

Original Article

Atrial Fibrillation and its Association with First Ever Stroke

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Author's Contribution

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ABSTRACT

Objective: To determine the frequency of atrial fibrillation in adult patients with first ever ischaemic stroke.**Methodology:** A total of 86 patients of stroke were selected for this study. CT scan brain (plain) was advised for all the patients. Subsequently those patients in whom CT scan was suggestive of ischemic stroke, a 12 leads electrocardiogram was done for the confirmation of atrial fibrillation, which was verified by a cardiologist.**Results:** The mean age of the patients was 57.16+17.12 years. There were 52 (60.5%) male and 34 (39.5%) female patients. Out of total 86 patients, pulsus deficit was present in 17(19.8%) patients. The mean ventricular rate was 86.98 + 22.13 per minute. There were 17 (19.8%) patients with irregular rhythm recorded on ECG while 69 (80.2%) patients had regular rhythm. Likewise P wave was absent in 17(19.8%) patients and present in the remaining 69 patients (80.2%). There were 17 (19.8%) patients in whom atrial fibrillation was present while in 69 (80.2%) patients it was absent.**Conclusion:** Atrial fibrillation is a common arrhythmia and a major risk factor for ischemic stroke, especially in the elderly. The prevalence of atrial fibrillation in ischemic stroke increases with age in both genders.**Keywords:** Ischemic stroke, atrial fibrillation, pulsus deficit.**Cite this article as:** Bandeshah AL, Rind LA, Saeed A, Mehmood A, Niaz MA. Atrial Fibrillation and its Association with First Ever Stroke. *Ann Pak Inst Med Sci.* 2020; 16(4):237-240.

Introduction

A stroke is defined as a focal neurological deficit, secondary to a vascular lesion that lasts longer than 24 hours.¹ Stroke is the most common reason for admission in hospitals among neurological diseases, and about 80% of them are thromboembolic (ischemic) in origin.² It is third leading cause of death in the world, after cancer and heart disease. Due to severe morbidity and mortality associated with stroke, it is essential to establish the cause in order to reduce the risk factors. Old age, hypertension, smoking, obesity, diabetes, family history, left ventricular dysfunction, and previous history of stroke are the risk factors for the development of stroke.³

Atrial fibrillation is a frequent arrhythmia that increases the risk of ischemic stroke, particularly in the elderly. In both genders, the prevalence of atrial fibrillation increases with age in ischemic stroke patients, rising from

4.4% in those less than 50 years to 44.7% in those 90 years and older.⁴

Atrial fibrillation predisposes to left atrial thrombus formation and systemic thromboembolism that leads to five times increased risk of ischemic stroke, as compared to patients in sinus rhythm.⁵

The rate of stroke mortality in the Pakistani population is much greater than the rate in Western Europe. It might indicate a low "initial" health status of the population, which is affected with several life-threatening disorders, all of which are substantial risk factors for both the first and recurring strokes. The aim of our study was to evaluate whether our people with first-ever or recurrent stroke have any association with transient or permanent atrial fibrillation.

According to WHO estimates stroke has become the second leading cause of death in developing and

developed world. Every year, approximately 200 people per 100,000 have their first stroke.⁶

Stroke can be a devastating illness causing a lot of distress to the patients and their families, so the personal and social consequences of any residual disability after stroke can be considerable. Early prediction of stroke outcome might be improved by developing clinical criteria.⁷

It contributes to the increase in the number of admissions in medical departments of our hospitals and is a major drain on the already strained health resources. It is obvious that the best way to manage the cerebrovascular disease is through prevention, as has already been proved in the case of ischemic heart disease. In Pakistan health care delivery system is deficient. This study aimed to determine the frequency of atrial fibrillation in first ever-ischemic stroke in our population so that careful cardiac evaluation and appropriate treatment can be instituted to improve the outcome in patients with atrial fibrillation related ischemic stroke.

Methodology

The cross sectional study was conducted in emergency and indoor patients of the departments of Neurology and general medicine at the Pakistan Institute of Medical Sciences (PIMS), Islamabad. Non-probability purposive sampling was used. A sample size is calculated to be 86 by using the formula $n = z^2 pq / e^2$ and keeping 5% error, considering the prevalence of ischemic stroke due to atrial fibrillation to be 6%.

All patients with clinical illness suggestive of ischemic stroke, which persists for more than 24 hours and CT scan brain suggestive of ischemic infarct or within normal limits, were included in the study.

Patients with two or more episodes of stroke, CT scan brain findings of cerebral haemorrhage or subarachnoid hemorrhage, known cases of atrial fibrillation, rheumatic heart disease, and known cases of myocardial infarction were all excluded from the study.

