrillation. The patients were evaluated with transthoracic 2D echocardiography and treated according to their conditions. The condition of valves, dilatation, and structure of chambers, presence of clot in left atrial appendage, ventricular function, and presence of pulmonary hypertension were noted. Statistical analysis was performed. **RESULTS:** Hypertension found in 68% of patients. The proportions of paroxysmal, persistent, and permanent types of AF were 56%, 22%, and 22% respectively. Echocardiography revealed a dilated left atrium (LA) in 29% of patients whereas electrocardioversion required in 10% of patients. A total of 68% of patients were anticoagulated. Warfarin used in the treatment of 21% of patients. Rate control was achieved successfully in 99% of patients treated with AV node blockers. Rhythm reversal (success in 64%) is a difficult method to treat while rate control (success in 99%) can be achieved. **CONCLUSION:** Hypertension was the most common risk factor for atrial fibrillation in the study group. Warfarin and Acenocoumarol remained the anticoagulants of choice in the treatment of valvular atrial fibrillation. The rate control method to treat atrial fibrillation should be given preference over the rhythm reversal method.

KEYWORDS : atrial fibrillation, valvular atrial fibrillation, hypertension, ischemic heart disease, left atrium dilatation, anti-coagulation.

INTRODUCTION:

Atrial fibrillation (AF) is the most common sustained arrhythmia. Various forms of AF, paroxysmal viz. persistent, and permanent require very individualized approaches to management. Regardless of the structural heart disease condition, atrial electrical and mechanical remodeling acts as a consequence of the arrhythmia and leads to atrial fibrillation. Increased heart rate and irregular rhythm are the characteristics associated with AF [1]. Patients with AF demonstrated a 3.67-fold higher risk in general population leading ramification on mortality and cardiovascular comorbidities along with the compromise on the quality of life that makes atrial fibrillation a profound burden on public health [2]. Previous studies mentioned it as prime mover among cardiovascular disorders that compels frequent hospitalizations, thromboembolic events like stroke or peripheral embolism, heart failure, and sudden cardiac deaths [3]. In the case of Non-valvular AF (NVAF), the risk of stroke escalated by nearly fivefold. The echocardiogram technique also confirmed the increased risk of thromboembolic events in some studies based on AF patients. Apart from these factors, the age of individual, hypertension, congestive heart failure, diabetes, angina, mitral incompetence, chronic kidney disease, and diabetes mellitus are also a potential pretext for the AF [4]. Variety of drugs with superior properties for prudent management of AF have been emerged recently like the Non-Vitamin K Antagonist oral anticoagulants (NOACs or NVKAC) directly inhibit key proteases (factors IIa and Xa) namely Edoxaban, Rivaroxaban, Apixaban, and Dabigatran [5], and antagonists to factor Xa inhibitors namely Andexanet alfa, a monoclonal antibody against Direct thrombin inhibitors namely Idarucizumab and many are in the pipeline [6]. The diagnostic procedures and therapeutic alternatives for atrial fibrillation are updating over the years and continue to go relentlessly to improve them. Though there are countless studies on risk factors, presentations, investigations, and treatment-related to AF but the management of AF still needs robust studies to improve management, make it better with the ongoing research and clinical trials.

In the current study, we have included a spectrum of cases with varied risk factors, their workup, and management. It will describe the clinical profile of AF patients. We attempted to evaluate the same concerning the risk factors, presentations, investigations, and treatment. The paramount of the study were risk factors, the various presentations, the echocardiographic profile, the anticoagulation agents, the rate and rhythm control agents, and methods used in the treatment of atrial fibrillation.

MATERIAL AND METHODS:

Study recruitment area in this study was in-patient and Out-patient departments of General Medicine, Cardiology and ICU of Jaslok Hospital. This is a prospective type of observational study and it included 100 patients with atrial fibrillation. All patients at or above the age of 18 years having atrial fibrillation either admitted to the General medicine and Cardiology departments, Intensive care unit or coming to the General Medicine and Cardiology OPD were chosen for study. Patients below the age of 18 years were excluded from the study.

