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Original Article

Clinical presentation, management, and outcomes in the Indian Heart Rhythm Society-Atrial Fibrillation (IHRS-AF) registry

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ABSTRACT

Aim: A national atrial fibrillation (AF) registry was conducted under the aegis of the Indian Heart Rhythm Society (IHRS), to capture epidemiological data-type of AF, clinical presentation and comorbidities, current treatment practices, and 1-year follow-up outcomes.

Methods: A total of 1537 patients were enrolled from 24 sites in India in the IHRS-AF registry from July 2011 to August 2012. Their baseline characteristics and follow-up data were recorded in case report forms and subsequently analyzed.

Results: The average age of Indian AF patients was 54.7 years. There was a marginal female preponderance – 51.5% females and 48.5% males. At baseline, 20.4% had paroxysmal AF; 33% had persistent AF; 35.1% had permanent AF and 11% had first AF episode. At one-year follow-up, 45.6% patients had permanent AF.

Rheumatic valvular heart disease (RHD) was present in 47.6% of patients. Hypertension, heart failure, coronary artery disease, and diabetes were seen in 31.4%, 18.7%, 16.2%, and 16.1%, respectively.

Rate control was the strategy used in 75.2% patients, digoxin and beta-blockers being the most frequently prescribed rate-control drugs. Oral anticoagulation (OAC) drugs were used in 70% of patients. The annual mortality was 6.5%, hospitalization 8%, and incidence of stroke 1%.

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Conclusions: In India, AF patients are younger and RHD is still the most frequent etiology. Almost two-third of the patients have persistent/permanent AF. At one-year follow-up, there is a significant mortality and morbidity in AF patients in India.

1. Introduction

Atrial fibrillation (AF) is the most common sustained and serious cardiac rhythm abnormality and is responsible for substantial morbidity and mortality in the general population.[1] AF is often seen in conjunction with cardiovascular disease, hypertension, diabetes, and obesity, and also as an isolated arrhythmia.[1,2] Atrial fibrillation patients have a higher mortality, especially in presence of multiple comorbidities; it affects quality of life and frequently leads to emergency room visits and hospitalizations. Presently, the management of AF includes assessment of thromboembolic risk and stroke prevention, symptom management utilizing appropriate rate-control or rhythm-control strategies, and treating associated diseases.[1–4]

There have been several studies evaluating the epidemiology of AF in Western countries.[5–8] In India, AF is a growing public health problem in the context of the epidemiologic transition from communicable to noncommunicable diseases. The effect of AF on mortality and morbidity is likely to be substantial and increases the economic burden. However, contemporary data on AF and its outcomes are lacking from India. The use of anticoagulant and its monitoring are major challenges for healthcare system in India due to lack of accessibility to the monitoring test, lack of compliance by patients, and interactions with diet and medicines. The IHRS initiated a prospective AF registry, to characterize the epidemiology and type of AF in India, its clinical presentation, management, and outcomes.

2. Methods

2.1. Registry design

The IHRS-AF registry is an observational, multicentric, national prospective study of men and women with AF in India. This national registry was developed under the aegis of the IHRS and was conducted across 24 sites, in 12 cities from India (Fig. 1). The investigator in each of the center was an electrophysiologist or practicing cardiologist and patients recruited were either from outpatient clinic or admitted for atrial fibrillation. The registry started in July 2011 with a follow-up for each patient at 6 months and 1 year from baseline evaluation. A total of 1537 patients were enrolled from July 2011 to August 2012 and evaluated. To minimize the risk of recruitment bias, the registry aimed for consecutive patient recruitment at each site. At baseline, available data were collected based on the following points: patient demographics, medical history, type of AF, date and method of diagnosis, symptoms, and treatment decisions. The following additional information was collected during the baseline visit: past treatments, changes in treatments, past INR values, dates of monitoring, and past events. Follow-up data collection took place