Following approval from the hospital's Ethical Committee, a total of 86 patients over the age of 18, both genders, whose history and clinical examination were suggestive of stroke, were admitted to the Pakistan Institute of Medical Sciences, Islamabad's Departments of Neurology and General Medicine. Informed consent was taken from all the patients. CT scan brain (plain) was advised for all the patients. Following that, in

patients whose CT scan suggested an ischemic stroke, a 12-lead electrocardiogram was performed to confirm atrial fibrillation, which was confirmed by a cardiologist. No risk was involved in obtaining an electrocardiogram in ischemic stroke patients. However, benefit was offered to improve the outcome in ischemic stroke patients by appropriate treatment of atrial fibrillation. All the data was collected through a specially designed proforma.

The collected data was entered into SPSS version 10 and analyzed accordingly. The quantitative variables like age and ventricular rate were presented as mean and standard deviation. The qualitative variables like, sex, ECG rhythm, pulsus deficits, loss of P-wave and CT scan findings were presented as frequency and percentages. As this was descriptive cross sectional study, no statistical test of significance was applied.

Results

The mean age of the patients was 57.16±17.12 years. Distribution of patients by age in presented in table I

Age (Years)	No.	Percentage
18-20	3	3.5
21-30	4	4.7
31-40	7	8.1
41-50	18	20.9
51-60	18	20.9
61-70	17	19.8
71-80	13	15.1
81-90	6	7.0
Mean±SD	57.16±17.12	

In the sex distribution of patients, there were 52 (60.5%) male and 34 (39.5%) female patients.

In the distribution of patient by diagnosis, presented in (Table II). On CT scan brain, there were 86 (100%) patients of ischemic infarct. Regarding pulsus deficit, there were 70 (81.4%) patients in which it was absent and 16 (18.6%) patients in which it was present.

The mean ventricular rate of the patients was 86 per minute. The Mean±SD of patients by ventricular rate was 86.98±22.13. (Table III).

In the distribution of rhythm, there were 17 (19.8%) patients of irregular rhythm and 69 (80.2%) patients of regular rhythm.

In the distribution of P-wave, there were 17 (19.8%) patients in whom P-wave was absent and 69 (80.2%) patients in whom P-wave was present

In the frequency of atrial fibrillation, there were 17 (19.8%) patients in whom atrial fibrillation was present and 69 (80.2%) patients in whom atrial fibrillation was absent.

Table II: Distribution of patients by diagnosis (n=86)

Diagnosis	No.	Percentage
Bilateral MCA infarct	8	9.3
Left MCA infarct	32	37.2
Right MCA infarct	21	24.4
Left tempo-parietal infarct	6	7.0
Right thalamic infarct	4	4.7
Infarct right frontal lobe	3	3.5
Left basal ganglion	3	3.5
Cerebral atrophy	4	4.6
Bilateral occipital lobe infarct	2	2.3
Brain stem infarct	3	3.5

Table III: Distribution of patients by ventricular rate(n=86)

Ventricular rate (per minute)	No.	Percentage
Up to 70	17	19.8
71-80	29	33.7
81-90	20	23.3
91-100	6	7.0
101-110	6	7.0
111-120	3	3.5
>120	5	5.8
Mean±SD	86.98±22.13	

Discussion

Atrial fibrillation is a common arrhythmia and a major risk factor for ischemic stroke, especially in elderly. The prevalence of atrial fibrillation in ischemic stroke increased with age in both sexes from 4.4% in patients younger than 50 years upto 44.7% in those 90 years and older.⁵

Atrial fibrillation predisposes to left atrial thrombus formation and systemic thromboembolism that leads to five times increased risk of ischemic stroke, as compared to patients in sinus rhythm.⁷

According to World Health Organization (WHO) criteria, a cerebral accident or stroke is defined as rapidly developing symptoms and/or signs of focal and, at times, global loss of cerebral function with no apparent cause other than that of vascular origin.⁸

In our study, the mean age of the patients was 57.16±17.12 years, and the age range of the patients was between 18-90 years. As compared with the study of Dabrava and Garay⁹, the mean age of the patients was 59.4±11.5 years with range of 38-83 years, which is partly comparable with our study. The mean age in our study is comparable with study of Dabrava and Garay, however, the age range is much wider i.e.,18-90 years. The manifestation of ischemic stroke related to atrial fibrillation in a much younger population has both social and etiological importance in terms of loss of productive hours and yet to be evaluated risk factors for causation of this condition. This aspect needs further large-scale epidemiological studies.

The etiological relationship of atrial fibrillation to ischemic stroke in our study is though comparable to figures quoted in international studies, certain aspects need further large scale and long-term studies, firstly the finding of much younger population being affected by atrial fibrillation related ischemic stroke is an important as well as surprising observation. What are the factors that are predisposing our relatively younger population to atrial fibrillation related stroke have to be determined in order to stratify the risk factors/causes and rectify them if possible?

Secondly is this high figure of atrial fibrillation related ischemic stroke need long term prophylactic pharmacological therapy (anticoagulation/antiarrhythmic) to decrease the incidents of this entity?

