Bangladesh Journal of Neuroscience 2017; Vol. 33 (1): 1-5

ORIGINAL ARTICLES

Association between Age and New Onset Ischemic Stroke in Diabetic Patients

SINA H[1], ISLAM MR[2], HABIB M[3], GHOSE SK[4], AHMED KGU[5], CHOWDHURY AH[6], SAHA K[7], ARIFUZZAMAN M[8], ALAM I[9], MUSTARY T[10], DHALI SA[11]

Abstract

Background: *Ischemic stroke is the end result of occlusion of a blood vessel supplying the brain by a thrombus originating somewhere outside the brain or as a result of a thrombotic stenosis of a cerebral blood vessel itself. Older people have higher prevalence of ischemic stroke.* ***Objective:*** *To evaluate the association between higher age and new onset ischemic stroke in patient with diabetes mellitus.* ***Method:*** *This cross sectional study was conducted in the Department of Neurology, BSMMU, Dhaka from February 2013 to September 2014 on 50 DM patients with first attack of ischemic stroke. mRS was measured on 14th day of the stroke.* ***Result:*** *Majority of the patients (40.0%) were in age group 51-60 years. The mean age was 58.9 ± 9.6 years with a range from 30 to 75 years. Males were 52.0% and females were 48.0%. Male to female ratio was 1.08:1. It was observed that more than one third (36.0%) patients were current smoker, 9(18.0%) were ex-smoker and 23(46.0%) were non smoker. Majority of the patients, 29(58.0%), had hypertension. Mean systolic BP was found 129 ±16 mmHg with a range from 90 to 160 mmHg. The mean diastolic BP was found 81±11 mmHg with a range from 60 to 100 mmHg. Age has significant positive correlation with modified ranking scale on 14th day of stroke [r= 0.322 (p=0.023)].* ***Conclusion:*** *As per study result, it can be concluded that increasing age is associated with higher level of mRS.*

Keywords: *Ischemic stroke, diabetes mellitus, mRS, age.*

Introduction:

Ischemic stroke is characterized by the sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurologic function. Acute ischemic stroke is caused by thrombotic or embolic occlusion of a cerebral artery and is more common than hemorrhagic stroke.

Stroke is the third leading cause of death worldwide and the leading cause of acquired disability in adults in most regions. WHO estimated that there were over 2.1 million people who died of stroke in 1990 alone. In Asia, burden of stroke is likely to increase substantially in the near future because of the aging population[1]. In Bangladesh, stroke is the third leading cause of death[2]. Bangladesh is ranked 84 in the world in mortality rate due to stroke by the World Health Organization. The prevalence of stroke in Bangladesh is 0.3%. The high number of disability-adjusted life-years lost due to stroke (485 per 10,000 people) show that stroke severely impacts Bangladesh's economy[2].

1. Dr. Hashmi Sina, Assistant Professor, Neurology, Dhaka Medical College.
2. Prof. Md. Rafiqul Islam, Professor, Neurology, Bangabandhu Sheikh Mujib Medical University.
3. Prof. Mansur Habib, Professor & Head, Neurology, Dhaka Medical College.
4. Dr. Swapon Kumar Ghose, Associate Professor, Neurology, Dhaka Medical College.
5. Dr. Kazi Gias Uddin Ahmed, Associate Professor, Neurology, Dhaka Medical College.
6. Dr. Ahmed Hossain Chowdhury, Associate Professor, Neurology, Dhaka Medical College.
7. Dr. Kanol Saha , Associate Professor, Neurology, Dhaka Medical College.
8. Dr. Mohammad Arifuzzaman, Assistant Professor, Neurology, Dhaka Medical College.
9. Dr. Iftikher Alam, Junior Consultant, Neurology. Dhaka Medical College.
10. Dr. Tamanna Mustary, Thesis Part Student, Dermatology and Venereal Diseases, Dhaka Medical College.
11. Dr. Sabbir Ahmed Dhali, Registrar, Neurology, Dhaka Medical College.

