IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 5 Ser. 4 (May. 2019), PP 54-59
www.iosrjournals.org

Clinical Predictor of Ischemic and Hemorrhagic Stroke in Hypertensive Patient Attending In a Tertiary Care Hospital of Bangladesh

Lokman Hakim[1], Milton Barua[2], Amanat Ullah[3], Mofizul Islam[4],
[1] *Dept. Of Medicine, BIRDEM, Dhaka, Bangladesh*
[2] *Corresponding Author, FCPS Medicine, MD Endocrinology and Metabolism, Dept. Of Endocrinology, BIRDEM, Dhaka, Bangladesh, Mobile: 8801911771116*
[3] *AR, Dept of Endocrinology, CMCH, Chittagong, Bangladesh*
[4] *SMO, Dept. Of Neurology, BIRDEM, Dhaka, Bangladesh*

Abstract
Stroke is the leading cause of adult disability, second leading cause worldwide. A hospital based observational study was carried out in Department of Medicine, Comilla Medical College Hospital, Comilla. One hundred adult stroke patients were included in this study. There is no significance of mean age between ischemic and hemorrhagic group. Severe hypertension 52.0% in hemorrhagic and 28.0% in ischemic stroke group. Smoking was significantly more in ischemic stroke patients compare to hemorrhagic stroke. Obese patients were significantly more in ischemic stroke group. Smoking shows to be in favor of IS where high blood pressure is closely related to HS. The improvement of functional outcome up to 3 months was significantly greater with HS.

Key words: *Ischemic, Hemorrhage, Stroke, Hypertension.*

Date of Submission: 29-04-2019 Date of acceptance: 13-05-2019

I. Introduction

Stroke is a major cause of death and disability worldwide[1] and not only increase mortality and morbidity but also put a great economic burden on the society. Patients who survive each year, 31% require assistance in activities of daily living, 20%require assistance in walking and 16% require institutional care[2].After coronary artery diseases and cancer, stroke in the third commonest cause of death in the developed countries. Mortality from stroke varies between populations around the world, but whether these differences are due to genetic or environmental factors is not clear. Stoke is defined as the rapidly developing symptoms and /or signs of focal loss of cerebral function with no apparent cause other than the vascular origin[3]. Due to faster life style and rapid urbanization incidence of stroke is gradually increasing. But improve management strategy of stroke decline the death rate markedly. Most of the development in stroke management occurred in developed world.[4-5] The total burden of stroke on the community is probably underestimated in epidemiological studies because many people have episodes of asymptomatic stroke[6]. As in United State of America possibly more then 9,000000 each year-seen to have clinically silent but MR imaging detectable tissue ischemia[7]. Stroke is a clinical diagnosis made on the characteristics temporal profile of neurological symptoms and signs as exemplified by the World Health Organization definition "rapidly developing clinical signs of (focal or global) disturbance of cerebral function with symptoms lasting 24 hours or longer leading to death with no apparent cause other then vascular origin. This definition includes subarachnoid hemorrhage but exclude subdural hematoma and hemorrhage of infarction caused by infection or tumor[8]. So the main pathological types of stroke are cerebral infarction, primary intra-cerebral hemorrhage and subarachnoid hemorrhage. In developed countries, about 85 to 90% of strokes are due to cerebral infarction and 10 to 15% due to intracranial hemorrhage[9].

Infarction may be due to thrombosis and embolic phenomenon while hemorrhage is mostly due to aneurysms or hypertensive bleed. Usually the hemorrhage is very sudden in onset and cerebral infarction has gradualonset.[10]To make a diagnosis of stroke, a detailed history and thorough clinical

