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Original research article

A study on clinical and etiological profile in patients of atrial fibrillation in tertiary care centre in southern Bihar

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Abstract

Introduction: Atrial fibrillation (AF) is a major risk factor for ischemic stroke, congestive heart failure and mortality. The prevalence of AF is influenced by age, gender, cardiovascular disease (CVD) such as valvular heart disease, and CV risk factors such as hypertension, diabetes, obesity, and insulin resistance. It was calculated that currently more than 3 million inhabitants of the USA suffer from atrial fibrillation and that this will increase to more than 7 million by 2050.

Aim and Objective: To find the various symptoms and possible underlying etiological factors for Atrial fibrillation, both cardiac and non-cardiac in our population.

Methodology: An observational study was conducted in General Medicine department in Narayan Medical College and Hospital, Jamuhar. Detail study of etiology complication and clinical presentation of atrial fibrillation will be done in present study. Informed consent from each patient will be obtained. The patient 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.

Result: Maximum 79% of study subjects had RHD, 28% had DM, 4.5% study subjects had systemic hypertension, 4% subjects had CAD, 2.5% Subjects had COPD, 3% had hyperthyroid, whereas 9% had other etiological factors. Most common clinical features were enlarged LA Size (85.5%), Cardiac failure (41.5%), MS/MR (28.5%), Mitral/Aortic stenosis (18.5%), decrease in ejection fraction (14%). While the least common clinical features were MR (1.5%), RWMA (9.5%), IVSD (11.5%).

Conclusions: prevalence of chronic AF is still more common below the age of 50 years and this is mostly due to high prevalence of rheumatic heart disease in India as being the most common etiology of AF. CHF is the most common associated condition with chronic AF.

Keywords: AF (Atrial Fibrillation), SHT (Systemic Hypertension), CAD,RHD

Introduction

Atrial fibrillation is described by a rapid and irregular atrial impulse without effective atrial contraction, as well as a rapid and irregular ventricular rate. Atrial fibrillation is one of the most common arrhythmias seen in general practise, affecting about 0.4 percent of the overall population and 3-5 percent of those over 65. Atrial fibrillation has been dubbed the "grandfather" of cardiac arrhythmias by Selzer. Despite the fact that it is not immediately life threatening, atrial fibrillation has long-term negative consequences[1].

Ischemic stroke, congestive heart failure, and mortality are increased by atrial fibrillation (AF). Age, gender, cardiovascular disease (CVD) such as valvular heart disease, and CV risk factors such as hypertension, diabetes, obesity, and insulin resistance all affect the prevalence of AF. It is estimated that more than 3 million people in the United States suffer from atrial fibrillation, with this number expected to rise by more than 7 million by 2050[2].

The American Heart Association/American College of Cardiology/European Society of Cardiology divides

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atrial fibrillation into four categories: first observed case, chronic (two or more episodes), paroxysmal (lasts less than seven days), persistent (lasts longer than seven days), and permanent (sustained for more than 1 year or has failed cardio version). Persistent AF-Needs pharmacological or electrical intervention to stop. Permanent AF is described as continuous AF that has failed to respond to cardioversion or has never been attempted[3].

Previous stroke, hypertension, advancing age, diabetes, and congestive heart failure are clinical characteristics that predict a higher risk of stroke in people with AF. The mortality rate of strokes caused by AF is double that of strokes not caused by AF. Opportunistic screening by pulse palpation, accompanied by an ECG in those with an abnormal pulse, is critical in patients 65 and older to detect AF before the first stroke[4].

The prevalence of AF in the general population is estimated to be between 0.4 and 1%.The annual incidence of AF is 0.1 percent in those under the age of forty, and it rises to 2% in those over the age of eighty.As people get older, the frequency and prevalence of atrial fibrillation rises exponentially. The modified incidence and prevalence of AF approximately doubles with each passing decade of life, and men have a 50% higher incidence of AF than women at any given age. The prevalence of AF in the United States is expected to rise from 2 to 5 million in 2000 to 6 to 12 million in 2050, with projections reaching nearly 16 million if the growth in age-adjusted AF incidence persists[5].

