

**Original article**

**The Frequency of Ischemic Stroke Associated with Atrial Fibrillation at a Tertiary Care Hospital**

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**Abstract**

Acute ischemic stroke is most commonly associated with atrial fibrillation. However, its prognostic impact on patients with acute cerebrovascular accidents is not fully clarified. Stroke associated with AF is associated with the worst outcome as compared to without atrial fibrillation. Atrial fibrillation is present in 20–30% of patients affected by stroke. Also, in Pakistan the prevalence of atrial fibrillation with ischemic stroke patients is still unknown. **Objective:** To determine the association of atrial fibrillation with acute ischemic stroke. **Material & methods:** This cross-sectional analytical study was conducted at Neurology ward of Aga Khan University Hospital, Karachi, over eight months from 19th May 2020 to 18th December 2020. A total of two hundred sixteen patients who were admitted with the diagnosis of ischemic stroke were included in the study. **Results:** The 216 patients with first-ever acute ischemic stroke for more than 24 hours, age range between 30 and 80 years, both male and female were included in the study. The mean systolic blood pressure SBP and diastolic blood pressure DBP was 132.64±17.68 & 84.45±15.01 & mean duration of diabetes mellitus in new onset ischemic stroke patients was 11.1±6.61years male outnumbered females, with 78(36%) women and 138(64%) men. **Conclusion:** In summary, it was found that incidence of atrial fibrillation with ischemic stroke is most common among Pakistani population.

**Keywords:** Atrial fibrillation; Stroke; Oral anticoagulation; Transient ischemic attack; Thromboembolism

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**Introduction:**

Cerebrovascular accident (Stroke) is the second most common cause of mortality worldwide. In developing countries, 66 % of deaths occur due to AF, this can lead to more than six million deaths annually<sup>1</sup>. WHO gauges that acute ischemic stroke will continue to be the second driving cause of death in developed and developing countries until 2020 and the third frequent cause of reduced disability-adjusted life annually around the world after ischemic heart disease (IHD)<sup>2, 3</sup>. Roughly 77 % of

patients have acute ischemic strokes and about 10-30 % of survivals will have a second stroke within five years with acute mortality in a few cases after the second stroke up to 70 %. At last, more than 25 % of acute ischemic stroke survivors are older than 65 years of age<sup>4</sup>. It has been notified that patients with AF have higher mortality compared to sufferers without AF, with rates between 30.5 and 63.0% at 12 months after stroke<sup>5, 6</sup>. The ischemic stroke can occur at any age but it is more common particularly in older age<sup>7</sup>. Atrial fibrillation is considered to be a major

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hazard for ischemic stroke, in particular to elderly patients<sup>8,9</sup>. However, very few studies are made on its impact on the outcome of stroke.<sup>10</sup> In Pakistan, atrial fibrillation was taken note of in 22% and 25% of patients enduring stroke<sup>10</sup>. Case studies from China has reported forty percent of atrial fibrillation in acute ischemic stroke patients<sup>11</sup>. Another study from China, reported eleven percentage of cases with CVA (infarct) having atrial fibrillation<sup>12</sup>. According to research published in 2012 by Durrani, K. and Rasheed, M., a total of four hundred and fifty-eight patients with stroke were recruited, among them atrial fibrillation was observed in 189 out of 458 patients (41.48%) with ischemic stroke<sup>13</sup>. Study based on AF in Ischemic CVA by Saposnik, G., et al. in 2013, among 12,686 participants suffering from acute stroke, Atrial fibrillation was recorded in 2185 (17.2%), respectively<sup>14</sup>. After an intensive literature search, just a few research discovered on the prevalence of atrial fibrillation. This makes a study motive to conduct such a study in Pakistani population. Based in this rules might be advanced to reduce this hassle which in the end will decrease hospital stay and clinical expenses. Moreover, the frequency of recurrent episodes of atrial fibrillation in ischemic stroke patients of Pakistani populace continues to be unknown. Early diagnosis of AF in symptomatic patients as early as possible will provide help to enhance the quality of life of our patients and have the best chance for successful treatment.

