Original Article

Clinical profile of atrial fibrillation in hospitalized patients: experience from two tertiary centers of Bangladesh

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ABSTRACT

Background: *Chronic rheumatic heart disease (RHD), particularly mitral stenosis, is traditionally thought to be the dominating cause of atrial fibrillation (AF) in Bangladesh. But over the past decades, parallel to the changes in dominating disease pattern, rheumatic fever and possibly RHD has declined in the country. Also, the current practice of anticoagulation in AF here is not known. The study was carried out to explore the current aetiology and clinical profile of AF in hospitalized patients.*

Methods: *This cross-sectional study included 302 consecutive adult patients with AF admitted in 2 hospitals in Dhaka, Bangladesh. History, clinical examination and investigations including transthoracic echocardiography were done to find out the aetiology, type of AF, selected complications and the pharmacotherapy including anticoagulation practice in hospitalized AF patients.*

Results: *The mean age of the patients was 54.00 ± 12.46 years (range 14 to 85 years). The most common etiology was rheumatic valvular heart disease (47.7%), followed by ischaemic heart disease (IHD) (29.5%) and hypertensin (5.0%). Majority (249, 82%) had coarse AF and only 18% had fine AF. Thirteen (4.3%) patients presented with stroke and 7 (2.3%) had left atrial thrombus. The most common drugs used were beta blocker (32.78%), digoxin (32.45%) and combination of beta blocker and digoxin (23.84%). Anticoagulant was used in 56.95% cases. Among the anticoagulants, warfarin was most commonly prescribed (69.18%), followed by rivaroxaban and apixaban in 15.69% and 13.95% cases, respectively.*

Conclusion: *RHD is still the dominating cause of AF in hospitalized patients in Bangladesh. Despite high prevalence of rheumatic valvular AF, anticoagulants are underused. Warfarin is far more commonly used than the direct oral anticoagulants (DOACs).*

Key words: *atrial fibrillation, rheumatic heart disease, coronary artery disease, anticoagulants, stroke, Bangladesh.*

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INTRODUCTION

Atrial fibrillation (AF) is the most common sustained arrhythmia; it increases with age and presents with a wide spectrum of symptoms and severity.[1] The estimated prevalence of AF in adults currently ranges between 2% and 4%.[2] According to the Global Burden of Disease Study 2020, globally, 50.00 million individuals had prevalent AF/atrial flutter in 2020.[3] A 2.3-fold rise is expected in the coming decades, largely owing to extended longevity of the general population and intensifying search for undiagnosed AF.[4-6] AF is associated with significant morbidly and mortality. The total number of global deaths estimated for AF/atrial flutter in 2020 was 0.33 million.[3]

AF is principally an acquired disease but rarely familial forms too have been described. Although increasing age is a prominent risk factor for AF development, a congruent increase in the burden of other comorbidities including hypertension, diabetes mellitus (DM), heart failure (HF), coronary artery disease (CAD), chronic kidney disease (CKD), obesity and obstructive sleep apnoea (OSA) plays an important role.[6-7]

There may be significant racial and geographical variation in incidence, as well as, in underlying aetiology or associated risk factors of AF. Racial variation in AF incidence is complex and not fully understood. One study of black and white individuals from the Cardiovascular Health Study (CHS) and the Atherosclerosis Risk in Communities (ARIC) study suggested that genetic markers of European ancestry were associated with an increased risk of incident AF.[8] On the other hand, in areas with a high prevalence of rheumatic heart disease (RHD), valve disease is the most common substrate for the occurrence of AF and this problem assumes greater importance because the resulting escalation in morbidity and mortality involves relatively younger population.[9] According to a recent meta-analysis, about one-third of patients with RHD (32.8%, range: 4.3%–79.9%) have AF, with an incidence which almost triples every 5 years after diagnosis.[10] In Bangladesh, the data on the incidence, prevalence, underlying risk factors or aetiology, complications and related information are sparse. Traditionally, RHD, specially mitral stenosis (MS) is thought to be the commonest cause of AF. Like many other developing countries, the prevalence of acute rheumatic fever and probably of RHD is declining in Bangladesh as well.[11]

And hence, the current contribution of RHD and consequently, the underlying aetiology and risk factors for AF in the country is unknown. The objective of the study was to determine the current aetiology of AF in hospitalized patients. Demographics, clinical presentation, pharmacotherapy including anticoagulation for AF were also observed.