While atrial fibrillation can exacerbate any cardiac condition, it can also occur in the absence of any symptoms. The following is the most common aetiology factors:

• Cardiomyopathies • Rheumatic heart disease • Ischemic heart disease (IHD) and Acute Myocardial Infarction (AMI) • Hypertensive heart disease • Thyrotoxicosis

Other less common etiological factors: Acute pericarditis, pericardial constriction, COPD, Congenital heart disorders (e.g. ASD), The development of atrial fibrillation was linked to increasing age and increased left atrial size[6].

Atrial fibrillation may be symptomatic or asymptomatic. Despite the fact that symptomatic AF is more common, a patient's description and tolerance of AF can differ based on ventricular rate and rhythm, the involvement of other cardiac disease, and other medical conditions. The sensation of a rapid heartbeat or palpitations, which occur at rest or only after exercise or stress, is perhaps the most common symptom of AF. Dyspnoea, nausea, presyncope and vertigo are common symptoms. Chest pain, symptoms of worsening CHF and symptoms associated with embolism, especially stroke, may also be present[7].

Oral anticoagulants such as vitamin K antagonists (warfarin), direct thrombin inhibitors (dabigatran), and factor Xa inhibitors (rivaroxaban and apixaban) have been licenced by the FDA for the prevention of stroke in people with AF[8].

This study is planned to know clinical presentation and to find out possible clinical and etiological profile of patients with AF.

Aims and objectives

1. To assess the various symptoms of atrial fibrillation.
2. To assess various etiological factors for atrial fibrillation, both cardiac and non-cardiac patients.

Methodology

Materials and methods

Study design: An observational study was conducted in General Medicine department in Narayan Medical College and Hospital, Jamuhar.

Sample Size: Sample size is calculated depending upon the prevalence of atrial fibrillation in general population. It was found in the previous study that prevalence of atrial fibrillation was 1.5%(As per study by Modi SK *et al*.,[9]conducted in Delhi"Atrial Fibrillation in India: Is it a Tide Rising or a Tsunami?") the maximum error in the estimate we were willing to tolerate, say ± 5%, at 2-sided test with 95% confidence level (α=5%) and design effect =1, expected sample size is 23 patients. But to increase the power of study we had selected 200 study subjects.

Formulas

Following formulas is used to compute sample size

$n = deff * Npq/(d2/z2 *(N-1)+pq)$

Where

n is sample size

deff is design effect

N is population size

P is estimated prevalence

q= 1-p

d = absolute level of precision

Duration of study: Sept 2020 to March 2021.

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Nature of study: Observational study.

Inclusion criteria

All the patients aged 18 years and above who presented with AF were included in study.

Exclusion criteria

1. Pregnant women.
2. Patients who did not give consent for.

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 screening was done for the underlying causes, which may haveled 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 was recorded on standard proforma to find out aetiology 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 was done whenever necessary.

