

Atrial Fibrillation Patients' Clinical and Echocardiographic Evaluation: A Prospective Study

Virendra Prasad Sinha¹, Ashok Kumar², Upendra Narayan Singh³

¹Associate Professor, Department of Cardiology, Patna Medical College and Hospital, Patna, Bihar, India.

²Assistant Professor, Department of Cardiology, Patna Medical College and Hospital, Patna, Bihar, India.

³Assistant Professor, Department of Cardiology, Patna Medical College and Hospital, Patna, Bihar, India.

Received: 01-06-2021 / Revised: 04-07-2021 / Accepted: 23-07-2021

Corresponding author: Dr. Virendra Prasad Sinha

Conflict of interest: Nil

Abstract

Aim: The aim of the study clinical and echocardiographic assessment of patients with atrial fibrillation.

Methods: The present study was conducted in the Department of cardiology, Patna Medical College and Hospital, Patna, Bihar, India for 1 year. Total 100 patients were evaluated clinically, and detailed Cardiovascular, Neurological examination was done to evaluate etiology and for any evidence of thromboembolism. Echocardiography was also done.

Results: Most common symptom was dyspnoea 75% followed closely by palpitation 58%. There was history of mild to moderate chest pain in 12% of patients. 18% of patients had history of syncope/dizzy spells. Fatigability was noticed in 20% cases and congestive cardiac failure noticed in 68% cases. majority of patients, 55% had RHD as underlying cause of atrial fibrillation. There were 40% females and 15% males in this group. 9% patients had coronary artery disease. Hypertension alone was present in 7% of patients. 9% of patients had COPD as a risk factor. 8% of patients had cardiomyopathy Hyperthyroidism was found in 3% of patients. 70% patients had heart rates >100. Fibrillary P wave was seen in 22% patients and absent p waves in 78% of patients. LVH was seen in 11% patients, RVH in 30% patients, RBBB in 6% patients, and LBBB in 7% patients, ST depression and T wave inversion in 59% patients. As evident from above table the maximum number of patients i.e. 37% had LA dimension between 4.1-5.0 cm².

Conclusion: In our study dyspnoea was the commonest symptom in atrial fibrillation and rheumatic heart disease was the major aetiological factor. Patient with left atrial dimension >4.0 cm had sustained atrial fibrillation. Thromboembolic phenomenon was more common in chronic AF and all the patients had mitral valve disease.

Keywords: cardiomyopathy, atrial fibrillation, rheumatic heart disease

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Atrial Fibrillation (AF) is one of the commonest arrhythmia seen in clinical practice. The incidence is 0.5% in patients under 60 years of age and 10% in patients above the age of 80 years. In Western countries, elderly population is at risk, but in countries like India where rheumatic heart disease (RHD) is rampant, it is the commonest cause of mortality and morbidity in the young.[1]

15% of all strokes are related to AF associated with thromboembolic events.[2] Electro- physiologically, AF represents disorganized atrial depolarization that results from chronic wavelets of re-entry. The various causes of AF that have been suggested are damage to sino atrial node and internodal pathways, atrial dilatation and occlusion of the nodal artery.[3]

Electrocardiography in AF shows an irregularly irregular ventricular rhythm, 'P' waves may be absent or coarse fibrillary waves may be present. Fast fibrillary waves are seen more often in recent onset atrial fibrillation.[4,5]

Technical advances in 2D-Doppler ultrasonography have led to the emergence of echocardiography as an integral tool in the evaluation and management of patients with cardiac rhythm disturbances.

Material and methods

The present study was conducted in the Department of cardiology, Patna Medical College and Hospital, Patna,

Bihar, India for 1 year, after taking the approval of the protocol review committee and institutional ethics committee. 100 patients, 40 males and 60 females were included in this study. All patients were requested to participate and after taking consent they were investigated historically and clinically to find out cause and complication of atrial fibrillation as per semi structured question are(annexure). Out of 100 patients 70 were those who attended OPD and rest were 30 indoor patients The patients were screened for the underlying causes, leading to AF and correlated clinically and echocardiographically. Detailed history was recorded in each case paying special attention to history regarding symptoms of AF like 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 intake. A detailed history was also taken regarding the presence of other co-morbid conditions like hypertension, rheumatic heart disease, thyrotoxicosis, chronic obstructive pulmonary disease, old stroke, coronary artery disease and re-recurrent congestive heart failure. A complete physical, systemic and laboratory examination was done on each patient. A detailed systemic examination was done with special emphasis on cardiovascular system -

examination. Echocardiography was performed on AF patients by an experienced cardiologist.