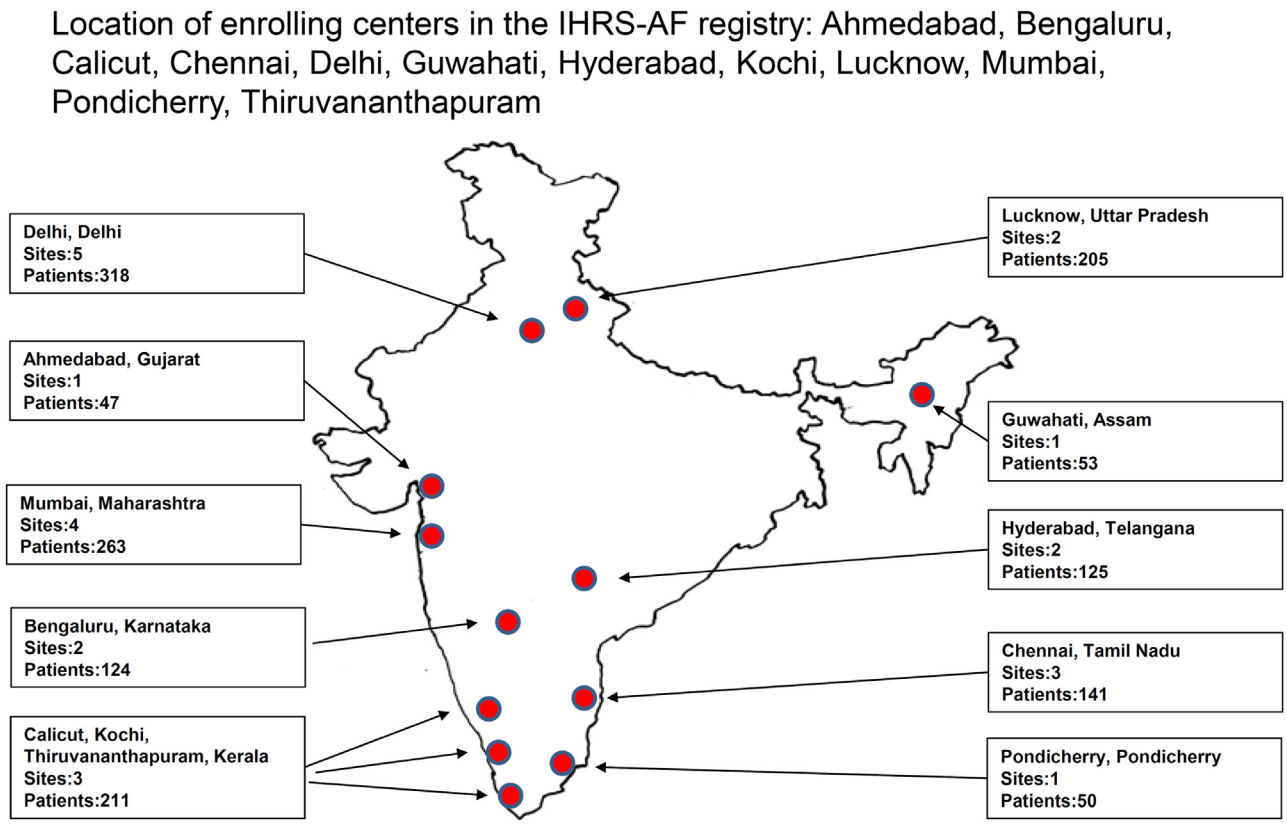

Fig. 1. Location of enrolling centers in the IHRS-AF registry.

at 6 and 12 months by inperson visit at the recruitment site, with the aim of documenting all clinical events and treatment. Outcome data included hospitalization, stroke, interventions, bleeding complications, and death. Bleeding complication was recorded as major (if hospitalization or blood transfusion was necessary) or minor (if only adjustment of anticoagulant dose was necessary). In case of no follow-up at scheduled time, a telephonic reason for no follow-up and outcome event if any was recorded.

Independent ethics committee and hospital-based institutional review board approvals were obtained, as necessary, for the registry protocol. All patients were provided written informed consent to participate. As an observational registry, no specific treatments, tests, or procedures were mandated or withheld from the patients, and patients were free to withdraw from the registry at any time. Data were summarized in subgroups using measures of central tendency and dispersion, number of patients for continuous data, and as count and percentage for categorical data.

