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ORIGINAL ARTICLE

Frequency of Atrial Fibrillation and its Complication

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ABSTRACT

Background: Evidence available on atrial fibrillation in Pakistan is not enough. Therefore, present study aims to determine frequency of atrial fibrillation and its associated complications.
Place and duration of study: This cross sectional study was conducted at Department of Medicine, at SKBZ/AK CMH Muzaffarabad (Tertiary Care Hospital Muzaffarabad AJK) from July to December, 2019.
Methodology: Total 1100 patients included for this study through non-probability consecutive sampling. Ethical approval and consent forms were taken. Patients were examined for atrial fibrillation through ECG. The patients who were confirmed as AF were detail examined and their cause and complications were noted down. Data was analyzed with SPSS version 24. One sample t test was used to predict AF in the population Chi-square test was applied. P value ≤0.05 was considered significant.
Results: Out of 1100 patients mean age of patients was 43.4±12.7 years. The male to female ratio was 11:10. The atrial fibrillation was diagnosed in 250 (22.7%). In our population, at least 20% of the patients are having issue of atrial fibrillation with p value 0.016. The percentage of AF was higher in female 40.4% as compared to male 6.9%. Similarly the percentage of AF was higher in hypertensive patients (37.8%) as compared to non-hypertensive patients (12.3%).
Conclusion: The prevalence of atrial fibrillation is moderately high in our data. Our sample results support the hypothesis that female are mostly with AF. Hence there is need to take measures to prevent them.
Keywords: Atrial fibrillation, Causes of atrial fibrillation, Complications of atrial fibrillation

INTRODUCTION

Atrial fibrillation, often called AFib or AF. Atrial fibrillation is most common supra-ventricular arrhythmia associated with stroke and cardiac function risk.An arrhythmia is when the heart beats too slowly, too fast, or in an irregular way.[1,2]Mechanism of atrial fibrillation is associated with beginning of trigger. Trigger some time play role as automatic foci of tachycardia and sometimes in form of multiple wavelets leading towards atrium (left).[3]Chaotic atrial activation occurs as a result of enhance focal automaticity. Recurrent atrial fibrillation in cardiovascular heart failure, ischemic and valvular heart diseases is associated with atrial stretch. Left atrial appendage (LAA) is major source of systemic thromboembolism in patients suffering with atrial fibrillation. LAA stasis, hypercoagulability and endothelial dysfunction is associated with atrial fibrillation >48 hours[4].

New diagnosis of atrial fibrillation is based upon presence and absence of hemodynamic instability. Presence of hemodynamic instability involves direct current cardioversion (DCCV) and initiation of anticoagulation therapy.[5] Absence of hemodynamic instability involves duration of atrial fibrillation.Duration of atrial fibrillation <48 hours involves DCCV and initiation of anticoagulation therapy while duration >48 hoursleads to full anticoagulation for 4 weeks followed by DCCV and rule out LAA thrombus followed by DCC plus initiation of anticoagulation therapy.[6] Long term management of atrial fibrillation involves quality of life improvement, rate control strategy (pharmacological and non-pharmacological intervention), Rhythm control strategy through anti-arrhythmic therapy and ablation therapy.[7]

Literature reported atrial fibrillation complications include thromboemolism, hemodynamic compromise, arrhythmogenesis, embolism and stroke. Hemodynamic complication include loss of effective atrial contraction, increases ventricular rate and irregular ventricular rhythm.[8]However, chronic atrial fibrillation is associated with sudden death in Wolf-Parkinson-White syndrome.[9] Evidence available on atrial fibrillation in Pakistan is not enough to reach any conclusion.

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Therefore, present study aims to determine frequency of atrial fibrillation and its associated complications at SKBZ/AK CMH Muzaffarabad (Tertiary Care Hospital Muzaffarabad AJK).

SUBJECTS AND METHODS

Ethical approval was taken from ethical approval board vide letter No. 20. Ethical Committee/DME/2018 dated 30-01-2018. A sample size of 1100 patients were included to assess for atrial fibrillation based on irregular pulse or ECG indicative of arrhythmia coming from different wards or from emergency. The sample size of our study is calculated on the basis of the incidence of AF in the patients who were on risk of AF which was 3.54%, absolute precision 1.1% and confidence level 95%.[10]The required sample size is 1085. We take a low absolute precision level because we also want to calculate the frequency of different causes and complications associated with AF. The patients were included in this study through non-probability consecutive sampling.