examination is mandatory followed by computerized tomography (CT) scan of the brain for confirmation[11]. CT scan is preferable to magnetic resonance imaging (MRI) in the acute stage because MRI does not easily detect intracranial hemorrhage within the first 48 hours after a bleeding episode[12]. Hypertension is a major risk factor for stroke that is usually associated with other risk factors such as smoking, obesity, previous history of stroke of TIA, myocardial infarction, angina, atrial fibrillation, history of contraceptive pills used by women and alcohol intake[13-15]. Up to 50% of strokes may be attributable to elevated blood pressure and hypertension is the most important modifiable risk factor for stroke.[16] The risk of the stroke has been shown to have direct relationship to elevation of both systolic and diastolic blood pressure in men and w omen of all ages; the strongest association being with systolic blood pressure. The risk of stroke is increased by about 25% with each 10 mm of Hg rise in systolic blood pressure and with diastolic blood pressure of more than 110 mm of Hg; risk is 15 times more than of individual with less than 80 mm of Hg. The factors responsible for the inadequate level of blood pressure control include treatment resistant high blood pressure; recent start of drug therapy, patient's noncompliance with treatment, and suboptimalcare[17].Adequate control of blood pressure is a cornerstone of stroke prevention. Forty five percent of all strokes, among subjects with treatment for hypertension, might be attributed to uncontrolled bloodpressure[18]. High and low blood pressure levels are common following acute stroke, with up to 60% of patients being hypertensive (systolic blood pressure > 160 mm Hg) and nearly 20% having relative hypotension (systolic blood pressure <140 mm Hg), within the first few hours of the event, both conditions being associated with an adverse prognosis.[19]

II. Methods

It was a observational cross-sectional study conducted in the Department of Medicine, Comilla Medical College Hospital, Comilla from January 2018 to June 2018. One hundred adult hypertensive stroke patient with first ever stroke were evaluated during the study period. A semi-structured questionnaire was developed. The questionnaire was developed using the selected variables according to the specific objectives. The questionnaire contained questions related to: 1) socio-demographic characteristics, and 2) illness characteristics and other relevant information. A check list section was also developed. Prior to original data collection, a pre-test session was conducted. Necessary modification was done before finalized the questionnaire. Variables were age, sex, occupation, income, diabetes mellitus, dyslipidaemia, smoking, obesity and stroke. All data were recorded systemically in preformed data collection form and quantitative data were expressed as mean and standard deviation and qualitative data as frequency distribution and percentage. All statistical analysis was done by using SPSS-22 version. All p values <0.05 considered as statistically significant (95% confidence limit).

III. Results

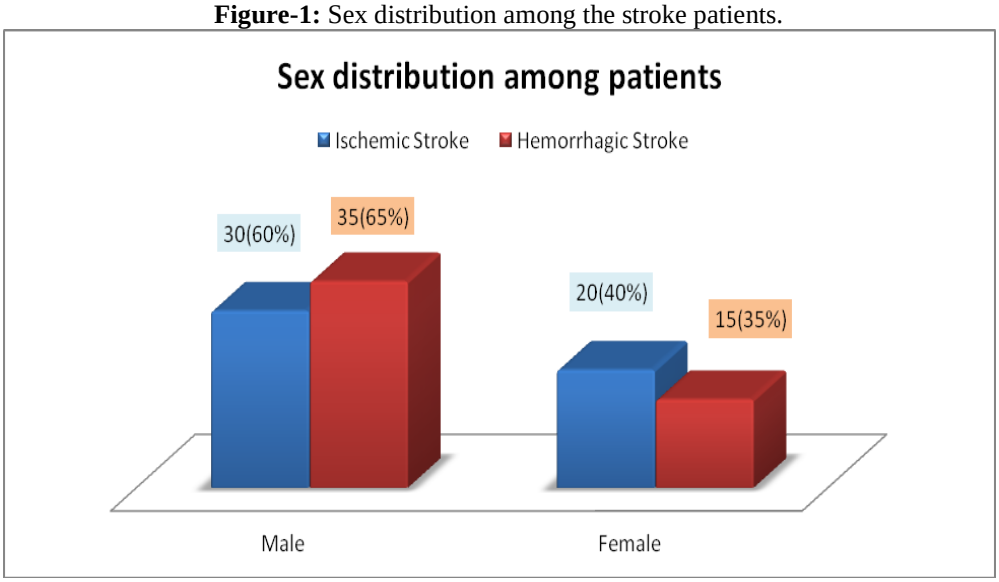
Table-1: Age group distribution among patients.

