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Original Research Article

The study of clinical and echocardiographic assessment of patients with atrial fibrillation

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ABSTRACT

Background: Atrial Fibrillation is the most common arrhythmia encountered in our clinical practice accounting for 1/3rd of the total hospital admissions for cardiac rhythm disturbances. Recent worldwide epidemiological data have reaffirmed that AF is a global epidemic and has adverse effects on long term morbidity and mortality. This study is aimed to assess the clinical profile and etiology along with Echocardiographic evaluation of patients presenting with Atrial Fibrillation.
Methods: Total of 100 patients of Atrial Fibrillation were enrolled for the study, who got admitted in hospital from March 2017 to June 2018. These 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: Mean Age of the patients enrolled was 67.02±12.50 yrs. There was male predominance. The presenting complaints were dyspnea, palpitations, chest pain & pedal edema. On Echocardiography, Hypertensive Heart Disease was found to be the most common etiology. Mean LA size was 46.18±9.49 mm. LA clot was present in 4% patients. Most common complication was congestive cardiac failure followed by stroke. CHA2DS2- VASc score was ≥2 in 86% patients.
Conclusions: Increasing age and hypertension are associated with occurrence of AF. Hypertensive heart disease was the most common etiology in elderly age group. Presence of LVH or left atrial enlargement in patients with hypertensive heart disease requires early management to improve the outcomes.

Keywords: Atrial fibrillation, Left atrial size, Left ventricular hypertrophy

INTRODUCTION

Atrial fibrillation (AF) is a Supraventricular tachyarrythmia with uncoordinated[1] activity of atria characteristically resulting in disordered atrial mechanical and electrical function.[2] Electrocardiographically characterized by low amplitude baseline oscillations called as Fibrillatory or 'F' waves and an irregularly irregular rhythm of ventricles with the rate of 300 to 600 beats per minute and they are variable in amplitude, shape and timing.

The overall prevalence of Atrial Fibrillation in general population is around 0.4% to 1%. For both men and women, prevalence and incidence of AF were disproportionately higher in developed nations as compared with the developing nations.[3] There are various risk factors which predisposes the patient to develop Atrial Fibrillation that includes Hypertensive heart Disease, Coronary Artery disease, Rheumatic valvular diseases, Hypertrophic and dilated Cardiomyopathy, Congestive cardiac failure, Pericarditis and Myocarditis, Congenital Heart Disease, Post cardiac surgery, Sick

sinus syndrome. Some non-cardiac risk factors include Age, Hyperthyroidism, Alcohol intake, Chronic obstructive pulmonary disease, Obstructive sleep apnea, Diabetes mellitus, Smoking, Drugs - Theophylline and Familial.

Electrocardiographic risk factors include left axis deviation, left ventricular hypertrophy, ischemic changes and Echocardiographic risk factors include left atrial enlargement, increased left ventricular wall thickness and decreased left ventricular fractional shortening.

Various common complications associated with Atrial Fibrillation include Congestive cardiac failure. at rest approximately 20% of left ventricular stroke volume is by atrial contraction which will be lost in AF and hence LV dysfunction can occur.[4] The most common complication in AF is thromboembolism induced stroke. AF is associated with 5 fold increased risk of stroke than in unaffected population. Older patients are not only more prone to AF but their risk of stroke is considerably increased as compared to younger patients with AF.[5]

In this background it is pertinent to know the clinical profile and etiological factors responsible for Atrial Fibrillation and echocardiographic profile in an institute to manage the patients in the hours of Emergency.

METHODS

This is an observational hospital based study whose protocol was approved by the ethical committee of the institution. Individual informed consent was taken from all the patients. A total of 100 patients were enrolled for the present study, the one who presented to Emergency/ICU/Wards in Sri Guru Ram Das Hospital Amritsar from March 2017 to June 2018 with Atrial fibrillation detected on ECG. Patients were studied in detail with reference to age, sex, clinical features and history of present & past illness. Detailed Cardiovascular and Neurological examination was done to know the etiology and to assess for any evidence of thromboembolism. The aims and objectives are to assess the clinical profile and etiology of the patients presenting with Atrial Fibrillation and to perform Echocardiographic evaluation of patients with Atrial Fibrillation.