Inclusion criteria was based upon age >12 years, symptoms including palpitation, dysponea and fatigue and all the patients reporting in Emergency Department requiring anECG which was advised by the treating physician. Patients with immune-deficiency syndrome, psychiatric disorders, and mentally retarded individuals were excluded from study. All patients were undergone through medical and physical history, laboratory test, consultation of cardiology and electrocardiography (ECG). The patients were selected for the study from January 2018 to October 2018 and the confirmed patients of AF was treated with drug therapy. The patients was followed up to 12 months to observe the complication of the treatment. Descriptive statistics (Mean±SD) and frequency, percentages were calculated. Effect modifiers age, gender, diabetes mellitus and hypertension were controlled through stratification. Post stratification chi-square test was applied. P value ≤0.05 was considered significant.

RESULTS

Out of 1100 patients there were 580 (52.7%) male and remaining 520 (47.8%) were female. The male to female ratio in our sample was 1.1:1. Mean age of patients was 43.4±12.7 years. There were 580(52.7%) male and 520(47.3%) female in the study. Atrial

fibrillation was reported in 250 (22.7%) patients. The estimated percentage of AF in the concern symptomatic population is calculated through one sample t test. The result of one sample t-test shows that the incidence of AF is at least 20% in our population with p value 0.016. 125 (11.4%) patients were diabetic and 450 (40.9%) were hypertensive patients. The proportion of AF is significantly different between male and female, between hypertensive patients and non-hypertensive patients and diabetic and non-diabetic patients with p 0.000 (Table 1).

The complications are higher in percentage with atrial fibrillation and there is association between occurrence of sudden cardiac arrest, ventricular failure and thromboembolism with p 0.000 (Table 2). Further, in thromboembolism, out of total 170 positive patients, 140 (82.35%) were cerebrovascular accident, 20 (11.76%) were acute limb ischemia and the remaining 10 (5.9%) were pulmonary embolism. The Chi-square test of association showed that the percentage of atrial fibrillation was higher with thromboembolism diagnosed cases as compared to the others in which thromboembolism was negative, with p value 0.000. Common causes of atrial fibrillation were mentioned in Figure 1. The complications of patients were mentioned in Figure 2.

Figure1: Bar chart of atrial fibrillation causes

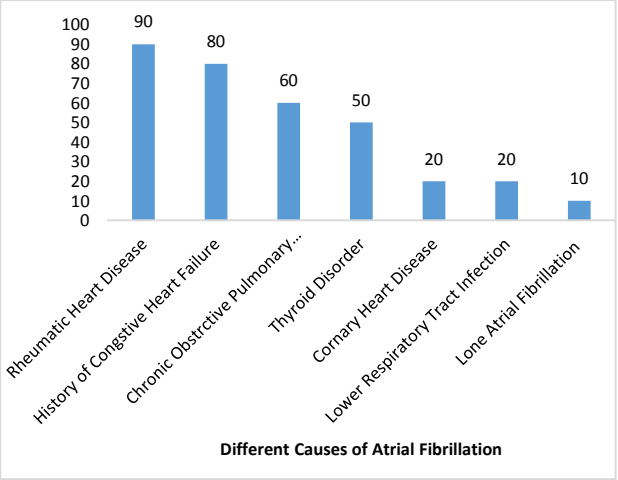


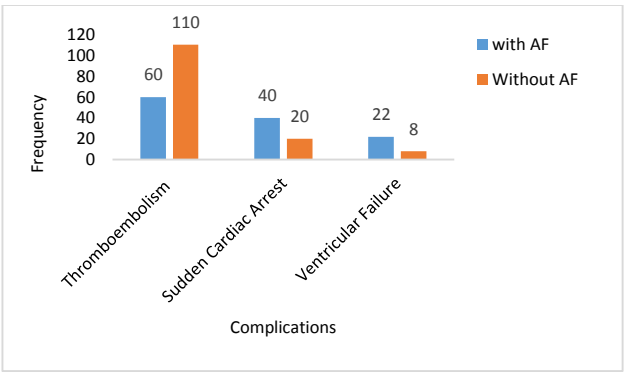
Table 1: Association between atrial fibrillation and independent variables

