

## IS RHEUMATIC HEART DISEASE STILL THE MOST COMMON CAUSE OF ATRIAL FIBRILLATION IN INDIA?

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### ABSTRACT

#### BACKGROUND

The past decade has witnessed an extraordinary growth in the knowledge regarding atrial fibrillation. It is a heterogeneous rhythm that appears with several conditions and crosses the path of almost all clinicians. It is the most common sustained cardiac arrhythmia and the third leading cause of death due to cardiovascular diseases. The incidence of atrial fibrillation approximately doubles with each decade of adult life and ranges from 2 or 3 new cases per 1000 population per year between the ages of 55 and 64 years to 35 new cases per 1000 population per year between the ages of 85 and 94 years. Although, the vast majority of patients with atrial fibrillation are relatively asymptomatic, patients can have profoundly limiting symptoms. The initial presentation of atrial fibrillation maybe an embolic complication or exacerbation of heart failure, but most patients complain of palpitations, chest pain, dyspnoea, fatigue, lightheadedness or syncope. For patients with symptomatic atrial fibrillation lasting many weeks, initial therapy maybe anticoagulation and rate control while the long-term goal is to restore sinus rhythm. When cardioversion is contemplated and the duration of atrial fibrillation is unknown or exceeds 48 hours, patients who do not require long-term anticoagulation may benefit from short-term anticoagulation. If rate control offers inadequate symptomatic relief, restoration of sinus rhythm becomes a clear long-term goal. Early cardioversion may be necessary, if atrial fibrillation causes hypotension or worsening heart failure. Experimental studies have explored the mechanisms of the onset and maintenance of the arrhythmia; drugs have been tailored to specific cardiac ion channels; non-pharmacologic therapies have been introduced that are designed to control or prevent atrial fibrillation; and data have emerged that demonstrate a genetic predisposition in some patients.

#### MATERIALS AND METHODS

It is a prospective, observational study performed at Gayatri Medical College Hospital, Visakhapatnam, a multispecialty hospital catering to health needs of patient population belonging mostly to the middle and upper socioeconomic strata.

#### RESULTS

Of the total number 531 patients, 187 patients were admitted as inpatients and remaining were treated on an outpatient basis. Three hundred and three patients were females averaging to about 57% of patient population. Of the one hundred and eighty seven patients admitted as inpatients, ninety two were females. Of the total three hundred and three females, seventy three patients expired. Sixty two patients lost follow-up among total patients. One third of our patients were older than sixty years of age. Rheumatic heart disease was the most common cause of arrhythmia in females, while ischaemic heart disease was more common in males. More than half of the patients developed heart failure at some stage during their followup.

#### CONCLUSION

In this prospective cohort study of young to older ethnic Indians, we clearly demonstrated age was an important determinant for atrial fibrillation, but rheumatic heart disease has increased the prevalence of atrial fibrillation in the non-elderly population. The most common cardiovascular pathologies associated with presence of atrial fibrillation in the general population are hypertension, coronary heart disease, congestive heart failure and valvular heart disease. At a global level, the spectrum of structural heart disease in patients with atrial fibrillation has changed over the last century.

#### KEYWORDS

Arrhythmias, Cardiac C14.280.067, Heart Failure C14.280.434, Myocardial Ischaemia C14.280.647.

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#### BACKGROUND

Atrial fibrillation is a supraventricular tachyarrhythmia characterised by uncoordinated atrial activation with consequent deterioration of mechanical function. On the electrocardiography, rapid, irregular, fibrillatory waves that vary in size, shape and timing replace consistent 'p' waves and there is an irregular ventricular response that is rapid when conduction is intact. Atrial fibrillation may occur in association with atrial flutter or atrial tachycardia. The