Results

Table 1 show that most common symptom was dyspnoea 75% followed closely by palpitation 58%. There was history of mild to moderate chest pain in 12% of patients. 18% of patients had history of syncope/dizzy spells. Fatigability was noticed in 20% cases and congestive cardiac failure noticed in 68% cases.

Table 2 shows that majority of patients, 55% had RHD as underlying cause of atrial fibrillation. There were 40% females and 15% males in this group. 9% patients had coronary

artery disease. Hypertension alone was present in 7% of patients. 9% of patients had COPD as a risk factor. 8% of patients had cardiomyopathy. Hyperthyroidism was found in 3% of patients.

Table 3 shows that 70% patients had heart rates >100. Fibrillary P wave was seen in 22% patients and absent p waves in 78% of patients. LVH was seen in 11% patients, RVH in 30% patients, RBBB in 6% patients, and LBBB in 7% patients, ST depression and T wave inversion in 59% patients.

As evident from above table the maximum number of patients i.e. 37% had LA dimension between 4.1-5.0 cm². (Table 4)

Table I. Various Mode of Presentation of Patients with Atrial Fibrillation

Symptoms	No. of patients	Percentage
Dyspnoea NYHA Class II – IV)	75	75
Congestive cardiac failure	68	68
Palpitation	58	58
Fatigue	20	20
Syncope/ Dizzy spells	18	18
None	15	15
Chest pain	12	12

Table 2: Clinical Characteristics According to Cause of Atrial Fibrillation

Risk factors	Male	% age	Female	% age	Total	% age
RHD	15	15	40	40	55	55
HTN (alone)	4	4	3	3	7	7
COPD	7	7	2	2	9	9
Coronary artery disease	6	6	3	3	9	9
Cardiomyopathy	6	6	2	2	8	8
Congenital heart diseases	0	0	2	2	2	2
Hyperthyroidism	0	0	3	3	3	3
Lone AF	2	2	5	5	7	7
Total	40	40	60	60	100	100

Table 3: ECG Findings of Patients with Atrial Fibrillation

ECG findings	No. of patients	Percentage
Heart Rate -- > 100	70	70
< 100	30	30
Fibrillary waves	22	22
Absent 'p' waves	78	78
RBBB	6	6
LBBB	7	7
ST depression/ 'T' wave inversion	59	59
LVH	11	11
RVH	30	30

Table 4: Left Atrial Dimensions

LA Dimensions	No. of patients	Percentage
< 4.0 cm ²	31	31
4.1 – 5.0 cm ²	37	37
> 5.0 cm ²	32	32

Discussion

Out of 100 patients, most common symptom was dyspnoea

75% followed closely by palpitation 58%. There was history of mild to moderate chest pain in 12% of

patients. 18% of patients had history of syncope/dizzy spells. Fatigability was noticed in 20% cases and congestive cardiac failure noticed in 68% cases. Tischler et al[6] reported dyspnoea in 62% of patients, palpitation in 33% patients, and syncope in 12% patients in a similar study. Flaker et al [7] in their study observed that 78% patients had dyspnoea and 11 % had chest pain at presentation whereas Levey et al⁸ reported that 54.1% patients had palpitation, 44.4% patients had dyspnoea and 10.1% patients had chest pain. Fatigue was noted in 14.3% patients. In our study Congestive cardiac failure was reported in 69% patients whereas study conducted by Levey et al[8] reported 29.8% patients with CCF.

