

# Etiological and Clinical Study of Atrial Fibrillation

C Mamatha Reddy<sup>1</sup>, Bingi Srinivas<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Cardiology, Kakatiya Medical College, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India,

<sup>2</sup>Assistant professor, Department of Medicine, Kakatiya Medical College, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India

## Abstract

**Introduction:** Atrial fibrillation (AF) is the common arrhythmia seen in clinical practice. It is characterized by worm-like writhing movements of atrial muscle resulting in loss of atrial transport function.

**Materials and Methods:** A total of 50 cases of AF, admitted in Medical and Cardiology wards of Mahatma Gandhi Memorial General Hospital, Warangal, from 2006 to 2008 formed the study material.

**Results:** A clinical study of 50 patients (aged from 20 to 80) with electrocardiographically documented AF.

**Conclusion:** Atrial fibrillation due to rheumatic aetiology is more common in younger age group, while that due to other causes like hypertension, ischemic heart disease common in older age. Chronic AF due to pulmonary disease is most commonly observed in males.

**Key words:** Atrial fibrillation, RHD, IHD

## INTRODUCTION

Atrial fibrillation (AF) is the common arrhythmia seen in clinical practice. It is characterized by worm-like writhing movements of atrial muscle resulting in loss of atrial transport function.<sup>[1-5]</sup> It is responsible for increased mortality from all cardiovascular causes and shortens average life span. The uncontrolled high ventricular rate in patients with AF over a period may result in progressive cardiomegaly increased functional mitral regurgitation and decreased left ventricular function leading to congestive cardiac failure and risk of sudden deaths.<sup>[6-10]</sup> Irrespective of underlying cause, it increases the risk of thromboembolic phenomenon.

Its incidence varies with age ranging from 0.5% in young adults to 1.5% in the age group of 40–70 years and 10% in people of more than 70 years of age. The high incidence of this problem and its significant contribution to both cardiovascular and cerebrovascular morbidity and mortality aroused interest in us to study the problem.<sup>[11-16]</sup>

This study is aimed at assessing the incidence, clinical features, etiology, etc., atrial size, and mitral valvular area in AF.

## Aim of the Study

AF is the most common rhythm disturbance in the heart due to different etiology and it causes both morbidity and mortality.

The aim of the present study is as follows:

1. To know the prevalence of AF
2. To know the various clinical presentations in AF
3. To detect various etiological factors of AF
4. To know the relation between AF and left atrial size
5. To know relation between mitral valvular area dimensions and AF.

## MATERIALS AND METHODS

A total of 50 cases of AF, admitted in Medical and Cardiology wards of Mahatma Gandhi Memorial General Hospital, Warangal, from 2006 to 2008 formed the study material.

A total of 50 cases were examined in detail as per pro forma with special reference to cardiovascular system. Other systems were also examined in detail, whenever it was found necessary. In each case, history of present and past illness was carefully inquired into so as to obtain a complete historical background of case.

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**Corresponding Author:** Dr. Bingi Srinivas, Flat no 301, Balaji residency, OPP OLD RTA office, Nayeemnagar, Hanmakonda, Warangal 506009, Telangana, India

Investigations such as urine examination, complete blood picture, erythrocytes sedimentation rate, blood urea, serum creatinine, blood sugar, serum electrolytes, and chest X-ray (CXR) examination have been carried out. Special investigations such as electrocardiogram (ECG), echocardiogram, and transesophageal echocardiogram (TEE) were also done. Whenever necessary blood for culture and sensitivity, computed tomography-brain in case of stroke. The ECG was studied for rate and “f” wave pattern.

The echocardiogram was studied to assess the valvular lesions, mitral valve area (MVA) in mitral stenosis cases, and enlargement of chambers particularly the left atrium size. TEE to detect any thrombi or bacterial vegetation in the cardiac chambers or on valves.

For few patients, TEE not done due to patient III health, sometimes patient unwillingness.

## RESULTS

A clinical study of 50 patients (aged from 20 to 80 years) with electrocardiographically documented AF Table 1.

The present study consists of 50 cases, of which there were 27 females and 23 males showing female predominance.