clinician should distinguish a first-detected episode of atrial fibrillation, whether symptomatic or self-limited, recognising the uncertainty about the actual duration of the episode and about previous undetected episodes. After two or more episodes, atrial fibrillation is considered recurrent. If the arrhythmia terminates spontaneously, recurrent atrial fibrillation is designated paroxysmal; when sustained beyond seven days, it is termed persistent. Termination with pharmacological therapy or direct current cardioversion does not alter the designation. First-detected AF maybe either paroxysmal or persistent. The category of persistent atrial fibrillation also includes cases of longstanding ones longer than one year usually leading to permanent atrial fibrillation in which cardioversion has failed. Secondary atrial fibrillation occurs in the setting of acute myocardial infarction, cardiac surgery, pericarditis, myocarditis, hyperthyroidism or acute pulmonary diseases. In these situations, atrial fibrillation is not the primary problem and concurrent treatment of the underlying disorder usually terminates the arrhythmia. The term 'lone' atrial fibrillation applies to individuals younger than 60 years without clinical or echocardiographic evidence of cardiopulmonary disease including hypertension. Its causes, precipitators and maintainers are too complex and the approaches to its management are controversial. The clinician needs to fully understand these complexities, the strengths and weaknesses of various management strategies and needs to apply them to individual patients. For these reasons, there has been a strong impetus to improve our knowledge and understanding of atrial fibrillation and its response to various therapeutic interventions.

#### Aims and Objectives

1. To study the prevalence of atrial fibrillation in cardiac patients.
2. To compare the incidence of AF within various groups affected.

#### MATERIALS AND METHODS

Five hundred and thirty one patients who had either visited the hospital as outpatients or who had been admitted as inpatients over a period of 12 months from September 2016 to September 2017 with a provisional or final diagnosis of atrial fibrillation were studied. All these patients were subjected to meticulous history taking, thorough physical examination, necessary investigations, appropriate treatment and regular followup.

#### Inclusion Criteria

1. All patients with provisional or final diagnosis of atrial fibrillation.
2. Patient age above 12 years.

#### Exclusion Criteria

1. Lone atrial fibrillation.
2. Atrial fibrillation in children.

#### RESULTS

Of the total number 531 patients, 187 patients were admitted as inpatients and remaining were treated on outpatient basis. Three hundred and three patients were females averaging to about 57% of patient population. (Table 1). The incidence of atrial fibrillation among ischaemic heart disease patients was high 73 out of 531 patients. This clearly exceeded the incidence in rheumatic heart disease (Table 2). The contrary was found to be true with female gender with no incidence in IHD group.

Male - 228 (43%)  
Female - 303 (57%).

Age Group	Number of Patients
<20	21
21-30	62
31-40	73
41-50	125
51-60	42
61-70	135
>70	73

**Table 1. Total Number of Patients 531**

Various Aetiologies and Comorbidities	Male	Female
Rheumatic heart diseases (A)	52	125
Other valvular lesions (B)	10	10
Ischaemic heart disease (C)	73	21
Hypertension and ischaemic heart disease (D)	10	10
IHD and DM (E)	21	-
IHD, DM and HTN (F)	21	21
COPD and lung disease (G)	42	31
Dilated cardiomyopathy (H)	10	21
Thyrotoxicosis (I)	21	10
Cirrhosis of liver (J)	12	10