3. Results

The IHRS-AF registry enrolled 1537 patients with AF across 24 sites in India. These patients were followed with a 6-month and 12-month follow-up visit. Of the 1537 patients enrolled at baseline, 1399 patients (91.02%) were assessed during their 6-monthly, follow-up visit and 1375 patients (89.45%) were assessed during their 12-monthly, follow-up visit. The baseline characteristics of these AF patients are detailed in Table 1. The mean age of the entire cohort of AF patients was 54.7 ± 15.9 years (range 18–96 years). There was a marginal female preponderance – 51.5% females and 48.5% males. Rheumatic heart disease (RHD) was present in 47.6% of patients. Hypertension was noted in 31.4%; heart failure in 18.7%; diabetes in 16.1% and coronary artery disease in 16.2% patients.

At baseline visit, 20.4% of the patients were diagnosed to have paroxysmal AF while 33.0% and 35.1% had persistent and permanent AF, respectively. 11% had presented with first episode of AF. At one-year follow-up, 45.6% patients were in permanent AF; 10.5% and 20.3% continued to have paroxysmal and persistent AF, respectively and 22.6% patients had no further AF (Fig. 2).

In this IHRS-AF registry, rate-control strategy was adopted in 75.25% of the patients. Rate control as defined by a resting heart rate <90 bpm was achieved in 66% of the patients at 1-year follow-up. The antiarrhythmic drugs used were digoxin (27%), beta-blockers (21%), calcium channel blockers (15%), amiodarone (17%), and sotalol (1%). Of the patients assigned to rate-control drugs, approximately 3% switched to rhythm-control strategy on follow-up and approximately 20% of the patients assigned to rhythm control switched to rate control on follow-up. At one-year follow-up, rate-control strategy was assigned to 79% patients.

The stroke prevention strategy was oral anticoagulation (warfarin or acenocoumarin) in 70% patients and antiplatelets (aspirin or clopidogrel) in the remaining 30% patients. Of the RHD patients, 83% received oral anticoagulants. The $CHADS_2$ scoring in the non-RHD patients was 0 in 11.6%; 1 in 19.9%; 2 in 21.2% and more than 3 in 47.3%. The bleeding risk as evaluated by the HAS-BLED score was 0 in 17.1%; 1 in 33.3%; 2 in 18.9% and more than 3 in 30.7% patients. In the non-RHD AF patients, 53.5% were prescribed oral anticoagulants. The proportion of patients on oral anticoagulants was comparable to patients with paroxysmal, persistent and permanent AF.

At one-year follow-up, 16 (1.03%) patients had stroke. Of these 16 patients, 15 were on oral anticoagulants with a mean INR of 1.85. Eight patients had ischemic stroke and 6 patients had hemorrhagic stroke (type of stroke undetermined in 2 patients). Four patients died of stroke (25% mortality).

In the one-year follow-up, 43 (2.70%) patients had bleeding complications. 40 patients were on oral anticoagulants with a mean INR of 1.71. Thirty patients had minor bleeding complications and 13 patients (0.85%) had major bleeding complications, i.e. requiring hospitalization or blood transfusion.

The all-cause mortality rate was 6.5% (100 patients) at one-year follow-up. The common causes of death were heart failure (35%), myocardial infarction (14%), sudden cardiac death (12%), stroke (4%), and noncardiac causes (12%) (Table 2). The rate of hospitalization was 8% (with 123 hospitalization events in 109 patients) during the 1-year follow-up period. The causes of hospitalization (Table 3) were stroke (13%), angina needing coronary interventions (13%), symptomatic heart failure (10%),

Table 1
Description of baseline characteristics of 1537 patients enrolled in the IHRS-AF registry.

