

ORIGINAL ARTICLE

To analyse individuals with atrial fibrillation clinically and through echocardiography

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ABSTRACT:

Aim: The study's goal is to analyse individuals with atrial fibrillation clinically and through echocardiography. **Methods:** The current research was carried out at the Department of Cardiology. A total of 80 patients were clinically assessed and documented. A cardiovascular and neurological examination was performed to determine the cause and look for signs of thromboembolism. An echocardiogram was also performed. **Results:** Dyspnoea was the most prevalent symptom. Palpitation came in second at 58.75 percent, followed by 76.25 percent. 12.5 percent of patients had a history of mild to severe chest discomfort. 18.75% of patients reported a history of syncope or dizzy episodes. Fatigability was seen in 21.25 percent of the patients, and congestive heart failure was observed in 68.75 percent of the cases. RHD was the underlying aetiology of atrial fibrillation in 53.75 percent of individuals. This group was made up of 42.5 percent girls and 15 percent men. One-tenth of the patients had coronary artery disease. Only hypertension was found in 7.5 percent of individuals. COPD was a risk factor for 10% of the patients. Cardiomyopathy affected 8.75 percent of individuals. 2.5 percent of patients had hyperthyroidism. Heart rates were higher than 100 in 68.75% of patients. A fibrillary P wave was found in 22.5 percent of patients, whereas p waves were missing in 77.5 percent. LVH was found in 10% of patients, RVH in 31.25 percent, RBBB in 6.25 percent, and LBBB in 7.5 percent, with ST depression and T wave inversion in 60% of patients. As seen in the table above, the majority of patients, 37.5 percent, had LA dimensions ranging from 4.1 to 5.0 cm². **Conclusion:** In our analysis, dyspnea was the most prevalent symptom of atrial fibrillation, and rheumatic heart disease was the leading cause. A patient with a left atrial diameter greater than 4.0 cm experienced persistent atrial fibrillation. The thromboembolic phenomena was more prevalent in chronic AF patients, and all of them had mitral valve dysfunction.

Keywords: Atrial fibrillation, clinically, echocardiography

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INTRODUCTION

Atrial fibrillation (AF) is a kind of supraventricular tachyarrhythmia characterised by uncoordinated atrioventricular activity, which results in abnormal atrial mechanical and electrical function.^{1,2} Electrocardiographically characterised by low amplitude baseline oscillations known as Fibrillatory or 'F' waves and an irregularly irregular ventricular rhythm at a rate of 300 to 600 beats per minute and variable in amplitude, shape, and timing. In the general population, the prevalence of atrial fibrillation is between 0.4 and 1%. The frequency and incidence of AF were disproportionately greater in industrialised countries than in developing countries for both men and women. Hypertensive heart disease, Coronary Artery disease, Rheumatic valvular disorders, Hypertrophic and dilated Cardiomyopathy, Congestive cardiac failure, Pericarditis and Myocarditis, Congenital Heart Disease, Post cardiac surgery, Sick sinus syndrome are all risk factors for Atrial Fibrillation. Age, hyperthyroidism, alcohol use, chronic obstructive pulmonary disease, obstructive sleep apnea, diabetes mellitus, smoking, drugs containing theophylline, and family history are all non-cardiac risk factors.³

AF is electrophysiologically defined as disorderly atrial depolarization caused by persistent wavelets of

re-entry. Damage to the sinoatrial node and internodal pathways, atrial dilatation, and nodal artery obstruction have all been proposed as causes of AF. Electrocardiography in AF reveals an abnormally irregular ventricular beat, with either no or coarse fibrillary waves. Fast fibrillary waves are more common in atrial fibrillation that has just developed.^{4,5} Echocardiography has emerged as an essential technique in the assessment and therapy of patients with cardiac rhythm abnormalities as a result of technological developments in 2D-Doppler ultrasonography.

METHODS AND MATERIALS

After receiving clearance from the protocol review committee and the institutional ethics committee, the current research was carried out at the Department of Cardiology. This research involved 80 patients, 35 men and 45 women. All patients were asked to participate, and after permission was obtained, they were evaluated historically and clinically to determine the source and complications of atrial fibrillation using semi-structured questions (annexure). There were 52 OPD patients and 28 indoor patients among the 80 patients. The patients were evaluated clinically and echocardiographically for the underlying causes of their AF. In each case, a

detailed history was taken, with special attention paid to symptoms of AF such as palpitation, chest pain, dyspnoea, orthopnoea, paroxysmal nocturnal dyspnoea, sweating, nausea and vomiting, cough, fever, haemoptysis, dizziness, syncope, weakness, easy fatigability, neurodeficit, sudden blindness, tremors, smoking, and alcohol consumption. Other co-morbid illnesses such as hypertension, rheumatic heart disease, thyrotoxicosis, chronic obstructive pulmonary disease, old stroke, coronary artery disease, and recurrent congestive heart failure were also thoroughly investigated. Each patient had a thorough physical, systemic, and laboratory assessment. A thorough comprehensive examination was performed, with a focus on the cardiovascular system. An expert cardiologist conducted echocardiography on AF patients.