**Table 2. Aetiologies of Atrial Fibrillation**

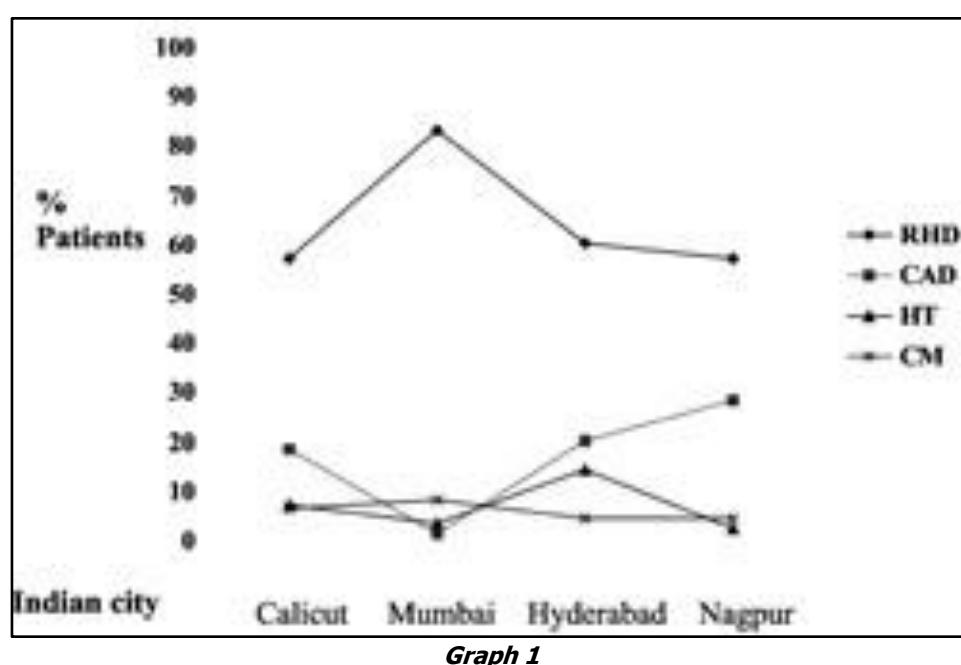
IHD- Ischaemic heart disease; DM- Diabetes mellitus; HTN- Hypertension; COPD- (chronic obstructive pulmonary disease).

In our study of 531 patients, more females were admitted with a diagnosis of atrial fibrillation. Of the one hundred and eighty seven patients admitted as inpatients, ninety two were females. Of the total three hundred and three females, seventy three patients expired. Sixty two patients lost followup among total patients. One third of our patients were older than sixty years of age. Rheumatic heart disease was the most common cause of the arrhythmia in females, while ischaemic heart disease was more common in males. More than half of the patients developed heart failure at some stage during their followup. Only a minor section of patients opted for the radiofrequency catheter ablation mostly because of financial constraints. Other reasons being the presence of other coexisting cardiac and non-cardiac diseases and advanced age.

## DISCUSSION

The currently diagnosed estimate of 2.3 million people in the United States with it is expected to increase to 5.6 million by 2050.<sup>1</sup> Its prevalence doubles with each decade of age reaching almost 9% at the age of 80 to 89 years. Its population prevalence has reached epidemic proportions. This doubling with each decade of age is independent of the known predisposing conditions. Cardiovascular Health Study and Framingham Study data indicate that the incidence of atrial fibrillation per 1000 person-years in those younger than the age 64 years is 3.1 in men and 1.9 in women, increasing sharply to approximately 19.2 per 1000 person-years in those aged 65 to 74 years and to as high as 31.4 to 38 in octogenarians.<sup>2</sup> Atrial fibrillation is uncommon before 60 years of age, but its prevalence increases markedly thereafter afflicting approximately 10% of the population by 80 years of age. A survey on the Asian population reported relatively low rates for atrial fibrillation prevalence. A study on young healthy residents in northern India showed only 0.1% prevalence of atrial fibrillation.<sup>3</sup> Approximately, one third of all patients who have atrial fibrillation are aged 80 years or older, and it is estimated that by 2050, half of patients who have atrial fibrillation are likely to be in this age group. There is a male preponderance of risk for reasons that are currently unknown. This is in contrast to our study wherein there is slight female preponderance. But, our study with female preponderance could be due to rheumatic heart disease. A study in Portugal by Daniel Bonhorst showed no sex predisposition.<sup>4</sup> The increase in incidence with age may involve age-related cardiac abnormalities, including gradual loss of nodal fibres and increased fibrous and adipose tissue in the sinoatrial node, decreased ventricular compliance from myocardial fibrosis resulting in atrial dilatation that predisposes to atrial fibrillation and extensive senile amyloid infiltration of the sinoatrial node.<sup>5</sup> But, our study with middle age and young patients numbered more than three hundred constituting 65% of the patient population. There also