Inclusion criteria

Patients aged more than 18yrs and clinically and electrocardiographically proven Atrial Fibrillation cases were included in this study.

It was diagnosed clinically by the presence of irregularly irregular pulse rate, pulse deficit of >10, S1 of variable intensity and by using 12 Lead ECG showing absence of P waves, presence of fibrillatory waves that vary in size, shape and timing leading to irregular ventricular response.

Exclusion criteria

Patients suspected clinically to have atrial fibrillation later proved to have different arrhythmia electrocardiographically were excluded from this study.

All the patients who were enrolled in this study were subjected to routine laboratory investigations along with Lipid Profile, Thyroid Profile, MRI 3D Brain wherever applicable and then Echocardiography was done to evaluate the etiology of AF.

Data was entered in Microsoft Excel sheet and analyzed using proportions.

RESULTS

Among the total 100 patients with Atrial Fibrillation enrolled in this study as shown in Table I, Mean Age of the patients was 67.02±12.50 yrs and maximum were in the >50 yrs age group (n = 90; 90%). Males were predominant in this study as 62 % (n = 62) and females were 38 % (n = 38). Among the various risk factors and co-morbidities, the presence of hypertension, diabetes mellitus, smoking, Alcohol were studied. 84 patients (84%) in this study were hypertensive, 18 patients (18%) were diabetic, 33 patients (33%) had a significant history of Alcohol consumption and history of smoking was present in 9 patients (9%). Metabolic Syndrome was present in 15 patients (15%). CHA2DS2-VASc score of more than 2 was seen in 86% of the patients. Rheumatic heart disease was seen in 10 patients as the cause of AF. Symptomatology is shown in Figure 1 and the most predominant presenting symptom was Dyspnea that was class IV in 56 patients (56%) followed by pedal edema in 39 patients (39%), Stroke in 22 patients (22%), Palpitations in 15 patients (15%), Typical Chest Pain in 6 patients (6%) and in 9 patients (9%) AF was discovered incidently during work up of some intercurrent illness.

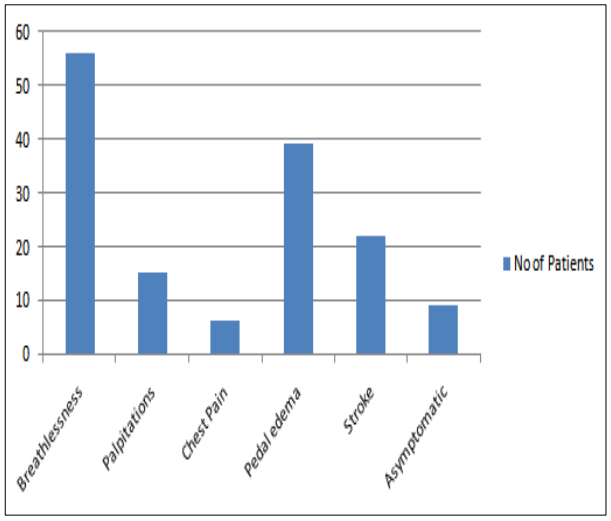

Figure 1: Distribution according to symptomatology.

Table 1: Demographic profile and various characteristics of study population.

Variables	No. of patients (n)	Percentage (%)
Age (yrs)		
<50	10	10.0
>50	90	90.0
Sex		
Male	62	62.0
Female	38	38.0
Risk factors		
Hypertension	84	84.0
Diabetes mellitus	18	18.0
Alcohol	33	33.0
Smoking	09	9.0
Rheumatic heart disease	10	10.0
Metabolic syndrome	15	15.0
CHA2DS2- VASc		
≤1	04	4.0
≥2	86	86.0

On Echocardiographic evaluation as shown in Table 2, two groups were seen - Valvular AF group and Non Valvular AF group. It was found that Hypertensive heart disease (HHD) was the most common etiology among the non- valvular causes of AF in this study. It was seen in 62 patients out of 90 (68.8%) followed by Coronary artery disease (CAD) in 18 patients (20%),Dilated Cardiomyopathy (DCM) in 6 patients (6.6%) and 1 patient (1.1%) each of congenital heart disease (CHD), Hypertrophic Obstructive Cardiomyopathy (HOCM), Chronic Obstructive Pulmonary Disease (COPD) and Lone AF. Among the cases of valvular AF of 10 patients, Mitral stenosis with Mitral regurgitation was the most common lesion found in 9 patients (90%). 8 patients (80%) out of 10 had severe Mitral Stenosis having valve area of <1.5 cm2. Mean LA Size in this study was 46.18±9.49 mm.

