

Original Research Article

Study on clinical presentation and etiological profile of atrial fibrillation patients

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ABSTRACT

Background: Atrial fibrillation is one of most common arrhythmias observed in general practice. Atrial fibrillation may occur paroxysmal or may become established as permanent condition. The aim of the treatment of atrial fibrillation is either normalization of rhythm by cardioversion or control of ventricular rate by drugs. The present work was undertaken to study, clinical presentation, aetiology and complications in patients developing atrial fibrillation.

Methods: A prospective study carried out at Department of Medicine V.M. Medical college and Shri Chhatrapati Shivaji Maharaj Sarvopachar Rungnalaya, Solapur, over the study period of two years. 100 patients of atrial fibrillation diagnosed by following clinical and ECG criteria were included. Detail study of aetiology complication and clinical presentation of atrial fibrillation was done in present study.

Results: Commonest presenting symptom was breathlessness (70%) followed by palpitation (58%). Common signs elicited were irregular pulse, apex pulse deficit (92%). Congestive cardiac failure was present in 46% patient among those raised JVP was seen in 100% cases, oedema in 60.8% hepatomegaly 63.04% basal crepitations in 86.9% cases. ECG revealed coarse fibrillary waves (81.8%) in patients with rheumatic heart disease whereas fine fibrillary waves were seen in patients with IHD as cause of AF.

Conclusions: Size of fibrillary wave may be predicted etiology of AF as coarse waves are common in rheumatic and fine waves in non-rheumatic AF. The present paper would help in early diagnosis and prompt treatment of AF.

Keywords: Atrial fibrillation, Apex pulse deficit, Congestive cardiac failure, ECG

INTRODUCTION

Atrial fibrillation is characterized by rapid irregular atrial impulse without effective atrial contraction and irregular and rapid ventricular rate.¹ Atrial fibrillation is one of most common arrhythmias observed in general practice,

accounting for about 0.4% of overall population and 3-5% of those over the age of sixty-five years. Selzer has rightly called atrial fibrillation the grandfather of cardiac arrhythmias.² Although not immediately life threatening, atrial fibrillation causes insidious detrimental effects over many years.

Rheumatic heart disease has very prevalence in this country and occurs at an early age compared to western countries where atrial fibrillation is uncommon before the age of fifty.³

History, physical examination, auscultation, radiography and ECG offer clues to the cause of this arrhythmia whereas echocardiography often confirms the precise structural disease responsible for atrial fibrillation.

The aim of treatment of atrial fibrillation is either normalization of rhythm by cardioversion or control of ventricular rate by drugs like digoxin verapamil, diltiazem etc.

Atrial fibrillation has captured the imagination of clinical investigators who initiated trail to examine several aspects of this multifaceted arrhythmia. In recent years has been significant advances in this understanding of atrial fibrillation and its treatment has been dramatically altered by recent availability of non-pharmacological therapies such as AV node ablation, pacing, the implantable atrial defibrillator and surgery.

These advances though in their infancy are bound to change the treatment scenario of atrial fibrillation in the years to come.

The present work was undertaken to study, clinical presentation, aetiology and complications in patients developing atrial fibrillation and to know (if any) differences in age and aetiology of atrial fibrillation in this study group.

METHODS

The study design was a prospective conducted at Department of Medicine V.M. Medical college and Shri Chhatrapati Shivaji Maharaj Sarvopachar Rungnalaya, Solapur, for two years with the study population of 100 patients of atrial fibrillation diagnosed by following clinical and ECG criteria were included. The patients of atrial fibrillation diagnosed by following clinical and ECG criteria were included and the patients of atrial fibrillation not diagnosed by following clinical and ECG criteria were excluded.

Procedure

Detail study of aetiology complication and clinical presentation of atrial fibrillation was done in present study. Informed consent from each patient was obtained. The patient was screening done for the underlying causes, which may lead to AF and correlated with clinically and eco-cardio-graphically. A detailed and complete physical, systematic and laboratory examination was performed on each patient.

The clinical criteria include irregular palpitations, irregularly irregular pulse, apex pulse deficit, variation in

intensity of 1st heart sound, absence of 'a' wave in jugular venous pulse.

The ECG criteria includes presence of fibrillary or 'f' wave (small irregular baseline undulations of variable amplitude and morphology, varying R-R interval.

The details of history and clinical examination were recorded on standard proforma to find out etiology and clinical profile of atrial fibrillation. Routine investigations like hemogram, chest X-ray, ESR, urine examination. Renal function test, blood sugar and electrolytes and ECGs of all patients are done. Special investigations like thyroid function test, blood culture, pulmonary function test, Echocardiography were done whenever necessary.