RESULTS

The age and gender distribution of the patients is shown in Table 1. According to Table 2, the most prevalent symptom was dyspnea (76.25 percent), followed closely by palpitation (58.75 percent). 12.5 percent of patients had a history of mild to severe

chest discomfort. 18.75% of patients reported a history of syncope or dizzy episodes. Fatigability was seen in 21.25 percent of the patients, and congestive heart failure was observed in 68.75 percent of the cases.

According to Table 3, the majority of patients, 53.75 percent, had RHD as the underlying cause of their atrial fibrillation. This group was made up of 42.5 percent girls and 15 percent men. One-tenth of the patients had coronary artery disease. Only hypertension was found in 7.5 percent of individuals. COPD was a risk factor for 10% of the patients. Cardiomyopathy affected 8.75 percent of individuals. 2.5 percent of patients had hyperthyroidism.

According to Table 4, 68.75 percent of patients had heart rates greater than 100. A fibrillary P wave was found in 22.5 percent of patients, whereas p waves were missing in 77.5 percent. LVH was found in 10% of patients, RVH in 31.25 percent, RBBB in 6.25 percent, and LBBB in 7.5 percent, with ST depression and T wave inversion in 60% of patients.

As seen in the table above, the majority of patients, 37.5 percent, had LA dimensions ranging from 4.1 to 5.0 cm. (See Table 5)

Table 1 Age and gender of the patients

Sex	Number =80	%
Male	35	43.75
Female	45	56.25
Age	39.55±69(mean)	

Table 2 Various Mode of Presentation of Patients with Atrial Fibrillation

Symptoms	Number	Percentage
Fatigue	17	21.25
Syncope/ Dizzy spells	15	18.75
None	13	16.25
Chest pain	10	12.5
Dyspnoea NYHA Class II – IV)	61	76.25
Congestive cardiac failure	55	68.75
Palpitation	47	58.75

Table 3 Clinical Characteristics According to Cause of Atrial Fibrillation

Risk factors	Total	Percentage
Congenital heart diseases	1	1.25
Hyperthyroidism	2	2.5
Lone AF	5	6.25
RHD	43	53.75
HTN (alone)	6	7.5
COPD	8	10
Coronary artery disease	8	10
Cardiomyopathy	7	8.75

Table 4 ECG Findings of Patients with Atrial Fibrillation

ECG findings	No. of patients	Percentage
Heart Rate -- > 100	55	68.75
< 100	25	31.25
Fibrillary waves	18	22.5
Absent 'p' waves	62	77.5
RBBB	5	6.25

LBBB	6	7.5
ST depression/ 'T' wave inversion	48	60
LVH	8	10
RVH	25	31.25

Table 5 Left Atrial Dimensions

LA Dimensions	No. of patients	Percentage
< 4.0 cm ²	24	30
4.1 – 5.0 cm ²	30	37.5
> 5.0 cm ²	26	32.5

DISCUSSION

Atrial fibrillation is the most common arrhythmia, and its prevalence rises substantially with age. It is a major cause of disability and mortality in the aged population. The most prevalent symptom among 100 individuals was dyspnea. Palpitation came in second at 58.75 percent, followed by 76.25 percent. 12.5 percent of patients had a history of mild to severe chest discomfort. 18.75% of patients reported a history of syncope or dizzy episodes. Fatigability was seen in 21.25 percent of the patients, and congestive heart failure was observed in 68.75 percent of the cases. In a comparable research, Tischler et al⁶ observed dyspnea in 62% of patients, palpitation in 33% of patients, and syncope in 12% of patients. In one research, Flaker et al⁷ discovered that 78% of patients had dyspnoea and 11% had chest pain upon presentation, while Levey et al⁸ discovered that 54.1 percent of patients had palpitation, 44.4 percent had dyspnoea, and 10.1 percent had chest pain. 14.3 percent of patients reported fatigue. Congestive cardiac failure was recorded in 69 percent of our patients, while Levey et al⁸ reported CCF in 29.8 percent of their patients.

