



## Frequency of Atrial Fibrillation in Patients of Ischemic Stroke

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### ABSTRACT

**Introduction:** Atrial fibrillation is a common etiological factor in patients presenting with ischaemic stroke. **Material & methods:** This descriptive cross sectional study was conducted in medicine wards of Shaheed Mohatrama Benazeer Bhutto Medical University, Larkana from May till November 2013. A total 102 patients of diagnosed ischaemic stroke having age  $>18$  &  $<80$  years were included. Presence of atrial fibrillation was noted. Effect modification was analyzed by applying the Chi-square taking P value  $\leq 0.05$  as significant. **Results:** The mean  $\pm$  SD age of patients was  $53.78 \pm 8.34$  years with range of 38-71 years. Mean  $\pm$  SD duration of presenting symptoms was  $9.18 \pm 7.55$  hours (Range 3-36 hours). Majority of patients were males i-e; 90.2% (n= 92). Patients from rural areas were 55% (n= 56). The frequency of atrial fibrillation was diagnosed in 26.5% (n= 27) patients. Gender, age, duration of presenting symptoms, smoking & dyslipidemia and myocardial infarction were effect modifiers of frequency of atrial fibrillation among patients of ischaemic stroke. Family history, hypertension & diabetes mellitus were not associated with increased risk of AF. **Conclusion:** The frequency of atrial fibrillation among ischaemic stroke patients was 26.5% which is quite high. All patients of ischaemic stroke should be evaluated and treated early for atrial fibrillation.

**Key words:** Atrial fibrillation (AF), Ischaemic stroke, Myocardial infarction (MI), Dyslipidemia

### INTRODUCTION

Stroke or cerebrovascular accident is sudden onset of a neurologic deficit occurring due to vascular mechanism. By definition the clinical signs of focal/global neurological deficits and the symptoms last  $>24$  hours.<sup>1</sup> More than 500,000 strokes & 200,000 deaths due to these strokes occur annually and it is the third leading cause of death in the United States.<sup>1</sup> Stroke deaths are common in western as well as eastern countries but the incidence in Asia is generally higher than in the western countries. The major factors contributing to this high toll are high prevalence of diabetes mellitus hypertension and smoking.<sup>2,3</sup> Estimated annual incidence of stroke in Pakistan is 350,000 new cases every year. Survival rate is low among these patients while the survivors live with a lot of complications due to limited advanced health & physiotherapeutic facilities.<sup>4,5</sup> Stroke can be ischemic (85%) or hemorrhagic

(15%).<sup>6</sup> Ischemic stroke is most often due to atherothrombotic or embolic occlusion of large cerebral vessels. These emboli may arise from the heart, aortic arch, or other arterial lesions such as the carotid arteries.<sup>7</sup> Cardio-embolic strokes account for about 20% of all ischemic strokes which most of times are caused by the atrial fibrillation (AF) & sustained atrial flutter.<sup>8</sup> Embolization of left atrial thrombi account for  $>45\%$  of cardiogenic thromboembolism. AF increases the risk of stroke 5-fold and accounts for around 15-20% of all stroke cases.<sup>9,10</sup> Emboli arising from the heart or passing through it from the venous system reach the brain and lead to ischemic stroke and TIA.<sup>11</sup> AF can affect patient of any age, but its prevalence is 6.7% in patients aged 50-59 years and 36.2% in those aged 80-89 years.<sup>12</sup> Besides AF increases the severity and vulnerability to death among these patients.<sup>13</sup>

It is estimated that without treatment, about 5% patients with AF will have a stroke each year.<sup>14</sup> The

patients presenting with ischemic stroke should be thoroughly examined for presence of AF because it causes the recurrence of stroke thus increasing the risk of morbidity and mortality.<sup>13</sup> Hannon N et al (2009)<sup>15</sup> in a recent prospective population based study found that incidence of repeated stroke doubled in AF patients compared to non-AF patients (21.9% vs. 12.8%). The similar study reported that overall 31.2% patients with ischemic stroke had AF diagnosed.<sup>15</sup> The frequency of AF among ischaemic stroke patients progressively increased from 29.7% to 43.8% when the stroke severity was graded.<sup>15</sup>