DATA COLLECTION

All patients fulfilling the inclusion criteria were selected and studied after explaining to them the details of the study and obtaining informed consent from them. Atrial fibrillation was diagnosed clinically based on the irregular pulse, apex-pulse deficit, and correlation with their symptoms. Further, the diagnosis was confirmed with a 12-lead electrocardiogram showing the absence of P wave, presence of fibrillatory waves, varying RR interval, and irregularly irregular rhythm (Figure 1).

Figures:

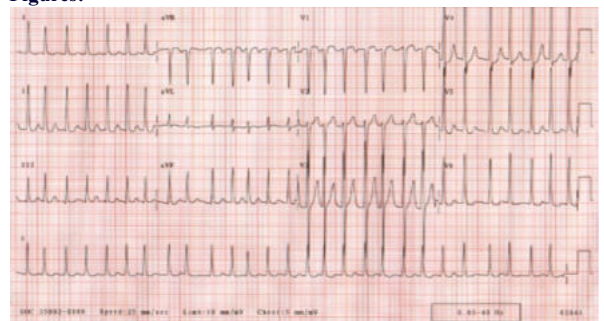


Figure 1: ECG findings of AF patient with Ventricular rate varied from 130-168 beats per minute, irregularly irregular rhythm, and discernible P waves.

Its risk factors and presentations were noted. Based on the duration of AF it was classified into four parts, first onset, paroxysmal, if it did not resolve spontaneously or lasted up to 7 days, persistent, if lasted more than seven days up to a year, permanent, if it lasted more than a year.

Further, the patients were evaluated with transthoracic 2D echocardiography and condition of valves, dilatation and structure of chambers, presence of clot in left atrial (LA) appendage, ventricular function, and presence of pulmonary hypertension were noted. Treatment included anticoagulation, rate, and rhythm control agents and methods.

STATISTICAL ANALYSIS:

Qualitative data was represented in the form of frequency and percentage. Type of Qualitative data included sex of cases, history of hypertension and diabetes, Clinical features like palpitations, breathlessness and pedal edema, hypotension, stroke, gangrene and bleeding, use of Rate Control agents, past medical history, type of AF, anticoagulant agents used, pharmacological cardioversion, direct current cardioversion, etc.

Association between qualitative variables was assessed by Chi-Square test with Continuity Correction for all 2 X 2 tables and with or without Continuity Correction in rest and Fisher's Exact test for all 2 X 2 tables where p-value of Chi-Square test was not valid due to small counts. In presence of small counts in tables in more than two rows and/or columns, adjacent row and/or Column data was pooled and Chi-Square Test reapplied with Continuity Correction for all 2 X 2 tables and with or without Continuity Correction in rest and Fisher's Exact test for all 2 X 2 tables where p-value of Chi-Square test is not valid due to small counts in spite of pooling of data (e.g. Association between Type of AF & Cardioversion). Age was the only quantitative data and was represented using Mean \pm SD and Median and Interquartile range (IQR). Results were graphically represented where deemed necessary. Appropriate statistical software, including but not restricted to MS Excel, PPSPP version 0.8.5 was used for statistical analysis. Graphical representation was done in MS Excel 2010.

RESULTS:

The mean age of the study participants was 68.20 years. The distribution of age here was between 39.58 and 96.82 years. The majority (61%) of the patients were above the age of 65 years. The male to female ratio was 50:50 in this study. In this study, the most common risk factor was hypertension found in 68% of patients. Diabetes (42%), ischemic heart disease (41%), valvular heart diseases (VHD) (14%), cerebrovascular accidents (11%), pneumonia (9%), structural heart disease (4%), and hyperthyroidism (3%) were the other important risk factors involved in AF. In the case of VHD, mitral stenosis was the most prevalent in patients. The most common presenting feature of patients was breathlessness (dyspnea) in 36% of patients. Also, a substantial population of 35% of patients was asymptomatic and detected with AF only on routine evaluation. The proportions of paroxysmal, persistent, and permanent types of AF were 56%, 22%, and 22% respectively. Significant echo findings include dilated LA in 29%, presence of VHD in 14% patients, structural heart disease in 4%, and the presence of LA thrombus in 2%. In patients with LA dilatation, 15% had mild, 9% had moderate, and 5% had severe LA dilatation. LA thrombus reported in 2% of the population. Both patients suffered VHD called rheumatic heart disease with mitral stenosis. A total of 68% of patients were anticoagulated. Warfarin was the commonest anticoagulant used in 21% and used in Valvular AF (VAF) as well as NVAF. On the other hand, Rivaroxaban and Dabigatran – NOACs or NVKAC were used only in NVAF. Rate control agents provided in 66% of patients. The most common control agent used was metoprolol in 41% of the patients followed by Diltiazem in 19%, Digoxin in 15%, Verapamil in 9%, Atenolol in 4%, Carvedilol in 4% and Propranolol in 1%. Pharmacological cardioversion by using antiarrhythmic agents tried in 56% of patients. Amiodarone was the most common antiarrhythmic drug used in 55% of patients. Propafenone (in 2% patients) or Sotalol (in 1% of patients) were added only when symptoms of AF remained unabated despite rate control and the use of amiodarone. Rate control agents (in 66% of the population) were preferred over antiarrhythmics (in 56% of the population) due to their lesser toxic effects. Electrocardioversion was required in 10% of patients having hypotension due to AF. Rate control was achieved successfully in 99% of patients treated with AV node blockers (beta-blockers, calcium blockers, digoxin) while reversal of rhythm could be achieved only in 62% of patients treated with antiarrhythmic agents. This is because as chronicity increases or LA size increases, rhythm reversal becomes difficult while the rate can still be controlled.

Reversal of rhythm could be achieved in patients with paroxysmal (89.3%) > persistent (22.7%) > permanent (9.1%) types of AF. Thus as chronicity increases, chances of rhythm reversal decrease. (p-value = 1.16×10^{-12}). As LA size increases, chances of rhythm reversal

decrease. (p-value = 0.00175). AF found in people with structural heart diseases is chronic. (p-value = 0.032). LA size increases with the chronicity of AF. (p-value = 1.42×10^{-5}). Also, the severity of LA dilatation increases with the chronicity of AF. (p-value = 1.42×10^{-5}).

A comparison between VAF and NVAF showed the following -

a) LA size – LA size in VAF was found larger than in NVAF. (p-value = 0.00049).

b) The occurrence of LA thrombus – LA thrombus was found more with VAF than NVAF. (p-value = 0.018)

c) The anticoagulant used were NVKACs, used only in NVAF while Warfarin and Acenocoumarol (Vitamin K Antagonist Anticoagulants) remain the anticoagulants of choice in VAF. (p-value = 0.0041).

b) The occurrence of LA thrombus - LA thrombus was found more with VAF than NVAF. (p-value = 0.018)

c) The anticoagulant used - Novel oral anticoagulants NOAC (also known as Non-Vitamin K Antagonist Oral Anticoagulants or NVKAC) were used only in NVAF while Warfarin and Acenocoumarol (Vitamin K Antagonist Anticoagulants) remain the anticoagulants of choice in VAF. (p-value = 0.0041).

DISCUSSION:

The present study was conducted to investigate risk factors, the various presentations, the echocardiographic profile, the anticoagulation agents, the rate and rhythm control agents, and methods used in the treatment of atrial fibrillation in a total of 100 patients with only above the age of 18 years.

