The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/18.4234

ORIGINAL PROF-4234

ISCHEMIC STROKE;

FREQUENCY AND CONTRIBUTING FACTORS OF ATRIAL FIBRILLATION IN PATIENTS WITH FIRST ISCHEMIC STROKE

1. MBBS, FCPS
Consultant Neurologist
DHQ Hospital Faisalabad.
2. MBBS, FCPS
Associate Professor
DHQ Hospital Faisalabad.
3. MBBS
Medical Officer
Basic Health Unit.
4. MBBS, FCPS
Senior Registrar
Department of Oncology
Allied Hospital Faisalabad.

Correspondence Address:
Dr. Muhammad Naveed Alam
Consultant Neurologist
DHQ Hospital Faisalabad.
naveed72020@gmail.com

Article received on:
16/08/2017
Accepted for publication:
15/11/2017
Received after proof reading:
02/01/2018

Muhammad Naveed Alam[1], Tahir Habib Rizvi[2], Memoona Alam[3], Muhammad Tahir[4]

ABSTRACT... Objectives: To determine the frequency and contributing factors of atrial fibrillation in patients with first ischemic stroke. **Methodology:** This study included 150 patients with first acute ischemic stroke. All the patients had electrocardiography to detect the presence of atrial fibrillation. The patients were also labeled for risk factors like hypertension, congestive heart failure, smoking, and hyperthyroidism, etc. **Setting:** Mayo Hospital Lahore. **Duration of Study:** 1st January 2013 to 30th June 2013. **Type:** Descriptive Cross Sectional. **Results:** Atrial fibrillation was present among 22 (14.6%) patients. Among patients with atrial fibrillation, smoking, congestive heart failure and hypertension were the most frequent risk factors which were present in 11 (50%), 6 (27%), and 5 (22.7%) patients, respectively. **Conclusion:** Frequency of atrial fibrillation among patients with first ischemic stroke was high. Smoking, congestive heart failure and history of coronary artery bypass grafting are frequent risk factors.

Key words: Ischemic Stroke; Atrial Fibrillation; Contributing Factors.

Article Citation: Alam MN, Rizvi TH, Alam M, Tahir M. Ischemic stroke; frequency and contributing factors of atrial fibrillation in patients with first ischemic stroke. Professional Med J 2018;25(1):84-89. **DOI:**10.29309/TPMJ/18.4234

INTRODUCTION

Stroke referred to a debilitating illness that is caused by deficient blood supply to the brain. It is defined as an abrupt onset of characteristic neurological deficit that is attributable to a focal vascular cause lasting for more than twenty four hours or leading to death.[1]

Stroke is the leading cause of physical disability and the third leading cause of death worldwide.[2] The age adjusted annual death rate from stroke is 116 per 100,000 populations in USA and some 200 per 100,000 in UK, some 12% of all deaths. Low and middle income countries are significantly more affected than developed countries.[3] Approximately 80% of strokes are due to ischemic cerebral infarction and 20% to brain hemorrhage.[4] It is predicted that stroke will soon become the leading cause of death worldwide. In Pakistan, the prevalence of stroke is increasing[5] and a reported incidence is 250/100,000.[6]

Stroke is a medical emergency and can cause permanent neurological damage, complications and death. It is not a diagnosis but a clinical syndrome with numerous causes. Clinical symptoms of ischemic stroke depend on the anatomical location of the thrombus. Stroke usually presents with an acute loss of brain functions. These functions usually involve the realm of motor, sensory, language, vision, visuo-spatial perception or consciousness. Clinical examination along with neuroimaging leads to a proper diagnosis of is stroke due to cerebral infarction.[7]

Defining stroke types helps in determining the most effective therapy and is clearly related to prognosis. Computed tomography or magnetic resonance imaging should be performed to confirm the type of stroke.[8] A stroke is occasionally treated with thrombolysis, but usually with supportive care like speech therapy, physiotherapy and occupational therapy and secondary prevention with antiplatelet drugs, blood pressure control, statins, and in selected patients with carotid endarterectomy and anticoagulation.[9-10]