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

Result

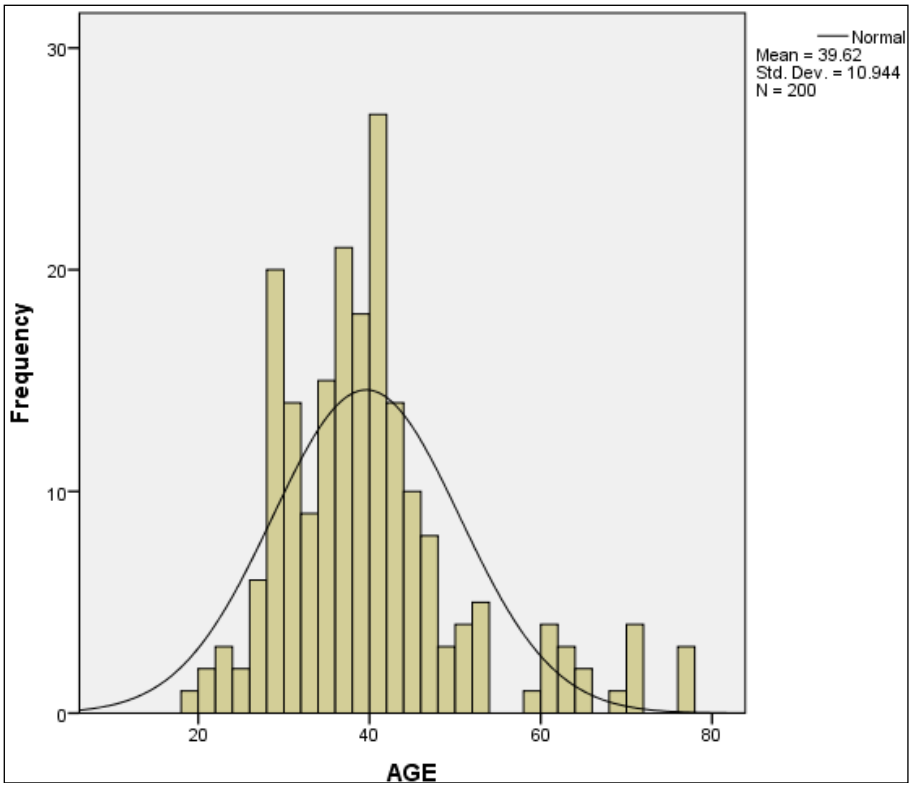

Fig 1: Is histogram of age of study subjects. The mean age of study subjects was 39.62.±10.94, Majority of study subjects were in the range of 20-40 yrs(65%), 28% study subjects were in the range 40-60 yrs, whereas only0.5% study subjects were in the range of <20 yrs.

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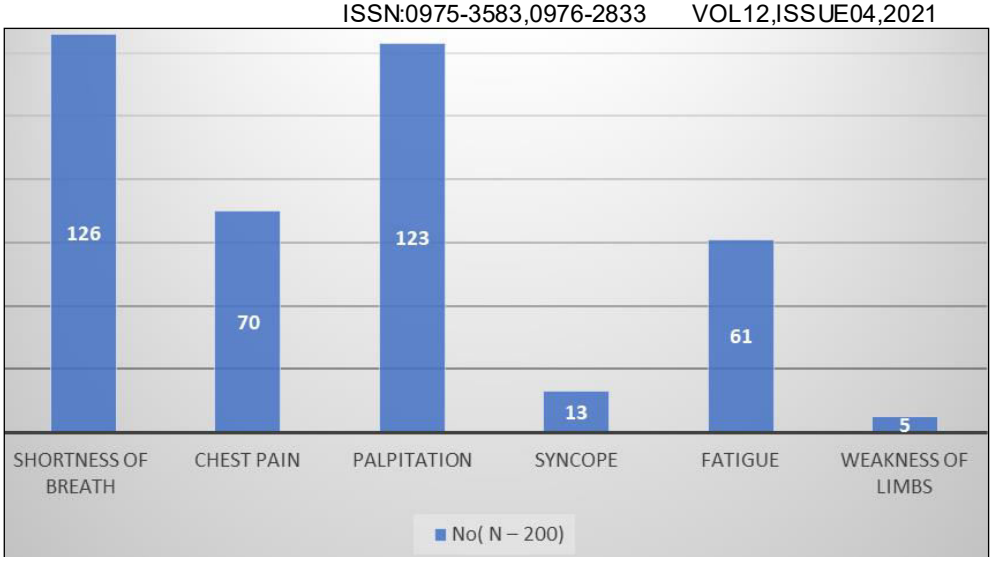

Fig 2: Shows distribution of study subjects as per Symptoms. Majority of study subjects had symptoms like shortness of birth (63%), Palpitation (61.5%), Chest pain (35%), Fatigue (30.5%) however symptom such as syncope (6.5%) and weakness of limb(2.5%) is not very prevalent.