#### **Material and methods:**

This cross-sectional analytical study was performed at Neurology ward of Aga Khan University Hospital Karachi. Duration of study was eight months, from 19th May 2020 to 18th December 2020. For calculation of sample size, 95% significance level [1-alpha], level of significance (5%), the frequency of atrial fibrillation in CVA was founded in 17.2% taking 5% desired precision. Two hundred and sixteen patients were participated in this study. The software of W.H.O was used to calculate sample size. Sampling technique is nonprobability consecutive sample.

#### **Inclusion Criteria:**

Patients presenting with Ischemic type of Cerebrovascular accident (Stroke) for more than 24-hours

Age range between 30 to 80 years

Either Sex

#### **Exclusion Criteria include the following:**

Those presented with head trauma, Intracerebral hemorrhage, Subarachnoid hemorrhage and transient ischemic attack were excluded

Chronic Renal failure (preoperative hemodialysis or serum creatinine >3 mg/dl).

Adult Respiratory Distress Syndrome patients (excluded because of normal chest x-ray and absence of left ventricular failure on echocardiography).

#### **Data collection methods:**

A total of 216 consecutive patients with first-ever ischemic stroke lasting for >24 hours, age between 30 and 80 years of both sexes were included in the study. The purpose of the research was to explain to the patients. After taking history and examination of the patient a written informed consent was taken from the patient or his attendants participated in this research work. The patients were labeled as having atrial fibrillation if he has symptoms of palpitation, irregularly irregular pulse, absent P waves with variable RR interval. Blood samples for Complete blood picture, Electrolytes, fasting blood glucose and lipid profile were taken from patients and tested in the laboratory of hospital, those having fasting blood glucose FBS more than 115mg/dl, triglyceride levels more than 155mg/dl and high-density lipoprotein cholesterol less than 45mg/dl for females and less than 40mg/dl for males were included. This facts alongside the demographics and the comorbidities like Diabetes Mellitus (DM), hypertension (HTN), Cigarette-Smoking, and morbid-obesity had been stated and entered within the proforma by the researchers.

#### **Data analysis:**

Statistical analysis was done using SPSS version 20. Mean and standard deviation calculated for age, Blood Pressure (Systolic/Diastolic), duration of diabetes mellitus, hyperlipidemia and duration of smoking. Frequency and percentages were calculated for ischemic stroke, gender, hypertension, diabetes mellitus, obesity, smoking status, previous history of stroke, and obesity as appropriate. Effect modifiers were controlled through stratification of age, gender, smoking status, diabetes mellitus, HTN, blood triglycerides, previous history of stroke, and obesity variables were done to correlate the effect of these on the outcome of atrial fibrillation, using chi square to check any statistical significance. p value less than 0.05 was taken as statistical significance.

**Ethical clearance:** This study was approved by local ethical committee.

## Results

Two hundred and sixteen patients with acute ischemic stroke for more than 24 hours' time period, age range between 30 to 80 years, of either gender were included in this research. The study duration was eight months, from 19th May 2020 to 18th December 2020. Mean age was  $65.95 \pm 17.38$  (ranging 30-80) years (Table 1). The mean SBP and DBP of the participants was  $132.64 \pm 17.68$  &  $84.45 \pm 15.01$  (ranging 90-190) (Table 2). Male out-numbered females, with 78 (36%) females and 138 (64%) males. The ratio of male to female is 1.5:1. Mean duration of smoking consumption of the patients;  $14.2 \pm 5.8$  Years (ranging 2-25) (Figure 1). 119 (55.1%) patients identified diabetes mellitus in stroke patients. The majority of the patients aged >65 years i.e. 115 (53.2%) while One hundred one (66.8%) patients were less than 65 years old. 193 (89%) subjects were identified present for hypertensive and only 27 (12.5%) patients did the consumption of smoking, 5 (2.3%) patients had a previous history of stroke. AF was detected in 74 out of 216 participants with accounting for 34.3% (74/216) of all CVA patients (Figure 2). Only 16 (7.4%) patients found obese, 42 (19.4%) subjects were identified present for triglyceride in ischemic stroke and chronic kidney disease (CKD) were presented in a few patients which accounting for 31 (14.4%) respectively. Effect modifier will be controlled through stratification of age, gender, DM, HTN, smoking status, levels of triglyceride, obesity and previous history of stroke variable will be done to co-relate there effect on the outcome of atrial fibrillation, chi-square test will be applied and  $p \leq 0.05$  will be taken as significant (Table: 3, 4).

