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Original article

Atrial fibrillation in a tertiary care institute – A prospective study

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ABSTRACT

Objective: Atrial fibrillation is the commonest sustained arrhythmia. In western countries the common causes of atrial fibrillation are hypertensive heart disease, dilated cardiomyopathy, and coronary heart disease. Rheumatic heart disease being still common in India, we studied its contribution to atrial fibrillation.

Material and methods: 137 consecutive patients of atrial fibrillation coming to our hospital were subjected to echocardiography to determine the cause.

Results: Out of 137 patients with atrial fibrillation, 76 were female (55.47%) and 61 were male (44.43%). Mean age was 51.24 ± 15.36 years. Commonest cause of AF was rheumatic heart disease found in 84 (61.31%) patients. Next common causes were hypertensive heart disease in 14 (10.2%) patients and chronic obstructive pulmonary disease (COPD) in 14 (10.2%) patients. Mean left atrial size was 47.8 ± 12.25 mm.

Conclusion: In our study of patients coming from a rural back ground of North India, more than 60% patients of AF are due to RHD. Hypertensive heart disease and COPD are the next common causes.

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Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia, occurring in 1–2% of the general population. Valvular heart diseases are found in around 30% patients with AF. In rheumatic heart disease, AF occurs early in mitral stenosis and mitral regurgitation but is uncommon in aortic valve disease. In western countries, rheumatic AF is now a thing of the past, but since rheumatic heart disease (RHD) is still a common cause of heart disease in developing countries, it is still a common cause of AF.

1. Material and methods

137 consecutive patients presenting with various symptoms to the medicine and cardiology OPD or admitted in cardiology

or medicine department and having ECG evidence of AF were the subjects of the study. Patients were enrolled with effect from April 2006 to March 2008. Clinical examination and routine investigations were done. All were subjected to echocardiography. The patients not found to have any cardiac anomaly on echocardiography were subjected to pulmonary function tests and thyroid function test. Patients not found to have any cardiac or pulmonary disease and normal thyroid function tests were labeled to have lone AF.

Left atrial (LA) size was measured in parasternal long axis view in all patients. Since some patients of AF do not have evidence of left heart disease and AF in them may be arising from right atrial (RA) anomaly, we also measured sum of LA and RA size in four chamber view. LA and RA size was taken as the largest diameter in four chamber view.

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2. Results

Out of 137 patients with AF, 76 were female (55.47%) and 61 were male (44.53%). Mean age was 51.24 ± 15.36 years. AF was persistent in 57 patients and permanent in 80 patients. Table 1 shows the causes of AF in 137 patients studied. Rheumatic heart disease (RHD) was the commonest cause of AF, found in 84 (61.31%) patients. Hypertensive heart disease (HHD) was found in 14 (10.2%) patients. Out of these 11 had left ventricular hypertrophy (LVH) with diastolic dysfunction and three had LVH and systolic dysfunction. Dilated cardiomyopathy with left ventricular dysfunction was found in 10 (7.29%) patients. Valvular heart disease other than RHD was found in 7 (5.1%) patients. Out of these 3 had mitral valve prolapse, and 3 had degenerative valve disease, one had tricuspid valve prolapse. One patient was found to have thyrotoxicosis. Two patients had normal echocardiography, pulmonary function tests and thyroid function tests and were thus having lone AF.

Mean LA size was 47.80 ± 12.25 mm. Mean LA size was higher in RHD patients (53.01 ± 11.54 mm). 31 patients (22.6%) had LA size less than 40 mm. Commonest cause of AF in these patients was COPD, found in 8 (25.8%) patients. 6 patients (19.35%) had HHD, 5 had DCM (16.12%) and 5 had RHD (16.12%), two had bicuspid valve disease with aortic stenosis and aortic regurgitation, one had degenerative mitral valve disease, one had thyrotoxicosis and two patients had lone AF.

In 84 patients with AF due to RHD, all patients had involvement of mitral valve (Table 2). Commonest cause was mixed mitral lesion (mitral stenosis (MS) with mitral regurgitation (MR)), found in 19 patients (26.61%). Isolated MS was seen in 13 patients (15.47%). Other patients had involvement of aortic valve with mitral valve in various combinations (Table 2). Organic tricuspid valve disease was seen in 9 patients of RHD with AF (10.71%). All these patients had involvement of mitral valve with or without aortic valve (Table 2). 8 patients had undergone closed mitral valvotomy (CMV) and two had undergone mitral valve replacement (MVR).

Mean of sum of LA and RA size was 96.89 ± 19.14 mm. Sum of LA and RA size of <80 mm was found only in 5 (4.76%) patients.

Table 1 – Overall profile of atrial fibrillation patients.

