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A Clinical and Demographic Profile of Atrial Fibrillation-A Hospital-Based Descriptive Study

Sourav Chattopadhyay, Aniket Sinha*, Suman Kumar, Abhinav Choudhary and Sumit Singh Kaushal

Department of General Medicine, M.G.M. Medical College & L.S.K. Hospital, Kishanganj, Bihar, India

**Corresponding e-mail: draniketsinha@gmail.com*

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ABSTRACT

Background: *Atrial Fibrillation (AF) is an abnormal heart rhythm characterized by the rapid and irregular beating of the atrial chambers of the heart. High blood pressure and valvular heart disease are the most common alterable risk factors for AF. This study aimed to evaluate the clinical profile and echocardiographic features in patients of AF.* ***Methods:*** *A total of 110 patients aged over 18 years and diagnosed with AF were enrolled in the study at MGM Medical College and LSK Hospital, Kishanganj, Bihar. These patients underwent a detailed general physical and systemic examination. Relevant biochemical investigations, chest X-rays, and echocardiography were done in all patients.* ***Results:*** *The mean age of the study group was found to be 62.8 years with a male preponderance. Hypertension was the most common cause overall contributing to 28.79% followed by rheumatic heart disease (21.2%). A total of 36 patients exhibited LA size greater than 5 cm and LA clot was observed in 4% of patients on transthoracic echocardiography.* ***Conclusion:*** *Hypertension was seen to be a major risk factor for AF and hence it needs to be detected and managed early. Lifestyle modifications with diet and exercise can help in reducing the prevalence of hypertension and thus the risk of developing AF.*

Keywords: Atrial fibrillation, Hypertension, Blood pressure, Echocardiography, Chest X-ray

INTRODUCTION

Atrial fibrillation is the most common type of cardiac arrhythmia. It is due to abnormal electrical activity within the atria of the heart, causing them to fibrillate. It is characterized as tachyarrhythmia, which means that the heart rate is often fast. This arrhythmia may be paroxysmal (less than seven days) or persistent (more than seven days). Due to its rhythm irregularity, blood flow through the heart becomes turbulent and has a high chance of forming a thrombus (blood clot), which can ultimately dislodge and cause a stroke. Atrial fibrillation is the leading cardiac cause of stroke. Risk factors for atrial fibrillation include advanced age, high blood pressure, underlying heart and lung disease, congenital heart disease, and increased alcohol consumption. Symptoms vary from asymptomatic to symptoms such as chest pain, palpitations, fast heart rate, shortness of breath, nausea, dizziness, diaphoresis (severe sweating), and generalized fatigue. Although atrial fibrillation may be a permanent disease, various treatments and risk modifying strategies have been developed to help reduce the risk of stroke in patients that remain in atrial fibrillation. Treatments include anticoagulation, rate control medication, rhythm control medication, cardioversion, ablation, and other interventional cardiac procedures.

MATERIALS AND METHODS

The present study was an observational time-bound study conducted from 2020 to 2021. All the patients who presented with features suggestive of AF and were 18 years or older were enrolled in the study at MGM Medical College and

LSK Hospital, Kishanganj, Bihar. A diagnosis of AF was confirmed by Electrocardiographic (ECG) changes. Written informed consent was taken from all the participants. A detailed history with chief complaints of dyspnea, chest pain, palpitations, and fatigue was obtained. An inquiry was made into the associated co-morbid conditions and personal habits of patients. All patients underwent elaborate general and systemic examinations. The cardiovascular system examination included detailed assessments such as inspection, palpation, and auscultation of the cardiovascular system, presence of murmurs, looking for signs of cardiac failure and Pulmonary Artery Hypertension (PAH), and the presence of cardiomegaly. All patients underwent routine investigations complete blood count, renal function tests, liver function tests, chest X-ray, thyroid profile, and ECG. AF was diagnosed based on the ECG findings of absence of P-waves, irregular R-R intervals with a rapid ventricular rate. A 2D-Echocardiogram (2D-ECHO) was done in all ECG proven AF patients, to determine LA (Left Atrial) and LV (Left Ventricular) dimensions; assess the LV wall thickness and function as well as recognize the underlying pathological conditions to know the aetiology of AF (valvular, myocardial or pericardial aetiology). All patients were evaluated using M-mode and two-dimensional transthoracic echocardiography and colour flow Doppler examination. Each 2D ECHO consisted of parasternal long and short axes, and apical two and four-chamber views. The conventions of the American Society of Echocardiography were followed in obtaining LA dimensions, LV end-systolic, and end-diastolic dimensions, as well as right ventricular end-diastolic dimensions. The anterior-posterior LA dimension was calculated in the short axis view from M-mode echocardiography and LA area or volume was measured in apical-chamber or four-chamber views. Left ventricular volumes were measured and Ejection Fraction (EF) was calculated.