This needs multicenter randomized large prospective studies to determine the risk versus benefit ratio of long-term prophylactic pharmacological therapy of atrial fibrillation.

Another limitation of our study was the small sample size and short duration, both of which can be addressed by conducting multicenter trials at the same time funded by both the public and private sector.

In another study conducted by Somody et al¹⁰ the mean age of the patients was 55±15.8 years, which is also same and comparable with our study.

Patients in our research were 60.5% male and 39.5% female. Patients in Dabrava and Garay⁹'s research were 67% male and 33% female, which is similar to our study. Hu et al¹¹ found that 59.7% of patients were male and 40.3% were female in another study, which is similar to and equivalent to ours.

In our study, the mean ventricular rate of the patients was 86.98 ± 22.13 per minute, which attributed the presence of risk factor of atrial fibrillation in our patients.

In our study, in the distribution of rhythm, there were 19.8% of patients of irregular rhythm and 80.2% of patients of regular rhythm.

Arboix et al¹² concluded that each cerebral infarction etiologic subtype was associated with its own cardiovascular risk profile. Consequently, the cardiovascular risk factors associated with mortality were also different for each ischemic stroke subtype.

In our study, the frequency of atrial fibrillation was found in 19.8% of patients. As compared with the study of Dabrava and Garay⁹ the frequency of atrial fibrillation was found in 22% patients, which is comparable with our study.

In another study conducted by Arboix et al¹² the frequency of atrial fibrillation was found in 29.8% of patients. In another study conducted by Strandberg et al¹³ the frequency of atrial fibrillation was found to be 14%, which is also comparable with our study.

Conclusion

Atrial fibrillation is a common arrhythmia and a major risk factor for ischemic stroke, especially in the elderly. The prevalence of atrial fibrillation in ischemic stroke increases with age in both genders.

References

1. Iso H, Moriyama Y, Sato S, Kitamura A, Tanigawa T, Ymaagishi KM, et al. Serum total homocysteine concentration and risk of stroke and its subtypes in Japanese. *Circulation*. 2004; 109: 2766-72.
2. Qureshi MA, Jamshed TD, Siddique AM. Stroke-a study of clinical patterns and risk factor. *Ann King Edward Med Coll*. 2003; 9: 98-100.
3. Smith WS, Johnston SC, Easton D. Cerebro-vascular disease. IN: Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL (editors). *Harrison's Principles of Internal Medicine*. 16th ed. USA: Mc Graw Hill; 2005: 2372-92.
4. Marini C, De Santis F, Sacco S, Russo T, Olivieri T, Olivieri L, Totaro R, et al. Contribution of atrial fibrillation to incidence and outcome of ischemic stroke: results from a population based study. *Stroke*. 2005; 36: 1115-9.
5. Verheugt FW. Stroke prevention in atrial fibrillation. *Neth J Med* 2006; 64: 31-3.
6. Khan A, Sherin A, Ahmed H, Khalil AM. Acute complications of stroke. *JPMI*. 2004; 18: 220-24.
7. Marini C, De Santis F, Sacco S, Russo T, Olivieri T, Olivieri L, Totaro R, et al. Contribution of atrial fibrillation to incidence and outcome of ischemic stroke: results from a population-based study. *Stroke* 2005; 36: 1115-9.
8. Verheugt FW. Stroke prevention in atrial fibrillation. *Neth J Med* 2006; 64: 31-3.
9. Dabrava J, Garay R. The role of transesophageal echocardiography in detection of cardiogenic and aortic sources of embolism in stroke and transient ischaemic attacks. *Vnitr Lek* 2006; 52: 144-51.
10. Somody E, Delay M, Rouesnel PH, Galley D, Cosnay P, Arquizan C, et al. Clinical evolution of patients following investigation of atrial vulnerability after a first cerebral ischaemic accident. *Arch Mal Coeur Vaiss*. 2006; 99: 221-9.
11. Hu DY, Zhang HP, Sun YH, Jiang LQ; Antithrombotic Therapy in Atrial Fibrillation Study Group. The randomized study of efficiency and safety of antithrombotic therapy in nonvalvular atrial fibrillation: warfarin compared with aspirin. *Zhonghua Xin Xue Guan Bing Za Zhi*. 2006; 34: 295-8.
12. Arboix A, Garc-a-Eroles L, Comes E, Oliveres M, Targa C, Balcells M, et al. Importance of cardiovascular risk profile for in-hospital mortality due to cerebral infarction. *Rev Esp Cardiol*. 2008; 61: 1020-9.
13. Strandberg M, Marttila RJ, Helenius H, Hartiala J. Transoesophageal echocardiography should be considered in patients with ischaemic stroke or transient ischaemic attack. *Clin Physiol Funct Imaging*. 2008; 28: 156-60.