According to Davis et al,[3] RHD, Ischaemic Heart Disease (IHD), hypertension and cor-pulmonale are the most commonly found condition in patients of AF. In current study rheumatic heart disease was the commonest cause of AF. majority of patients, 55% had RHD as underlying cause of atrial fibrillation. There were 40% females and 15% males in this group. 9% patients had coronary artery disease. Hypertension alone was present in 7% of patients. 9% of patients had COPD as a risk factor. 8% of patients had cardiomyopathy Hyperthyroidism was found in 3% of patients.

In India, a study conducted by Singh et al[9] reported RHD in 37.87%, cardiomyopathy in 13.6%, HTN in 3%, IHD in 3.03%, thyrotoxicosis in 9.05% and lone fibrillation in 1.5% of

their patients. Kumar et al[10] reported RHD in 39%, IHD in 29%, HTN in 54%, cardiomyopathy in 4%, COPD in 3% and thyrotoxicosis in 5% of their patients. Timane et al[11] showed RHD in 55% patients, cardiomyopathy in 11.25%, thyrotoxicosis and COPD in 8.75% each. Studies conducted by Levey et al[8] reported RHD in 15.2%, non-rheumatic valvular lesion in 3.3%, cardiomyopathy in 14%, hypertensive heart disease in 21.4%, IHD in 16.6%, thyrotoxicosis in 3.1%, and COPD in 11.2% as the various causes of atrial fibrillation. Kannel et al[12] reported RHD in 54.08% respectively and found that RHD was the most common cause of AF. In our study also RHD was the commonest underlying cause of AF constituting 55% of cases which was in contrast to study conducted by Levey et al⁸ with a prevalence of 15.2%.

Flaker et al[7] found that LA size was a useful predictor of recurrent AF; the larger the left atrium the higher the risk of developing atrial fibrillation. Henry et al[13] (observed if left atrial dimension exceeded 4.5 cm², cardioversion was unlikely to be effective in the long run. Left atrial size >4.0cm² is the single strongest predictor of increased risk of embolization Cabin et al and Blackshear et al[14,15] and according to Sandflippo et al[16] atrial size is increased in time with atrial fibrillation even in the absence of other causes of atrial enlargement. In our study the maximum number of patients i.e. 37% had LA dimension

between 4.1 -5.0 cm², LA dimension less than 4.0 cm² was seen in 31% of patients and LA dimension more than 5.0 cm² was seen in 32% of patients and mean LA size was 4.72cm²[2]. In our study of various ECG findings in patients with atrial fibrillation, 70% patients had heart rate > 100 per minute, fibrillary 'p' waves were present in 78% of patients, LVH was seen in 11% of patients, RVH was seen in 30% of patients, RBBB was seen in 6% of patients, LBBB was seen in 7% of patients and ST depression and Twave inversion in 58% of patients. Kumar et al[11] in their study observed ST and T changes in 15%, low voltage in 4%, LBBB in 4%, RBBB in 2%, fast ventricular rate in > 100 in 85%, fibrillary 'p' waves in 71%, LVH in 13% and RVH in 30% of patients.

Metabolic syndrome (MS) has been recently associated with an increased risk for the development of atrial fibrillation (AF) in the general population. The prevalence of the MS varied from 31.7% to 47.8% according to the each time definition used.[17,18] However no such association was noted in our study.

Similarly in another similar study the prevalence of paroxysmal, persistent, and permanent AF was 22.7, 21.5, and 55.8%, respectively. Underlying cardiac disorders, present in 156/172 patients (90.7%), included hypertensive heart disease (47.7%), valvular heart disease (25.6%), dilated cardiomyopathy (15.7%), and coronary artery disease (6%) [19] The results were though different from our population.

Few recent study established these facts that Atrial fibrillation (AF) occurs commonly in patients with acute myocardial infarction (MI) and is associated with an increased long-term mortality.[20]. Similarly, Atrial fibrillation has been shown to be associated with a poor outcome among patients with ischemic stroke particularly among patients, who are not eligible to oral anticoagulant treatment. These, associations were not studied in the present study, which remain limitation of the current study.