Though the incidence and prevalence of stroke increase sharply with age it can affect at any age[3] Studies done in both western countries and Asia disclose a higher incidence of ischemic stroke in men than in women under 80, however, most elderly patients with stroke (aged >80 years) are women[4,5]. In addition, disparities exist in risk factors, clinical presentation, and outcomes of stroke among patients with different ages and genders[6-9].

Most ischemic stroke patients have multiple vascular risk factors. There are quite a few studies from developed countries concerning the age effect on the profile of vascular risk factors in ischemic stroke patients and the results are inconsistent[4,9-11]. Such studies are scarce in Bangladeshi population and whether the distribution pattern is different from that of developed countries remains to be elucidated. Thereby, we investigated the age specific prevalence of vascular risk factors in patients with first-ever ischemic stroke in Bangladesh.

Method:

This cross sectional study was conducted in the Department of Neurology, BSMMU, Dhaka, from February 2013 to September 2014. Fifty patients with first attack of ischemic stroke with DM were included in this study. Patient's mRS was done on the 14th day of stroke. During this period other relevant investigations were done and recorded. Correlation between age and mRS was confirmed using Pearson Correlation Test. Statistical software SPSS 12.0 was used for analysis. A p value of <0.05 was taken as level of significance.

Results:

It was observed that the mean age of the patients was 58.9 ± 9.6 years with a range from 30 to 75 years and majority of the patients (40.0%) were in age group 51-60 years in this study. Twenty six (52.0%) patients were male and 24(48.0%) were female. Male to female ratio was 1.08:1. It was also observed that more than one third (36.0%) of the patients were current smoker, 9(18.0%) were former smoker and 23(46.0%) were non smoker. More than half of the patients had hypertension. It was observed that mean systolic BP was found 129 ± 16 mmHg with a range from 90 to 160 mmHg and the mean diastolic BP was 81±11 mmHg with a range from 60 to 100 mmHg.

Significant positive correlation was found between age and modified ranking scale on 14th day of stroke [r= 0.504 (p<0.001)].

Age significantly positively correlated with mRS. The estimated odds ratio suggests that there is 1.11 times greater likelihood of facing severe disability for 1 year increase in age.

Table-I

Demographic and clinical profile of the study subjects (n=50)

	Frequency	Percentage
Age (years)		
≤40	4	8.0
41-50	5	10.0
51-60	20	40.0
61-70	19	38.0
>70	2	4.0
Mean ±SD	58.9 ± 9.6	
Range (min-max)	(30-75)	
Gender		
Male	26	52.0
Female	24	48.0
Smoking habit		
Current	18	36.0
Former	9	18.0
Non smoker	23	46.0
Hypertension	29	58.0
Systolic BP (mmHg) [Mean ±SD]	129 ± 16	
Diastolic BP (mmHg) [Mean ±SD]	81 ± 11	

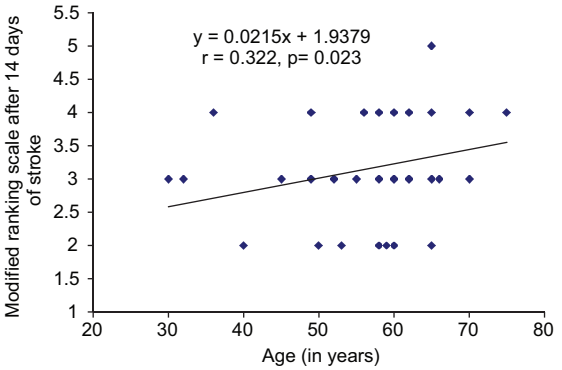

Fig.-1: *The scatter diagram shows significant positive relationship [r= 0.322 (p=0.023)] between age with modified ranking scale on 14th day of stroke.*

Table-II

Multivariate logistical regression analysis of modified ranking Scale for Stroke Severity (mRS) and the outcome variables

Independent variables	p value	OR	95% CI for OR	
			Lower	Upper
Age	0.020*	1.112	1.017	1.216
Sex	0.056	0.070	0.005	1.071
Smoking	0.115	0.254	0.046	1.399
Hypertension	0.192	0.373	0.085	1.641
HBA1c	0.014*	2.332	1.186	4.584