Data was recorded manually for analysis of individual parameters using graphs and tables. Descriptive statistics such as frequency analysis, percentage were used for categorical variables and mean and SD were used for continuous variables to present the data.

RESULTS

Maximum incidence of atrial fibrillation was observed in age group 51-60years (24%) followed by 31-40years (22%). Atrial fibrillation was more common in females (56%) as compared to males (44%). Most common age group in female was 21-30years while in male was 51-60years. Out of 100 patients, 46% showed signs of CCF. Most common sign was raised JVP in 100% cases followed by basal crepitations (86.9%).

Most common presenting symptom was breathlessness seen in 70% of patients followed by palpitations in 58% of patients and swelling of legs (38%).

Most common past history in patients presenting with atrial fibrillation was, rheumatic heart disease (33%) followed by digoxin treatment (25%) and rheumatic fever (RF) (21%) (Table 1).

Out of 100 patients 92 (92%) showed A-P deficit. Maximum was both 11-20 beats in 53 (53%). 8 patients did not show A-P deficit. The important finding in them was presence of either bradycardia or tachycardia (Table 2).

Most common etiology in this study was rheumatic heart diseases 55% especially mitral stenosis (41.81%). Next common cause was IHD (20%) in IHD, 13 out of 20 cases were anterior wall AMI either fresh or old (Table 3).

Most common etiology was mitral stenosis was seen in the age group of 31-40 years in 10 cases. Commonest age group for multivalvular was 21-30 yrs (7 cases). Commonest age group for IHD was 51-60yrs. (10 cases). For COPD 61-70yrs (5 cases) (Table 4).

Table 1: Distribution of presenting signs, symptoms and past history of atrial fibrillation.

Presenting signs, symptoms and past history	No. of patients	%
Signs		
JVP	46	100
Edema	28	60.8
Hepatomegaly	29	63.04
Basal crepitations	40	86.9
Symptoms		
Palpitation	58	58
Breathlessness	70	70
Syncope	3	3
Cough	15	15
Chest Pain	18	18
Swelling of legs	38	38
Neurodeficit	8	8
Unconsciousness	1	1
Limb pain	1	1
Convulsion	1	1
Past history		
Rheumatic fever (RF)	21	21
Rheumatic heart disease (RHD)	33	33
Ischaemic heart disease (IHD)	12	12
Hypertension (HTN)	17	17
IHD + HTN	12	12
Congestive Cardiac failure (CCF)	10	10
COPD	12	12
Neurodeficit	2	2
Alcohol intake	18	18
Digoxin treatment	25	25

MS was commonest cause which was more common in females (17 cases). IHD was more common in males (13 cases). CMP was more common in males (4 cases), all were males. Thyrotoxicosis is common in females both cases were females (2 cases) (Table 5). Out of 100 patients, 59 had AF related complications. Most common complication was observed as CCF (46%) and there were 9 thromboembolic events and 4 deaths (Table 6).

Table 2: Distribution of apex pulse (A-P) deficit.

A-P deficit	No. of patients	%
1-10	2	2.17
11-20	53	57.6
21-30	27	29.3
31-40	10	10.8
Patients with A-P deficit	92	92
Patients without A-P deficit	8	8

Table 3: Aetiology of atrial fibrillation.

Aetiology	No. of patients	%
RHD	55	55
IHD	20	20
HTN	5	5
COPD	12	12
Cardiomyopathy (CMP)	4	4
Thyrotoxicosis	2	2
Lone AF	2	2
Total	100	100

Table 4: Age wise distribution of etiological factor in patients of AF.

Age (years)	MS	MR	MS + MR	Multi valvuler	IHD	COPD	HTN	LONE	CMP	THY	Total
12-20	1	1									2
21-30	4	1	3	7						1	16
31-40	10	1	4	5	2						22
41-50	6		2	1	2	1		1	2		15
51-60	2	1	2	2	10	4	2		1		24
61-70				2	2	5	2	1			12
71-80					2	2	1			1	6
81-90					2					1	3
Total	23	4	11	17	20	12	5	2	4	2	100

Fine 'f' waves in ECG were more common in AF secondary to IHD and causes other than RHD. Coarse 'f' waves were common in AF secondary to RHD. Echocardiographic detection of left atrial thrombus. Out of 100 patients 12 showed LA thrombus. Total no. of patients with AF and thromboembolic events was 9. Patients with LA thrombus and having thromboembolic events were 4 (Table 7).

