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Prevalence of Heart Failure in Patients with Atrial Fibrillation in Thiruvananthapuram: A Community Based Cross - Sectional Study

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ABSTRACT

Background

Atrial fibrillation is the most common type of cardiac arrhythmia. It is due to abnormal electrical activity within the atria of the heart, causing them to fibrillate. Atrial fibrillation (AF) and heart failure (HF) are growing cardiovascular disease epidemics worldwide. There has been an exponential increase in the prevalence of AF and HF correlating with an increased burden of cardiac risk factors and improved survival rates in patients with structural heart disease. Population-based studies into heart failure in AF are scarce and little is known about its prevalence in the general population. We aimed to estimate the prevalence of Heart Failure, and to identify associated factors

Methods

A community-based cross-sectional study conducted in the Trivandrum district and Government Medical College, Thiruvananthapuram from September 2019 to March 2023 through randomly selected population from Trivandrum District using multi-stage cluster sampling

Results

A total of 61200 patients were enrolled and 524 patients had AF. The mean age of the overall study population was found to be 64.5 ± 6.7 yrs with male : female ration of 304:220. 28 % of the AF patients had HF with majority of the patients having HFrEF followed by HFmrEFanDHFpEF

Conclusion

In conclusion, AF was associated with all HF, HFrEF, and HFpEF events, and there was no significant difference in the associations of AF with incident HFrEF vs. HFpEF events

INTRODUCTION

Heart failure (HF) is a frequent cause of hospitalization and death in patients with atrial fibrillation (AF). Identifying AF patients at risk of HF hospitalization could help select individuals for intensive follow-up and treatment. (1) Atrial fibrillation (AF) is a major risk factor for stroke, heart failure (HF), and death.AF and HF share common risk factors and can perpetuate each other's progression; their coexistence is associated with a higher incidence of mortality, compared to that for each individual condition. (2) Although current data to support strategies of HF prevention in individuals with AF are limited, early identification of AF patients at high risk of developing HF could facilitate the evaluation of HF prevention in this population. Intensified follow-up, referral to specialized centres, rhythm management, and risk factor management all may improve the prognosis of patients with AF. (3,5)

Stroke prevention is one of the central goals in patients with AF. In comparison, HF prevention receives considerably less attention in clinical care, guidelines, and research. At present, we lack good tools to predict incident HF among patients with AF, and HF prevention is not currently a major clinical focus in this population. An easily available and generalizable risk score for incident HF in AF patients would enable clinicians to easily identify high-risk patients and implement early intervention strategies to potentially prevent HF. Moreover, it would lay the foundation to test primary preventive strategies in randomized trials. (6,8)

We aimed to estimate the prevalence of Heart Failure , and to identify associated factors.

METHODOLOGY

Study Design

Community based cross-sectional study

Study Period

September 2019 to March 2023

Selection Criteria: Randomly selected population from Trivandrum District using multi-stage cluster sampling.

Study Setting

Our study was a follow up study, which was aimed to detect the outcome of patients with atrial fibrillation identified by Trivandrum atrial fibrillation study. In Trivandrum atrial fibrillation study, which was a community-based study they identified the atrial fibrillation prevalence to be 0.92% in the community. The Trivandrum Atrial fibrillation study started from September 2019 and started identifying patients with atrial fibrillation from that period itself. The collected data was available and kept in our hospital registry and the study completed in April 2022.So our aim was to follow up patients identified in that study, with atrial fibrillation. So, we have to collect data retrospectively from hospital registry as well as from patients during follow up after obtaining consent from them.

Inclusion Criteria

1. All individuals greater than 18 years of age
2. Individuals consenting for the study.

Exclusion Criteria

1. All individuals less than 18 years of age
2. Individuals not consenting to the study.

Sample Size

Sample size calculated from the parent study epidemiology, clinical profile, stroke risk of atrial fibrillation in india (AP-AF study) . Results from AP AF study by Daljeethkaur et al found that the composite outcome of patients with AF with stroke , heart failure and other clinical outcomes was found to be 19.9% in that study

Sample size is calculated by using the formula

$N= 4pq/d^2$

Were

p= prevalence from previous studies

q= 100-P

d=allowable error (5-20% of p)

p=19.9%

q= 100-19.9= 81.1%

Calculated sample size is 403.

