

# ASSOCIATION BETWEEN HYPERTENSION AND THE SEVERITY OF NEW ONSET ISCHEMIC STROKE IN DIABETIC PATIENTS

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## Abstract

**Objective:** To evaluate the association between hypertension and the severity of new onset ischemic stroke patient with diabetes mellitus.

**Method:** This Cross sectional study was carried out in the Department of Neurology, BSMMU, Dhaka, from February 2013 to September 2014 on 50 patients with first attack of ischemic stroke with DM. mRS was measured on 14<sup>th</sup> day of the stroke. During this period other important relevant investigations were also recorded.

**Result:** In this study, out of 50 patients, 40.0% were in age group 51-60 years and the mean age of the patients was  $58.9 \pm 9.6$  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 former smoker and 23(46.0%) were non smoker. More than half of the patients had hypertension (58.0%). Mean systolic BP was  $129 \pm 16$  mmHg with a range from 90 to 160 mmHg and the mean diastolic BP was  $81 \pm 11$  mmHg with a range from 60 to 100 mmHg. No association was found between hypertension with severity of new onset ischemic stroke in Diabetic patients.

**Conclusion:** As per study result it can be concluded that there is no association between hypertension and the severity of new onset ischemic stroke in Diabetic patients.

**Keywords:** Hypertension, Ischemic stroke, diabetes mellitus

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## Introduction:

Stroke is defined as a sudden onset of a neurological deficit caused by an acute focal injury to the central nervous system due to a vascular cause.<sup>1</sup> The incidence of strokes occurring every year worldwide is about 17 million and it is the second leading cause of death after coronary artery disease.<sup>2</sup> Ischemic strokes are the most common (H<sup>o</sup>85%), the rest are hemorrhagic which include cerebral and subarachnoid (H<sup>o</sup>15%).<sup>3</sup>

Stroke is the third leading cause of death in Bangladesh (Islam et al. 2013).<sup>4</sup> The World

Health Organization ranks Bangladesh's mortality rate due to stroke as number 84 in the world. The reported 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 (Islam et al. 2013).<sup>4</sup>

Hypertension (HTN) is the most common modifiable risk factor for stroke, with blood pressure (BP) reduction being associated with a reduced rate of stroke recurrence.<sup>5</sup> However, how best to treat HTN during the acute period

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of ischemic stroke is less well established. In a recent study using data collected from nationwide Emergency Departments, 69% of presenting patients had a systolic blood pressure of >139 mm Hg, while other studies have found blood pressures of >150/90 mm Hg in up to 84% of patients.<sup>6,7</sup> Although the management of BP in acute ischemic stroke has been addressed in many clinical trials, there are no definitive data showing that treatment in the hyperacute or acute setting alters clinical outcomes.<sup>8,9</sup>

The existing studies have shown that the main cause of ischemic stroke is the lesion of vascular wall. Diabetes mellitus is one of the major risk factors of atherosclerosis, which can accelerate the process of vascular lesion.<sup>10</sup>

**Method:**

This Cross sectional study was carried out in the Department of Neurology, BSMMU, Dhaka, from February 2013 to September 2014. This study was conducted on 50 patients with first attack of ischemic stroke with DM. On 14<sup>th</sup> day of stroke, patient’s mRS was done along with HbA1c. During this period other important relevant investigations were recorded. Statistical software SPSS 12.0 was used for analysis. A p value of <0.05 was taken as level of significance.

**Results:**

In this study, it was observed that majority of the patients (40.0%) were in age group 51-60 years and the mean age was 58.9 ± 9.6 years with a range from 30 to 75 years. 26(52.0%) patients were male and 24(48.0%) were female. Male to female ratio was 1.08:1. It was 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. It was

observed that majority of the 29(58.0%) patients had hypertension. Mean systolic blood pressure was 129 ± 16 mmHg with a range from 90 to 160 mmHg and mean diastolic blood pressure was 81±11 mmHg with a range from 60 to 100 mmHg in this study.

Mean modified ranking scale on 14<sup>th</sup> day of stroke were 2.7±0.8 and 2.6±1.0 in hypertensive and normotensive patients respectively. The mean difference was not statistically significant (p>0.05) between two groups.

