



FREQUENCY OF ATRIAL FIBRILLATION IN PATIENTS WITH ACUTE ISCHEMIC STROKE

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ABSTRACT

Introduction: Acute ischemic stroke (AIS) has many preventable causes; of which atrial fibrillation (AF) is a significant issue. Varying frequencies of AF among stroke patients have been reported. The discrepancy is majorly due to hindrances in detection of intermittent and silent AF. This study aimed to determine the frequency of Atrial Fibrillation (AF) in patients presenting with acute ischemic stroke. **Objective:** To determine the frequency of atrial fibrillation in patients with acute ischemic stroke visiting peoples medical college and hospital (PMCH), Nawabshah. **Methods:** A cross-sectional, observational study was conducted in the Department of General Medicine, (Unit III) at Peoples Medical College and Hospital, Nawabshah. Study duration was from 4th Aug 2020 to 4th Feb 2021. All patients with acute ischemic stroke were included. Sociodemographic profile was documented. Occurrence of atrial fibrillation was recorded on electrocardiogram was done in these patients to reach the outcome i.e. frequency of AF. Data was entered and analyzed using SPSS v.22. **Result:** Of 183 ischemic stroke patients, there were 104 (56.8%) males and 79 (43.2%) females. Their mean age (years) was 50.19 ± 7.33 . Atrial fibrillation was seen in 45 (24.6%) patients. Most AF patients were males, older in age and had a statistically significant family history of AIS. **Conclusion:** This study concludes that AF patients are a high-risk group for developing acute ischemic stroke episodes. The incidence is higher in male gender, older population, and individuals with family history of ischemic stroke.

Key words: stroke, ischemic, atrial fibrillation, frequency

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INTRODUCTION

Atrial Fibrillation (AF) is one of the most common presentations of arrhythmia and may be seen in both – patients with a structural heart disease or those without it¹⁻³. However, patients with a preexisting cardiovascular disease (CVD) are more likely to experience AF⁴, and its incidence increases with increasing age⁵. As the population ages globally, it is estimated that 6–12 million population in the United States (US) will be affected by AF by the end of 2050 and by the end of 2060 18 million population in Europe⁶⁻⁸. Even at present, the diagnosis and course of management of AF is consuming a significant proportion of healthcare resources globally⁹. AF itself complicates into adverse clinical outcomes. AF patients are more prone to other cardiovascular events such as acute ischemic stroke (AIS). As many as one third of all AIS have underlying AF¹⁰. The risk of AIS is increased by five to six folds in AF patients¹¹. Global statistics report that the second most common cause of death and the third most common cause of disability is stroke. Sixty-eight percent of strokes are ischemic in etiology and 32% of them are hemorrhagic¹². Population based studies have estimated that the prevalence and incidence of AIS is scarce in Pakistan. According to a recent review article, Pakistan has a stroke incidence of 250/100,000 person-years and a prevalence rate of 191/1000. The study also reported age-sex standardized mortality rate to be 83.3/100,000 person-years in Pakistan¹³. Local literature supporting the high incidence of AIS in AF patients is scarce. Results from Northern Pakistan reported a higher percentage with 22-25% of AIS patients being detected with underlying AF^{14,15} as compared to Punjab were 7-10% of such cases were reported^{16,17}. These figures can be justified by limited medical resources in northern Pakistan with most population living in far-flung rural settlements miles away from tertiary care hospitals. This results a delay in seeking medical help. Zafar et al argued that the

higher prevalence in northern region may also be due to differences in their genetic makeup which requires further research¹⁸. This study aimed to assess the frequency of atrial fibrillation as the predisposing risk factor of acute ischemic stroke in Southern Pakistan.

MATERIAL AND METHODS

An observational, cross-sectional study was conducted in Department of General Medicine (Unit III) at Peoples Medical College and Hospital (PMCH), Nawabshah. The study duration was from 4th Aug 2020 to 4th Feb 2021. The study was commenced after approval from Institutional Review Committee. Non probability consecutive sampling technique was adapted. Sample size was calculated using OpenEpi Sample Size Calculator. With a 22% frequency of AF in AIS patients^[12], confidence interval 95%, and bond of error 6%, the sample size calculated was 183. Inclusion criteria included patients of both genders of age 15 to 60 years with ischemic stroke admitted within ≤ 6 hours of symptom onset, and those confirmed on CT scan brain (hypodense area). Acute ischemic stroke was defined as a focal neurological deficit of sudden onset lasting for >24 hours with evidence of cerebral infarction CT scan brain shows hypodense area suggestive of ischemic stroke. Patients with intracranial hemorrhage on CT scan brain, chronic liver disease (assessed by history, physical examination & ultrasound findings: coarse echo texture of liver, irregular margins, increased portal vein diameter > 13 mm, splenomegaly), congestive heart failure (EF $\leq 25\%$), patients taking diuretics, and patients who had already developed AF at the time of hospital admission were excluded. Pregnant patients were also not included in this study. All patients were screened for AF. It was detected on electrocardiography monitoring of patients, Absence of P waves and presence of QRS complexes with or without the presence of coarse or fine fibrils for at least 60 seconds was considered as atrial

fibrillation. Socio-demographic profile of the participants was also included. Data was entered and analyzed using SPSS v.22. Frequencies and percentages were computed for categorical variables. Mean and standard deviation (SD) was calculated for continuous variables. Post stratification chi-square test was applied for correlation. $P \leq 0.05$ was considered level of significance.

RESULTS

A total of 183 patients with ischemic stroke were selected to conduct this study. There

were 104 (56.8%) males and 79 (43.2%) females. Their mean age was 50.19 ± 7.34 years. The mean height of our sample was 1.68 ± 0.25 m and mean weight was 67.32 ± 21.57 kg. The mean BMI was 25.10 ± 5.33 kg/m². There were 61 (33.3%) with family history of ischemic stroke. Forty percent patients were known diabetics and 51% were hypertensive. All other sociodemographic variables are summarized in table 1.