RESULTS

Patient Demographics

A total of 110 patients above 18 years diagnosed with a new-onset AF were included in the study. The mean age of the study group was 62.8 years with a male to female ratio of 1.5:1. The majority of the patients (40%) were in the age group of 46-65 years. Table 1 illustrates the age distribution of patients with AF.

Table 1 Age distribution of patients with AF

Age in Years	No. of Patients
18-45	16
46-65	43
66-75	30
>75	21

Presenting Clinical Features

Majority of the patients (n=66) presented with dyspnea followed by pedal oedema (n=25). The other presenting features were fatigue, stroke, palpitation, chest pain, syncope, and giddiness. Out of 110 patients, 35 gave a history of smoking and 9 patients had a history of alcohol consumption. An elevated Jugular Venous Pulse (JVP) was found in 20% of cases, an irregularly irregular pulse was observed in 90% of cases. A palpable P2 was observed in 39 patients. A varying S1 was found in 83% and a loud P2 was heard in 19% on auscultation. pansystolic murmur was heard over both mitral and tricuspid areas in 11 and 42 patients, respectively, and a mid-diastolic murmur was heard in 16 patients. Presystolic accentuation was noticed in 9% of patients. Around 20% of patients had crepitations on auscultation suggestive of pulmonary oedema. Neurological deficits were detected in 6%, and heart failure in 15% of patients. The type of AF commonly encountered in the present study was the persistent type (n=67), followed by paroxysmal (n=26) and permanent (n=17).

Aetiology of AF

The commonest cause of AF seen in our study was from the non-valvular group contributing to 75.9% of cases. Hypertension was observed to be the most common non-valvular cause of AF. The other non-valvular causes of AF are depicted in Table 2. Amongst the valvular aetiology of AF, Rheumatic Heart Disease (RHD) was the commonest cause accounting for 25 out of 110 patients. The valvular involvement in RHD is represented in Table 3.

Table 2 Non-valvular causes of AF

Aetiology	Number (n=83)
Hypertension	32
COPD	19
Diabetes Mellitus	11
IHD	7
Dilated Cardiomyopathy	5
Thyrotoxicosis	4
Lone AF	1

Table 3 Valvular involvement in RHD

Valvular involvement	Number (n=27)
MS with TR	10
MS with MR with TR	8
Isolated MS	6
MR	3

Investigation Findings

The findings on chest X-ray included cardiomegaly (32%), COPD (21%), pulmonary oedema (19%), and 5% had Acute Respiratory Distress Syndrome (ARDS) due to acute febrile illness and the remaining 23% revealed no findings on chest X-ray. All 110 patients were found to have an absence of P-wave with a varying R-R interval. However, 95 patients had additional ECG findings such as non-specific ST-T changes (33%), Left Ventricular Hypertrophy (LVH) (21%), Right Ventricular Hypertrophy (RVH) (18%), Right Bundle Branch Block (RBBB) (12%), Left Bundle Branch Block (LBBB) (5%), AF with aberrancy and block (4%) and digitalis effects (3%). The commonest ECHO findings noted in this study were pulmonary artery hypertension (59%), tricuspid regurgitation (58%), RHD (21%), Dilated atria (40%), Systolic dysfunction (9%), LVH (29%), and regional wall motion abnormalities suggestive of IHD (9%). Left atrial clot was noticed in 4% of patients (Table 4).

Table 4 Comparison of risk factors and associations of AF with earlier studies

	The Framingham Study	Cardiovascular Health Study	ALFA Study	Present
Mean Age	72	-	68.7	62.8
Smoking	34.80%	-	-	32.03%
DM	16.30%	-	10.70%	14.10%
HTN	44%	-	39.40%	28.79%
CHF	20.60%	19%	29.80%	16%
RHD	16%	4.30%	15.20%	21.20%
IHD	25%	22%	16.60%	6.70%
Stroke	-	14.80%	8.40%	5%
Thyrotoxicosis	-	2.40%	3.10%	3.70%
COPD	36%	7.70%	11.20%	17.70%