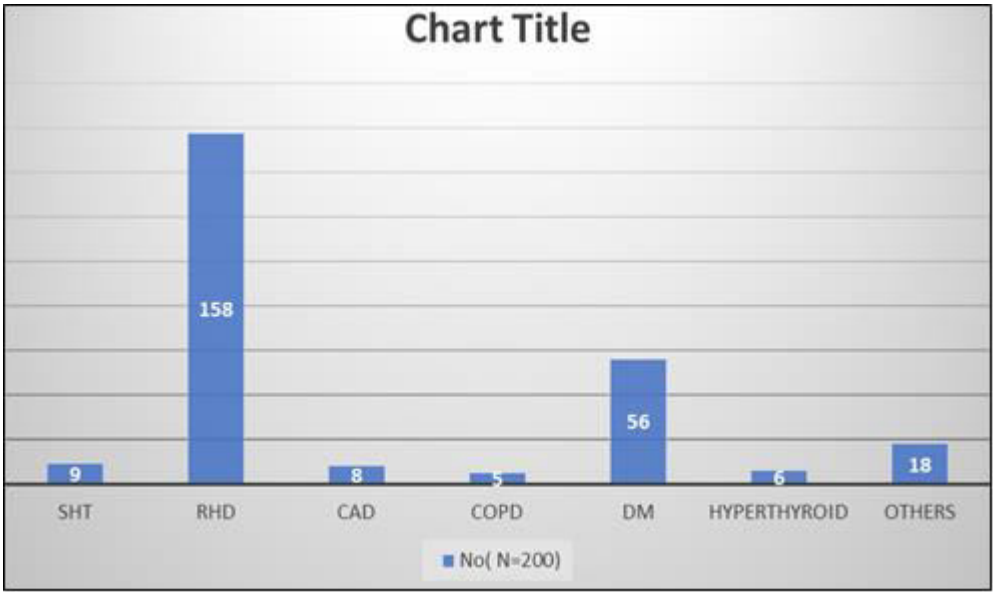

Fig 3: Distribution of study subjects as per Aetiology

Fig 3 shows distribution of study subjects as per Etiology. Maximum 79% of study subjects had RHD, 28% had DM, 4.5% study subjects had systemic hypertension, 4% subjects had CAD, 2.5% Subjects had COPD, 3% had hyperthyroid, whereas 9% had other etiological factors.

Table 1: Distribution of study subjects as per Clinical features

Clinical Features	No(N-200)	%
Cardiac Failure	83	41.5
TACHYPNEA	38	19
LVIDD	22	11
EF decreased	28	14
LVPWDD	26	13
IVSD	23	11.5
RWMA	19	9.5
Severe MS	20	10
MS/MR	57	28.5
MR	3	1.5
Mitral/Aortic Stenosis	37	18.5
Enlarged LA Size	171	85.5
Enlarged RA Size	20	10

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Table 1 shows distribution of study subjects as per Clinical features. Most common clinical features were enlarged LA Size (85.5%), Cardiac failure (41.5%), MS/MR (28.5%), Mitral/Aortic stenosis (18.5%), decrease in ejection fraction (14%). While the least common clinical features were MR (1.5%), RWMA (9.5%), IVSD (11.5%).

Table 2: Correlation of Type of AF with the LA size

Type of AF * LA Size Cross tabulation					
Type of AF	LA Size				Total
	Normal	Mildly abnormal	Moderately abnormal	Severely abnormal	
First detectedAF	29	16	15	0	60
Permanent AF	0	52	0	0	52
Persistent AF	0	0	56	0	56
Paroxysmal AF	0	0	0	26	26
Recurrent AF	0	0	6	0	6
Total	29	68	77	26	200

Table 2 Shows Correlation of Type of AF with the LA size. Most common severly abnormal LA size was there with Paroxysmal AF(13%), whereas most common moderately abnormal LA size were there in Persistent AF and most common mildly abnormal AF was there in Permanent AF, On applying Chi square test we found significant difference among them with pearson chi squre 432.9 and p value-0, highly significant.