Total patients	137
Male	61 (44.53%)
Female	76 (55.47%)
Mean age (yrs)	51.24 ± 15.36
Diabetic	05
Hypertensive	20
Rheumatic heart disease	84 (61.31%)
Hypertensive heart disease	14 (10.2%)
COPD	14 (10.2%)
Dilated cardiomyopathy	10 (7.29%)
Nonrheumatic valvular heart disease	7 (5.1%)
Congenital heart disease	3 (2.18%)
Coronary artery disease	2 (1.45%)
Thyrotoxicosis	1 (0.72%)
Lone AF	2 (1.45%)

Table 2 – Atrial fibrillation and rheumatic heart disease.

Total patients	84
Male	36 (42.85%)
Female	48 (57.15%)
Mean age (yrs)	45.39 ± 14.18
Isolated MS	13 (15.47%)
Isolated MR	8 (9.52%)
MS with MR	19 (26.61%)
MS with AR	10
MR with AR	3
MS with MR with AR	11
MS with MR with AS with AR	1
Organic tricuspid valve disease (TS-4, TS and TR-5)	9
With MS and MR	5
With isolated MS	1
With MS, MR and AR	1
With MS and AR	2
Post closed mitral valvotomy	6
Post mitral valve replacement	1

Since almost all patients had persistent or permanent AF and having organic heart disease, with majority having RHD, the patients were put on digoxin or beta blockers or both to control heart rate. Most of them required diuretics to control symptoms. All except the two having lone AF were put on oral anticoagulants and the dose was adjusted according to INR. Other drugs were added as required according to the diagnosis.

3. Discussion

Atrial fibrillation (AF) is the most common sustained arrhythmia in humans, and is responsible for a large number of thromboembolic complications and deaths. Prevalence of AF increases with age. So growing prevalence of AF can in part be explained due to increase in the aging population, as life expectancy has increased.

Hypertension is an independent predictor of AF and is found in around 60–80% of AF population.¹ Coronary artery disease was found in one third to one fourth of patients of AF.^{1,2} AF is found in around 30–40% of patients of heart failure.³ Valvular heart disease, especially mitral valve disease used to be a common cause of AF, 50–60 years ago. But due to marked decrease in incidence of RHD in western countries, the mitral valve disease and thus valvular heart disease is now an uncommon cause of AF there. Mitral valve disease causes left atrial dilatation, which is a common substrate for AF. Diabetes mellitus is a known risk factor for stroke and is found in around 20% patients of AF.^{1,2} Hyperthyroidism is also a cause for AF. It occurs in 20–25% of older patients with hyperthyroidism, but in those less than 30 years of age, it is very uncommon.⁴ So in modern era, improved management of hyperthyroidism has rendered it as an uncommon cause of AF.² Even sub clinical hypothyroid patients have around 3-fold increase in incidence of AF.⁵ Some patients without structural heart disease also have paroxysmal or persistent AF. This disorder has been termed as lone AF. In Framingham study, 31 patients of AF had no structural heart disease and were thus having lone AF.⁶

Other uncommon causes of AF include valvular heart surgery, coronary artery bypass grafting, congenital heart disease and chronic obstructive pulmonary disease. RHD is now an infrequent cause of AF but high frequency of AF is found in patients with mitral stenosis, mitral regurgitation and tricuspid regurgitation. AF occurred in 29% with isolated mitral stenosis, 16% with isolated mitral regurgitation, and 52% with both conditions.⁷

In the present study, commonest cause of AF was RHD, found in more than 60% of patients. This is in sharp contrast to the findings in the studies from West, where RHD is a very uncommon cause of AF. The reason is that RHD is still a common cause of heart disease in developing countries and so a more common cause of AF. The commonest lesion in RHD associated with AF was mixed mitral valve lesion. This is because the largest LA size is seen in mixed mitral valve lesions. Mean LA size in our study was found to be 47.80 ± 12.25 mm. Several studies have shown a strong correlation between LA size and new onset AF.^{8,9} In the Framingham Heart Study, every 5 mm increase in LA diameter was associated with around 39% increase in incidence of AF.⁸ Cardiovascular health study showed that LA size more than 50 mm was associated with 4-fold increase in incidence of AF.⁹ Nine patients of RHD with AF in the present study had organic tricuspid valve disease. These patients are more likely to have AF because of large LA and also increase in size of right atrium (RA).

AF was more common in women, with female to male ratio 1.24. This is consistent with findings of Nadeem et al who also found that AF was more common in women.¹⁰

Hypertensive heart disease and COPD were the next common causes of AF. In COPD there is enlargement of RA and AF could be having its origin from RA. Since some patients of AF may have normal LA size but large RA, as cases of COPD, Ebstein's anomaly and pulmonary embolism, we measured the size of LA and RA and tried to correlate with AF. We found that more than 95% patients of AF had sum of LA and RA size >80 mm. Thus in some patients of AF, sum of LA and RA size may be more predictive of new onset of AF than LA size alone.

4. Conclusion

In our study comprising of patients from a North Indian rural background we found that RHD continues to be an important

cause of atrial fibrillation. In RHD, mixed mitral valve lesion is the commonest lesion seen.

Conflicts of interest

The author has none to declare.

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