In another study which evaluated the first time presenters of stroke it was found that out of 1549 patients of ischemic stroke about 20% patients had AF diagnosed on ECG. In this study the mortality rate was 6% while 39% patients were discharged with disability.<sup>16</sup> Most of AF related stroke cases and commending deaths can be prevented with appropriate antithrombotic therapy in such patients.<sup>17</sup> Stroke is cause of much of morbidity and mortality in elder aged patients. It can be prevented if the patients having cardio-embolic lesions especially atrial fibrillation are diagnosed early and treated prophylactically with anticoagulants. For that there is need of relevant statistics which describe the magnitude of burden of AF in ischaemic stroke patients. Upon robust literature very scant data was found at national and nil at local level. This provides a strong rationale to conduct current study. If it is found that AF is frequent in ischemic stroke patients, this study will recommend screening all stroke patients & managing all AF patients with antithrombotic measures so as to prevent any chance of embolism to the brain which will minimize the morbidity and mortality in ischemic stroke patients. Objective of this study was to determine the frequency of atrial fibrillation in patients presenting with ischaemic stroke at a tertiary care hospital in Larkana

## **MATERIALS AND METHODS**

**Study design:** Descriptive cross sectional study.

**Study setting:** Medicine Ward, Shaheed Mohtarma Benazir Bhutto Medical University, Larkana.

**Study duration:** 6 months from 22-05-2013 to 22-11-2013.

**Sample Size:** With the expected frequency of atrial fibrillation of 31.2%<sup>15</sup> among stroke patients, margin

of error set as 9%, and confidence level at 95%, and using the least proportion formula the calculated sample size was 102 at least.

**Sampling technique:** Non probability consecutive sampling.

### **Inclusion Criteria:**

Age >18 but <80 years.

Both genders.

Ischaemic stroke diagnosed on clinical evaluation followed by confirmatory CT scan.

Willing to participate in the study.

### **Exclusion Criteria:**

Pregnant patient.

Patients above 80 years.

History of migraine, vestibular dysfunction.

Metabolic disorders like hyperthyroidism, hyperparathyroidism.

Transient ischaemic attack, subarachnoid hemorrhage & venous sinus thrombosis.

Meningitis (Bacterial, tuberculous, viral), Encephalitis, Multiple sclerosis.

Intracranial space occupying lesion (e.g., tumor, abscess, tuberculoma).

Epileptic seizures with postictal symptoms.

Cardiac syncope, Atrial flutter alone.

Transient global amnesia (TGA).

Peripheral nerve disorders like mononeuropathy and radiculopathy, Bell's palsy, vestibular neuritis and extraocular muscle imbalance due to cranial neuropathy.

Patient already taking anti-thrombotic drugs like warfarin, heparin.

Vasovagal spam.

Lorem Ipsum.

### **Statistical analysis**

Data were entered into SPSS version 17. Continuous variables like age, duration of symptoms were expressed in mean ( $\pm$  standard deviation). Frequencies (& percentages) were calculated on categorical variables like gender, family history (of ischemic stroke or atrial fibrillation), presence of co-morbidity and outcome variable i-e; presence of AF. Effect modifiers like age, gender, family history, duration of symptoms and presence of co-morbidity were stratified to analyze their effect on the outcome i-e; frequency of AF in stroke. It was followed by applying the Chi-square taking P value  $\leq 0.05$  as significant.

## RESULTS

To assess the magnitude of burden of atrial fibrillation among patients of ischemic stroke, the current study was conducted at Medicine Ward, Shaheed Mohtarma Benazir Bhutto Medical University, Larkana. The results expressed over sample of 102 patients are as under.

The mean  $\pm$  SD age of patients was  $53.78 \pm 8.34$  years with range of 38-71 years. Mean  $\pm$  SD duration of presenting symptoms was  $9.18 \pm 7.55$  hours with a range of 3-36 hours.

Majority of patients were males i-e; 90.2% (n= 92) while only 9.8% (n=10) were females. Patients coming from rural setting were 55% (n= 56) while those belonging to urban living areas were 45% (n= 46) .

Patients were evaluated in different age categories and found that 5.9% (n= 6) patient were of age less than 40 years (minimum 38 years), 33.3% (n= 34) patients were of age 41-50 years, 38.2% (n= 39) patients were of age 51-60 years, 21.6% (n= 22) patients were of age 61-70 years, while only <1% (n= 1) patient were of age above 71 years.

When duration of symptoms with which patient presented was categorized, the results showed that patients presenting with less than 3 hours were 17.6% (n= 18), 29.4% (n= 30) presented between 4-6 hours, 38.2% (n= 39) presented between 7-12 hours, 6.9% (n= 7) presented between 13-24 hours while those presenting between 23-36 hours were 7.8% (n= 8).

