Original Article

Prevalence of Atrial Fibrillation in patients attending emergency department of Shahid Gangalal National Heart Centre, Kathmandu, Nepal

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Abstract

Background and Aims: Atrial fibrillation (AF) is the most common sustained arrhythmia. This study aims to evaluate its prevalence in patients attending emergency department of tertiary care cardiac centre.
Methods: It was a prospective observational study of 1012 consecutive patients who attended emergency department of Shahid Gangalal National Heart Centre from September 2014 to November 2014. Electrocardiogram, demographic features, diagnosis and clinical presentations were reviewed.
Results: Among the 1012 patients, 553 (54.6%) were male and 459(45.4%) were female. Mean age was 52.13±17 years. A total of 140 patients (13.8%) patients had AF. The mean age of patients with AF was 55 years. The prevalence of AF was higher in female than male (19.2% Vs 9.4%). Among the Rheumatic heart disease patients, seventy percentages of them had AF. Dyspnea was the commonest symptom of patients with AF followed by palpitation.
Conclusion: The prevalence of AF in our study is higher than in western world mainly because of endemic rheumatic heart disease.

Key words: Atrial fibrillation, hypertension, rheumatic heart disease, left venticular systole dysfunction

Introduction

Atrial fibrillation (AF), the most common sustained cardiac arrhythmia encountered in clinical practice, is increasing in prevalence.1 The surface electrocardiogram characteristically demonstrates rapid atrial fibrillatory waves with changing morphology and rate and a ventricular response that is usually irregularly irregular.[1] It is a potent risk factor for ischemic stroke, increasing the risk of stroke 5-fold[2] and accounting for approximately 15% of all strokes. Symptomatic AF may also reduce quality of life, functional status, and cardiac performance.[3] The lifetime risk of developing AF is approximately 25%.[4] The prevalence of AF increases substantially with age.[5] The adjusted incidence and prevalence of AF is roughly double for each advancing decade of life, [6, 7] and, at any given age, men have an approximately 50% higher incidence of AF than women.[6] Several previous studies have reported the prevalence of AF ranging from 1.2% to 2.8% in persons aged 60 through 69 years to 7.3% to 13.7% in persons aged 80 years or older.[2,3,8,9] Among the various causes of AF, hypertension, rheumatic valvular heart disease, and congenital heart disease are the most commonly related conditions.[10, 11] Other causes include congestive heart failure, coronary artery disease, dilated, hypertrophic and restrictive cardiomyopathies and pulmonary hypertension.

There are no documented studies on prevalence of AF done in Nepal. Hence this study was conducted to evaluate the prevalence of AF in patients attending the emergency department of Shahid Gangalal National Heart Centre (SGNHC), Kathmandu, Nepal.

Methods

This was a single centre, prospective, observational study. Consecutive patients (n=1012) who attended the emergency department of SGNHC from September 2014 to November 2014 were included in this study. The study was approved by institutional review board of National Academy of Medical Sciences, Kathmandu and SGNHC. Written informed consent was obtained from the patients.

An electrocardiogram of each patient was analysed independently by two observers and the differences were solved by consensus. The presence and absence of AF and the diagnosis of each patient were noted. The demographic features of all patients and presenting symptoms of patients with AF were also recorded. The statistical analysis was done with SPSS version 20. Categorical data were analysed by the Chi Square test.

Descriptive statistics were computed and analysed as mean and standard deviation for continuous variables. p value less than 0.05 was taken as the level of significance at 95% confidence interval.

Result

A total of 1012 consecutive patients were evaluated. Among them 553 (54.6%) were male and 459 (45.4%) were female. The age of patients ranged from 10 – 97 years with the mean age of 52.13±17.81 years. Among the patients, 470 (46.4%) had hypertension (HTN); 378 (37%) patients had clinical or subclinical cardiac disease; 279 (27.6%) had neither heart disease nor hypertension. Subclinical heart disease included patients with primary diagnosis of hypertension or non cardiac diagnosis with concomitant cardiac disease like asymptomatic left ventricular systolic dysfunction or mild to moderate mitral regurgitation on echocardiographic screening at the emergency department. Clinical cardiac disease includes patients with primary diagnosis of various cardiac diseases. Among 470 patients with primary diagnosis of hypertension, 115 (11.36%) patients had subclinical cardiac disease. Patients with clinical and subclinical cardiac disease included 120 (11.8%) patients with CAD, 74 (7.3%) patients with rheumatic heart disease (RHD); 54 (5.3%) patients with left ventricular systolic dysfunction, 36 (3.5%) patients with non rheumatic mitral valve disease, 30 (2.9%) patients with aortic valve disease; 24 (2.3%) patients with cor pulmonale, 19 (1.8%) patients who had undergone mitral valve replacement, 15 (1.4%) patients with congenital heart disease and 3 patients each with constrictive pericarditis and post-permanent pacemaker insertion. A total of 104 (10%) patients were diabetic.