DISCUSSION

Atrial fibrillation is the most common arrhythmia encountered in clinical practice characterized by uncoordinated atrial activity resulting in an irregularly irregular ventricular rhythm with a rate of 300-600 beats per minute [1,2]. It has an estimated prevalence of 3% in adults and its prevalence increased progressively with age. Some of the well-

known risk factors of AF include hypertension, valvular heart disease, male gender, obesity, and alcohol consumption [3]. The mean age of presentation in the present study was found to be 62.8 years with the majority of the patients above 45 years of age. This was in concordance with the study by Mohan G, et al. wherein the mean age was 67.02 ± 12.50 years with more than 90% of patients above 50 years of age [2]. The prevalence of atrial fibrillation increases substantially with age. This was an observed trend in several other studies, the most notable of them being the Rotterdam study and ATRIA study [4,5]. However, these studies have been limited by relatively small numbers of patients with AF, restriction of age ranges, ethnic homogeneity [6-9]. There was a slight male preponderance in our study similar to other earlier studies. Men are more susceptible to the development of AF. As the prevalence of diabetes, hypertension, COPD, and IHD is more common in men and differences in atrial Effective Refractory Period (ERP) in response to rapid atrial pacing have been reported in men and women. The etiological factors of AF were categorized into valvular and non-valvular groups. Non-valvular causes formed the majority in the present study (76.7%) out of which hypertension formed a significant majority (37.9%). This was similar to the study by Mohan G, et al., however, this finding did not correlate with the study by Singh, et al. who Reported Valvular Etiology (RHD) as the cause in 60% of patients [2,10]. In the present study, valvular cause in the form of RHD was observed in 23.3% of patients. Risk factors for developing AF in the Framingham Heart study were hypertension (44%), diabetes (16%), prior myocardial infarction (26%), COPD (36%), and valvular heart disease (17%) [11]. Similar findings have been reported in the Cardiovascular Health Study as well [12]. An increase in LV thickness and stiffness due to hypertension impairs LV diastolic function which leads to LA stretch and pressure and LA remodelling and dysfunction. Structural, contractile, architectural, and electrophysiological changes in atria collectively called atrial cardiomyopathy occur due to atrial remodelling ultimately leading to AF [13]. The other risk factors under the non-valvular group include COPD (17.7%), diabetes mellitus (14.1%), IHD (6.7%), dilated cardiomyopathy (6.3%), and thyrotoxicosis (3.7%). Neurological deficits in the form of stroke were observed in 5% of our patients and 16% of our patients showed features of heart failure. Table 4 illustrates the comparison of the present study with earlier studies conducted [12,14]. Majority of our patients (62.1%) presented with dyspnea followed by pedal oedema (23.3%). Similarly, Mohan G, et al. reported dyspnea and pedal oedema as the predominant symptoms in 56% and 39% of patients, respectively [2]. However, Shaik Sulaiman Meeran, et al. reported palpitations and dyspnea as the predominant symptoms in 52% and 14%, respectively [3]. Similarly, the ALFA study reported palpitations in 54% of the patients, dyspnea in 44%, angina in 10%, and syncope and dizzy spells in 10% [14]. Palpitations on exertion were observed in 11% of patients in the present study. Echocardiography (ECHO) is a vital tool in the diagnostic armamentarium of AF as it gives valuable information regarding cardiac function, complications, and prognosis in AF [15]. Left atrial dilatation indicates chronicity and left ventricular dysfunction, thus resulting in AF. Normally LA size is less than 40 mm, however, a size more than (45-50) mm increases the risk of development of AF by four-fold and it is observed that sustained AF in turn can further increase the LA size. Thus, LA size is an important predictor of AF, as well as its complications such as stroke as 20%-30% of strokes, occur as a result of AF [16]. In the present study, 32% of patients were found to have a LA size of more than 50 mm. In addition, a study y Mahmood ul Hassan, et al. reported a significant correlation between LA size of greater than 45 mm and LA clot in AF [17]. LA clot was observed in only 4% of patients in the present study unlike the study by Mohan G, et al. with 14.5 % of patients exhibiting LA clot [2]. It is noticed that transesophageal ECHO has greater sensitivity in picking up LA clots in comparison with a transthoracic ECHO [18]. This lower percentage could be attributed to the fact that all the patients in the present study were subjected to transthoracic ECHO, hence, the presence of LA clot could have been easily missed on transthoracic ECHO.

CONCLUSION

Hypertension is one of the leading causes of AF, accounting for most cases of AF. In the present study, RHD is the second most common cause, its prevalence reducing owing to the rampant usage of antibiotics. As the prevalence of hypertension is steadily on the rise, it contributes significantly to cardiovascular risk and death. However, adopting healthy lifestyle habits, early screening, and control of hypertension can in turn reduce the risk of developing AF.

DECLARATIONS

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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