Age Group	**Ischemic Stroke (n=50) No. (%)**	**Hemorrhagic Stroke (n=50) No. (%)**	**P value**
Below 45	10 (20%)	15 (30%)	
45-55	18 (36%)	20 (40%)	
56-65	16 (32%)	12 (24%)	
Above 65	6 (12%)	3 (6%)	
Total	50 (100%)	50 (100%)	
Mean±SD	55.1±8.45	57.41±10.31	0.223^{ns}

p value reached from Unpaired student t-test, s= significant

Table 1 show that the highest number of Ischemic stroke 18(36%) and Hemorrhagic 20(40%) stroke patients found in 45-55 age group. The lowest 6(12%) Ischemic and 3(6%) Hemorrhagic in above 65 age group. Mean±SD age 55.1±8.45 in ischemic stroke group and 57.41±10.31 in hemorrhagic stroke, there is no significance of mean age between ischemic and hemorrhagic group.

Figure-1: Sex distribution among the stroke patients.



Chi-square test, p = 0.294 (not significant)

In figure 1 showed that, Among Ischemic group, male were 30(60%) and female were 20(40%). In Hemorrhagic group male were 35(70%) and female were 15(30%).

Table-2: Level of blood pressure with stroke patients.

Level of blood pressure (mm/Hg)	Ischemic Stroke (n=50) No. (%)	Hemorrhagic Stroke (n=50) No. (%)	p value
Mild 130-(139/85-89)	9(18.0%)	17(34.0%)	
Moderate (160-179/100-109)	15(30.0%)	19(39.0%)	0.038[s]
Severe >180/>110	26(52.0%)	14(28.0%)	
Total	50(100.0%)	50(100.0%)	

p value reached from Chi-square test, s= significant

Among study subjects, severe hypertension 26(52.0%) in hemorrhagic and 14(28.0%) in ischemic stroke group. Moderate hypertension 15(30.0%) Hemorrhagic and 19(38%) Ischemic stroke patients had moderate hypertension. The association between two groups were statistically significant (p=0.038).

Table -3: Smoking status stroke patients.

Smoking	Ischemic Stroke (n=50) No. (%)	Hemorrhagic Stroke (n=50) No. (%)	P value
Yes	40(80.0%)	29(58.0%)	0.017[s]
No	10 (20.0%)	21(42.0%)	
Total	50 (100.0%)	50(100.0%)	

p value reached from Chi-square test, s= significant

Table 3 shows that among the Ischemic stroke patients 40(80%) were found smoking history and 10(20%) didn't have habit of smoking. Among Hemorrhagic stroke patients 29(58%) had smoking habit and 21(42%) didn't have. Smoking was significantly more in ischemic stroke patients compare to hemorrhagic stroke.

Table -4: Obesity status among stroke patients

Obesity	Ischemic Stroke (n=50) No. (%)	Hemorrhagic Stroke (n=50) No. (%)	P value
Obese	8(16.0%)	2(4.0%)	0.04[s]
Non Obese	42 (84.0%)	48(96.0%)	
Total	50 (100.0%)	50(100.0%)	

p value reached from Chi-square test, s= significant

Among the Ischemic stroke patients, 8(16.0%) had obesity and 42(84.0%) had no obesity. On the other hand, among hemorrhagic stroke patients 2(4.0%) had obesity and 48(96.0%) had no obesity. Obese patients were significantly more in ischemic stroke group.

Table-5: Comparison of blood pressure between two groups (n=100)

Variables	Ischemic Stroke (n=50) Mean±SD	Hemorrhagic Stroke (n=50) Mean±SD	p value
SBP	142.35 ± 22.10	154.76 ± 28.67	0.017[s]
DBP	84.59 ± 25.24	94.23 ± 18.75	0.032[s]

p value reached from Unpaired student-t test, s= significant

Table 5 shows that the mean (±SD) of SBP and DBP 142.35±22.10, 84.59±25.24 in ischemic stroke patients and 154.76±28.67, 94.23±18.75 in hemorrhagic stroke patients. Mean SBP and DBP significantly increased in hemorrhagic stroke patients compare to ischemic stroke ($p<0.05$).