Independent variables	Atrial Fibrillation		P value
	No	Yes	
Age			
<45 years	310 (80.9%)	73 19.1%)	0.000
Between 45 to 60 years	240 (85.1%)	42 14.9%)	
More than 60 years	300 (69%)	135 (31%)	
Gender			
Male	540(93.1%)	40(6.9%)	0.000
female	310(59.6%)	21040.4%)	
Hypertension			
No	570 (87.7%)	80 12.3%)	0.000
Yes	280 (62.2%)	170 (37.8%)	
Diabetes			
No	739 (75.8%)	236 24.2%)	0.318
Yes	101 (80.8%)	24 (19.2%)	

Table 2: Association of AF with common complications

Complications	Categories	Atrial Fibrillationn(%)		P value
		Yes	No	
Sudden Cardiac Arrest (SCA)	Yes	40 (66.7)	20 (33.3)	0.000
	No	210 (20.2)	830(79.8)	
Ventricular Failure (VF)	Yes	22 (73.3)	8 (26.7)	0.000
	No	228 (21.3)	842 (78.7)	
Thromboembolism	Yes	60 (35.3)	110 (64.7)	0.000
	No	190 (20.4)	740 (79.6)	

Figure 2: Bar chart of different complications



DISCUSSION

Atrial fibrillation is one of very common arrhythmias worldwide. It is an extraordinarily costly and annoying health problem. To improve the patient's QoL expectancy outcome, one should aimed to address the underlying heart disease rather than restoring sinus rhythm.[11]In present study, total 1100 patients were included in study. Out of them, Atrial fibrillation was reported in 250 (22.7%) patients while 850 (77.3%) did not have atrial fibrillation. In a similar study conducted in Peshawar in 2018, the researcher included 163 patients aged more than 15 years with known acute ischemic stroke. AF was found in 33 (20.2%) patients and out of them, 25 (75.8%) were new onset stroke while other 8 (24.2%) were in recurrent stroke.[12]

In a study conducted in 2017, the researcher reveals that in Europe 1-3% population suffers from AF. The prevalence of AF is consistent across all countries of Europe. The data showed that France had the lowest incidence of stroke and mortality followed by Netherland and UK whereas Romania had higher incidence rates. The Romania's number may not portray the real picture as there was some issues of data accessibility.[13] Prevention measurements from AF was only present in UK through screening program. Similarly, prevalence of atrial fibrillation was low in Africans as compare to Caucasians (1.5% vs 2.2%).[14]

An estimated prevalence of atrial fibrillation ranges from 0.5-1%.[3]In another study researchers used smart watch based irregular pulse notification system to identify the atrial fibrillation patients. They included 419297 subjects in 8 months and 2161 (52%) of them received notification of irregular pulse. Atrial fibrillation was present in 34% whereas surprisingly atrial fibrillation was not higher 35% in aged patients as compared to the younger or adult patients.[15]

In a recent study conducted in 2020 showed that AF promotes thromboembolism. It is also proved that the prevalence and incidence of AF is increased in aged.[16]Theprevalence of AF was 7.3% in patients having aged >65 years. They also showed that this prevalence is higher in men.[17]Evidence exist that males are more prone to have atrial fibrillation as compare to female. Majority of atrial fibrillation (70%) patients belongs to age group 65-85 years.[18]Zhao et al included 170 chronic AF patients with not known coronary heart disease. They divided the patients into two groups i.e. non severe and severe based on the assessment of color of Doppler, spectral Doppler, morphologic parameters of the tricuspid valve and right side of the heart. The results showed that the severe AF patients were aged 76±10 years as compared to the non-severe AF patients having an average age of 70±11 years.[19]

In a study the researchers estimated the risk factors of AF in general population over 55 years of age. They included 4606 subjects and observed with an average duration of 9.4 years. The lifetime risk of AF after 55 years of age was 37.1% and was substantially influenced by both polygenic and clinical risk factor burden. The low polygenic and clinical risk tertiles had comparatively low lifetime risk of AF 22.3% as compare to high

tertiles having a risk of 48.2%. The lower clinical risk factor burden was associated with later AF onset.[20]