seems to be an age-related prothrombotic diathesis. Age is a more potent atrial fibrillation risk factor if it is combined with other risk factors.<sup>6</sup> Also, ageing reflects longer exposure to predisposing conditions for atrial fibrillation and even in advanced age, some individuals are clearly more vulnerable to its development than others. The most credible explanation for the increasing prevalence of atrial fibrillation is that the current elderly population has more predisposing conditions, such as diabetes, obesity, heart failure, coronary and valvular heart disease and prior cardiac surgery. This trend brought about by advances in treatment of cardiovascular disease has produced a population of elderly survivors containing more candidates for atrial fibrillation than formerly. The Rochester study, however, observed only modest increases in the prevalence of these predisposing conditions over three decades, which only partially explained the observed magnitude of the increased atrial fibrillation prevalence.<sup>7</sup> The prevalence of rheumatic heart disease has decreased significantly worldwide and hypertension and coronary heart disease are being increasingly recognised as aetiological agents in atrial fibrillation. This has changed the structure of baseline cardiovascular disease in atrial fibrillation patients. Among the causes in our country, rheumatic mitral valvular disease topped the list followed by ischaemic heart disease.<sup>8</sup> We further noted that rheumatic heart disease is the most common cause of atrial fibrillation in females, while ischaemic heart disease is the main reason for atrial fibrillation in males. Overall, the biggest burden is due to rheumatic heart disease. This relative high incidence of rheumatic fever in our country maybe the reason for the slightly high female predisposition of atrial fibrillation in our study. This is in consensus with a similar study done in Nepal by Chowdhury et al in Mymen Singh Medical College.<sup>9</sup> A recent survey conducted at four cities in private and public institutes published in Journal of Association of Physicians of India also reported the same<sup>10</sup> (Graph 1).



Atrial fibrillation accounts for approximately 45% of all embolic strokes.<sup>11</sup> The annual risk for stroke for octogenarians who have atrial fibrillation is in the range of 3% to 8% per year, atrial fibrillation is associated with an increased long-term risk for stroke, heart failure and all-cause mortality, particularly in women.<sup>12</sup> We observed that more number of women had stroke compared to men. The same results were obtained in similar studies done by Margaret et al in the ATRIA study.<sup>13</sup> Registry and trial data indicate that 20% to 35% of patients with acute decompensated heart failure who are admitted to the hospital will be in atrial fibrillation at presentation. In about one third of these patients, the atrial fibrillation will be of recent onset. Despite the high frequency with which the combination of atrial fibrillation and acute decompensated heart failure is encountered, there were few published data that specifically address this problem. Atrial fibrillation and worsening heart failure interact in a dangerous pattern. The adverse effects of atrial fibrillation in patients with heart failure may include loss of atrial transport, rapid and irregular ventricular rates and toxic effects of anti-arrhythmic drug therapy. Worsened heart failure in turn leads to increased atrial stretch and heightened sympathetic tone. In our study, we observed that heart failure is more common in females with atrial fibrillation. The incidence of congestive heart failure being high in females could be due to poor compliance with drugs, lack of salt restriction and excessive physical activity. Hence, patients were thoroughly educated on the need for compliance with drugs, salt restriction, moderation of physical activity and regular follow up. Similar findings were found by Benjamin et al in a population-based cohort study where they found out heart failure is associated with an 1.8 and 3.4 fold risk for atrial fibrillation in men and women, respectively.

## CONCLUSION

In this prospective cohort study of young to older ethnic Indians, we clearly demonstrated age was an important determinant for atrial fibrillation, but rheumatic heart disease has increased the prevalence of atrial fibrillation in the non-elderly population. The most common cardiovascular pathologies associated with presence of atrial fibrillation in the general population are hypertension, coronary heart disease, congestive heart failure and valvular heart disease. At a global level, the spectrum of structural heart disease in patients with atrial fibrillation has changed over the last century. It may be concluded that the most common cause of atrial fibrillation in Indian population may shift from rheumatic heart disease to ischaemic heart disease in the near future due to the changing trends in the cardiac diseases.

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