Baseline characteristics	Values (measures of central tendency, dispersion, and range)
Age, years	
Mean ± SD, min–max	54.7 ± 15.9, 15–96 years
Median, 25th–75th	55, 42–67 years
Gender	
Men	746 (48.5%)
Females	791 (51.5%)
Medical history, N (%)	
Known history of AF	904 (58.8)
Rheumatic valvular heart disease	732 (47.6)
Hypertension	482 (31.4)
Heart failure	288 (18.7)
Diabetes mellitus	248 (16.1)
Other	163 (10.6)
Stroke/transient ischemic attack/thromboembolism	141 (9.17)
Hyperlipidemia	131 (8.52)
Cardiomyopathy	126 (8.19)
Thyroid disease	120 (7.8)
COPD/lung disease	120 (7.8)
Old Infarction	83 (5.4)
Nonrheumatic valvular heart disease	83 (5.4)
Renal failure	70 (4.55)
Sick sinus syndrome	68 (4.42)
Angina	60 (3.9)
Bleeding	49 (3.2)
Atrial septal defect/congenital heart disease	28 (1.8)
Obstructive sleep apnea	31 (2.01)
Family has AF history	26 (1.7)
Peripheral vascular disease	18 (1.1)
Procedures, N (%)	
Valve replacement surgery	187 (12.2)
Previous percutaneous coronary intervention/coronary artery bypass grafting	106 (6.9)
Medications, N (%)	
Aspirin	354 (23.0)
Clopidogrel	202 (13.1)
Other antiplatelets	9 (0.6)
Combination of antiplatelets	31 (2.02)
Warfarin	637 (41.4)
Acenocoumarin	439 (28.6)
Other oral anticoagulants	60 (3.9)
$CHADS_2$ score, N (%) (excluding patients with rheumatic valvular heart diseases)	787 (100)
0	91 (11.6)
1	157 (19.9)
2	167 (21.2)
3	372 (47.3)
HAS-BLED score, *N* (%)	
0	259 (17.1)
1	505 (33.3)
2	286 (18.9)
≥3	466 (30.7)

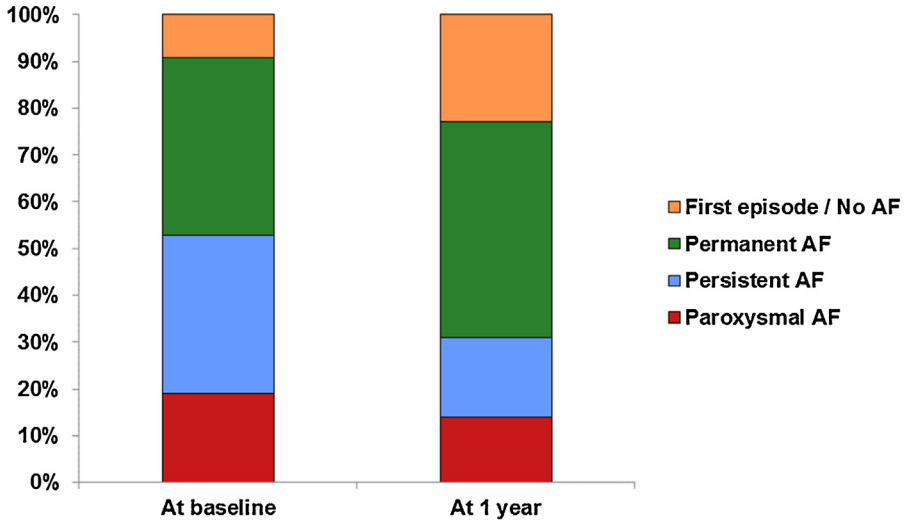

Fig. 2. Difference in each atrial fibrillation type from baseline to 12-month follow-up visit.

Table 2
Causes of death identified in the 100 patients who died during the 1-year follow-up period in the IHRS-AF registry.

Identified cause of death	Number of deaths
Heart failure	35
Myocardial infarction	14
Sudden cardiac death	14
Stroke	5
Noncardiac	12
	Noncardiac causes: Respiratory infection/disease – 5 Accident/suicide – 3 Renal failure – 2 Cancer – 2
Unknown	20
Total	100

Table 3
Reasons for 123 hospitalizations in 109 patients who were hospitalized during the 1-year follow-up period in the IHRS-AF registry.

Reason for hospitalization	Number of hospitalizations
Heart failure	12
Fast VR	10
Angina and coronary interventions	16
Valvular interventions	12
Cardioversion	5
Ventricular arrhythmias	4
Stroke	16
Digoxin toxicity	1
Noncardiovascular reasons	47
Total	123

valvular interventions (10%), fast ventricular rate (9%), and cardioversion (4%) (Table 3).