Discussion:

In this study 78.0% of the patients were in 6th and 7th decade and the mean age was 58.96±9.58 years with range from 30 to 75 years. Similar findings also found in the study of Shuangxi et al.[12], Basu et al.[13] and Doi et al.[14] where mean age was 60.5±8.65 years, 60.0 ±13 years and 58.0±10.0 years respectively. On the other hand, higher age was observed in the studies of Rathore et al.[15], Kamouchi et al.[16] and Sare et al.[17] where mean age was 64.8±9.4 years, 69.0±12.0 years and 68.9±12.1 years respectively. The higher mean age may be due to increased life expectancy, geographical variations, racial and ethnic differences may have significant impacts.

In this study it was observed that 52.0% patients were male and 48.0% female and male to female ratio was 1.08:1, which is closely resembled with Shuangxi et al.[12], Kamouchi et al.[16], Rathore et al.[15], Sare et al.[17], Basu et al.[13] and Yao et al.[18] series.

In the present study it was observed that more than one third (36.0%) of the patients were current smoker, 18.0% were former smoker and 46.0% were non smoker. Similar findings also seen in the studies of Shuangxi et al.[12], Kamouchi et al.[16] and Doi et al.[14] where current smoker was 38.9%, 46.0% and 50.1% respectively.

In this current study it was observed that 58.0% patients had hypertension. Similarly, 55.6% and 43.3% patients were found hypertensive in the studies of Shuangxi et al.[12] and Doi et al.[14] respectively. Hypertensive patient was 70.9%[16], 73.2%[10] and 74.0%[13].in some others studies which were higher than the current study.

Mean systolic BP was 129.25±15.98 mmHg and mean diastolic BP was 81±10.77 mmHg in our study. Doi et al.[14] found mean systolic blood pressure 134.0±20.0 mmHg and mean diastolic blood pressure 81.0±11 mmHg, which were similar to the current study. Kamouchi et al.[16] revealed mean systolic blood pressure 161.0±30.0 mmHg and mean diastolic blood pressure 88.0±18.0 mmHg which were higher than the current study. Similarly higher systolic and diastolic blood pressure was also revealed by Rathore et al.[15] and Sare et al.[17].

A significant positive correlation was observed between age and modified ranking scale on 14th day of stroke [r = +0.322; p=0.023]. The incidence and prevalence of stroke increase sharply with age[3]. Older patients had higher prevalence of classic vascular risk factors such as ischemic heart diseases, chronic heart failure, and atrial fibrillation[18]. The Framingham and other studies showed that advanced age in acute stroke was independently associated with high mortality (Kelly-Hayes et al. 1988) [19]. Advanced age with diabetes mellitus was also an independent predictor of 30-day mortality (Kasper et al. 2005) [20].

Conclusion:

Patients having new onset ischemic stroke with DM were predominant in above 5th decade and more common in male subjects. Finally it can be concluded that increased age is associated with higher mRS, so more stroke severity.

Acknowledgement: Mohammad Zahid Hasan, Office Assistant, Neurology, Dhaka Medical College Hospital

References:

01. Langhorne P. 'Stroke disease' In: Walker B, Colledge N, Ralton S, Penman I. 22nd ed. 2014. Davidson's Principles and Practice of Medicine, Elsevier, London.
02. Islam MN, Moniruzzaman M, Khalil MI, Basri R, Alam MK, Loo KW, Gan SH. Burden of stroke in Bangladesh. International journal of stroke. 2013 Apr; 8(3):211-13.
03. Marini C, Triggiani L, Cimini N, Ciancarelli I, De Santis F, Russo T, et al. Proportion of older people in the community as a predictor of increasing stroke incidence. Neuroepidemiology. 2001; 20(2):91-5.
04. Rojas JI, Zurrú MC, Romano M, Patrucco L, Cristiano E. Acute ischemic stroke and transient ischemic attack in the very old–risk factor profile and stroke subtype between patients older than 80 years and patients aged less than 80 years. European Journal of Neurology. 2007;14(8):895-99.
05. Wang D, Hao Z, Tao W, Kong F, Zhang S, Wu B, Lin S, Liu M. Acute ischemic stroke in the very elderly Chinese: risk factors, hospital management and one-year outcome. Clinical neurology and neurosurgery. 2011; 113(6):442-6.
06. Olindo S, Cabre P, Deschamps R, Chatot-Henry C, Rene-Corail P, Fournerie P, et al. Acute stroke in the very elderly: epidemiological features, stroke subtypes, management, and outcome in Martinique, French West Indies. Stroke. 2003; 34(7):1593-97.
07. Niewada M, Kobayashi A, Sandercock PA, KamiDski B, CzBonkowska A. Influence of gender on baseline features and clinical outcomes among 17,370 patients with confirmed ischaemic stroke in the international stroke trial. Neuroepidemiology. 2005; 24(3):123-28.
08. Ayala C, Croft JB, Greenlund KJ, Keenan NL, Donehoo RS, Malarcher AM, et al. Sex differences in US mortality rates for stroke and stroke subtypes by race/ethnicity and age, 1995–1998. Stroke. 2002; 33(5):1197-201.
09. Andersen KK, Andersen ZJ, Olsen TS. Age- and gender-specific prevalence of cardiovascular risk factors in 40 102 patients with first-ever ischemic stroke: a Nationwide Danish Study. Stroke. 2010; 41(12):2768-74.
10. Giralt D, Domingues Montanari S, Mendioroz M, Ortega L, Maisterra O, Perea Gainza M, et al. The gender gap in stroke: a meta analysis. Acta Neurologica Scandinavica. 2012 ; 125(2):83-90.
11. Roquer J, Campello AR, Gomis M. Sex differences in first-ever acute stroke. Stroke. 2003; 34(7):1581-85.
12. Shuangxi G, Song T, Bo S, Avinash C, Anna M, Hui F, et al. Study of the relationship of glycated hemoglobin levels and neurological impairment and three months prognosis in patients with acute ischemic stroke. Life Sci J. 2012; 9(2):119-21.
13. Basu S, Sanyal D, Roy K, Bhattacharya KB. Is post-stroke hyperglycemia a marker of stroke severity and prognosis: A pilot study. Neurology Asia. 2007 Jun; 12:13-19.
14. Doi Y, Ninomiya T, Hata J, Fukuhara M, Yonemoto K, Iwase M, et al. Impact of glucose tolerance status on development of ischemic stroke and coronary heart disease in a general Japanese population: the Hisayama study. Stroke. 2010; 41(2):203-9.
15. Rathore JA, Kango ZA, Mehraj A. Predictors of mortality after acute stroke a prospective

hospital based study. Journal of Ayub Medical College Abbottabad. 2011; 23(2):144-46.

16. Kamouchi M, Matsuki T, Hata J, Kuwashiro T, Ago T, Sambongi Y, et al. Prestroke glycemic control is associated with the functional outcome in acute ischemic stroke: the Fukuoka Stroke Registry. Stroke. 2011; 42(10):2788-94.
17. Sare GM, Ali M, Shuaib A, Bath PM. Relationship between hyperacute blood pressure and outcome after ischemic stroke: data from the VISTA collaboration. Stroke. 2009 ; 40(6):2098-103.
18. Yao XY, Lin Y, Geng JL, Sun YM, Chen Y, Shi GW, et al. Age-and gender-specific prevalence of risk factors in patients with first-ever ischemic stroke in China. Stroke research and treatment. 2012; 2012.
19. Kelly-Hayes M, Wolf PA, Kannel WB, Sytkowski P, D'Agostino RB, Gresham GE. Factors influencing survival and need for institutionalization following stroke: the Framingham Study. Arch Phys Med Rehabil 1988; 69:415–8.
20. Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL, et al. editors. Harrison's Principles of Internal Medicine. 16th ed. New Delhi: McGraw-Hill, Medical Publishing Division; 2005; 2372–93