Most common comorbidity was smoking 61.8% (n= 63) followed by diabetes mellitus 33.3% (n= 34). Other comorbidities were hypertension among 27.7% (n= 28), dyslipidemia among 25.5% (n= 26) & myocardial infarction among 30.3% (n= 31) patients.

Beside this family history of ischemic stroke was positive in 27.7% (n= 28) patients and family history of atrial fibrillation was positive in 18.6% (n= 19) patients.

Atrial fibrillation was diagnosed in 26.5% (n= 27) patients of ischemic stroke.

Gender was an effect modifier of frequency of atrial fibrillation but non-significant. (P value = 0.476). Male gender was slightly more affected. AF was present in 25(27.2%) of males and 2(20%) of females (p value=0.476).

It was a significant finding that with increasing age there was increase in rate of atrial fibrillation (P value = 0.022) (table 1).

Age of patients (Years)	Atrial fibrillation		Total	P value
	Yes	No		
Up to 40	1 16.7%	5 83.3%	6 100.0%	0.022
41 to 50	7 20.6%	27 79.4%	34 100.0%	
51 to 60	7 17.9%	32 82.1%	39 100.0%	
61 to 70	11 50.0%	11 50.0%	22 100.0%	
71 and above	1 100.0%	0 0.0%	1 100%	
Total	27 26.5%	75 73.5%	102	

Table 1: Age and frequency of atrial fibrillation

Duration of presenting symptoms (hours)	Atrial fibrillation		Total	P value
	Yes	No		
2-4	2 11.1%	16 88.9%	18 100.0%	0.021
5-6	6 20.0%	24 80.0%	30 100.0%	
7-8	10 25.6%	29 74.4%	39 100.0%	
9-10	4 57.1%	3 42.9%	7 100.0%	
$\geq 11$	5 62.5%	3 37.5%	8 100%	
Total	27 26.5%	75 73.5%	102	

Table 2: Effect of duration of presenting symptoms on frequency of atrial fibrillation

More the duration of presenting symptoms more was frequency of atrial fibrillation. The rate increased up to 6 six times in those who presented very late (up to 36 hours). It was a significant finding (P value = 0.021) (table 2).

Contrary to above findings the family history was not shown to have any significant effect on frequency of ischemic stroke among patients of atrial fibrillation. It was noted that even the patients not having family history of ischemic stroke had higher rate (29.7%) of AF than those who had family history of ischemic stroke. Simultaneously family history of atrial fibrillation did not have any different rate of AF in presenting patients.

Comorbidity	Atrial fibrillation		Total	P value
	Yes	No		
Smoking	20 31.7%	43 68.3%	63 100%	0.095
Hypertension	9 32.1%	19 67.9%	28 100%	0.288
Diabetes Mellitus	8 23.5%	26 76.5%	34 100%	0.411
Dyslipidemia	13 50%	13 50%	26 100%	0.002
Myocardial infarction	16 51.6%	15 48.4%	31 100%	0.000

**Table 3 Co morbidities and frequency of atrial fibrillation**

An increased rate of atrial fibrillation was noted among smokers compared to non-smokers but this did not achieve statistical significance (P value = 0.095). Regarding other comorbidities in patients of ischemic stroke besides hypertension & diabetes mellitus, only dyslipidemia and myocardial infarction were significantly associated with an increased rate of atrial fibrillation (P value = 0.002 & 0.000 respectively) (table 3)

## DISCUSSION

Cerebrovascular Accident or stroke is a major cause of morbidity and mortality worldwide.<sup>3,5,11,18</sup> Survivors usually suffer from lifelong disability. Early stroke management, and early initiation of secondary stroke prevention, may improve outcomes in patients with acute ischemic stroke. Ten percent of patients with acute ischemic stroke arrive at the receiving hospital within 3 hours of symptom onset. Such patients are prone to many complications.<sup>11-13,16</sup>

Despite new post-stroke management strategies it remains a serious disease because at many times the underlying disease is not recognized which may lead to recurrence of stroke and worsen its sequel. One such condition is presence of atrial fibrillation. If there is early diagnosis of AF then it can be managed so as to prevent further morbidity and mortality. Atrial fibrillation related strokes are more likely to be severe, disabling and fatal than non-atrial fibrillation related strokes.<sup>11,13-16,19(20)</sup> The current study was done to assess the magnitude of burden of AF in patients who presented with ischemic stroke to medical ward.