DISCUSSION

The study of atrial fibrillation has come a long way from its recognition as a sign of mitral stenosis by up to the use of high-resolution electrocardiography for detecting the patients prone for atrial fibrillation.⁴ Even then it has been said that this arrhythmia that was once well known as pathognomonic of mitral stenosis still remains

physiological mystery, despite the so much technological advances and computers. Therefore, it has undergone extensive studies in past several decades.

Table 5: Sex wise distribution of an etiological factors.

Aetiology	Male	Female	Total
MS	6	17	23
MR	1	3	4
MS + MR	6	5	11
Multivalvular	3	14	17
IHD	13	7	20
COPD	6	6	12
HTN	3	2	5
LOAN AF	2	0	2
CMP	4	0	4
Thyrotoxicosis	0	2	2
TOTAL	44	56	100

Table 6: Complications of atrial fibrillation.

Complications	No. of patients
CCF	46
Thrombo-embolism	9
• Peripheral	1
• CNS	8
Death	4
Total	59

Table 7: Electrocardiographic fibrillatory waves distribution according to etiology.

Aetiology	Fine 'f'	Coarse 'f'
RHD	16	45
IHD	17	3
HTN	5	1
COPD	9	4
LONE	2	2
CMP	3	1
Thyrotoxicosis	2	0

In this study, it was observed that atrial fibrillation was common in age group 51-60years (24%) immediately followed by 31-40years (22%). According to western literature atrial fibrillation is rare below the age of 40 years. The Framingham, a study found maximum incidence in the range of 45-64 years.⁵ In the Mackenzie J series, greater incidence was found in the group of 56-66 years of age.⁶ At each age incidence of atrial fibrillation is powerfully influenced by the undertaking etiology. In western countries, commonest aetiology is ischaemic heart disease, hypertension and rheumatic heart disease contributes less.⁷

In developing countries like India, where prevalence of rheumatic heart disease is very high ranging from 1.3 to 22 per 1000 population, the commonest cause of atrial

fibrillation is rheumatic heart disease which occurs at younger age than ischaemic heart disease.⁸

Setty MR et al, reported that in India atrial fibrillation occur at an earlier age in patients with rheumatic heart disease.⁹

In this study though, most common age group was 51-60years (24%) followed by 31-40years (22%), in later age group cause of atrial fibrillation was mainly rheumatic heart disease 90.9% and even former age group has aetiology of atrial fibrillation as rheumatic heart disease in 29.16% of patients.

Thus, this study correlates with Setty MR et al, as atrial fibrillation in this study occur at younger age group in patients of rheumatic heart disease.⁹

In this study incidence of atrial fibrillation in females was 56% and in males was 44%. Thus, there was female predominance. The female predominance was seen as author had commonest aetiology of atrial fibrillation as rheumatic heart disease which was seen in 55 (55%) cases out of which 39 (70.9%) were females.

In Framingham study, there is predominance of males over females. The difference between these studies is because Framingham study group is from western countries where main cause of atrial fibrillation is ischaemic heart disease which is more common in males which is not the case in this study.⁵

In this study, 46% cases had CCF, commonest sign of CCF was raised JVP in all cases (100%) followed by basal crepitation in 86.9%, hepatomegally in 63.04% and edema was seen in 60.8%.

According to Lip GY et al, CCF is commonest complication in 35% cases.⁷

Symptoms due to fibrillation are dominated by multiple factors the most important of which is the cardiac status. The rapid ventricular rate and loss of atrial contribution to ventricular filling adversely affect cardiac output. This leads to left ventricular failure and breathlessness. Another common symptom would be palpitation due to ventricular rate.

In this study commonest presenting symptom was breathlessness found in 70% cases followed by palpitation found in 58% cases. Thus, the findings correlate with Setty MR et al, who found breathlessness as commonest symptoms in 76% cases and palpitation in 68.6% cases.⁹

In this study, past history of rheumatic heart disease was found in 33% cases, ischaemic heart disease in 12% and hypertension in 17% cases, previous embolic episodes in 2% cases. Again, the difference between two studies was

due to the fact that present study group had commonest aetiology of atrial fibrillation as rheumatic heart disease.

The difference in ventricular rate and peripheral pulse rate is called as apex pulse deficit. In atrial fibrillation with fast ventricular rate, each ventricular contraction is not strong enough to cause peripheral pulse hence apex pulse deficit is felt. But in cases of atrial fibrillation with slow ventricular rate especially when patients are on positive inotropic like digoxin each ventricular contraction will cause peripheral pulse hence apex pulse deficit may not be apparent.