Table 2: Distribution according to Etiology of Non - Valvular AF group on Echocardiography.

Etiology	Number of patients (n)	Percentage (%)
HHD	62	68.8
CAD	18	20
DCM	6	6.6
HOCM	1	1.1
CHD	1	1.1
COPD	1	1.1
Lone AF	1	1.1
Total	90	100.0

Regarding other parameters studied on Echocardiography as shown in Table 3, Ejection Fraction (EF) was found to be more than 44% in 70 patients (70%) and less than 44% in 30 patients (30%) as evaluated in the study. Left ventricular hypertrophy (LVH) was seen in 52 patients. Diastolic Dysfunction was seen in 23 patients (23%) out of 100. Regional wall motion abnormalities (RWMA) were present in 16 patients and LA (left atrial) clot was seen in 4 patients (4%) and that too in cases of Valvular AF.

Table 3: Distribution according to various parameters assessed on echocardiography.

Echocardiography	No of patients (n)		Total (n)
	Present	Absent	
EF<44%	30	70	100
LVH	52	48	100
Diastolic Dysfunction	23	77	100
RWMA	16	84	100
LA Clot	4	96	100

As shown in table 4, the most common complication was found to be as Congestive cardiac failure in 53 patients (53%) followed by stroke in 22 patients (22%), Early Death occurred in 10 patients (10%) and no major complication was documented in 15 patients (15%). CHA2DS2-VASc scores were calculated to assess the future risk of stroke occurrence in Non-valvular cases of AF. The score of 1 was present only in 4 patients (4.44%) out of 90 patients with Non-Valvular AF rest all had scores ≥2 i.e. requiring the use of chronic anticoagulation.

Table 4: Distribution according to complications of atrial fibrillation.

Complications	No of patients (n)	Percentage (%)
Congestive cardiac failure	53	53.0
Embolism	22	22.0
No complications	15	15.0
Death	10	10.0
Total	100	100.0

DISCUSSION

Atrial fibrillation is the most common arrhythmia whose incidence increases dramatically with age and is a significant source of disability and death in the elderly population. In a study done by N Vidya et al, mean age was found to be 47 yrs and males were predominant i.e. 55% and females were 45%.[6] In this study mean age was 67.02±12.50 yrs. In a study done by Michael et al, Hypertension was an independent predictor of AF and was found in around 60-80% of AF population.[7] In Framingham study also hypertension and diabetes were the significant independent predictors of atrial fibrillation after adjusting for age and other predisposing conditions. For men and women respectively, diabetes conferred a 1.4 and 1.6 fold risk and hypertension conferred a 1.5 and 1.4 fold risk after adjusting for other associated

conditions.[8] In a study done by Vyssoulis comprising of 15,075 consecutive, non-diabetic patients with essential hypertension (age range: 40-95 years, 51.1% males), the prevalence of the Metabolic Syndrome varied from 31.7% to 47.8% and all the components of the criteria were associated independently with Atrial Fibrillation.[9]

The CHA2DS2-VASc score stratified the patients by taking history of congestive heart failure, Hypertension, Diabetes Mellitus, Vascular Disease, Female sex (1 point each) and Age >75 yrs and Previous Stroke or TIA (2 points each). The score was more than 2 in 86% patients. Scores of ≥2 are considered to be at high risk for stroke occurrence. This had been reported that patients with Atrial Fibrillation are at five to seven fold greater risk of stroke than the general population and strokes secondary to Atrial Fibrillation have a worse prognosis than in patients without Atrial Fibrillation.[10,11]

Dyspnea was the most common presenting complaints of the patients enrolled in this study. According to a study done by Tischler et al, dyspnea was reported in 62% of patients, palpitations in 33% patients, and syncope in 12% patients, Flaker et al in his study observed that 78% patients had dyspnea and 11% had chest pain at presentation whereas Levey et al, reported that 54.1% patients had palpitations, 44.4% patients had dyspnea and 10.1% patients had chest pain. Fatigue was noted in 14.3% patients. Atrial fibrillation was of Permanent type in 57 patients (57%) followed by persistent AF in 17 patients (17%) and new onset in 16 patients (16%).[12-14]