Table 1: Socio-demographic profile of the participants (n=183)

Patient Characteristics		Frequency (%)
Gender	Male	104 (56.8%)
	Female	79 (46.2%)
Socio-economic status	Lower income	80 (43.7%)
	Middle income	83 (45.4%)
	Upper income	20 (10.9%)
Comorbidity	Diabetes mellitus	77 (42.1%)
	Hypertension	93 (50.8%)
Age in years	Mean \pm SD	50.19 ± 7.34
	Less than 45	54 (35.5%)
	45 or more	129 (64.5%)
Body mass index in kg/m ²	Mean \pm SD	25.11 ± 5.34
	17-25	113 (65%)
	More than 25	70 (35%)
Duration of acute ischemic stroke in hours	Mean \pm SD	4.58 ± 1.03
	4 or less	79 (41.6%)
	More than 4	104 (58.4%)
Family history of ischemic stroke		61 (33.3%)

In this study, 45 (24.6%) participants developed atrial fibrillation during the study period. AF was significantly associated with family history of ischemic stroke ($p < 0.05$) but was not significantly associated with any other sociodemographic variables (table 2).

Table 2: Correlation of atrial fibrillation with socio-demographic profile of the participants (n=183)

Patient characteristics		Atrial fibrillation		P value
		Yes n (%)	No n (%)	
Gender	Male	27 (14.8%)	72 (42.1%)	0.621
	Female	18 (9.8%)	61 (33.3%)	
Socio-economic status	Lower income	20 (10.9%)	60 (32.8%)	0.879
	Middle income	21 (11.5%)	62 (33.9%)	
	Upper income	4 (2.2%)	16 (8.7%)	
Age in years	Less than 45	12 (8.1%)	42 (27.4%)	0.695
	45 or more	33 (16.5%)	96 (48%)	
Body mass index in kg/m ²	17-25	26 (15.1%)	87 (49.9%)	0.343
	More than 25	19 (9.5%)	51 (25.5%)	
Duration of acute ischemic stroke in hours	4 or less	14 (9.1%)	65 (32.5%)	0.187
	More than 4	31 (15.5%)	73 (42.9%)	
Comorbidity	Diabetes mellitus	24 (13.1%)	53 (29%)	0.078
	Hypertension	27 (14.8%)	66 (36.1%)	0.156
Family history of ischemic stroke	Yes	21 (11.5%)	40 (21.9%)	0.029
	No	24 (13.1%)	98 (53.6%)	

DISCUSSION

The incidence of atrial fibrillation, in AIS patients, worsens the prognosis. It is also known to independently predict increased risk for recurrence of stroke and that too of greater severity and also increases the risk of embolism¹⁹. The frequency of AF in this study was 24.6% as compared to the work of Shah et al²⁰ where a frequency of 20% AF was reported in stroke patients. Alam et al¹⁷ conducted their work in Peshawar (northern Pakistan) and reported that 12% of their ACS patients developed AF. Their frequency was lower than ours. They also included patients with hemorrhagic stroke while this study particularly included patients with ACS only. Safeer et al²¹ reported that 25% of their ACS patients developed AF which is slightly higher than the frequency reported in this study. In one of the studies in Karachi, AF was reported in 41 % of the elderly patients of stroke whereas a study conducted in Azad Kashmir reported AF in 11% cases of ischemic stroke aged 45 years and above^{22,23}. In Friberg et al., AF was noted in 28% patients with ischemic stroke²⁴.

Most of the local literature comprises a small sample size contrary to the published literature from the West. A population-based study was conducted by Marini and colleagues²⁵ with 3530 ACS patients the frequency of AF was 25%. Their results are slightly higher than ours. It may be explained by a higher mean age – 78.8 years – of the sample in this study as it is reported that the incidence of AF also increases as the age increase²⁵⁻²⁷. Copenhagen Stroke Study was conducted with 1197 ACS and AF was diagnosed in 18%^[28]. In a Japanese study with 15,000+ ACS patients w AF was diagnosed in 21%²⁹. Literature from the Western world depict that AF-associated stroke is most common in in North America (35%) and Europe (33%) and lowest in Latin America (17%)³⁰.

A population based study which reported 24% of ACS patients developing AF, it was also reported that AF developed more commonly in female patients and patients

of age ≥ 80 years³¹. In this study among 45 patients (24.6%) with AF, 14.8% were males while 9.8% were females as compared to Shah et al²⁰ where 48.5% AF patients were men while 51.5% were women.

Increased atrial fibrillation frequency in our sample can be explained by limited awareness of the disease and restricted availability of health services for our poor population which results in delay in health seeking. Furthermore, not all AF patients have cardiac embolus as the etiology of ACS. Other determinants include underlying diabetes mellitus, hypertension, and vascular disease which significantly increase the risk of atrial fibrillation.³²⁻³⁴

This study is critical in reporting the high frequency of ischemic stroke in AF patients from south of Pakistan. Its results intimate a need to ensure appropriate anticoagulation in these patients to prevent ischemic events. However, the study is limited by its small sample size. Further studies with robust designs, especially longitudinal cohorts, to establish a cause and effect relationship between AF and AIS are essential.

CONCLUSION

Patients with atrial fibrillation are high-risk group for developing ischemic stroke episodes. The incidence is higher in male gender, older population, and individuals with family history of ischemic stroke. Early intervention with anticoagulation and appropriate patient and family education are essential to protect this vulnerable group and prevent ischemic episodes.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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CONFLICT OF INTEREST: No competing interest declared.

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