Epidemiologic studies of the risk factors for stroke

are important for determining the origin and its prevention. In the past several decades many studies have successfully identified a number of risk factors. Risk factors or risk marker for cerebral infarction are classified according to their potential for modification (non-modifiable, modifiable, or potentially modifiable) and strength of evidence (well documented or less well documented). Non modifiable risk factors include age, sex, low birth weight, race/ethnicity, and genetic factors. Well documented and modifiable risk factors include hypertension, diabetes, atrial fibrillation, exposure to cigarette smoke and certain other cardiac conditions, dyslipidemia, carotid artery stenosis, post- menopausal hormone therapy, poor diet, physical inactivity, and obesity. Less well documented or potentially modifiable risk factors include metabolic syndrome, alcohol abuse, oral contraceptive use, hypercoagubility, inflammation and infection.[10-12]

For the detection of stroke, CT scan is considered the first line investigation due to its availability and exquisite sensitivity for detection of blood and infarction.[14] By excluding hemorrhagic stroke, this can help in initializing thrombolytic therapy which is the mainstay of treatment for ischemic stroke.[9]

Atrial fibrillation is the most common cardiac arrhythmia and contributes as a common risk factor for ischemic stroke.[15] AF commonly coexists with cardiovascular risk factors, and the presence of these adds to the development of new onset AF, especially if inadequately managed,[16] and to complications associated with AF, such as stroke.[17]

AF inclines to stroke due to fulfillment of Virchow's triad of thrombogenesis,[18] while formation of thrombus occurs when the ''vessel wall abnormalities'' is present ''abnormal blood flow'' and ''abnormal blood constituents'.[19]

Strokes in AF have a significant risk of morbidity and morbidity, it further causes more disability, and increases the hospital stays. Evidently, AF is a major public health problem, and significantly impacts on healthcare costs.[19]

Atrial fibrillation is present in 10% of the Asian ischemic stroke patients.[20] In another study, the prevalence of atrial fibrillation in patients who experienced first ever ischemic stroke was found to be 24.6%.[21] The proposed mechanism that how atrial fibrillation causes ischemic stroke is explained by its association with thrombosis in the left atrium or left atrial appendage due to stasis of blood,[22] embolization of these thrombi ultimately results in ischemic stroke. Prevention of this complication is a major component of clinical management in patients with atrial fibrillation. Mant J. et al in 2007 proved that warfarin is superior to aspirin in primary and secondary prophylaxis of ischemic stroke in patients with atrial fibrillation.[23]

Major risk factors identified in new onset Atrial fibrillation were congestive heart failure (19.6%), coronary bypass surgery (11.5%), myocardial infarction (11.0%), valvular heart disease (4.3%), and other cardiovascular diseases which includes stroke in 14.8%, other pulmonary disease (7.7%), pulmonary embolus (1.4%), and other or unknown (27.3%) while thyroid disease in 2.4% of the cases.[24]

To date, there is no local data available regarding frequency of atrial fibrillation in patients with first ischemic stroke. Moreover, two studies (mentioned above) done on frequency of atrial fibrillation in ischemic stroke patients showed a wide frequency range i.e. 10% and 24%. This provides a rationale for the study to define the magnitude of this reversible risk factor for ischemic stroke in our population. This baseline data of the problem and its contributing factors obtained by my study may be used in future studies.