Table-6: Comparison of lipid profile between two groups (n=100)

Variables	Ischemic Stroke (n=50) Mean±SD	Hemorrhagic Stroke (n=50) Mean±SD	p value
TG	4.68 ± 1.24	4.70 ± 1.06	0.931[ns]
TC	1.71 ± 1.18	1.75 ± 1.26	0.866[ns]
HDL	1.15 ± 0.33	1.26 ± 0.36	0.114[ns]

p value reached from Unpaired student-t test, ns= not significant

Table 6 shows that the mean (±SD) of TG, TC, HDL among the Ischemic stroke patients were 4.68±1.24, 1.71±1.18, 1.15±0.33 and Hemorrhagic stroke patients were 4.70±1.06, 1.75±1.26 and 1.26±0.36 respectively. There is no significant difference of lipid profile between ischemic and hemorrhagic stroke patients

Table-7: Distribution of Hypertensive and Ischemic stroke patients according to temporal profile.

Type of stroke	Ischemic Stroke (n=50) No. (%)	Hemorrhagic Stroke (n=50) No. (%)	P value
Complete stroke	48 (96.0%)	40 (80.0%)	0.013[s]
Evolving stroke	2(4.0%)	10 (20.0%)	
Total	50(100.0%)	50(100.0%)	

p value reached from Chi-square test, s= significant

Table 7 shows that in Hemorrhagic group complete stroke were 48 (96%) and evolving stroke were 02(4%) patients. In Ischemic group complete stroke were 40(80.0%) and evolving stroke 10(20%). Temporal profile were significantly difference between ischemic and hemorrhagic stroke patients.

IV. Discussion

In this study, the maximum number of Ischemic 18(36%) and Hemorrhagic 20(40%) stroke patients found in 45-55 age group. Mean age 55.1±8.45 in ischemic stroke and 57.41±10.31 in hemorrhagic stroke patients. In some other studies, the mean age of patients was 54.5+9.66 years with a range of 17-75 years[20]. Stroke in people under 45 years of age is less frequent than in older populations but has a major impact on the individual and society[21]. In the present study, in Ischemic group male were 30(60%) and female were 20(40%). In Hemorrhagic group male were 35(70%) and female were 15(30%). It can be compared with another study. Out of 47 patients 21 were males and 26 females were found in that study[20]. Female patients were globally older than male patients at stroke onset[22]. The age-adjusted incidence of lacunar infarction (3.8 per 1000 person-years for men and 2.0 for women) was higher than that of atherothrombotic infarction (1.2, 0.7) and cardioembolic infarction (1.3, 0.5) in both sexes[23]. In present study, severe blood pressure 24(52.0%) in hemorrhagic and 14(28.0%) in ischemic stroke group. Moderate blood pressure 15(30.0%) Hemorrhagic and 19(38%) Ischemic stroke patients had moderate blood pressure. The association between two groups were statistically significant (p=0.038). In a study, hypertension and family history of hypertension were the significant factors associated with hemorrhagic stroke versus ischemic stroke[24]. In another study, three hundred and forty-eight patients (67%) had hypertension and of these, 250 had first ever stroke at the time of admission[25]. Cerebral hemorrhage is more common in hypertensive stroke patients as compared to cerebral infarction and hypertension is most common modifiable risk factor for stroke found in another study[26]. Hypertension was the most common risk factor, followed by ischemic heart diseases and diabetes mellitus[20]. In one study it was mentioned that, every 3rd person above age of 45 years had hypertension[27]. It was found that among the Ischemic stroke patients 40(80%) were found smoking history and 10(20%) didn't have habit of smoking. Among Hemorrhagic stroke patients