**Table 1:** Descriptive Statistics of age of the patients (n=216)

Age of the Patients (Years)	Descriptive Statistics
N	216
Mean $\pm$ SD	$65.95 \pm 17.38$
Minimum	30
Maximum	108
Range	78

**Table 2:** Descriptive Statistics of systolic and diastolic blood pressure of the patients (n=216)

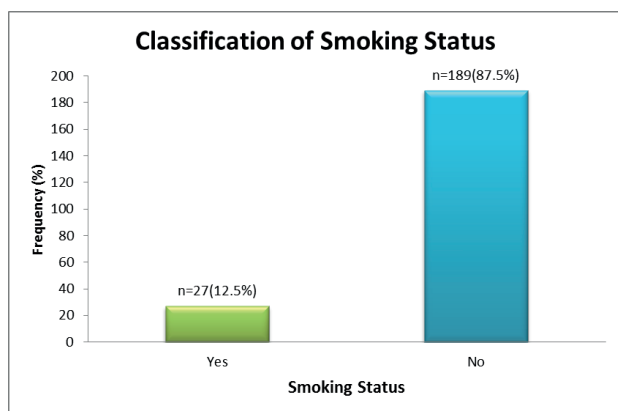
Descriptive Statistics	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Count	216	216
Mean $\pm$ SD	$132.64 \pm 17.68$	$84.45 \pm 15.01$
Minimum	90	40
Maximum	190	110
Range	100	108

**Table 3:** Comparison of atrial fibrillation (AF) in patients with ischemic stroke with gender distribution (n=216)

Gender Distribution	Atrial Fibrillation			P-value
	Present	Absent	Total	
Male	44(20.4%)	94(43.5%)	138(63.9%)	0.328
Female	30(13.9%)	48(22.2%)	78(36.1%)	
Total	74(34.3%)	142(65.7%)	216(100%)	

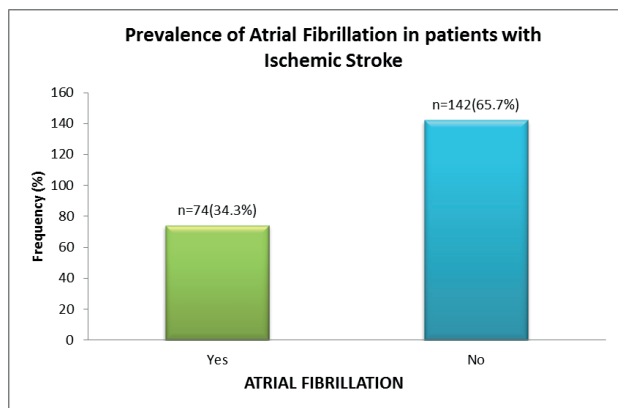
**Table 4:** Comparison of atrial fibrillation (AF) in patients with ischemic stroke with age groups (n=216)

Age Groups	Atrial Fibrillation			P-value
	Present	Absent	Total	
$\leq 65$ Years	29(13.4%)	72(33.3%)	101(46.8%)	0.107
>65 Years	45(20.8%)	70(32.4%)	115(53.2%)	
Total	74(34.3%)	142(65.7%)	216(100%)	