4. Discussion

The IHRS-AF registry is the largest evaluation of the clinical presentation, management, and outcomes in patients with AF in India. The IHRS-AF registry reveals that the Indian AF patients are more than a decade younger than the AF patients in the western world.[9] Also, the proportion of AF patients with RHD was significantly higher in India (47.6%).[10] There was not a significant difference between the mean age of patients without and with RHD (55.6 vs 53.6 years). The relatively younger age of Indian AF patients is therefore not primarily determined by RHD. In fact, it appears that a higher prevalence of hypertension, diabetes, and coronary artery disease in the young in India[11] is responsible/associated with younger AF patients.

Two-thirds of Indian AF patients were either persistent or permanent type of AF. This trend is unlike the western AF population. Chronicity of AF in India patients seems related to the higher prevalence of RHD. Over one-year follow-up, more patients progressed from paroxysmal and persistent variety to permanent AF (46%).

The predominant strategy of rate control for AF is understandable with a higher prevalence of RHD and more persistent/permanent AF. At one year, almost 80% patients were assigned to rate control. Resting heart rate of <90 bpm was achievable in only two-thirds of the patients at one-year follow-up. Nonavailability of class IC antiarrhythmic drugs like propafenone and flecainide during the study period (2011–2012) led to predominant use of amiodarone as the rhythm-control drug.

The overall use of anticoagulants was 70%, reasonable when compared to other nations. In RHD patients, the utilization of anticoagulants was better at 83%. Vast majority of the non-RHD patients had a high $CHADS_2$ score (2 or more in 68.5%). There was a tendency to under anticoagulate, as the average INR of the entire cohort over one year was 1.8.

The stroke rate was 1%/year and this is comparable to the reported literature, especially with higher RHD patients and $CHADS_2$ score. Stroke was the reason for hospitalization in 13% patients. Eight patients had ischemic stroke and 6 had hemorrhagic stroke. Four of the 16 stroke patients died, a mortality of 25%.

The major bleeds (requiring hospitalization and or blood transfusion) were less than 1%; however, all bleeding complications were seen in 43 patients (2.7%). Bleeding complications is comparable to literature reports. It was however surprising to observe that the average INR in these patients who had bleeding was low at 1.71.

The annual mortality of AF was 6.5%. This is similar to what was noted in the European AF registry[12]; however, their patients were almost two decades older than in IHRS-AF registry. The higher mortality in IHRS-AF was predominantly due to heart failure, myocardial infarction, sudden death, and stroke. Rheumatic heart disease and comorbidities such as hypertension, coronary artery disease, and diabetes probably result in higher mortality in AF.

There is likely to be some bias, as the patients in this registry are recruited from tertiary referral centers.

The annual hospitalization was 8%. Cardioversion and valvular interventions are legitimate reasons for hospitalization in the hope of improving symptoms and translating to better long-term outcome and these constituted 14%. However, heart failure and rapid ventricular rates accounted for 22% of hospitalizations. Interestingly, angina and coronary interventions were necessary in 13% of the patients requiring hospitalizations. This relatively higher incidence is likely because of higher prevalence of hypertension and diabetes in the Indian AF patients.

4.1. Study limitations

There is likely to be a selection bias in view of recruitment of patients predominantly from tertiary referral centers, managed by electrophysiologists or interventional cardiologist. The community incidence and prevalence of AF is lacking. A segregation of patients from public and private institutes might further help define the type of AF burden and guide management strategies.

5. Conclusion

In India, AF patients are younger, and RHD is widely prevalent necessitating specific treatment with respect to anticoagulation, rate control, and valvular interventions. The overall mortality and hospitalization are higher, primarily due to heart failure and stroke, which needs to be prevented and promptly treated. Measures to improve the use and monitoring of oral anticoagulation will favorably impact stroke, which is a major cause of morbidity and mortality. The current availability of class IC antiarrhythmic drugs and novel oral anticoagulants along with radiofrequency ablation in selected patients may further improve outcomes in AF patients.

Conflicts of interest

The authors have none to declare.

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