**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	27	54.0
Non smoker	23	46.0
Hypertension	29	58.0
Systolic BP (mmHg)	129 ± 16	
[Mean ±SD]		
Diastolic BP (mmHg)	81 ± 11	
[Mean ±SD]		

**Table II**

*Association between hypertension with modified ranking scale on 14<sup>th</sup> day of stroke (n=50)*

Hypertension	n	Modified ranking scale (On14th day of stroke)		P-value
		Mean±SD	Min-max	
Yes	29	2.7±0.8	1-3	0.134
No	21	2.6±1.0	1-5	

P value reached from unpaired t-test

**Table-III**  
*Dependent Variable: Modified ranking Scale for Stroke Severity (mRS)*

Independent variables	Unstandardized B (beta)	Wald	S.E.	Sig.	OR	Standardized B (beta)	95% CI for OR Lower	Upper
Age	.106	5.421	.046	.020*	1.112	0.2415	1.017	1.216
Sex	-2.656	3.650	1.390	.056	.070	-0.3063	.005	1.071
Smoking	-1.370	2.479	.870	.115	.254	-0.2400	.046	1.399
Hypertension	-.987	1.702	.756	.192	.373	-0.1154	.085	1.641
HBA1c	.847	6.025	.345	.014*	2.332	0.2873	1.186	4.584
Constant	-8.290	4.632	3.852	.031	.000	0.2415	-	-

\*Significant at 5 Percent level of significance

### Discussion:

In this series it was observed that majority (78.0%) patients were in 6<sup>th</sup> and 7<sup>th</sup> decade and the mean age was 58.96±9.58 years with range from 30 to 75 years. Shuangxi et al.<sup>11</sup> and Basu et al.<sup>12</sup> showed the mean age was 60.5±8.65 years varied from 45 to 81 years and the average age was 60.0 ±13 years varied from 25 to 88 years respectively. Similarly, Doi et al.<sup>13</sup> obtained the mean age 58.0±10.0 years, which is consistent with the current study. On the other hand, Rathore et al.<sup>14</sup> has observed higher mean age, which was 64.78±9.404 years varied from 45–85 years and the maximum frequency was seen between ages 55–74 years. Similarly, Kamouchi et al.<sup>15</sup> and Sare et al.<sup>16</sup> showed the mean age of the study subjects was 69±12 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.<sup>11</sup>, Kamouchi et al.<sup>15</sup>, Rathore et al.<sup>14</sup>, Sare et al.<sup>16</sup> and Basu et al.<sup>12</sup> series, where all the above investigators found male predominance in their study.

In this present studies 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. Shuangxi et al.<sup>11</sup>, Kamouchi et al.<sup>15</sup> and Rathore et al.<sup>14</sup> showed 38.9%, 46.0% and 57.0% study subjects were

current smoker respectively. In another study, Doi et al.<sup>13</sup> observed 50.1% patients were current smoker in their study, which were comparable with the current study.

In this current study it was observed that 58.0% patients had hypertension. Similarly, Shuangxi et al.<sup>11</sup> and Doi et al.<sup>13</sup> found 55.6% and 43.3% of their study patients were hypertensive, respectively. Kamouchi et al.<sup>15</sup> found 70.9% of patients hypertensive, Sare et al.<sup>10</sup> found history of hypertension in 73.2% and Basu et al.<sup>12</sup> obtained that the majority of the patients were hypertensive (74.0%). Above results were higher than the current study.

In this present study, it was observed that the mean systolic BP was 129.25±15.98 mmHg which varied from 90 to 160 mmHg. The mean diastolic BP was 81±10.77 mmHg which varied from 60 to 100 mmHg. Doi et al.<sup>7</sup> showed that the mean systolic blood pressure was 134.0±20.0 mmHg and mean diastolic blood pressure was 81.0±11 mmHg, which was consistent with the current study. Kamouchi et al.<sup>15</sup> showed the mean systolic blood pressure was 161.0±30.0 mmHg and mean diastolic blood pressure was 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.<sup>14</sup> and Sare et al.<sup>16</sup>.

### Conclusion

Patients having new onset ischemic stroke with Diabetic Mellitus were predominant in 6<sup>th</sup> decade and above and more common in male subjects. Finally it can be concluded that

hypertension is not associated with stroke severity measured in mRS scale.

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