29(58%) had smoking habit and 21(42%) didn't have. Smoking was significantly more in ischemic stroke patients compare to hemorrhagic stroke. In a study, smoking, drinking, kidney diseases and lower HDL-C were the significant factors contributing to ischemic stroke in man[25]. Young patients had a much higher proportion of smoking and drinking than middle aged[22]. Smoking and alcohol consumption favored HS, whereas age, sex, and hypertension did not herald stroke type was found in another study[27]. It is found that among the Ischemic stroke patients 8(16%) had obesity and 42(84.0%) had no obesity. Among Hemorrhagic stroke patients 2(4.0%) had obesity and 48(96%) had no obesity. Obese patients were significantly more in ischemic stroke group. It can be compared with another study. Our finding was similar to that of other research in China.[20] In the risk factors, the prevalence of obesity was inappreciable (9.44% in ischemic patients and 1.97% in hemorrhagic patients) and it was more contributive in ischemic patients[26]. Obesity was the significant factors for females with ischemic stroke[25]. It was found that the mean the mean (±SD) of SBP and DBP 142.35±22.10, 84.59±25.24 and Hemorrhagic stroke patients were 154.76±28.67, 94.23±18.75 respectively. Mean difference of SBP and DBP between ischemic and hemorrhagic stroke were statistically significant ($p<0.05$). Zhand et al.[24] reveals in a study, elevated SBP, elevated DBP was significant decreased in hemorrhagic stroke patients compare to ischemic stroke. In present study the mean (±SD) of TG, TC, HDL among the Ischemic stroke patients were 4.68±1.24, 1.71±1.18, 1.15±0.33 and Hemorrhagic stroke patients were 4.70±1.06, 1.75±1.26 and 1.26±0.36 respectively. There is no significant difference of lipid profile between ischemic and hemorrhagic stroke patients. In a large cohort of elderly patients,[21] low triglycerides levels were associated with an increased risk of hemorrhagic stroke. In East China, a low level of HDL was much more closely related to ischemic stroke risk (OR=1.535)[23]. In a study, hypercholesterolemia was found the significant factors for females with ischemic stroke[24]. The present study shows that in Hemorrhagic group complete stroke were 48 (96%) and evolving stroke were 02(4%) patients. In Ischemic group complete stroke were 40(80.0%) and evolving stroke 10(20.0%). In one study, of the patients 3993 (10.1%) had Hemorrhagic Stroke. Stroke severity was almost linearly related to the probability of having HS (2% in patients with the mildest stroke and 30% in those with the most severe strokes)[28]. Virtually every one was (88) displayed complete stroke[26].

V. Conclusion

The present comparative study shows smoking and other risk factor (obesity and lipid profile) to be in favor of HS as compared to IS, whereas presence of diabetes, atrial fibrillation, previous myocardial infarction and previous stroke disfavors the likelihood of HS. High blood pressure is closely related to hemorrhagic stroke. The improvement of functional outcome up to 3 months was significantly greater with HS.

References

[1]. Shyu WC, Lin SZ, Lee CC, LinDD, Granulocyte colony stimulating factor for acute ischemic stroke; a randomized controlled trail. CMAJ 2006; 174 (7): 927-933.
[2]. Shi F, Hart RG,Sheman DG, TegeierCH,Stroke in peoples Republic of China. Stroke 1989;20:1581-5.
[3]. Brown MM. Stroke epidemiology and clinical features. Med Int Neuro12000;10(4):45-51.
[4]. World Health Organization. The world health report 2004: Geneva: WHO, 2004.
[5]. World Health Organization. The world health report 1999: Geneva: WHO, 1999.
[6]. American Heart Association. Heart and Stroke Statics-2004 update. Dallas, Am Heart Assoc.2004.
[7]. Janardhan V, Qureshi AL. Mechanism of ischemic brain injury. CurrCardiolResp 2004;6(2):117-123.
[8]. KhulCK,Textor J, Cieseke J. Acute and subacute ischemic stroke at high-fiesl-strength (3.0-T) diffusion-weighted MR imaging: intra individual comparative study. Radoiology 2005:234:509516.
[9]. Alam I, Haider I, Wahan F Khan W, Taqweem MA, lqowsherwan. Risk factors strratification in 100 patents of acute stroke, J Postagrad Med Inst 2004; 18:583-91.
[10]. Ahmed MM, Nasarullah M. Study of clinical presentation versus CT findings regarding the type of lesion in stroke. Pak J Neurol2004;10:17-22.
[11]. Rehman SU, Khan MA, Clinical versus CT Scan diagnosis in stroke: a comparative study of 50 cases. J Ayub Med Coll2002;14:2-5.
[12]. Kidwell CS, Chealela JA, Saver JL, StarkmanS,Hill MD, Demehuk AM, et al. Comparison of MRI and CT for detection of acute intraeerebralhemorrhage. J Am Med Assoc. 2004;292:1823-30.
[13]. FlossmannE, Rothwell PM. Family history of stroke in patients with transient ischemic attack in relation to hypertension and other intermediate phenotypes. Stroke 2005;36:35-5.
[14]. El-Atat F, Rundek T, Sowers JR, McFarlane SI. Stroke Prevention in diabetic and other high cardiovascular risk patient. CurrDiab Rep 2005;5:200-7.
[15]. Liu XF, van Melle G, Bogousslavsky J. Analysis of risk factors in 3901 patients with stroke. Chin Med Sci J 2055;20:35-9.
[16]. Gorecick PB, Sacco RL, Smith DB. Prevention of lststroke: a review of guidelines and multidisciplinary consensus statement from the national stroke association. JAMA 1999; 281:11121120.
[17]. Arnett Dk, Davis BR, Ford CE. Pharmacogeneties association of the angiotensin converting enzymes Insertion / Deletion polymorphism on blood pressure and cardiovascular risk in relation to antihypertensive treatment: the genetics of hypertension associated treatment (Gen HAT) study. Circulation 2005; 11: 3374-3383.
[18]. Li C, Engstrom G, hedblad B, Berglund G, Janzon L. Blood pressure control and risk of stroke: A population based prospective cohort study. Stroke 2005;36:725-30.
[19]. Potter J, robinson T, Ford G, James M, Jenkins D, Mistri A, et al. CHHIPS (Controlling Hypertension and Hypertension Immediately Post-stroke) Pilot Trial: rationale and design. J Hypertens 2005;23:649-55.

