

Original Research Article

The clinical and etiological profile of atrial fibrillation after echocardiography in a tertiary care centre from North India - a cross sectional observational study

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ABSTRACT

Background: Atrial fibrillation (AF) is the most common sustained arrhythmia in clinical practice. In western countries, rheumatic heart disease (RHD) is a rare cause of atrial fibrillation but in developing countries like India it is one of the commonest cause of atrial fibrillation. We studied etiology, left atrial size and the incidence of left atrial appendage clot in patients with atrial fibrillation at our institution so that guidelines could be formulated to manage the patients of AF in the hours of emergency.

Methods: 110 consecutive patients of atrial fibrillation coming to emergency, cardiology and medicine outpatient department over a period of one year were enrolled for the study. Ethical committee clearance was taken. Detailed history were taken, clinical presentation reviewed and examination were carried out. All patients were subjected to transthoracic echocardiography and for transesophageal echocardiography if required.

Results: The mean age of patients in the study was 58.42±14.27 years (range 22-90 years). Maximum numbers of patients were in the age group of 61-70 years (26.37%). Out of 110 patients with atrial fibrillation, 72 patients (65.46%) were females and 38 patients (34.54%) were males. Majority of patients presented with more than one symptom. Out of 110, 66 patients (60%) had RHD. Among RHD patients, 50 patients (45.55%) were females and 16 patients (14.55%) were males. Next common causes were hypertensive heart disease and degenerative valvular heart disease.

Conclusions: In our study RHD was the most common cause of atrial fibrillation, followed by hypertensive heart disease and degenerative valvular heart disease. Mitral valve involvement was seen in all patients of RHD. Left atrial enlargement was seen in majority of patients, so left atrial enlargement could be a predictor of atrial fibrillation. Patients of left atrial enlargement are more prone to develop left atrial appendage clot.

Keywords: Atrial fibrillation, Subhimalayan region

INTRODUCTION

Atrial fibrillation (AF) is an abnormal heart rhythm characterized by rapid and irregular beating.¹ Often it

starts as brief periods of abnormal beating which become longer and possibly constant over time. Most episodes have no symptoms. Occasionally there may be heart palpitations, fainting, lightheadedness, shortness of

breath, or chest pain. The disease is associated with an increased risk of heart failure, dementia, and stroke.² It is a type of supraventricular tachycardia.

High blood pressure and valvular heart disease are the most common alterable risk factors for AF.³ Other heart-related risk factors include heart failure, coronary artery disease, cardiomyopathy, and congenital heart disease.³ In the developing world valvular heart disease often occurs as a result of rheumatic fever.⁴

Lung-related risk factors include COPD, obesity, and sleep apnea.² Other factors include excess alcohol intake, diabetes mellitus, and thyrotoxicosis.² However, half of cases are not associated with one of these risks.² A diagnosis is made by feeling the pulse and may be confirmed using an electrocardiogram (ECG). A typical ECG in AF shows no P waves and an irregular ventricular rate.

AF is often treated with medications to slow the heart rate to a near normal range (known as rate control) or to convert the rhythm to normal sinus rhythm (known as rhythm control). Electrical cardioversion can also be used to convert AF to a normal sinus rhythm and is often used emergently if the person is unstable. Ablation may prevent recurrence in some people. Depending on the risk of stroke either aspirin or anti-clotting medications such as warfarin or a novel oral anticoagulant may be recommended. While these medications reduce this risk, they increase rates of major bleeding.

Atrial fibrillation is the most common serious abnormal heart rhythm.² In Europe and North America, as of 2014, it affects about 2% to 3% of the population. This is an increase from 0.4 to 1% of the population around 2005. In the developing world about 0.6% of males and 0.4% of females are affected. The percentage of people with AF increases with age with 0.14% under 50 years old, 4% between 60 and 70 years old, and 14% over 80 years old being affected. AF and atrial flutter resulted in 112,000 deaths in 2013, up from 29,000 in 1990.⁵ The first known report of an irregular pulse was by Jean-Baptiste de Sénac in 1749. This was first documented by ECG in 1909 by Thomas Lewis.²

Left atrial size is an important factor in the development of atrial fibrillation and in determining the long-term result of cardioversion. Atrial fibrillation was rare when left atrial dimension was below 40mm but common when this dimension exceeded 40 mm.⁶ In this background it is pertinent to know the clinical profile and etiological factors responsible for Atrial Fibrillation in an institute to manage the patients in the hours of Emergency.

METHODS

110 consecutive patients presenting with symptoms suggestive of AF to the emergency of Indira Gandhi Medical College Shimla, Himachal Pradesh, India and

having ECG evidence of atrial fibrillation were enrolled for the study. And college ethical committee clearance was taken. All the patients were subjected to echocardiography. The patients not found to have any cardiac anomaly were subjected to routine biochemistry, complete hemogram, pulmonary function test and thyroid function test.

Left atrial (LA) size was measured in parasternal long axis view in all patients. LA size was taken as the largest diameter in four chamber view. Transesophageal echocardiography was done to rule out left atrial appendage clot. Patients with no identifiable cause were labelled as lone AF.

RESULTS

Out of 110 patients 72 patients (65.46%) were females and 38 patients (34.54%) were males. The mean age of study subjects was 58.42±14.27 years (range 22-90). Highest number of patients with atrial fibrillation was seen in age group 61-70 years 26.37% followed by 25.45% in age group 51-60 years. 93 (84.55%) of study subjects were from rural population and majority of patients belonged to poor socioeconomic status.