Apex pulse deficit is subjective criteria and varies from time to time in same case. In present study, 92% patients had apex pulse deficit 8% were not having. The probable explanation for later is as discussed above. Maximum A-P deficit was between 11-20/min in 57.6% cases.

In this study, commonest aetiology of atrial fibrillation was rheumatic heart disease in 55 cases (55%) out of which 41.8% were due to mitral stenosis, 7.27% due to mitral regurgitation, 20% due to MS with MR and 30.9% due to multivalvular heart diseases, overall 69.09% cases were due to mitral valve disease, pure aortic valve disease was not seen in any case.

The study done by Raman TK reported that, 85% cases of atrial fibrillation were of rheumatic heart disease.¹⁰ According to Hurst aortic valve disease is rare cause of atrial fibrillation. Thus, the results co-relate with other studies.

Incidence of atrial fibrillation in myocardial infarction was 10.15%.¹¹ Atrial fibrillation is common in first 24hrs of infarction and tends to be transient lasting less than 24hrs in 90% of patients. Previously, it was thought there is no relation of atrial fibrillation and location of infarct.¹¹ But in another study, it was found that atrial fibrillation is more frequent following anterior than inferior wall myocardial infarct. This appears to be consequence of left atrial ischaemia in majority of patients.¹²

In this study, 20% of cases were due to ischaemic heart disease (myocardial infarction). Out of which 65% were anterior wall, 35% were inferior wall AMI overall 60% of atrial fibrillation due to AMI were transient and remaining were chronic.

Hypertension alone can cause atrial fibrillation. Mechanisms proposed are left atrial enlargement and hypertensive or ischaemic heart disease. In present study, 5% cases of atrial fibrillation were due to hypertension alone, out of which 60% were males, 40% were females.

In Framingham study, 37% males and 50% females had hypertension as causative factor.⁵

Chronic obstructive pulmonary disease (COPD) is one of the causes of AF. The mechanisms by which COPD

causes AF are RT atrial enlargement, pulmonary hypertension reflex stimulates arrhythmia, hypoxia, increase vagal tone hypercarbia may precipitate AF and infection, CCF, catecholamines may cause atrial fibrillation.

In present study, 12% cases of AF were due to COPD. A study carried out by Padamavati S in demonstrated that the incidence of AF in patients of COPD is 2.2%.⁸ Thus, this study shows COPD is one of common cause of AF.

In this study, 2% patients cause of AF was not established by available means were labeled as lone AF.

The results from Framingham study based on routine ECG examination revealed only 0.8% atrial fibrillation as lone AF.⁵

Thus, this finding was same as other studies and indicate though less common but lone AF is important and known entity.

Incidence of AF due to thyrotoxicosis has decreased recently because of earlier diagnosis and more precise control of disease. Present study shows 2% cases were because of thyrotoxicosis.

According to Thomas FB et al, prevalence of hyperthyroid individuals has varied from 6% to 85%.¹³

In this study, 46% patients of AF had congestive cardiac failure and almost all had underlying heart disease, other rheumatic heart disease, IHD or cor pulmonale.

In other study, it was reported that, CCF is common complication of AF seen in 35% cases.⁷

Thus, AF can be either cause of CCF. But in this study, all cases of CCF had another underlying heart disease hence, probably CCF was complication of AF.

Author had 9% case with thromboembolism as complication of AF. Out of which 88.8% had cerebral thromboembolism (stroke) and 11.11% had peripheral thromboembolism. According to Peterson P. AF carries an annual 3-6% risk of thromboembolic complications.¹⁴

AF causes thrombus in the left atrium due to stasis and dislodgement of thrombus from left atrium occurs due to conversion into sinus rhythm, in course of chronic atrial fibrillation and Intermittent changes in rhythm. It is accepted that amplitude of fibrillary waves recorded in ECG during AF may predict the cause of AF.¹⁴

In present study, coarse fibrillary waves (size >1mm) were more common in rheumatic heart disease 81.8% and fine fibrillary waves (size <1mm) were more common in non-rheumatic cases as IHD (85%).

In another study, it was observed that, 53% of cases of AF due to rheumatic heart disease has coarse 'f' waves and 56% of non-rheumatic cases had fine fibrillary waves.¹⁵

CONCLUSION

Breathlessness and palpitations were commonest presenting symptoms. Common complications of AF are CCF and thromboembolism especially of embolic stroke. Size of fibrillary waves may be predicted etiology of AF, as coarse waves are common in rheumatic and fine waves in non-rheumatic AF. The present paper would help in early diagnosis and prompt treatment of AF.

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