In another study, the researchers showed that race and sex are not associated with incidence of AF. Whereas income and education have significant impact and decrease incidence rate of AF with higher categories of income and education. This negative pattern was reverse for the patients having age 80 years or more.[21]In a study conducted in 2014, 14352 subjects were observed over a median follow up of 20.6 years. At the end of study 1794 (12.5%) AF cases were observed. Lower family income was associated with higher risk of AF with hazard ratio 1.45. The association of education and AF is depend upon the sex of the patient. The lowest education was associated with high risk of AF with hazard ratio 1.88 in women and 1.15 in men.[22]

In our study, the incidence of AF is significantly associated with patient's age with p value 0.000 as the prevalence of AF is higher (31%) in patients having age more than 60 years as compare to the patients having age between 45 to 60 years (14.9%) and patients having age less or equal to 45 years (19.1%). Similarly, there is strong relation between sex and incidence of AF. Out of total 250 AF cases, is higher in women in our sample. It is also said that "AF begets AF". The progression from paroxysmal to persistent AF more increasingly in the patients having silent or subclinical asymptomatic atrial fibrillation (SAF). SAF is common and have significant clinical implications. The complication of SAF was silent heart failure and early mortality.[23]

Risk of atrial fibrillation is high in patients with cardiovascular diseases as compare to patients without cardiovascular diseases (9.1% vs 1.6%)[24]. In a study, the researchers estimated the overall survival at 7 years of AF patients was 97% and multivariate analysis showed that duration of AF is the only risk factor for prediction of AF.[25]In a study conducted in 2019, the patients included in the study were assigned treatment randomly catheter ablation or drug therapy and follow up the patients around 4 years on average.The risk factors found was 80.6% with hypertension, 25.5% with diabetes, 19.2% with coronary artery disease, 10.0% with a prior stroke or transient ischemic attack, 15.3% with history of congestive heart failure.[26]In our study the incidence of AF in non-hypertensive patients was 80 out of 650 (12.3%) which is quite low as compare to the incidence of AF in hypertensive patients 170 out of 450 (378%) with p value 0.000, while the incidence of AF in non-diabetic patients 236 out of 975 (24.2%) is not different with diabetic patients having incidence of AF observed in 24 out of 125 (19.2%). Hence diabetes is not associated as risk factor of AF with p value 0.318. In our study the incidence of AF was observed more in female 210 out of 520 (40.4%) than male 40 out of 580 (6.9%). Hence there is significantly association between gender of the patient and incidence of AF with p (0.000).

In a systematic review and meta-analysis from 2006 to 2016, the researchers indicated that AF was associated with increased risk of myocardial infection with relative risk (RR) of 1.54, all-cause mortality with RR of 1.95 and heart failure with RR 4.62.[27]In another study results showed that the estimated actuarial survival rate with catheter cohort was 96.8% as compare to surgical cohort that gives 92%. Tethering height was the only risk factor for recurrent AF.[28]In our study the risk factors for AF is clearly identified as all patients having Rheumatic Heart Disease (RHD) 90 out of 90 (100%), Chronic Obstructive Pulmonary Disorder (COPD) 60 out of 60 (100%), Thyroid Disorder 50 out of 50 (100%), Coronary Heart Disease (CHD) 20 out of 20 (100%), Lower Respiratory Tract Infection (LRTI) 20 out of 20 (100%), Lone Atrial Fibrillation (LAF) 10 out of 10 (100%) have affected from AF, whereas the incidence of AF is reported having History of Congestive Heart Failure (CHF) was 28 out 80 (35%).

In present study, Thromboembolism was observedin 60 out of 250 (24%) in AF patients, Sudden Cardiac Arrest (SCA) was observed in 40 out of 250 (16%) and ventricular failure was observed in 22 out of 250 (8.8%) were significantly associated with atrial fibrillation having p (0.000) in all 3 complications. In a study included 2200 patients of AF from 126 cities, the researchers compared the cardiovascular procedures with drug therapy with respect of preventing strokes, deaths, and other complications. They conclude that after a year the patients who treated with catheter ablation showed substantial improvement in quality of life with respect of reduction in symptoms of AF.[29]In another study the researchers included 1968 confirmed patients with known risk factor of stroke. The results showed that the patients treated with catheter ablation have higher Atrial Fibrillation Effect on Quality of Life (AFEQT) as compared to the drug therapy at 12 months after treatment.[30]

CONCLUSION

Frequency of atrial fibrillation is moderately high in our data. Ventricular failure is most common complication of atrial fibrillation. Further research is required on prevention strategies of atrial fibrillation at community level.

Conflict of interest: Nil

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