MATERIAL AND METHODS

In this study, patients of all ages and both sexes presenting with ischemic stroke were enrolled in the study while those with typical clinical features of stroke but not evident on CT brain plain even after 24 hours of onset of symptoms and having history of previous stroke were excluded from the study. After approval by the Ethical Committee and Review Board Mayo Hospital Lahore, all consecutive subjects presenting in the neurology ward or medical emergency with

clinical features suggestive of ischemic stroke were considered for study, provided they meet the inclusion criteria. Patients presenting with features of stroke underwent CT brain plain in the radiology department and CT brain was reported by the radiologist. After this, patients fulfilling the inclusion criteria were finally included in the study after taking informed written consent. In such patients, ECG was performed. ECG was carried out by ECG technician and the findings were verified by medical consultant. Pulse rate and rhythm were taken by the researcher and afterwards were labeled as atrial fibrillation as per operational definition. In patients with atrial fibrillation, to find out contributing factors ECG was reviewed for ischemic changes to diagnose coronary artery disease, history of coronary artery bypass surgery was taken and echocardiography was performed in the cardiology department (by consultant cardiologist) to diagnose congestive heart failure. Thyroid function tests were done (in local laboratory of hospital) and history of smoking was taken to find out other contributing factors.

RESULTS

Mean age of the patients included in the study was 62.37+10.79 years [range 37 – 89].

Patients were also distributed according to sex. Out of 150 patients, there were 97 (64.7 %) male patients, while remaining 53 (35.3%) patients were female. Male to female ratio was 1.83:1 (Figure-1).

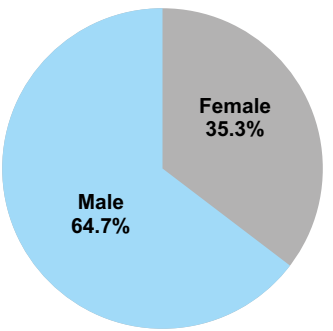

Figure-1. Distribution of patients by sex (n=150)

Among 150 patients in the study, atrial fibrillation was present among 22 (14.6%) patients, while absent in the rest ie 128 (85.4%) patients (Figure-2).

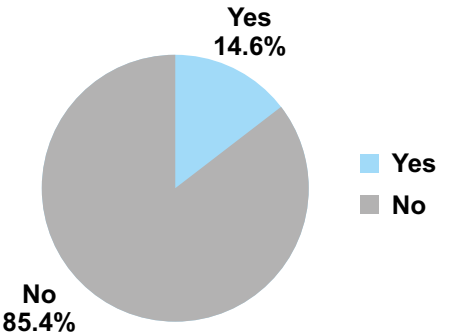

Figure-2. Distribution of patients by presence of atrial fibrillation (n = 150)

Among 22 patients with atrial fibrillation, coronary artery disease was present among 5 (22.7%) patients. 6 (27%) patients had congestive heart failure, 3 (13.6%) had valvular heart disease, 5 (22.7%) patients had hypertension and 2 (9%) patients had coronary artery bypass grafting. History of smoking was present in 11 (50%) patients. Only 1 (4.5%) had hyperthyroidism. (Table-I)

Risk factors		No. of patients	%
Congestive heart failure		6	27
Coronary artery disease		5	22.7
Coronary artery bypass grafting		2	9
Others	Smoking	11	50
	Hypertension	5	22.7
	Valvular lesions	3	13.6
	Hyperthyroidism	1	4.5

Table-I. Distribution of Patients by Contributing Factors of Atrial Fibrillation in Patients with First Ischemic Stroke (n=35)

DISCUSSION

This study was conducted in Medical and Neurology Units of a teaching hospital, Mayo Hospital Lahore to detect the frequency of atrial fibrillation among patients with first ischemic stroke. The results of this study showed a high frequency of atrial fibrillation among patients with ischemic stroke i.e. 14.6%. This study also highlighted the contributing factors associated with atrial fibrillation among these patients.

Previously, no study exclusively studied contributing factors among such patients. It was observed that smoking (50%) was the most common contributing factor followed by congestive heart failure (27%).

In literature, there are some other studies that have described the presence of atrial fibrillation among patients with ischemic stroke. But, the results are variable among different authors.