According to the study of Brandes A. et al. [7], the factors like advancing age, gender, coronary artery disease (CAD), vascular disease, diabetes, hypertension, outcomes such as cerebrovascular events impart to the enhancement of AF but exact percentage of involvement of these factors was not studied and mentioned clearly. In our study, we have calculated percentages of involvement of the risk factors helping us to find the most affecting risk factor among AF patients. Also, it is mentioned that 10 - 15% of patients with hyperthyroidism are prone to AF in the study performed by Jayaprasad N and Francis J [8] which is much lower around 3% in our study. Pneumonia is detected as a trigger causing the new onset of AF in a recent case study by Nichols L. [9] in 2017. Our study found similar results in 9 patients making pneumonia a dominant risk factor of AF.

Earlier studies have reported that AF is asymptomatic in most patients and dyspnea as the main presenting symptom of AF [10], we observed the same results in our study. According to Euro Heart Survey on atrial fibrillation in 2008 the paroxysmal AF patients constituted around 80% of the population among 5333 AF patients whereas in our study we observed it around 56% quite lesser than previous studies. In the case of persistent, and permanent types of AF, previous results were almost similar to our results [11]. In contrast to the study performed by Chiangthe CE. Et al. [12] with 9816 AF patients 26.5% had paroxysmal, 23.8% had persistent, and 49.6% had permanent AF, our study showed completely different results for paroxysmal and permanent AF.

In ECG findings of AF patients, we detected thrombus in 2 patients with AF. This result is similar to the study by Leung DY et al. [13] as they observed 3% left atrial thrombus in AF patients. Dilated LA was the most prevalent ECG finding in AF patients in our study with a higher percentage (29%) than a previous study (22%) by Qureshi W et al. [14]. A study by Thomas KL et al. [15] suggests 27.7% of AF patients had significant VHD, our study reported lesser VHD patients with AF.

Thomas KL et al. [15] prompted that 76.4% of the patients needed anticoagulation for the treatment of AF patients whereas in the present study it was 68%. A study by Noohi F et al. [16] reported the use of Warfarin in (21%) and rivaroxaban (20%) which is almost similar to our study results.

Statistically significant rate control was achieved in almost all the population with a success rate of 99% by rate control agents whereas rhythm restoration was achieved only in 62% of patients treated with antiarrhythmic agents like amiodarone (Pharmacological cardioversion) and electro cardioversion. This is because as the chronicity of AF increases the dilation of LA (LA size) also improves,

eventually rhythm reversal becomes difficult while the rate can still be controlled [17,18]. Significant maximum reversal of rhythm achieved in patients with paroxysmal (89.3%) which is high as compared to the previous study (50%) done by Fragakis N et al. [19], followed by persistent and permanent respectively showing that if chronicity increases, it is difficult to achieve rhythm reversal.

CONCLUSION:

Common risk factors such as hypertension, diabetes, hyperthyroidism as well as underlying conditions like Pneumonia significantly contribute to the development of AF. These conditions require timely management to reduce AF and improve quality of life. Conventional anticoagulants like Warfarin remained in choice for the treatment of valvular atrial fibrillation. Rate control method to treat atrial fibrillation should be given preference over rhythm reversal method to treat AF whereas a comprehensive study required regarding this wrangle.

REFERENCES:

- Wyndham CR. Atrial fibrillation: the most common arrhythmia. *Tex Heart Inst J.* 2000;27(3):257-267.
- Lee E, Choi EK, Han KD, Lee H, Choe WS, Lee SR, et al. Mortality and causes of death in patients with atrial fibrillation: A nationwide population-based study. *PLoS One.* 2018;13(12):e0209687.
- Arboix A, Alió J. Cardioembolic stroke: clinical features, specific cardiac disorders and prognosis. *Curr Cardiol Rev.* 2010;6(3):150-161. doi:10.2174/157340310791658730.
- Fohitung RB, Rich MW. Identification Of Patients At Risk Of Stroke From Atrial Fibrillation. *US Cardiology Review* 2016;10(2):60-4.
- Mekaj YH, Mekaj AY, Duci SB, Miftari EI. New oral anticoagulants: their advantages and disadvantages compared with vitamin K antagonists in the prevention and treatment of patients with thromboembolic events. *Ther Clin Risk Manag.* 2015;11:967-977.
- Hu TY, Vaidya VR, Asirvatham SJ. Reversing anticoagulant effects of novel oral anticoagulants: role of ciraparantag,andexanet alfa, and idarucizumab. *Vasc Health Risk Manag.* 2016;12:35-44.
- Brandes A, Smit MD, Nguyen BO, Van Gelder MRC. Risk Factor Management In Atrial Fibrillation. *AER.* 2018;7(2):118–27.
- N J, Francis J. Atrial fibrillation and hyperthyroidism. *Indian Pacing Electrophysiol J.* 2005;5(4):305-311.
- Nichols L. Pneumonia as a trigger for atrial fibrillation. *J Rural Med.* 2017;12(2):146-148.
- Heidt ST, Kratz A, Najarian K, Hassett AL, Oral H, Gonzalez R et al. Symptoms In Atrial Fibrillation: A Contemporary Review And Future Directions. *J Atr Fibrillation.* 2016 Jun 30;9(1):1422.
- Nieuwlaat R, Prins MH, Le Heuzey JY, Vardas PE, Aliot E, Santini M, et al. Prognosis, disease progression, and treatment of atrial fibrillation patients during 1 year: follow-up of the Euro Heart Survey on atrial fibrillation. *Eur Heart J.* 2008;29(9):1181-1189.
- Chiang CE, Naditch-Brülé L, Murin J, Goethals M, Inoue H, O'Neill J, et al. Distribution and risk profile of paroxysmal, persistent, and permanent atrial fibrillation in routine clinical practice: insight from the real-life global survey evaluating patients with atrial fibrillation international registry. *Circ Arrhythm Electrophysiol.* 2012;5(4):632-639. doi:10.1161/CIRCEP.112.970749
- Leung DY, Davidson PM, Cranney GB, Walsh WF. Thromboembolic risks of left atrial thrombus detected by transesophageal echocardiogram. *Am J Cardiol.* 1997;79(5):626-629. doi:10.1016/s0002-9149(96)00828-4.
- Troughton RW, Asher CR, Klein AL. The role of echocardiography in atrial fibrillation and cardioversion. *Heart.* 2003;89(12):1447-1454. doi:10.1136/heart.89.12.1447
- Thomas KL, Jackson LR, Shrader P, Ansell J, Fonarow GC, Gersh B, et al. Prevalence, Characteristics, and Outcomes of Valvular Heart Disease in Patients With Atrial Fibrillation: Insights From the ORBIT-AF (Outcomes Registry for Better Informed Treatment for Atrial Fibrillation). *J Am Heart Assoc.* 2017;6(12):e006475. Published 2017 Dec 22. doi:10.1161/JAHA.117.00647.
- Noohi F, Sadeghipour P, Kordrostami S, Shafe O, Maleki M, Kyavar M, et al. Rivaroxaban in patients undergoing surgical mitral valve repair. *J Thromb Thrombolysis.* 2020;49(3):475-479. doi:10.1007/s11239-020-02046-2.
- Maan A, Mansour M, N Ruskin J, Heist EK. Current Evidence and Recommendations for Rate Control in Atrial Fibrillation. *Arrhythm Electrophysiol Rev.* 2013;2(1):30-35.
- Bouzas-Mosquera A, Broullón FJ, Álvarez-García N, Méndez E, Peteiro J, Gándara-Sambade T, et al. Left atrial size and risk for all-cause mortality and ischemic stroke. *CMAJ.* 2011;183(10):E657-E664. doi:10.1503/cmaj.091688
- Fragakis N, Shakespeare CF, Lloyd G, Simon R, Bostock J, Holt P, et al. Reversion and maintenance of sinus rhythm in patients with permanent atrial fibrillation by internal cardioversion followed by biatrial pacing. *Pacing Clin Electrophysiol.* 2002;25(3):278-286.