

Mini Review

Atrial Fibrillation in India: Is it a Tide Rising or a Tsunami?

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Introduction

Atrial Fibrillation (AF) is the most common sustained cardiac arrhythmia in the general population [1–3]. It affects 1-1.5% of the population in the developed world. The prevalence of AF is strongly dependent on age. Framingham Heart Study investigators estimated that the overall lifetime risk for the development of atrial fibrillation was one in four after the age of 40 years and was one in six in the same age, even in the absence of preceding heart failure or myocardial infarction [4]. Systematic global surveillance of AF is necessary for better diagnosis and management of the condition.

There is enough evidence of progressive increase in overall burden, incidence, prevalence and AF-associated mortality between 1990-2010. Possible reasons for this rise may be the availability of improved diagnostic tools for the detection of atrial fibrillation.

Recent worldwide epidemiological data have reaffirmed the fact that AF is a global epidemic and has adverse effects on long term morbidity and mortality. Patients who have been diagnosed with atrial fibrillation have a 5-fold increased risk of stroke compared to those without atrial fibrillation thus making it a public health problem [5]. Although the effect of AF on the quality of life and survival has been well documented in the western population, similar data on incidence, prevalence, etiology, mortality and morbidity in the Indian population are limited. Most of the published epidemiologic studies have focused on predominantly Caucasian populations in North America or Europe, and information pertaining to AF in the Asian population is lacking. Few sporadic observational studies, REALIZE-AF, RELY-AF studies and the IHRS-AF registry have provided the insights into the epidemiology of AF from India. This review analyses the current epidemiological data of AF in the Indian population.

Incidence and Prevalence

The overall prevalence of AF in the general population in North America and Europe is reported to be 1-2% [6,7], with the estimated prevalence rates for men and women for every 1,00,000 population as 569.5 and 359.9 respectively while the estimated incidence rates were 60.7 and 43.8 in males and females in the year 1990. Over a span of two decades, there was a steady but modest increase in the prevalence rates - 596.2 in men and 373.1 in women per 1,00,000 population,

while the incidence rates significantly increased to 77.5 and 59.5 in men and women respectively. For both men and women, prevalence and incidence of AF were disproportionately higher in developed nations compared with developing nations which may be explained by the increasing frequency of diagnosis and reporting of the AF by the physicians as well as due to the rising age and cardiovascular comorbidities in the subject population.

A significant difference in the incidence of AF in various studies has reported a lower incidence of AF in Indo-Asians and African Americans as compared with white populations [8-11].

Lip et al performed a systematic review of the epidemiology of AF in regions outside North America and Europe to obtain information on AF in nonwhite populations [12]. The prevalence of AF ranged from 0.1%-4% in community-based and 2.8%-14%, respectively in hospital-based studies. The paucity of data was particularly striking low for India as only one relatively small-scale study qualifying for inclusion in the review [13].

In a population based study of 984 healthy subjects residing in a Himalayan village, the prevalence of AF of 0.1% was reported which was quite low as compared to the western population but this study included young, healthy participants (only 6% > 65 years of age), limitation being all were from only one village in the Himalayas and were subjected to only a one time ECG. Although based on a single small study, this low prevalence of AF among Indo-Asians is consistent with data from the West Birmingham AF Project and the E-Echocardiography Heart of England Screening Study., where the prevalence of AF was lower among Indo-Asians (0.6%) as compared to the general population (2.4%) [10,11].

Age is an important risk factor for development of new onset AF. The reported annual incidence of AF in men and women in the age group of 55–64 years has been reported to be 0.003% and 0.001% respectively, which increases to 0.038 in men and 0.031 in women in the 85–94 age groups [14]. In general, the incidence of AF is 0.1% per year in the population below forty years and increases to 2% in those older than 80 years [15]. The adjusted incidence and prevalence of AF roughly doubles for each advancing decade of life and at any given age, men have a ≈50% higher incidence of AF than women. The reported prevalence of AF ranges from 0.1% among adults less than 55 years of age to 9% in those >80 years of age [16].