Their age ranging from 21 years to 80 years, AF was seen more in the patients of age group ranging from 31 to 40 years.

AF patients with rheumatic etiology commonly presented below 50 years, but hypertension (HTN), ischemic heart disease (IHD), and dilated cardiomyopathy (DCM) presented after 50 years.

In this study, the main complaints were dyspnea, palpitations, pedal edema, chest pain, hemoptysis, and weakness of limbs.

The duration of symptoms ranged from 15 days to 20 years Table 2. Shorter duration in cases of ischemic heart disease, hypertensive heart diseases, thyrotoxicosis, cardiomyopathies, and lone AF but longer duration in rheumatic heart disease.

### Etiological Incidence

In this series of 50 cases, an attempt has been made to establish the etiology by history, clinical examination, ECG, CXR, and two-dimensional echocardiogram Table 3. Their incidence has been analyzed.

In this study, rheumatic heart disease (RHD) (52%) is the most common cause, followed by IHD (14%), HTN (10%), and DCM (10%).

Table 4 shows that female preponderance is seen in rheumatic and hypertensive heart disease etiology and male preponderance is seen in IHD and DCM.

Table 5 shows that AF commonly presented in 21–50 years of age group. Rheumatic etiology is most commonly seen below 50 years of age, and IHD and

**Table 1: Age and sex distribution**

Age group	Male	Female	Total	Percentage
0–10	-	-	-	-
11–20	-	-	-	-
21–30	6	6	12	24
31–40	4	11	15	30
41–50	4	3	7	14
51–60	5	4	9	18
61–70	4	1	5	10
71–80	-	2	2	4

**Table 2: Clinical presentation in 50 cases of chronic AP**

S. No.	Complaint	Number of patients	Percentages
1.	Dyspnea	44	88
2.	Palpitations	40	80
3.	Pedal edema	26	52
4.	Chest pain	19	38
5.	Hemoptysis	6	12
6.	Paralysis	7	14
7.	Syncope	1	2

**Table 3: Etiology of 50 cases of AF**

S. No.	Disease	Number of patients	Percentage
1.	RHD	26	52
2.	IHD	7	14
3.	HTN	5	10
4.	Thyrotoxicosis	1	2
5.	DCM	5	10
6.	Constrictive pericarditis	1	2
7.	Lone AF	1	2
8.	Marfan's syndrome	1	2
9.	Pulmonary disease	3	6

IHD: Ischemic heart disease, DCM: Dilated cardiomyopathy, HTN: Hypertension, AF: Atrial fibrillation, RHD: Rheumatic heart disease

**Table 4: Distribution**

Etiological incidence in 50 cases of AF in sex				
S. No.	Disease	Male	Female	Total
1.	RHD	9	17	26
2.	IHD	4	3	7
3.	HTN	2	3	5
4.	Thyrotoxicosis	-	1	1
5.	DCM	4	1	5
6.	Constrictive pericarditis	-	1	1
7.	Lone AF	1	-	1
8.	Marfan's syndrome	1	-	1
9.	Pulmonary disease	3	-	3

RHD: Rheumatic heart disease, HTN: Hypertension, IHD: Ischemic heart disease, DCM: Dilated cardiomyopathy, AF: Atrial fibrillation

**Table 5: Age and sex incidence according to etiology**

A. Female									
Age group	RHD	IHD	HTN	THY	Pulmonary diseases	HCM	C.P.	Lone AF	Marfan's
11-20	-	-	-	-	-	-	-	-	-
21-30	5	-	-	-	-	-	-	-	-
31-40	9	-	-	1	-	1	-	-	-
41-50	1	-	1	-	-	-	-	-	-
51-60	1	1	1	-	-	-	1	-	-
61-70	-	1	1	-	-	-	-	-	-
71-80	1	1	-	-	-	-	-	-	-

  

B. Male									
Age group	RHD	IHD	HTN	THY	Pulmonary diseases	HCM	C.P.	Lone AF	Marfan's
11-20	-	-	-	-	-	-	-	-	-
21-30	4	-	-	-	-	-	-	1	1
31-40	3	1	-	-	-	-	-	-	-
41-50	1	1	2	-	-	1	-	-	-
51-60	1	1	-	-	1	2	-	-	-
61-70	-	1	-	-	2	1	-	-	-
71-80	-	-	-	-	-	-	-	-	-

