Clinical profile of stroke in diabetic and non-diabetic patients at tertiary care hospital

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Abstract

Diabetes mellitus is a risk factor of stroke which influences the vascular lesions in brain ischemia, and the predominant type of brain infarction is deep subcortical brain infarction. It was observed that 75% patients with ischemic stroke of the deep branch of the MCA, have hypertension or diabetes. It was found that diabetic and nondiabetic patients with abnormal HbA1c level showed higher carotid artery stenosis in patients with abnormal HbA1c. Patients with AIS, the severity of stroke was higher in patients with abnormal HbA1c. The present cross-sectional observational study was conducted at tertiary care centre in the department of General Medicine after obtaining the ethical permission from the institution over a period of 18 months with the aim to assess the clinical profile, pattern of stroke and correlate level of HBA1C with type of stroke and prognosis in diabetic and non-diabetic patients. A total of 165 diabetic and non-diabetic patients with stroke attending OPD/IPD were involved in the study. The mean age of the Group -I patients were 59.26 ± 15.88 years and majority of the patients were males (63.5%) and the mean age of the Group -I patients were 59.85 ± 14.94 years and majority of the patients were males (63.8%). Hypertension was significant risk factor for stroke among patients in diabetic group. It was concluded that diabetes is an independent risk factor for stroke. Stroke in diabetes differs from that of stroke in non-diabetics with respect to age, sex, type, stroke severity, prevalence of risk factors, and outcome.

Keywords: Stroke, Diabetes mellitus, Non-diabetic, Clinical profile and Risk factors.

Introduction

Cerebrovascular events are the third most common cause of mortality globally. Among all cerebrovascular accidents, 80% are ischemic, rest are haemorrhagic. The middle cerebral artery (MCA) and its branches are the most commonly affected brain vessels in cerebral infarction.[1,2]

Diabetes mellitus is a risk factor of stroke which influences the vascular lesions in brain ischemia, and the predominant type of brain infarction is deep subcortical

brain infarction. It was observed that 75% patients with ischemic stroke of the deep branch of the MCA, have hypertension or diabetes.[3,4]

The Emerging Risk Factors Collaboration showed that the adjusted hazard ratios (HRs) with diabetes were 2.27 (1.95–2.65) for ischemic stroke, 1.56 (1.19–2.05) for hemorrhagic stroke and 1.84 (1.59–2.13) for unclassified stroke.[5]

The arteries and arterioles of cerebral circulation possesses considerable myogenic tone and respond to increases in TMP by active vasoconstriction.[6]

In a study it was found that diabetic and nondiabetic patients with abnormal HbA1c level showed higher carotid artery stenosis in patients with abnormal HbA1c. Patients with AIS, the severity of stroke was higher in patients with abnormal HbA1c.[7,8]

Thus, the present was conducted to assess the clinical profile, pattern of stroke and correlate level of HBA1C with type of stroke and prognosis in diabetic and non-diabetic patients.

Aims

➢ To study clinical profile of stroke in diabetic and non-diabetic patients at tertiary care hospital.

Objective:

➢ To find and compare pattern of stroke in diabetic and non-diabetic patients.

➢ To correlate level of HBA1C with type of stroke.

➢ To compare prognosis of stroke in diabetic patients and non-diabetic patients.

Material and methods

The present cross-sectional observational study was conducted at tertiary care centre in the department of general medicine after obtaining the ethical permission from the institution over a period of 18 months.

A total of 165 diabetic and non-diabetic patients with stroke attending OPD/IPD were involved in the study and were categorized into two groups. Group 1 consist of 85 diabetic patients with stroke and group 2 consist of 80 non-diabetic patients with stroke.

Inclusion criteria

➢ History-patients admitted with symptoms of ischemia

➢ NCCT brain

Exclusion criteria

➢ Patients in whom proper clinical history cannot be elicited

➢ Patients who refuse to give consent

➢ Transient ischemic events.

A detailed history was collected, clinical examination and NCCT was done.DM was confirmed on the basis of history, history of receiving oral hypoglycemic drugs or insulin, suggestive of diabetes or previous reports of blood sugar or glycosylated haemoglobin (HbA1C). Patients not known to have DM admitted with high blood sugar levels underwent repeat blood sugar (48 h after admission) and HbA1C estimation.