In the current study the results showed that out of 102 ischemic stroke patients 26.5% (n= 27) were found to have atrial fibrillation on 12 lead Electrocardiogram. Thus we came to know that AF is present in almost a quarter of all ischemic stroke patients and is a major cause of it. One large population bases study documented that frequency of atrial fibrillation among ischemic stroke patients was 24.6%.<sup>13</sup> A large retrospective study conducted by Srinivasan et al showed the prevalence of atrial fibrillation among patients of stroke was as high as 20%.<sup>20</sup> In a multicenter hospital-based study it was noted that in Europe the prevalence of atrial fibrillation among patients of stroke was as high as 18%.<sup>19</sup> Likewise a study from Italy also revealed that frequency of AF among ischemic stroke patients was 20.3%.<sup>16</sup> Thus we can say that the current study results are in approximation with these results from other countries.

The mean  $\pm$  SD age of patients in this study was  $53.78 \pm 8.34$  years with range of 38-71 years. The mean age of AF patients with stroke in western studies was found to be  $75 \pm 11$  years.<sup>21,22</sup> which is much higher than the current study. This is thought to be due to difference in the selection criteria set in current study and the stated western studies. In another study from Europe it was noted that mean age of patients was  $71.86 \pm 12.6$  years. Another possible reason of this is difference between the life expectancy and quality of life among western countries and our country.

Regarding effect of age on frequency of AF in ischemic stroke patients, it was noted in current study that with an increase in age there was a sharp increase in AF frequency. Accordingly; the frequency of AF increased from 17% among youngest patients (<40 years age) to 100% among eldest age group patients (>71 years) with p value = 0.022. Other studies also stated the similar trends. In a study by Lamassa et al, it was noted that frequency of AF among patients of stroke increased to double with increasing age and it was also found to be more in male gender than females.<sup>19</sup> Another study from USA also reiterated these findings wherein the increasing age up to a decade doubled the incidence of AF.<sup>20</sup> The Framingham study documented that for persons aged 80-89 years, atrial fibrillation was the sole cardiovascular condition to exert an independent effect on stroke incidence (P value <0.001).<sup>22,23</sup>

In current study majority of patients were males i-e; 90.2% (n= 92) while only 9.8% (n=10) were females. Further the frequency of atrial fibrillation affected male gender more than females. (P value = 0.476). In contradiction to the findings of current study, the other studies documented that female gender has more burden of AF than males when there is ischemic stroke under consideration.<sup>13,16</sup> In a large prospective study it was found that 57.9% patients of ischemic stroke who had AF were females.<sup>19</sup> Overall after menopause the risk of cardiovascular disease increases among women and reaching to 7th and 8th decade it reaches almost to that among men.<sup>3,7,11,19</sup> In our country the female life expectancy is not much higher than males as it is in western countries and cardiovascular diseases as a reason of morbidity & death among females not more than males that is why it is reasonable to state that in our study the female gender was less affected by AF than males.

Family history of ischemic stroke and atrial fibrillation was not associated with more frequency of AF among current patients of ischemic stroke. The finding was not significant. This association was not understandable in current study. None of other cited studies have revealed any such negative associations. This needs to be further evaluated in future studies.

The current study also evaluated the effect of comorbidities like smoking, hypertension, diabetes mellitus and myocardial infarction. It was highly significantly (P value = 0.000) found that myocardial infarction was risk factor for atrial fibrillation among patients of ischemic stroke. Further the dyslipidemia was significantly common risk factor among all patients. This association was also recognized in other studies. Marini C, et al.,<sup>13</sup> and Paciaroni M, et al.,<sup>16</sup> in their studies found that cardiovascular diseases like myocardial infarction and heart failure were important risk factors for atrial fibrillation among patients of ischemic stroke.

As the study was conducted in area which has majority of rural population in its surrounding therefore most of our patients were from rural areas and this also affected their time duration of reaching to the hospital. Finally; the above study results recommend that all patients of ischemic stroke should be evaluated and treated early for atrial fibrillation.

## CONCLUSION

Stroke is one of the leading causes of mortality and morbidity. Atrial fibrillation is a risk factor for ischemic stroke and is associated with increased morbidity and mortality. In current study the frequency of atrial fibrillation among ischemic stroke patients was 26.5% which is quite high. Elderly age, male gender, late presentation and comorbid myocardial infarction are major risk factors for AF among of patients of ischemic stroke. Although this study was done on a small scale, a large scale study is required for making recommendations for early evaluation and treatment of atrial fibrillation.

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