Hypertension and atrial fibrillation are the two important public health priorities. The prevalence of them is increasing worldwide and the two conditions often coexist in the same patient. Hypertension and AF are strikingly related to an excess risk of cardiovascular disease and death. Hypertension ultimately increases the risk of AF, and because of its high prevalence in the population, it accounts for more cases of AF than other risk factors. Among patients with established AF, hypertension is present in about 60% to 80% of individuals. In this study also Hypertension was the most common etiology found in the Non - valvular AF group on Echocardiography followed by Coronary Artery Disease. In Framingham Study done by Kannel et al, maximum patients had hypertensive heart disease (47%) as the most common etiology of AF followed by Rheumatic heart disease (17%) followed by CAD in 10% patients.[15]

In a study done by A. Banerjee et al, it was seen that EF measurement alone was not helpful in predicting the risk of stroke/ Thromboembolism in patients of Non Valvular AF with Heart Failure.[16] Presence of abnormal EF (LV systolic dysfunction) independently predicts the risk of stroke as shown by Atrial fibrillation investigators study.[17] It was observed in a study done by Mahmood ul Hassan that significant correlation was observed for LA clot in patients with AF and LA size > or = 45 mm, ($p>0.001$). Out of 1544 patients taken, the mean LA size was 43.82±2.12 mm. Atrial fibrillation was observed in 289 patients (18.7%). Overall clot was seen in 224 (14.5%) patients. Left atrial appendage clot was seen in 202 (89.73%) and LA clot was seen in 9 patients (4.02%).[18]

Atrial Fibrillation increases the risk of stroke, heart failure, and overall mortality.[19] Atrial fibrillation and congestive cardiac failure share similar risk factors, frequently coexist, and have additive adverse effects when occurring in conjunction. The association between AF and the development of CHF was analyzed in a study of 3288 patients diagnosed with AF at the Mayo Clinic. Twenty-four percent developed Heart Failure during a mean follow-up of 6.1 years, with an incidence of 44 per 1000 patient-years. A spike in the incidence of Congestive Heart Failure was seen early after the diagnosis of AF, with 7.8% of cases occurring within the first 12 months, and approximately 3% per year thereafter.[20]

Troughton RW et al concluded that echocardiography provides vital information about cardiac function, complications, and prognosis in patients with AF. Modalities like Transesophageal Echocardiography and Intracardiac Echocardiography can help to guide ablation therapy and decisions related to cardioversion. The integrated use of echocardiography will be an important component in the optimal management of the looming AF epidemic.[21]

CONCLUSION

Hypertension was the most common etiology found in males of elderly age group. The presenting complaints of these patients were dyspnea followed by pedal edema. These patients were associated with increased left atrial size and the most common complications present in this study were congestive cardiac failure followed by stroke. This study has provided many insights on potential risk factors for the occurrence of atrial fibrillation and its various presentations. This would help in early diagnosis and prompt treatment of patients with AF which remains a challenging problem in hours of emergency.

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REFERENCES

1. Prystowsky EN, Padanilam BJ, Waldo AL. Hurst's. The Heart, edited by Valentin fuster et al. Mcgraw Hill;2011;13:963-981.
2. Fuster V, Rydén LE, Asinger RW, Cannom DS, Crijns HJ, Frye RL, et al. ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation: executive summary: a report of the