METHODS

This was a cross-sectional study conducted in the 2 tertiary care hospitals from 2017 to 2019. The institutions included the National Institute of Cardiovascular Diseases (NICVD) and Sir Salimullah Medical College & Mitford Hospital (SSMC & MH), Dhaka, Bangladesh. A total of 302 consecutive patients with AF admitted in the Cardiology Unit 1 of NICVD and the Department of Cardiology of SSMC & MH were included. AF was defined on a standard 12-lead electrocardiogram (ECG) recording or a single-lead ECG tracing of e"30 seconds showing heart rhythm with no discernible repeating P waves and irregular RR intervals.[12] ECG was done with Mindray Beneheart R-12 12-Channel ECG Machine (Guangdong, China, Mainland) following standard protocol. A detailed history and clinical examination, 12-lead ECG, chest radiography and transthoracic echocardiogram (TTE) were done in all patients. Troponin I, exercise tolerance test (ETT), coronary angiography (CAG), thyroid function test, prothrombin time with international normalized ratio (INR), computed tomography (CT) scan of head or magnetic resonance imaging (MRI) of brain were done in selected patients.

The study protocol was approved by the Ethical Review Committee of NICVD. Informed consent was taken from each participant or near relatives. Statistical analysis was carried out by Statistical Package for the Social Sciences (SPSS) 25.0 (International Business Machines Corp (IBM), Armonk, New York, USA).

RESULTS

Initially 348 cases of AF were recruited; 264 from NICVD and 84 from SSMC & MH. After checking the data, 46 cases were excluded because of incompleteness. Finally, 302 patients with AF were included in the study. The mean age of the patients was 54.00 ± 12.46 years (range 14 to 85 years). Maximum incidence of AF was observed in the age group 41-60 years (71.0%) followed by 61-80 years (23.9%). Male-female ratio 1.78:1. Age and sex distribution of AF are shown in Figure 1.
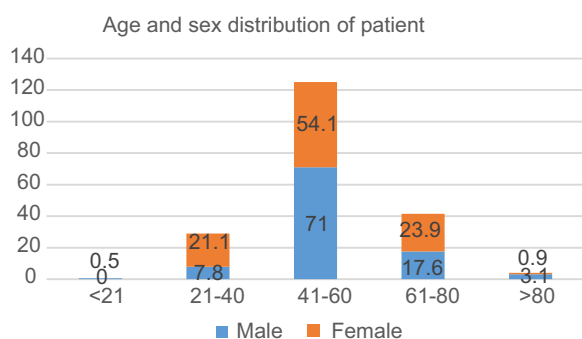
Figure 1. Age and sex distribution of patients with AF (N = 302

Common etiology of AF in this study were rheumatic valvular heart disease (VHD) (47.7%) and ischaemic heart disease (IHD) (29.5%). Hypertensin was the third most common cause of AF. (Figure 2). Rheumatic VHD was common in 41-60 years of age. IHD was the second most common etiology both in 41-60 years and 61-80 years. Loan AF was seen in elderly group mostly in 61-80 years of age.
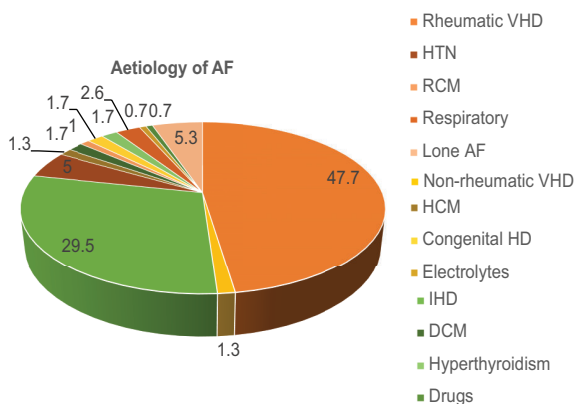