IHD: Ischemic heart disease, RHD: Rheumatic heart disease, HTN: Hypertension, AF: Atrial fibrillation, HCM: Hypertrophic cardiomyopathy

**Table 6: Different valvular affection in rheumatic heart disease with AF (26 cases)**

S. No.	Valve	Number of patients	Percentage
1.	MS	9	34.6
2.	MR	3	11
3.	MS+MR	7	26.9
4.	MS+MR+AR	2	7.6
5.	MS+AR	2	7.6
6.	MR+AR	1	3.8
7.	MS+MR+AS	1	3.8
8.	MR+AS+AR	1	3.8

MS: Mitral stenosis, MR: Mitral regurgitation, AR: Aortic regurgitation

hypertensive heart disease commonly seen above 50 years of age.

In all groups, female preponderance is noted, up to 50 years and male preponderance after 50 years.

Table 6 shows that M.S. is the most common lesion, of 26 cases, 21 cases have MS (80.7%) followed by MR (57.6%) next AR+MS/MR (23%).

Only MS cases are 9 (34.6%), only MR, 3 (11%) cases other common valvular lesion are MS+MR; MS+MR+AR.

**DISCUSSION**

The study population comprised “50” patients with electrocardiographic documented “AF” during the period of 2006–2008 in MGM Hospital, Warangal.

**Age and Sex Distribution**

In our present study, AF was seen more in the patient’s age group below 50 years (maximum 31–40 years).

According to Paul Wood and Lip G Y H, Golding D majority of people fibrillated after the age of 50 years.

In anticoagulation and risk factors in AF (ATRIA) study, 45% were aged ≥75 years.

In Rotterdam study of prevalence, incidence, and lifetime risk of AF, the prevalence of AF increased with age.

This difference is due to etiological cause of A.F. In our study, rheumatic etiology is common, but in above-mentioned studies HTN and IHD was common etiology.

In ATRIA and Rotterdam study, AF was more common in men than in women (etiological difference).

According to Lok NS and Lan CP, the ratio of female to male is 1.8: 1. In our study, the sex ratio of female to male is 1.2:1; showing female preponderance.

The common cause of AF in women, 50 years are RHD and common causes for AF in males, 50 years are non-rheumatic. This is collaborated with other studies.

**Clinical Presentation**

In the present study, dyspnea (88%) and palpitations (80%) were the most common presentation and stroke was observed in 14% cases.

The symptoms are of longer duration in rheumatic etiology and shorter duration in other causes.

In ALFA study by S. Levy, M. Marek, and L. Gulze in France (clinical presentation and underlying conditions in AF), palpitations (79%) were common presentation.

In Lok Ns and Lau CP study, dyspnea (38.1%) and palpitations (42.3%) were the most common presentation.

In S.S. Das, S.N. Dutta palpitations (90%), effort intolerance (82%), angina (60%), heart failure (28%), and stroke (15%) were observed.

**Etiological Incidence**

There is a significant variation in the incidence of various causes between the first five studies and the last two studies Table 7.

The RHD is the most common cause of AF in our country whereas in west IHD and HTN are the most common cause.

**Table 7: Etiological incidence of chronic A.F. by various authors**

Author	Number of cases	RHD%	IHD %	HTN %	Others %
Kannel <i>et al.</i> (Framingham study 1982)	98	17	10	47	-
Hinton <i>et al.</i> 1977	333	30	51	10	10
Hansberg	642	14.8	13.4	47.5	24.3
Lok NS and Lau CP	291	17.5	-	28.9	-
Lib Gy and Golding DJ	111	-	28.8	36.9	-
Raman TK (Madras)	100	58	33	3	6
S. Sharma and S. Joshi (New Delhi)	70	60	24	4.2	11.8
Present study	50	52	14	10	24

IHD: Ischemic heart disease, RHD: Rheumatic heart disease, HTN: Hypertension,

According to ICMR research report, the national incidence of RHD is 6/1000 population. Hospital-based studies from all over India show RHD ranging from 26.6 to 60 (average 40).