In our basic study the patients with atrial fibrillation were 524 so we decided to follow up all the patients with heart failure according to inclusion and exclusion criteria for the study.

RESULTS

A total of 61200 patients were screened during the study period from the Heart failure registry in the department of cardiology, Trivandrum. Based on the inclusion and the exclusion criteria a total of 524 patients with Atrial Fibrillation were included in the study. The present study is a sub-study of the

Out of 524 patients included in the study the mean age of the study population was found to be 64.5 ± 6.7 with minimum age being 32 years and maximum age being 98 years. The gender distribution showed majority of the patients were males (58.01 %) as compared to females. In this study valvular AF was seen 18.1 % of the patients and non-valvular AF was seen in 81.9 % of the study population

Table 1 Baseline Characteristics

Study Characteristics		Study Population N=524
Mean Age (yrs)		64.5 ± 6.7
Min-Max (Age)		32-98 yrs
Gender	Male	304 (58.01 %)
	Female	220 (41.9 %)
Atrial Fibrillation	Valvular	95 (18.1 %)
	Non-Valvular	429 (81.9%)
	• VKA	248 (58 %)
	• NOACS	181 (42%)

Complications like CAD, heart Failure and Stroke/TIA and it was numerically seen more commonly in male as compared to female. The admission in the ICU was more in patients with stroke and TIA followed by heart failure. Mortality was seen more commonly in patients with stroke/TIA

Table 2

Complications	Male		Female		Total
Heart Failure N=146	106	20.23	40	7.63	146 (28 %)
< 40	55	10.50	5	0.95	60 (11.4 %)
41-49	30	5.73	7	1.34	37 (7.01%)
>50	21	4.01	28	5.34	49 (9.3 %)

Out of 524 patients with AF 146 (28 %) patients had Heart failure as complication in which 20.23% were males and 7.63% were females as mentioned in the table :2

DISCUSSION

The Trivandrum Heart Failure Registry (THFR) recruited consecutive patients admitted for acute HF among 16 hospitals in Trivandrum, Kerala. THFR is the first organized HF registry in India to report 4-year

outcomes of participants hospitalized for HF. Atrial fibrillation is a cardiac rhythm disorder characterized by rapid, disorganized excitation of the atria and irregular activation of the ventricles. AF is associated with a fivefold increase in stroke risk and 25%–30% stroke seen in adults are associated with this arrhythmia.The present study is am bidirectional observational study conducted in Trivandrum to evaluate the outcome of atrial fibrillation over a follow up period of 4 years. A total of 61200 patients were screened and a total 524 patients were enrolled in the study based on the inclusion and exclusion criteria.

The mean age of the study population was 64.5 ± 6.7. Studies by miyaska et al. chughssetal.have also demonstrated an increase in AF incidence after age adjustment, which is probably a reflection of comorbidities and cardiovascular risk factors, in addition to other factors such as lifestyle changes. (9,10)

The present study is the sub study of the larger study where in out of 61200 patients it was found that 524 patients had atrial fibrillation. Further evaluation showed a 28 % (146) of the patients with AF had heart failure.Our finding of an overall association of AF with incident HF events is consistent with multiple prior studies of various populations.(11)

While individuals with AF may represent a population at higher risk for HF, little research has focused on how the pathophysiology of AF could also contribute to separate associations between AF and HFrEF and HFpEF. In our present substudy it was seen that 60 patients had HFrEF followed HFmrEF and HFpEF also a prevalence amongst the male population was seen in this study. (12) There was no association of AF with HFpEF events was observed in men in Models 2–4 is consistent with established sex differences in the epidemiology of HFpEF as per Dhingra et al study. (13)

CONCLUSION

In conclusion, AF was associated with all HF, HFrEF, and HFpEF events, and there was no significant difference in the associations of AF with incident HFrEF vs. HFpEF events. This suggests that AF increases risk for each of these primary subtypes to a similar magnitude.Further basic and translational research is needed to differentiate the mechanisms underlying the separate associations of AF with HFrEF and HFpEF.

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