According to Davis et al.³, the most prevalent conditions in AF patients are RHD, Ischaemic Heart Disease (IHD), hypertension, and cor-pulmonale. The most prevalent cause of AF in the present research was rheumatic heart disease. RHD was the underlying aetiology of atrial fibrillation in 53.75 percent of individuals. This group was made up of 42.5 percent girls and 15 percent men. One-tenth of the patients had coronary artery disease. Only hypertension was found in 7.5 percent of individuals. COPD was a risk factor for 10% of the patients. Cardiomyopathy affected 8.75 percent of individuals. 2.5 percent of patients had hyperthyroidism. A research done in India by Singh et al⁹ found RHD in 37.87 percent of their patients, cardiomyopathy in 13.6 percent, HTN in 3%, IHD in 3.03 percent, thyrotoxicosis in 9.05 percent, and lone fibrillation in 1.5 percent. Kumar et al¹⁰ found RHD in 39% of their patients, IHD in 29%, HTN in 54%, cardiomyopathy in 4%, COPD in 3%, and thyrotoxicosis in 5% of their patients. Timane et al¹¹ discovered RHD in 55% of patients, cardiomyopathy in 11.25 percent, thyrotoxicosis in 8.75 percent, and COPD in 8.75 percent. According to Levey et al⁸, the numerous causes of atrial fibrillation include RHD in 15.2

percent, non-rheumatic valvular lesion in 3.3 percent, cardiomyopathy in 14 percent, hypertensive heart disease in 21.4 percent, IHD in 16.6 percent, thyrotoxicosis in 3.1 percent, and COPD in 11.2 percent. Kannel et al¹² observed that RHD was the most prevalent cause of AF in 54.08 percent of the cases. In our analysis, RHD was the most prevalent underlying cause of AF, accounting for 53.75 percent of patients, compared to 15.2 percent in a study done by Levey et al⁸.

Flaker et al⁷ discovered that the size of the left atrium was a good predictor of recurrent atrial fibrillation; the bigger the left atrium, the greater the chance of getting atrial fibrillation. If the left atrial diameter surpassed 4.5 cm², cardioversion was unlikely to be successful in the long term, according to Henry et al¹³. The single greatest predictor of increased risk of embolization is left atrial size more than 4.0cm². According to Cabin et al, Blackshear et al^{14,15}, and Sandflippo et al¹⁶, atrial size increases over time with atrial fibrillation even in the absence of other causes of atrial enlargement. In our research, the majority of patients (37.5%) had LA dimensions ranging from 4.1 to 5.0 cm², 30% had LA dimensions less than 4.0 cm², 32.5 percent had LA dimensions more than 5.0 cm², and the mean LA size was 4.72cm². In our investigation of multiple ECG abnormalities in individuals with atrial fibrillation, 68.75% had heart rates greater than 100. A fibrillary P wave was found in 22.5 percent of patients, whereas p waves were missing in 77.5 percent. LVH was found in 10% of patients, RVH in 31.25 percent, RBBB in 6.25 percent, and LBBB in 7.5 percent, with ST depression and T wave inversion in 60% of patients. In their investigation, Kumar et al¹¹ discovered ST and T alterations in 15% of the patients, low voltage in 4%, LBBB in 4%, RBBB in 2%, rapid ventricular rate in >100% of the patients, fibillary 'p' waves in 71%, LVH in 13%, and RVH in 30%.

In the general population, metabolic syndrome (MS) has lately been linked to an increased risk of developing atrial fibrillation (AF). According to the temporal period utilised, the prevalence of MS ranged from 31.7 percent to 47.8 percent.^{17,18} However, no such link was found in our research.

Similarly, the prevalence of paroxysmal, persistent, and permanent AF was 22.7, 21.5, and 55.8 percent, respectively, in another comparable research. Hypertensive heart disease (47.7%), valvular heart

disease (25.6%), dilated cardiomyopathy (15.7%), and coronary artery disease (6%) were among the underlying cardiac abnormalities found in 156/172 individuals (90.7%).¹⁹ However, the outcomes were not the same as in our population.

A new research confirmed that atrial fibrillation (AF) occurs often in individuals with acute myocardial infarction (MI) and is related with a higher long-term mortality.²⁰ Similarly, atrial fibrillation has been linked to a poor result in patients with ischemic stroke, especially in those who are not candidates for oral anticoagulant therapy. These relationships were not investigated in the current research, which remains a drawback.

CONCLUSION

In our research, dyspnea was the most prevalent symptom of atrial fibrillation, and rheumatic heart disease was the leading cause. A patient with a left atrial diameter greater than 4.0 cm experienced persistent atrial fibrillation. The thromboembolic phenomena was more prevalent in chronic AF patients, and all of them had mitral valve dysfunction.

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