Minimum Duration=2 Years  
 Maximum Duration=25 Years  
 Mean ± SD=14.2±5.8 Years

**Figure1:** Classification of smoking status



**Figure2:** Prevalence of Atrial Fibrillation in patients with Ischemic Stroke

## Discussion

Atrial fibrillation (AF) is the leading cause of ischemic stroke and is detected in 35% of patients with acute stroke (embolic and thrombotic). The risk of recurrent AF in stroke patients can be reduced by oral anticoagulation but recommendations as per clinical guidelines are rather unclear concerning its utilization in the acute period of CVA (15). Be that as it may, AF increases the risk of stroke and disorder burden; it is one of the established predictors of worse consequences after acute intracerebral infarct.

In this current study, AF was detected in 74 out of 216 patients with acute (16) ischemic stroke accounting for 34.3% of all acute ischemic stroke patients.

Numerous researchers found that atrial fibrillation (AF) displayed in 12.5-15% in intense ischemic stroke patients which supports the claim that within the majority of strokes other sources than obscure AF are the cause<sup>17, 18</sup>. The study of Ziegler et al. recently

identified AF in thirty to thirty-five percent of victims that have liability to develop CVA<sup>19</sup>.

In this study, mean age of the participants was 76.5 years, which is greater than in foregoing researches, where the mean ages ranged between 66 to 74 years<sup>20-23</sup>. Although, the risk of atrial fibrillation with stroke doubles or triples among 66 to 70 years of age peoples (Figure 1), the overall predominance of atrial fibrillation amongst sufferers with embolic or thrombotic CVA (34%), that is much lower than was determined by Western Sweden study, wherein 39% (4566) ischemic strokes had been because of atrial fibrillation<sup>24</sup>. Atrial fibrillation is also associated with subclinical hyperthyroidism, when combined with AF and thyrotoxicosis, there is increase level of TG, LDL and decrease HDL which leads to ischemic infarct due to atherogenicity<sup>25</sup>.

It is illustrated that the extent of AF among ischemic stroke patients has increased in coming years despite the variations in study designs and diagnostic methods. Previous researches and this one, has found that the incidence of AF with thrombotic stroke patients in China is substantially lower than in European countries and North America. This research also briefly described the characteristics features of stroke with AF. The findings of higher AF incidence among the women and old age peoples were consistent with earlier research<sup>26</sup>.

The current study also determined that CKD patients have a higher probability of AF, which is consistent with past studies<sup>27</sup>.

In this research methodology, we have concluded that active smokers were have very less chances to have atrial fibrillation which is by previous case studies<sup>28</sup>. In any case, this is often conflicting with a latest study examining the affiliation between smoking and AF in the community populace which has shown smoking was exceedingly related with the frequency of AF<sup>29</sup>.

Moreover, it is notified that AF has direct association with increased levels of triglycerides, this affiliation has been reported by various studies<sup>30</sup>.

The most confinement is the need to get the research on the types of AF and risk of undocumented AF in the non-AF population, type of cerebrovascular accident (stroke), and data of other comorbidities. No exact data found on why high-risk patients did not get oral anticoagulants prior to diagnosis of AF, but the extent is by previous studies<sup>31</sup>.

### Conclusion:

In conclusion, we have observed that atrial fibrillation with stroke (embolic and thrombotic) are more prevalent, mainly in our population. Atrial fibrillation increase the rate of morbidity and mortality, early detection and intense management can prevent stroke-related mortality in AF patients. However, more studies are needed to be performed for the prevention of stroke in these patients.

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from the patients and the research was approved by the ethical committee of the university.

### Author's Contributions:

<sup>a</sup> HI Data gathering and idea owner of this study

<sup>b</sup> SI Collected Data, writing and Editing the manuscript

<sup>c,d,e</sup> Writing and submitting manuscript

<sup>f</sup> Editing and approval of final draft

**Data Availability Statement:** As per the university policy the data is not available publicly, but after taking permission from the university the data will be shared with the editor when required.

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