Altogether 140 (13.8%) patients had AF. The age of patients with AF ranged from 17 – 90 years with the mean age of 56.06 ±18.08 years. Out of them, 68 (48.5%) had permanent AF, 48 (34%) had persistent AF, 16 (11.4%) had first time detected AF, 8 (5.71%) had paroxysmal AF. The prevalence of AF in various clinical conditions is given in Table 1. The prevalence of AF was higher in patients with clinical and subclinical cardiac disease (28%) as compared to those without hypertension and heart disease (1.43%) which was statistically significant ($p<0.05$; odds ratio 17.73, 95% CI 7.6 – 41.05). AF was more prevalent among females than males (19.2% vs 9.4%; $p<0.05$; odds ratio 2.039; CI 1.48 – 2.80). Prevalence of AF in hypertensive patients was 5.95% which was significantly higher ($p< 0.05$; odds ratio 2.88, CI 1.17 – 7.05) than in those without HTN (1.43%). The study showed increasing prevalence of AF with age. The prevalence of AF above 60 years and between 10 and 60 years was 18% and 11.7%, respectively ($p = 0.0087$). Age distribution of atrial fibrillation is shown in Table 2. Table 3 shows the burden of AF in the various clinical conditions in the study population.

Table 1. Prevalence of AF (n=140)

Clinical Condition	%	P-value
Rheumatic heart disease	70.27	<0.01
Mitral stenosis	70.00	<0.01
Mitral regurgitation	66.66	<0.01
Mitral stenosis + regurgitation	76.92	<0.01
Hypertension	5.95	0.017
LV systolic dysfunction	27.77	<0.01
Post MVR	68.42	<0.01
Non rheumatic mitral disease	19.44	<0.01
Diabetes mellitus	6.73	0.04
COPD cor pulmonale	16.66	<0.01
CAD	3.33	0.49
Non cardiac non HTN patients	1.43	1.00
Congenital heart disease	20.00	0.01
Aortic valve disease	6.66	0.17
Electrocution		

Table 2 Prevalence of AF according to age group (n=140)

Age	Patient with AFb	Total patient	%
10 – 20	4	32	11.11
21 – 30	12	89	11.88
31 – 40	16	138	10.38
41 – 50	24	168	12.50
51 – 60	24	172	12.24
61 – 70	23	122	15.86
71 – 80	27	109	19.85
>80	10	42	19.23

Table 3. Burden of AF according to diagnosis (n=140)

Diagnosis	AF n (% of total AF)
Rheumatic heart disease	52 (37.14)
Mitral stenosis	28(20.00)
Mitral regurgitation	14(10.00)
Mitral stenosis + regurgitation	10(7.14)
Hypertension	28(20.00)
LV systolic dysfunction	15(10.71)
Post MVR	13(9.28)
Non rheumatic mitral disease	7(5.00)
Diabetes mellitus	7(5.00)
COPD cor pulmonale	4(2.85)
CAD	4(2.85)
Non cardiac non HTN patients	4(2.85)
Congenital heart disease	3(2.14)
Aortic valve disease	2(1.42)
Electrocution	1(0.71)

The prevalence of AF in rheumatic mitral stenosis, rheumatic mitral regurgitation and combined rheumatic mitral stenosis and regurgitation were 70%, 66% and 76%, respectively. There were 19 mitral valve replacement patients with 68% having AF. The prevalence of AF in patients with type 2 diabetes and coronary artery disease was found to be 7% (p = 0.046) and 3.3% (p = 0.49), respectively.

Among patients with AF, the most common symptom observed on presentation was dyspnea 67 (48%) followed by palpitations 46 (33%), stroke/transient ischemic attack (10%) and peripheral oedema (3%). 16 percent patients presented with symptoms unrelated to AF. One of the patients was asymptomatic.