Figure 2. Aetiology of AF. (N = 302)

ECG was analyzed to classify AF into coarse and fine. Out of 302 cases, 249 (82%) had coarse AF and only 18% had fine AF. ECG findings of AF in relation to age are shown in Figure 3. Out of 302 cases, 13 presented with stroke and 7 had left atrial (LA) thrombus. Both stroke and LA thrombus were common in male.
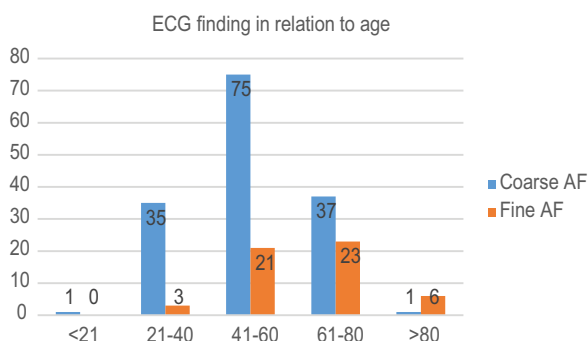

Figure 3. ECG findings of AF in relation to age. (N = 302)

The most common drugs used for AF were beta blocker (32.78%), digoxin (32.45%) and combination of beta blocker and digoxin (23.84%) (Table I).

Anticoagulant was prescribed in 56.95% cases. Most of the patients receiving anticoagulants had warfarin (119 cases, 69.18%). Regarding direct oral anticoagulants (DOACs), rivaroxaban was most commonly used (27 cases, 15.69%). Apixaban was also used in 24 cases (13.95%). Seven patients received low molecular weight heparin.

Table I. Drugs used in AF in relation to age (N = 302)

Drugs	Age distribution (%)					p value
	<21	21-40	41-60	61-80	>80	
Digoxin	0 (0)	9 (9.2)	83 (84.7)	6 (6.1)	0 (0)	
Beta blocker	1 (1.0)	10 (10.1)	68 (68.7)	20 (20.2)	0 (0)	
Amiodarone	0 (0)	0 (0)	0 (0)	2 (100)	0 (0)	
CCB	0 (0)	0 (00	2 (33.3)	3 (50)	1 (16.7)	0.001
Flecainide	0 (0)	0 (0)	0 (0)	4 (100)	0 (0)	
None	0 (0)	0 (0)	3 (14.3)	12 (57.1)	6 (28.6)	
Digoxin + Beta blocker	0 (0)	19 (26.4)	38 (52.8)	15 (20.8)	0 (0)	

Here, AF = atrial fibrillation, CCB = calcium channel blocker

DISCUSSION

The study presents some aspects of current profile of AF in hospitalized patients of Bangladesh. In this study, AF was common in age group 41-60 years (71.0%), followed by 61-80 years (23.9%). This is in contrast to the age group preponderance in western countries where, according to older data, approximately 70% of individuals with AF were between 65 and 85 years of age.[13] Only several small studies are available regarding epidemiology of AF in South Asian countries. According to these studies, AF is most prevalent in younger age group in this subcontinent, presumably due to the endemicity of RHD here.[14-16]

Regarding aetiology of AF, RHD is the dominant cause observed in this study. IHD and hypertension were responsible in 29.5% and 5.0% cases respectively. For decades, in developing country like Bangladesh and India, where prevalence of RHD is very high, the commonest cause of AF is presumed to be RHD.[17] And this is true even now despite significant transition in epidemiology of disease pattern in these countries from communicable to non-communicable diseases. RHD and IHD were responsible in 55% and 20% of AF cases, respectively in the study by Ahmed et al. carried out in India.[14] Almost 2/3rds (66.7%) of the AF cases were due to RHD, whereas 10.6% were due to IHD in another study by Jenner et al.[16] Noteworthy is that, hypertension though the third most common cause, was associated only in 5.0% cases. Non-rheumatic VHD was found in 1.3%. Lone AF was found in 5.3% cases in the present study. In western countries, the commonest aetiology of AF is IHD, hypertension and RHD contribute less.[18]