In this prospective trial, we included all age groups of the patients. The mean age of the patients was 62.37+10.79 years. The majority of the patients (46%) in our study were of age group 51 – 60 years. This was also observed that approximately 90% patients were of more than 50 years. The male population (64.7%) was also seen more frequently as compared to female (35.3%). Alhadramy O, et al[25] conducted a study among 413 patients with ischemic stroke. They found that the mean age of the patients was 65±15 years and male (51.2%) were almost equal to female (49.8%). Wohlfahrt J, et al[26] conducted a study in two hundred and twenty four patients with ischemic stroke to determine the AF. The mean age of the patients was 65.8% and 58.5% patient's population was male. An almost similar mean age was observed in both of these studies. However, there was difference in female to male ratio in both other studies.

In our study, atrial fibrillation was observed in 14.6% patients. In a previous study conducted by Marini, et al,[21] the presence of AF at stroke onset and during the acute phase was confirmed by a standard electrocardiogram. And it was observed that AF was present in 24.6% patients with ischemic stroke. In another study by Biswas M, et al,[27] the frequency of atrial fibrillation among stroke patients in Indian-American population was 9.7% and in White American patients was 22.5%. In another study conducted by De Silva et al,[20] conducted among Asian population, the atrial fibrillation was found to be present among 10% patients. So, this can be determined that frequency of atrial fibrillation varies greatly among different setups and populations. The overall frequency of atrial fibrillation was 10% to 24.9% in literature. Our study also determined a higher frequency of atrial fibrillation.

In our study, among the patients with atrial fibrillation, coronary artery disease was present among 22.7% patients. The possible association of vascular disease with stroke has been discussed in previous studies. In a study, it was detected that prior vascular disease amplified the risk of stroke by 20%.[29]

The history of bypass grafting was present in 9% patients in our study. Psaty BM, documented that history of CABG was present among 11.5% patients. Golmohammadi M, et al,[30] documented postoperative AF developed in 37(12.3%) of patients undergoing CABG.

Congestive heart failure was detected among 27% patients who had atrial fibrillation. Previously, the risk of stroke in atrial fibrillation was recorded in 40% approximately.[28] Another review conducted by the Working Group of Stroke Risk in Atrial Fibrillation failed to find the studies where the heart failure was recorded as an independent predictor of stroke, and consequently it was not find as a significant risk factor.[29]

Valvular lesions were present among 13.6% patients. Diker, et al, determined that the rate of AF in Rheumatic Heart Disease occurs in those with mitral stenosis, tricuspid regurgitation in combination and mitral regurgitation.[31]

In our study, smoking was present as a most frequent risk factor. There were 50% smokers. Thygesen et al,[32] in his study of risk factors of AF, found smoking as a risk factor in 20.5% patients with atrial fibrillation who suffered from stroke.

In our study, hypertension as a risk factor for stroke was present in 22.7% patients. Stroke Risk in Atrial Fibrillation Working Group found that for patients with AFib and hypertension, the risk of stroke increases 1.6 to 2.5 times compare with patients without AFib.[29] They also found that a history of hypertension and systolic blood pressure >160 mm Hg was independently and separately associated with an increased risk of

stroke in patients with AFib.[29]

Hyperthyroidism in our study was present among 4.5% patients with atrial fibrillation. However, Selmer, et al found hyperthyroidism in 1% patients. The frequency of hyperthyroidism may be higher due to the reason that ours is an endemic area for thyroid disease.

This study has certain limitations. This was a single centered study conducted in a limited population size. More studies are encouraged in different setups and in different study populations.

CONCLUSION

This study concludes that frequency of atrial fibrillation among patients with first ischemic stroke was high. So, screening for atrial fibrillation should be done in every single patient with first ischemic stroke. Smoking, congestive heart failure and history of hypertension were the common contributing factors associated with atrial fibrillation among these patients.

REFERENCES

1. Kalkonde YV, Deshmukh MD, Sahane V, Puthran J, Kakarmath S, Agavane V, Bang A. **Stroke Is the Leading Cause of Death in Rural Gadchiroli, India: A Prospective Community-Based Study.** Stroke. 2015; 46:1764-8.

2. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. **Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010.** Lancet. 2012; 380:2095–2128.

3. Krishnamurthi RV, Feigin VL, Forouzanfar MH, Mensah GA, Connor M, Bennett DA, et al. **Global and regional burden of first-ever ischaemic and haemorrhagic stroke during 1990–2010: findings from the Global Burden of Disease Study 2010.** Lancet Glob Health. 2013; 1:e259–e281.

4. Ojaghihaghighi S, Vahdati SS, Ramouz A. **Comparison of neurological clinical manifestation in patients with hemorrhagic and ischemic stroke.** World Journal of Emergency Medicine. 2017; 8(1):34-8.

5. Nomani AZ, Nabi S, Badshah M, Ahmed S. **Review of acute ischaemic stroke in Pakistan: progress in management and future perspectives.** Stroke and Vascular Neurology 2017; 2:30-9.

6. Khalid W, Rozi S, Ali TS, Azam I. **Quality of life after stroke in Pakistan.** BMC Neurology 2016; 16:250.

7. Du Y, Yang X, Li J. **Neuroimaging diagnosis for cerebral infarction: An 8-year bibliometric analysis.** Neural Regeneration Research. 2012; 7(30):2392-9.

8. Kamal AK, Itrat A, Murtaza M, Khan M, Rasheed A, Ali A. **The burden of stroke and transient ischemic attacks in Pakistan: a community-based prevalence study.** BMC Neurol 2009; 9:58.

9. Khan SN, Vohra EA. **Risk factors for stroke: a hospital based study.** Pak J Med Sci 2007; 23:17-22.

10. Zinkstok SM, Engelter ST, Gensicke H, Lyrer PA, Ringleb PA. **Safety of thrombolysis in stroke mimics: results from a multicenter cohort study.** Stroke. 2013 Apr; 44(4):1080-4.

11. Deoke A, Deoke S, Hajare S. **Profile of Modifiable and Non-Modifiable Risk Factors in Stroke in a Rural Based Tertiary Care Hospital – A Case Control Study.** Global Journal of Health Science. 2012;4(3):158-63.

12. Choudhury MSJH, Choudhury MTI, Nayeem A, Jahan WA. **Modifiable and Non-Modifiable Risk Factors of Stroke: A Review Update.** J Natl Inst Neurosci Bangladesh 2015; 1(1): 22-6.

13. Hacke W, Kaste M, Bluhmki E, Brozman M. **Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke.** N Engl J Med 2008; 359:1317-1329.

14. Kurukalasuria LR, Govindarjan G, Sowers J. **Stroke prevention in diabetes and obesity.** Expert Reve Crdiovasc Ther 2006; 4:487-502.

15. Khan NI, Naz L, Mushtaq S, Rukh L, Ali S, Hussain Z. **ischemic stroke; prevalence of modifiable risk factor in male and female patient in Pakistan.** Pak J Pharma Sci 2009; 22:62-67.

16. Parnetti L, Caso V, Lanari A, Saggese E, Sabastianelli M, Tayabeti SK, et al. **Stroke prevention and statin treatment.** Clin Exp Hypertens 2006; 28:335-344.

17. Hadi N, Ullah Z, Awan KH, Iqbal N. **CT scan findings in cerebovascular disease: a local experience** J Med Sci 2010;18:26-28.

18. Jhawar MB, Flaker G. **Preventing stroke in atrial fibrillation patients - clinical utility of oral anticoagulants.** J Blood Med 2012; 3:1-13.

19. Huxley RR, Lopez FL, Folsom AR. **Absolute and attributable risks of atrial fibrillation in relation to optimal and borderline risk factors: the Atherosclerosis Risk in Communities (ARIC) study.** Circulation 2011; 123:1501-1508.

20. Kirchhof P, Bax J, Blomstrom-Lundquist C. **Early and comprehensive management of atrial fibrillation: proceedings from the 2nd AFNET/EHRA consensus conference on atrial fibrillation entitled 'Research Perspectives in Atrial Fibrillation'.** Europace 2009; 11:860-885.