Discussion

AF is the most common sustained arrhythmia. There is a five-fold increased risk of stroke and three-fold increased risk of heart failure with AF, resulting in overall a higher morbidity and mortality[12]. This study evaluated the prevalence of atrial fibrillation in patients attending the emergency department of a tertiary cardiac care centre. The overall prevalence of AF in our study was 140 (13.8 %) patients.

Previous studies on prevalence of AF were of two basic types: population based and hospital based. The population based studies, used data from periodic checkups reflect general population. The first major population based studies were Western Australia Study[9], The Rochester Study[13], The Framingham Study8, The Cardiovascular Health Study[3]. Based on these four studies, Feinberg et al[5] reported the prevalence of AF to be 0.89% in United States in 1991. The prevalence of AF in hospital based studies was higher than the population based studies. Among patients attending general hospital, the prevalence of AF was 2.5% in Japan[14]. The prevalence of AF was 10.4% in 1637 acutely ill patients admitted to Auckland Hospital in 1999.[15] In the 50,000 consecutive patients of the Heart Station in Michael Reese Hospital[16], the prevalence of AF was 11.7%. The Hokkaido Atrial Fibrillation study group[17] found the prevalence of AF 14% in 20,000 patients visiting cardiovascular clinics in 13 hospitals in Hokkaido, Japan in 2000.

The majority of previous studies have shown a higher prevalence of AF in males compared to females. The Framingham Heart Study showed that men have a 1.5 times greater risk of developing AF than women[6]. In our study, 19.2% female had AF compared to 9.4% of males. This reflected a higher prevalence of RHD in females of 72% (n=61). Similar female dominance is seen in Indian Heart Rhythm Society Atrial Fibrillation (IHRS AF) registry with female occupied 51% of patients with AF.[18]

The mean age of patients with AF in our study was 56.09+18.04 years. In Indian cohort of REALIZE AF[19] study and in the IHRS AF[18] registry, the average age was 60 and 54 respectively. The average age of AF patients in Nepalese and Indian patients was a decade younger than the western studies. The mean age of patients with rheumatic valvular heart disease and AF was 40 years in our study. The mean age of patients with rheumatic valvular heart disease and AF in the CRAFT study20 was 38 years.

RHD is endemic in Asia, Africa, South America and Middle East.[21] Our study included 74 (7.3%) patients of RHD with prevalence of AF of 70%. AF in RHD contributed to 37.14% of total AF burden in our study. Echocardiographic evaluation of 137 consecutive patients with AF in a tertiary care centre from north India showed that 61.31% of AF was caused by RHD[22]. RHD, particularly with mitral valve disease, results in increased atrial chamber pressures, atrial stretch, increased atrial size, atrial muscle disruption, and fibrosis. Myocardial stretch slows conduction velocity, shortens refractory periods, increases the dispersion of refractoriness, and stimulates ectopic excitations, all lead to intra-atrial re-entry and fibrillation.

Left ventricular systolic dysfunction accounted for 54(5.3%) of total patients evaluated with 27.7% prevalence of AF. A population based study of people >65 years from the United States of America showed a prevalence of AF in patients with cardiovascular disease of 9.1% and in patients without cardiovascular disease of 1.6%.[3] AF occurs in about 10% of patients with NYHA class I or class II heart failure and in about 50% of patients with class IV.[23]

A total of 470(46.4%) patients in our study had HTN with 5.95% prevalence of AF. HTN was the underlying disease in 20% of patients with AF. In the Framingham heart study, HTN and diabetes increased the risk of AF by 1.5 fold.24 HTN was present in 59.1% of patients with AF in J-RHYTHM registry.[25] The prevalence of AF in diabetes and CAD was 7% (p=0.046) and 3.3 %(p=0.49) respectively.

The present study is not free of limitations despite being the first prevalence study. It is relatively a small study. Being a hospital based study; it doesn't truly reflect the population prevalence.

Conclusion

The prevalence of AF was found to be high in a population with endemic RHD. Management of patients with AF to decrease morbidity and mortality is very important. Prevention strategies should focus on reducing RHD, appropriate treatment of HTN and left ventricular systolic dysfunction.

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Cite this article as: Krishna Prasad Adhikari, Rabi Malla,Deepak Limbu, et al. Prevalence of Atrial Fibrillation in patients attending emergency department of Shahid Gangalal National Heart Centre, Kathmandu, Nepal. Nepalese Heart Journal 2016; 13 (1): 1-4.