Conclusion

In our study dyspnoea was the commonest symptom in atrial fibrillation and rheumatic heart disease was the major aetiological factor. Patient with left atrial dimension >4.0 cm had sustained atrial fibrillation. Thromboembolic phenomenon was more common in chronic AF and all the patients had mitral valve disease.

Reference

1. Ray IB. Acute management of atrial fibrillation: The commonest arrhythmia in clinical practice. JIMA 2004; 102:04.
2. Cabin HS, Perimutter RA, Feinstein AR, et al. Risk for systemic embolization of atrial fibrillation without mitral stenosis. Am J Cardiol 1990;65:1112-16
3. Davies MJ and Pomerance. A Pathology of atrial fibrillation in

- man. *British Heart J* 1972.; 34:520-25
4. Jayaprakash VL, Kumar NS, Manikantan TV et al. Atrial fibrillation: A clinical, electrocardiographic and echocardiographic correlation. *Indian Heart J* 2003; 55:439.
 5. Aronow WS, Schwartz KS, Koenigsberg M. et al. Prevalence of enlarged left atrial dimension by echocardiography and its correlation with atrial fibrillation. *Am J Cardiol* 1987; 59:1003-04.
 6. Tischler MD, Le TH, Andrew KAM, et al. Clinical echocardiographic and doppler correlates of clinical instability with onset of atrial fibrillation. *Am J Cardiol* 1990;66:721-24.
 7. Flaker GC, Fletcher KA, Rothbart RM, et al. Clinical and echocardiographic features of intermittent atrial Fibrillation that predict recurrent atrial fibrillation. *Am J Cardiol* 1995;76:355-358.
 8. Levy S, Maarek M, Guize L, et al. Characterization of different subsets of atrial fibrillation in general practice. *Circulation* 1999; 99:3028-35.
 9. Singh G, Arora P, Nayyar SB, et al. Study of atrial fibrillation an etiological review. *JAPI* 2002; 50:1500.
 10. Kumar AA, Arora P, Singh G, et al. Clinical profile of atrial fibrillation (AF)-study of 100 cases. *JAPI* 2002; 50:1558.
 11. Timane JM, Hardas MM, Agrawal SS, et al. Atrial fibrillation- A study by colour Doppler - 2D echocardiographic and its correlation with etiology and clinical profile. *JAPI* 2005;53:324
 12. Kannel WB, Abbott RD, McNomara PM, et al. Epidemiologic features of chronic atrial fibrillation. *N Engl J Med* 1982;306:1018-22.
 13. Henry WL, Morganroth J, Pearlman AS, et al. Relation between echocardiographically determined left atrial size and atrial fibrillation. *Circulation* 1976;53:273-79..
 14. Cabin HS, Perimutter RA, Feinstein AR, et al. Risk for systemic embolization of atrial fibrillation without mitral stenosis. *Am J Cardiol* 1990;65:1112-16
 15. Blackshear JL, Pearce LA, Asinger RW, et al. Mitral regurgitation associated with reduced thromboembolic Events in high risk patients with non-rheumatic atrial fibrillation. *Am J Cardiol* 1993;72:840-42
 16. Sanfilippo AJ, Abascal VM, Sheehan M, et al. Atrial enlargement as a consequence of atrial fibrillation. *Circulation* 1990;82:792-97.
 17. Probst P, Schlager NG, Selza A. et al. Left atrial size and atrial fibrillation in mitral stenosis. *Circulation* 1973; 108:1282-87.

18. Vyssoulis G, Karpanou E, Adamopoulos D, et al. Metabolic syndrome and atrial fibrillation in patients with essential hypertension. *Nutr Metab Cardiovasc Dis* 2011 July 23. [Epub ahead of print]
19. Ntep-Gweth M, Zimmermann M, Meitz A, et al. Atrial fibrillation in Africa: clinical characteristics, prognosis, and adherence to guidelines in Cameroon. *Europace* 2010;12(4):482-7
20. Li K, Huo Y, Ding YS. Clinical profile and outcomes of atrial fibrillation in elderly patients with acute myocardial infarction. *Chin Med J (Engl)* 2008;121(23):2388-91