21. Watson T, Shantsila E, Lip GY. **Mechanisms of thrombogenesis in atrial fibrillation: Virchow's triad revisited.** Lancet 2009; 373:155-166.

22. Hart RG, Pearce LA, Aguilar MI. **Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation.** Ann Intern Med 2007; 146:857-867.

23. De Silva DA, Woon FP, Moe KT, Chen CL, Chang HM, Wong MC. **Concomitant coronary artery disease among Asian ischaemic stroke patients.** Ann Acad Med Singapore 2008; 37:573-575.

24. Marini C, Santis FD, Sacco S, Rusoo T, Olivieri L, Totaro R. **Contribution of atrial fibrillation to incidence and outcome of ischemic stroke: results from a population- based study.** Stroke 2005; 36:1115-1119.

25. Holmes DR, Reddy VY, Turi ZG, Doshi SK, Sievert H, Buchbinder M. **Percutaneous closure of the left atrial appendage versus warfarin therapy for prevention of stroke in patients with atrial fibrillation: a randomized non-inferiority trial.** Lancet 2009; 374:534-542.

26. Mant J, Hobbs FDR, Fletcher K, Roalfe A, Fitzmaurice D, Lip GYH. **Warfarin versus aspirin for stroke prevention in an elderly community population with atrial fibrillation (the Birmingham Atrial Fibrillation Treatment of Aged Study, BAFTA): a randomised controlled trial.** Lancet 2007; 370:493-503.

27. Psaty BM, Manolio TA, Kuller LH, Kronmal RA, Cushman M, Fried LP. **Incidence of and Risk Factors for Atrial Fibrillation in Older Adults.** Circulation 1997; 96:2455-2461.

28. Alhadramy O, Jeerakathil TJ, Majumdar SR, Najjar E, Choy J, Saqqur M. **Prevalence ofand predictors of paroxysmal atrial fibrillation on holter monitor in patients with stroke or TIA.** Stroke 2010; 41:2596-2600.

29. Wohlfahrt J, Stahrenberg R, Weber-Krüger M, Gröschel S, Wasser K, Edelmann F, Seegers J, Wachter R, Gröschel K. **Clinical predictors to identify paroxysmal atrial fibrillation after ischaemic stroke.** Eur J Neurol 2013.

30. Biswas M, Sen S, Simmons J. **Etiology and risk factors of ischemic stroke in Indian-American patients from a hospital-based registry in New Jersey,** USA Neurology Asia 2009;14:81-86.

31. Atrial Fibrillation Investigators. **Risk factors for stroke and efficacy of antithrombotic therapy in atrial fibrillation. Analysis of pooled data from five randomized controlled trials.** Arch. Intern. Med 1994; 154:1449-1457.

32. Stroke Risk in Atrial Fibrillation Working Group. **Independent predictors of stroke in patients with atrial fibrillation: a systematic review.** Neurology 2007; 69:546-554.

33. Golmohammadi M, Javid GE, Farajzadeh H. **Incidence and Risk Factors for Atrial Fibrillation after First Coronary Artery Bypass Grafting in Urumiyeh Imam Khomeini Hospital from 2006 to 2008**. Iranian Cardiovascular Research Journal 2010;4:86-90.

34. Diker E, Aydogdu S, Ozdemir M, Kural T, Polat K, Cehreli S, Erdogan A, Göksel S. **Prevalence and predictors of atrial fibrillation in rheumatic valvular heart disease.** Am J Cardiol 1996; 77:96-98.

35. Thygesen SK, Frost L, Eagle KA, Johnsen SP. **Atrial fibrillation in patients with ischemic stroke: A population-based study.** Clinical Epidemiology 2009; 1:55-65.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	M. Naveed Alam	Planning of data collection	
2	Tahir Habib Rizvi	Topic selection, Statistical work	
3	Memoona Alam	Article writing	
4	Muhammad Tahir	Article writing