In the present study, ECG was analyzed to divide AF into coarse and fine. Out of 302 case, 249 (82%) had coarse AF, whereas less than 1/5th cases had fine AF. Coarse 'f' waves were commonly observed in age group of 41-60 years and fine AF was observed in relatively elderly population of age group 61-80 years. In the study by Ahmed et al., coarse AF was more common in AF secondary to RHD and fine AF was more common in AF secondary to non-RHD including IHD.[14] In another study, it was observed that 53% cases of AF due to RHD had ECG findings of coarse f waves and 56% of non-RHD had fine fibrillary waves.[19]

In the present study, thromboembolic manifestation like stroke was observed in 4.3% cases and was commoner in males than in females. Thromboembolism was observed in 9% of AF cases in the study by Ahmed et al.[14] Left atrial thrombus was found only in 7 (2.3%) cases detected by TEE. The prevalence of LA thrombus was 2.73% in in anticoagulated patients with AF detected by transoesophageal echocardiography (TEE) in a recently published metanalysis involving 25 studies and 14,653 patients with AF.[20]

The pattern of drug usage was studied in the present study. Digoxin was the most commonly used drug in AF. It was used alone in 32.45% and in combination with beta blocker in 23.84% of cases. This preferential use of digoxin may be due to the prevalence of RHD as the underlying cause of AF in the present study. In the study by Ahmed et al., digoxin was used in 1/4th of the AF patients.[14] The next commonly used drug was beta blocker which was used in 32.78% cases. Antiarrhythmic drugs like amiodarone or flecainide were used only in few cases. Only 56.95% cases received anticoagulants. Considering the high proportion of rheumatic valvular AF who must get anticoagulation, this is clearly far from optimal. In reality, throughout the world, a significant proportion AF patient even with high risk for thromboembolism are not anticoagulated. Up to the early 2000s, <70% of high-risk patients with AF were receiving adequate oral anticoagulation with vitamin K antagonist (VKA), i.e., warfarin.[21] Subsequently, even after introduction of direct oral anticoagulants (DOACs), up to 40%–50% of patients with AF may still not be anticoagulated.[22] In the present study, warfarin was used in majority (69.18%) of the cases receiving anticoagulation, whereas DOACs were used in 29.64% cases. This preferential use of warfarin over DOACs is presumably due to the presence of valvular AF for whom only VKA is recommended for anticoagulation at present.

Limitations

The sample size was small, comprising of only 302 cases. Only hospitalized patients were included compromising generalizability. Risk of thromboembolism by CHA_2DS_2-VASc Score was not assessed in cases of nonvalvular AF. Some of the cases of AF might be due to multiple causes, hence, ascribing a single underlying aetiology in every case may be an oversimplification. In this study, AF was not classified according to the current classification. Only TTE was done to detect LA

thrombus, using TEE might yield higher prevalence of thrombus. Also, the cases were not followed up adequately.

Conclusion

RHD is still the dominating cause of AF in hospitalized patients in Bangladesh. Most of the cases are coarse AF. Digoxin is the drug most commonly used in AF followed by beta blockers. Despite high prevalence of rheumatic valvular AF, anticoagulants are underused. Warfarin is far more commonly used than the DOACs.

Authors' contribution: AKMMI did literature search and drafted manuscript. IJS, MW, AMSR, MNI, MA, SZ collected data. MAR, MMK analyzed data. KFA collected data and drafted manuscript. All authors read and approved manuscript for submission.

Conflict of interest: Nothing to declare.

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