### Valvular Affection in RHD with AF

In our present study, AF in RHD occurred in 34.6% of patients with isolated MS and 11.5% of patients with isolated MR.

Combination lesions (26.9%) in MS + MR, 7.6% in MS + MR + AR, 7.6% in MS + MR, and 3.8% in MR + AR.

In Dicker E study, 29% of patients were with isolated MS and 16% of patients were with isolated MR. In our study, combination of the lesion is common.

### MVA in RHD Associated with MS

In our present study, MVA ranges from 0.4 to 2.8 cm<sup>2</sup>.

Most of the cases of AF associated with MVA is <1 mm<sup>2</sup> (severe).

Isolated MS have less MVA as comparatively associated with other valvular lesions.

### Left Atrial Size

In our present study, LA size ranged from 3 cm to 7–8 cm. In most of the cases, the LA size between 4 and 5 cm (56%).

Large LA commonly associated with regurgitations (MR).

In the study of left atrial diameter in AF, echo study (Stroke Prevention in Atrial Fibrillation investigations) DiHrich HC, Pearce LA, and A Singer RW, the mean left atrial diameter was 47 ± 8 mm an average 6 mm larger than with sinus rhythm.

In Hogleund C, Rosenhanrg (echo study) of the left atrial size >4–4.5 cm was associated with recurrent intermittent AF.

In the study of WL Henry, J. Morganroth, AS personal, and Clark (relationship between echocardiographically detected left

atrial size and AF). Left atrial dimension >40 mm common in AF, if LA >45 mm – cardioversion unlikely to be successful.

### Clots in Cardiac Chambers

In our study of 50 cases, 7 cases have clots in the left Of 7 cases, 6 cases are of rheumatic etiology, in that three cases were of left atrium clot, two cases were of left atrial appendage (LAA) clots, and one case has vegetation over anterior mitral leaflets/posterior mitral leaflets.

Of seven cases, on case in IHD, have a large soft clot in the left ventricle.

Two cases presented with stroke and two cases with infective endocarditis.

In the study of Gleen Davidson and Philip Greenland (about predictors of left atrial thrombus in mitral valve disease in AF), MS patients with AF had a preponderance of the left atrial thrombus of 18%. MS with sinus rhythm had 2.4% ± 3.3% preponderance of the left atrial thrombus. In MR with AF, the preponderance of the left atrial thrombus is 0.7%.

In TEE study of the left atrial body, LAA clot in patients with mitral valve disease in AF by Srimannarayana J; Varma R.S; Sathesh S; and Anil Kumar; left atrial clots were found in 33% of patients with mitral valve disease with AF.

### ECG Changes

- In this study, most of the cases shows (60%) tachycardia with ventricular rate >100/min. Ten cases showing ventricular rate >150/min
- RHD Cases showing high ventricular rate, comparative to other causes
- Most of the RHD cases showed RAD and RVH.

HTN cases were showing LVH.

### Complications in 50 Cases of A.F.

- In our study, CCF (60%) is the most frequent complication followed by angina (32%)

- Other major complications are stroke (14%), hemoptysis (12%), and infective endocarditis (4%)
- In most of the stroke patients, the etiology was rheumatic
- In lip GU Golding DJ study, the common complications are CCF (30.6%) and stroke (18%).<sup>[17-20]</sup>

## CONCLUSION

AF due to rheumatic etiology is more common in younger age group, while that due to other causes such as HTN and IHD common in older age. Rheumatic heart disease is the most common cause, followed by ischemic heart disease, HTN, and DCM. Most of the chronic, AF is associated with large left atrial size, 4–5 cm (56%). Chronic AF due to pulmonary disease is most commonly observed in males. Congestive cardiac failure (60%), angina (32%), and embolic stroke (14%) are common complications. Incidence of congestive cardiac failure is high in patients of chronic AF with fast ventricular rate. Incidence of angina is high in patients of chronic AF with fast ventricular rate and old age.

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