American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines and Policy Conferences (Committee to Develop Guidelines for the Management of Patients With Atrial Fibrillation) Developed in collaboration with the North American Society of Pacing and Electrophysiology. J Am College of Cardiol. 2001;38(4):1231-65.
3. Raja DC, Kapoor A. Epidemiology of Atrial Fibrillation-An Indian Perspective. J Assoc Physicians India. 2016:7-10.
4. Grogan M, Smith HC, Gersh BJ, Wood DL. Left ventricular dysfunction due to atrial fibrillation in patients initially believed to have idiopathic dilated cardiomyopathy. Am J Cardiol. 1992;69(19):1570-3.
5. Sastry KBR, Kumar LS, Anuradha P, Raj B, Afzal MAM. Clinical profile and Echocardiographic findings in patients with Atrial Fibrillation. IJSRP. 2016,6(2):44-7.
6. Vidya N, Gupta AK, Mahmood Syed E, Malini K, Patiyal RK. Etiological profile and clinical presentation of patients with atrial fibrillation from a rural area of Bihar. Natl J Med Res. 2012;2(2):124-7.
7. Nabauer M, Gerth A, Limbourg T, Schneider S, Oeff M, Kirchhof P, et al. The Registry of the German Competence NETwork on Atrial Fibrillation: patient characteristics and initial management. Europace. 2009;11(4):423-34.
8. Benjamin EJ, Levy D, Vaziri SM, D'agostino RB, Belanger AJ, Wolf PA. Independent risk factors for atrial fibrillation in a population-based cohort: the Framingham Heart Study. Jama. 1994;271(11):840-4.
9. Vyssoulis G, Karpanou E. Adamopoulos D, Kyvelou SM, Tzamou V, Michailidis A, et al. Metabolic syndrome and atrial fibrillation in patients with essential hypertension. Nutr Metab Cardiovasc Dis. 2013;23(2):109-14.
10. Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation: a major contributor to stroke in the elderly: the Framingham Study. Archives of internal medicine. 1987;147(9):1561-4.
11. Miyasaka Y, Barnes ME, Bailey KR, Cha SS, Gersh BJ, Seward JB, et al. Mortality trends in patients diagnosed with first atrial fibrillation: a 21-year community-based study. J Am College of Cardiol. 2007;49(9):986-92.
12. Tischler MD, Lee TH, McAndrew KA, Sax PE, Sutton MS, Lee RT. Clinical, echocardiographic and Doppler correlates of clinical instability with onset of atrial fibrillation. Am J Cardiol. 1990;66(7):721-4.
13. Flaker GC, Fletcher KA, Rothbart RM, Halperin JL, Hart RG. Clinical and echocardiographic features of intermittent atrial fibrillation that predict recurrent atrial fibrillation. Am J cardiol. 1995;76(5):355-8.
14. Lévy S, Maarek M, Coumel P, Guize L, Lekieffre J, Medvedowsky JL, et al. Characterization of different subsets of atrial fibrillation in general practice in France: the ALFA study. Circulation. 1999;99(23):3028-35.
15. Kannel WB, Abbott RD, Savage DD, McNamara PM. Epidemiologic features of chronic atrial fibrillation: the Framingham study. New Engl J Med. 1982;306(17):1018-22.
16. Banerjee A, Taillandier S, Olesen JB, Lane DA, Lallemand B, Lip GY, et al. Ejection fraction and outcomes in patients with atrial fibrillation and heart failure: the Loire Valley Atrial Fibrillation Project. Eur J Heart Failure. 2012;14(3):295-301.
17. Atrial Fibrillation Investigators: Atrial Fibrillation, Aspirin, Anticoagulation Study; European Atrial Fibrillation Study; Stroke Prevention in Atrial Fibrillation Study; Boston Area Anticoagulation Trial for Atrial Fibrillation Study; Canadian Atrial Fibrillation Study; Veterans Affairs Prevention in Atrial Fibrillation Study. Echocardiographic Predictors of Stroke in Patients with Atrial Fibrillation: A Prospective Study of 1066 Patients From 3 Clinical Trials. Arch Intern Med. 1998;158(12):1316-20.
18. ul Hassan M, Hussain C, Gul AM, ullah Jan H, Hafizullah M. Frequency of left atrial and appendage clot in patients with severe mitral stenosis. J Ayub Med College Abbottabad. 2010;22(2):40-2.
19. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al. Executive summary: heart disease and stroke statistics-2016 update: a report from the American Heart Association. Circulation. 2016;133(4):447-54.
20. Miyasaka Y, Barnes ME, Gersh BJ, Cha SS, Bailey KR, Abhayaratna W, et al. Incidence and mortality risk of congestive heart failure in atrial fibrillation patients: a community-based study over two decades. Eur Heart J. 2006;27(8):936-41.
21. Troughton RW, Asher CR, Klein AL. The role of echocardiography in atrial fibrillation and cardioversion. Heart. 2003;89(12):1447-54.

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