Table 3: Association of etiology of AF with type of AF

	SHT	RHD	CAD	COPD	DM	Hyperthyroid
Persistent AF	4	29	6	5	10	6
Permanent AF	3	49	0	0	7	0
First detected AF	0	48	0	0	28	0
Paroxysmal AF	2	26	2	0	9	0
Recurrent AF	0	6	0	0	2	0
Total	9	158	8	5	56	6

Table 3 shows Association of etiology of AF with type of AF. Majority of AF i.e. 158 study subjects had RHD, 56 study subjects had DM. out of 60 study subjects who had persistent AF, 29 had RHD, 10 had DM, 6 had hyperthyroid, 5 had COPD. Out of 52 study subjects had permanent AF, 49 had RHD, 7 had DM, 3 had SHT, Out of 56 first detected AF, 48 subjects had RHD, 28 subjects had DM. 6 Subjects with RHD and 2 subjects with DM had recurrent AF.

Discussion

In present study The mean age of study subjects was 39.62.±10.94, Majority of study subjects were in the range of 20-40 yrs(65%), 28% study subjects were in the range 40-60 yrs, whereas only0.5% study subjects were in the range of <20 yrs. This clearly shows that very few subjects are there on extreme of age. Other study such as by Rahul Gambhir*et al*.,[6]show that highest incidence of AF is reported in age group of 31 to 40 years and it rarely seen at extremes of age. Which is almost in accordance to our study. Study by Dharma Rao V *et al*.,[2]shows an average age of 45.44 years. The maximum number of cases were found between 40 to 60 years. Elderly age group comprised of less than 20 percent of cases. However in Japanese study about 44.00% patients had age more than 40 years, Study by Harshad*et al*.,[10]shows Maximum patients belonged to the age group of 51 to 70 years which is 45.4%;this difference may be due to study subject selection or etiology of AF, as RHD generally do not occurs in old age.

In present study Majority of study subjects had symptoms like shortness of birth (63%), Palpitation (61.5%), Chest pain (35%), Fatigue (30.5%) however symptom such as syncope (6.5%) and weakness of limb (2.5%) is not very prevalent. On comparison between various symptoms on presentation in various studies. Study by Rahul Gambhir[6]shows Breathlessness, Palpitation & cough were amongst the most common complaints. Other uncommon symptoms were abdominal pain, Nausea & Vomiting and Haemoptysis. Which is in accordance of our study. Study by Mandal RN *et al*.,[7]shows that Palpitation was commonest presenting complaint found in 24 (40%) out of 60 patients. In CARAF registry, palpitation was noted in as much as 50% of the patients. It was more in patients with rapid ventricular response and new onset AF[15].Second common symptom was cough, found in 18(30%) of the patients of this study. This includes cough related with pulmonary congestion due to elevated left atrial pressure

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secondary to mitral valve disease, heart failure, and respiratory tract infection. In study by Nand vidya*et al*.,[11]shows Palpitation (33.33%) was the most common presenting complaint encountered followed by dyspnoea (24.2%), chest pain (21.2%) and stroke (12.12%).