Table 1 shows the etiology of AF in 110 patients. Rheumatic heart disease was the commonest cause of atrial fibrillation seen in 66 (60%) of patients. Hypertensive heart disease was seen in 13 patients (12.73%) and degenerative valvular heart disease was seen in 12 patients (10.91%). Other causes in order of frequency were Ischaemic heart disease, Cor pulmonale, Thyrotoxicosis, Idiopathic dilated cardiomyopathy and constrictive pericarditis. Lone atrial fibrillation was seen in only one patient.

Table 1: Overall profile of atrial fibrillation patients.

Total patients	110
Male	38 (34.54%)
Female	72 (65.46%)
Mean age(yrs)	58.42 years±14.27
Rheumatic heart disease	66 (60%)
Hypertensive heart disease	13 (11.82%)
Degenerative valvular heart disease	12 (10.91%)
Cor pulmonale	4 (3.64%)
Ischaemic heart disease	4 (3.64%)
Thyrotoxicosis	4 (3.64%)
Diabetes mellitus	3 (2.73%)
IDCM	2 (1.82%)
Constrictive pericarditis	1 (0.90%)
Lone AF	1 (0.90%)

In 66 patients with AF due to RHD, there were 50 (45.55%) females and 16 (14.55%) males. The mean age in years in RHD patient was 53.68±12.68 years. All patients with RHD was involved of mitral valve, isolated

mitral valve involvement was seen in 13 patients (19.69%), isolated mitral regurgitation was seen in 3 patients (4.55%), mitral stenosis with mitral regurgitation was seen in 21 patients (31.82%) and multiple valve involvement involving mitral and aortic valve was seen in 29 patients (63.64%). Mean left atrial (LA) size in our study was 4.51 ± 0.95 cm, while in RHD patients mean LA size was of $4.88 \text{cm} \pm 0.77$ cm.

Out of 66 patients of RHD mean LA size was found increased (more than 4 cm) in 60 patients. Among non-rheumatic patients 19 out of 44 patients had LA size >4 cms. Five patients had appendage clot and they all had underlying RHD.

Table 2: Atrial fibrillation and rheumatic heart disease.

Total patients	66
Female	50 (45.45%)
Male	16 (14.55%)
Mean age in years	53.68 \pm 12.68
Isolated MS	13 (19.69%)
Isolated MR	3 (4.55%)
MS with MR	21 (31.82%)
MS with AR	4 (6.06%)
MR with AR	2 (3.03%)
MS with MR with AR	22 (42.94%)

Table 3: Echocardiographic correlation of left atrial size and left atrial appendage clot with atrial fibrillation.

Etiology	No of patients	Mean LA size	No. of patients having LA size >40 mm	No. of patients having LA/LA appendage clot
RHD	66	$4.88 \text{cm} \pm 0.77$ cm	60	5
Others	44	$3.98 \text{cm} \pm 0.94$ cm	19	0
Total	110	$4.51 \text{cm} \pm 0.95$	79	5

DISCUSSION

Atrial fibrillation is the most common sustained arrhythmia in clinical practice.⁷ By the turn of century it will be an increasingly common cause of stroke, thromboembolism and heart failure.⁸ Prevalence of atrial fibrillation increases with age.⁹ In western countries, rheumatic heart disease is a rare cause of atrial fibrillation but in developing countries like India it is one of the commonest cause of atrial fibrillation. In a study done on North Indian rural background RHD continues to be an important cause of atrial fibrillation and mixed mitral valve lesion was the commonest lesion seen.¹⁰

Hypertension is an independent predictor of atrial fibrillation and is found in 60-80% of atrial fibrillation cases in western population.¹¹ In addition to hypertensive heart disease, the most common cardiac abnormality associated with AF are ischaemic heart disease, mitral valve disease, hypertrophic cardiomyopathy and dilated cardiomyopathy. Hyperthyroidism is also a well-known cause for AF, it was found that among people 60 years age or older, a low serum thyrotropin concentration is associated with a threefold higher risk that atrial fibrillation will develop in the subsequent decade.¹² In Framingham study, 31 patients of AF had no structural heart disease and were thus having lone AF.¹³ In present study most common etiology of atrial fibrillation was rheumatic heart disease seen in 60% of patients. Hypertensive heart disease, degenerative valvular heart disease and cor pulmonale were next common causes of AF. Mean LA size in our study was 4.51 ± 0.95 cms, with mean LA size of 4.88 ± 0.77 cms in RHD patients.

Cardiovascular health study showed that LA size more than 50mm was associated with four-fold increase in incidence of atrial fibrillation.¹⁴ In present study 90.91% patients with RHD had increased LA size more than 40mm and 5 patients had LA appendage clot and all of them had evidence of RHD. AF was more common in women, with female to male ratio of 1.89. This is consistent with findings of Nadeem et al who also found that AF was more common in women.¹⁵

CONCLUSION

RHD remains most common cause of atrial fibrillation in developing countries, followed by hypertensive heart disease and degenerative valvular heart disease respectively. Mitral valve involvement was seen in all patients of RHD

Left atrial enlargement was seen in majority of patients, so left atrial enlargement could be a predictor of atrial fibrillation. Patients of left atrial enlargement are more prone to develop left atrial appendage clot.

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