However Indian studies have shown that the mean age of patients with AF is nearly a decade younger than the Western cohort. Hospital data records of patients with chronic AF from Andhra Pradesh revealed a mean age of 45.4 years, with most (51%) aged < 50 years and only 16.3% older than 60 years [17]. In an observational hospital based study carried amongst indoor patients of AF in Bihar, Vidya et al reported that the mean age of the patients was 47 years and majority of patients were aged between 51-60 years (48%) [18]. Amongst 137

patients with AF from a rural background in North India, Bhardwaj reported that the mean age of patients was 51.2 years, while analysis of patients with AF presenting at a tertiary care hospital in Gujarat, revealed that most (46%) patients with AF were between the age of 31-40 years, 31% were between 41-50 years and 15% were between the age of 15-30 years [19,20].

Data from the IHRS-AF registry and the Indian subset of REALISE AF and RELY-AF study also reaffirmed these findings [21-24].

The mean age of Indian patients with AF in the REALIZE-AF study was 60 years while that in the IHRS-AF registry was 54.2 years (range 15-96) [21-23]. Analysis of the IHRS-AF data (comprising of 1532 patients with AF from 24 participating centres) further revealed that 36% patients were older than 60 years while 18% patients were < 40 years. The average age of the registry patients in RELY-AF was 65.9 years in North and South America and Western and Eastern Europe [24]. In contrast, patients in India, the Middle East, and Africa were on average \approx 10 to 12 years younger. This can be attributed to the fact that rheumatic valvular heart disease (RVHD) which is an important cause of AF amongst Indian patients is more frequent in the younger population. The CRRRAFT study which exclusively included AF patients with RHVD reported a mean age of only 38 years [25].

Data from the West in both Framingham Heart Study and Atherosclerosis Risk in Communities Study, men had a 1.5-fold greater risk of developing AF than women and the lifetime risk of developing AF after age of 40 in the Framingham cohort was reported to be 26% for men and 23% for women [26,27]. However studies from India have revealed a slightly higher female preponderance with reported male: female ratio in the range of 1:1.38, 1:1.2. And 1:1.24 [17,19,20].

While the REALIZE-AF and RELY-AF studies reported an almost equal gender distribution in the Indian subset, the IHRS-AF registry observed that 51% patients were females, again confirming the higher prevalence of AF amongst females in the Indian cohort. The female preponderance is explained by the fact that RHVD is more frequent in females and RHVD is the commonest cause of AF amongst Indian patients.

In America and Western Europe there is an almost equal distribution between paroxysmal, persistent, and permanent AF. In contrast Permanent AF is expected to be more frequent in the Indian population due to the irreversible structural remodeling of the atria seen especially in RHVD and also due to the fact that patients often present late in the course of the disease.

The reported rates of paroxysmal AF were 38%, 43% and 19.5% in the REALIZE-AF, RELY-AF and the IHRS-AF studies while permanent AF was present in 34.3%, 18.6% and 35% respectively. This discrepancy is likely due to the fact that IHRS-AF registry had a greater representation of government hospitals, with a higher proportion of patients with RHVD and established AF.

Analysis of the IHRS-AF data in Indian population provided interesting insight into the evolving patterns of AF. At baseline visit, paroxysmal, persistent and permanent AF was seen in 20%, 33% and 35% patients respectively. Amongst patients with paroxysmal AF at baseline, on a one year follow-up, permanent AF developed in 22%

and persistent AF in 10%. In the persistent AF group at baseline, 22% progressed to permanent AF at one year. Most patients with permanent AF (90%) remained in permanent AF. Of the 11% who presented with first episode of AF at baseline, one-third did not develop any further AF episodes, however 50% developed persistent AF by one year [21,22].

Conclusion

The incidence, prevalence, risk factors and economic burden of AF in Indians are different from those in Western population. Indian patients of AF are about a decade younger and have female preponderance, which could be attributed to Rheumatic valvular disease. More proportion of Indian patients has persistent/permanent AF thus representing a higher stroke risk. More registries like the IHRS-AF registry are required to document the epidemiologic data of AF in India, thus helping us in better understanding of the changing trends in patients of AF and improve care, with better prevention and management strategies.

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