In the present study Maximum 79% of study subjects had RHD, 28% had DM, 4.5% study subjects had systemic hypertension, 4% subjects had CAD, 2.5% Subjects had COPD, 3% had hyperthyroid, whereas 9% had other etiological factors. Among most of the INDIAN studies the principle cause of AF is Rheumatic heart diseases. While in the western studies Ischemic heart diseases is the most common cause. The 2nd most common cause is Ischemic heart diseases in Indian studies while it is the most common cause in the west. Hypertension is among the other common causes. Study by Dharma Rao V *et al*.,[2]shows in their study rheumatic heart disease (75.51%) is the most common cause followed by ischemic heart disease (10.20%) and hypertension which is in accordance with our present study. Among the structural heart disease, valvular heart disease was seen in (51.51%) cases as a cause for AF. Chronic obstructive airway disease (COPD) in (6.06%) was the most important cause among non-structural heart diseases.93 RHD, IHD, HTN and cor-pulmonale are most commonly found conditions in patients with AF.98 In another Indian study by Singh G *et al*.,[12], RHD was reported in (37.87%), cardiomyopathy in (13.6%), HTN in (3%), IHD in (3.03%), thyrotoxicosis in (9.05%) and lone AF in (1.5%).102 Kumar *et al*.,[13] reported RHD in (39%), IHD in (29%), HTN in (54%), cardiomyopathy in (4%), COPD in (3%) and thyrotoxicosis in (5%) of their patients.103 Ischaemic heart disease (IHD) was the second most common cause of AF in the present study comprising (21.8%) of the cases. A recent study by Li K *et al*.,[14]established the fact that AF is more commonly associated in patients with acute myocardial infarction (MI) and is associated with increased long term mortality.

In present study Most common clinical features were enlarged LA Size (85.5%), Cardiac failure (41.5%), MS/MR (28.5%), Mitral/Aortic stenosis (18.5%), decrease in ejection fraction (14%). While the least common clinical features were MR (1.5%), RWMA (9.5%), IVSD (11.5%). Study by Nand Vidya *et al*.,[11]shows 62.1% had their left atrial size more than 3.5 cm. valvular heart disease, in particular mitral stenosis was noted as most common cause of enlarged left atrium in 31(47%) cases. Dilated cardiomyopathy was found in 6(9.09%) cases as cause of enlarged left atrium. CHF was a powerful independent predictor of the occurrence of AF in the Framingham study, in both symptomatic and asymptomatic LV dysfunction. AF is diagnosed in 10% to 35% of patients with CHF during the course of the disease 20 and is related to the clinical severity of its symptoms. A previous study by Habibzadeh F *et al*.,[15]found that MS was most common subtype of valvular heart disease associated AF[51].

In this study Most common severely abnormal LA size was there with Paroxysmal AF(13%), whereas most common moderately abnormal LA size were there in Persistent AF, and most common mildly abnormal AF was there in Permanent AF, Study by Harshad*et al*.,[10]shows that Test for significance using chi-square testing was applied for co-relating etiology versus LA size. Significant co-relation was found in the present study between RHD and LA size >4cm. The relationship between the presence of MS and the LA size was found to be statistically significant ('P'value<.05). This conforms with the findings by Flaker, Greg C., *et al*.,[16].

Majority of AF i.e 158 study subjects had RHD, 56 study subjects had DM. Out of 60 study subjects who had persistent AF, 29 had RHD, 10 had DM, 6 had hyperthyroid, 5 had COPD. Out of 52 study subjects had permanent AF, 49 had RHD, 7 had DM, 3 had SHT. Out of 56 first detected AF, 48 subjects had RHD, 28 subjects had DM. 6 Subjects with RHD and 2 subjects with DM had recurrent AF. Study by Harshad*et al*.,[10] shows Test for significance using chi-square testing was applied for co-relating etiology versus types of AF. Significant co-relation was found in the present study between RHD with first detected AF and permanent AF; COPD with persistent AF and Lone AF with recurrent AF. No other studies could be found for co-relation.

Conclusion

It was concluded that, the prevalence of chronic AF is still more common below the age of 50 years and this is mostly due to high prevalence of rheumatic heart disease in India as being the most common etiology of AF. CHF is the most common associated condition with chronic AF.

Conflict of Interest: No.

Funding: No.

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