[20]. Khan N, Khan H, Khan N. CT Scan findings and risk factors in patients presenting with stroke. Gomal J Med Sci 2013; 11: 192-4.
[21]. Griffiths D and J. Sturm, Epidemiology and Etiology of Young Stroke, SAGE-Hindawi Access to Research Stroke Research and Treatment Volume 2011, Article ID 209370, 9 pages doi:10.4061/2011/209370.
[22]. Yao XY, Lin Y, Geng JL, Sun Y, Chen Y, Shi G et al. Age and Gender-Specific Prevalence of Risk Factors in Patients with First-Ever Ischemic Stroke in China, Hindawi Publishing Corporation Stroke Research and Treatment Volume 2012, Article ID 136398, 6 pages doi:10.1155/2012/136398.
[23]. Tanizaki Y, Kiyohara Y, Kato I, Iwamoto H, Nakayama K, Shinohara N et al. Incidence and Risk Factors for Subtypes of Cerebral Infarction in a General Population, Stroke. 2000; 31: 2616-2622,
[24]. Zhang J, Wang Y, Wang GN, Sun H, Sun T, Shi JQ et al. Clinical factors in patients with ischemic versus hemorrhagic stroke in East China, World J Emerg Med 2011;2(1):18-23.
[25]. Khealani BA, Syed NA, Maken S, Mapari UU, Hameed B, Ali S et al. Predictors of ischemic versus hemorrhagic strokes in hypertensive patients. J Coll Physicians Surg Pak. 2005 Jan;15(1):22-5.
[26]. Abro AD, Abbasi MA, Hafeezullah, Sammo J, Sheikh M. Incidence of stroke in context of hypertension in local population, Pak J Physiol 2007;3(2).
[27]. Khealani, B., Hameed, B., Mapari, U. (2008). Stroke in Pakistan. Journal of the Pakistan Medical Association, 58(7), 400-3. Available at: http://ecommons.aku.edu/pakistan_fhs_mc_med_neurol/34.
[28]. Andersen KK, Olsen TS, Dehlendorff C, Kammersgaard LP. Hemorrhagic and Ischemic Strokes Compared Stroke Severity, Mortality, and Risk Factors, Stroke. 2009; 40: 2068-2072.

Milton Barua, "Clinical Predictor of Ischemic and Hemorrhagic Stroke in Hypertensive Patient Attending In a Tertiary Care Hospital of Bangladesh." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 5, 2019, pp 54-59.