Detailed neurological and other system examinations were done and recorded. Severity of stroke was assessed as per the NIHSS at admission and at the end of 1 week (on the day of discharge); appropriate laboratory testing and imaging were also done and treated as per the standard protocol in intensive care unit and general wards by a single observer and classified as patients with/without DM.

All patients were examined in detail along with clinical examination, radiological investigations, HBA1C and lipid profile.

Data was tabulated and analysed with the help of SPSS 21.0 version. Quantitative data is presented with the help of Mean and Standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table.

Association among the study groups is assessed with the help of Fisher test, student 't' test and Chi-Square test. 'p' value less than 0.05 is taken as significant.

Observations and Results

In the present study the mean age of the Group -I patients were 59.26 ± 15.88 years and majority of the patients were males (63.5%) and the mean age of the Group -I patients were 59.85 ± 14.94 years and majority of the patients were males (63.8%). No significant difference between the groups (p>0.05).

Table 1: Clinical presentation

Clinical Presentation	Diabetic		Non-diabetic	
	N	%	N	%
Hemiplegia	65	76.4	60	75
Speech involvement	31	36.5	31	38.7
Altered sensorium	10	11.8	19	23.7
Convulsions	7	8.2	8	10
Instability of gait	6	7.1	5	6.2
Headache	3	3.5	3	3.7
Vomiting	0	-	2	2.5

Table 1, depicted that the most common clinical presentation in both groups was Hemiplegia (76.4% and 75% respectively) followed by Speech Involvement (36.5% and 38.7% respectively), Altered Sensorium (11.8% and 23.7% respectively), Convulsions (8.2% and 10% respectively), Instability of gait (7.1% and 6.2% respectively), Headache (3.5% and 3.7% respectively) and Vomiting (0% and 2.5% respectively).

Table 2: Risk factors

Risk factors	Diabetic		Non-diabetic	
	N	%	N	%
Hypertension	63	74.1	31	38.7
Diabetes Mellitus	23	28.7	21	24.5
Dyslipidaemia	14	16.5	16	20
Past H/o of CAD	12	14.1	13	16.2
Smoking	47	55.3	43	53.8
Alcohol	24	28.2	17	21.2

It was reported that the diabetes mellitus, Smoking and Alcohol cases was higher in Diabetic group compared to Non-- diabetic group although it did not reach statistical significance (28.7% vs.24.5%, 55.3% vs. 53.8% and 28.2% vs. 21.2%). Dyslipidaemia and Past H/o ofCoronary Artery Disease (CAD) were more prevalent amongst Non- diabetic group but this difference was statistically not significant as per Chi-Square test (16.5% vs. 20% and 14.1% vs. 16.2%; p>0.05) as shown in table 2.

Table 3: Baseline parameters

Parameters	Diabetic		Non-diabetic	
	Mean	SD	Mean	SD
SBP (mmHg)	141.84	14.74	128.16	14.87
DBP (mmHg)	105.73	9.23	78.05	10.33
FBS (mg/dl)	160.24	11.64	106.30	19.44
PPBS (mg/dl)	211.85	16.09	115.48	36.77
HbA1c (%)	8.08	1.19	5.55	1.16
Creatinine (mg/dL)	0.65	0.18	0.81	0.19
Cholesterol (mg/dL)	189.28	12.69	190.84	13.51
Triglycerides (mg/dL)	217.84	36.18	147.90	39.02
LDL (mg/dL)	103.84	31.12	102.72	28.24
HDL (mg/dL)	38.91	6.38	50.31	6.05

The current study found that the mean SBP (141.84±14.74 mmHg vs. 128.16±14.87 mmHg; p<0.05), DBP (105.73±9.23 mmHg vs. 78.05±10.33 mmHg; p<0.05), FBS (160.24±11.64 mg/dl vs. 106.30±19.44 mg/dl; p<0.05), PPBS (211.85±16.09 mg/dl vs. 115.48±36.77 mg/dl;p<0.05), HbA1c (8.08±1.19% vs. 5.55±1.16%; p<0.05) and Triglycerides (217.84±36.18 mg/dl vs. 147.90±39.02 mg/dl; p<0.05) were

significantly higher and HDL (38.91±6.38 mg/dl vs. 50.31±6.05 mg/dl; p<0.05) was significantly lower in Diabetic Group compared to Non-diabetic group as per Student t-test (p<0.05). The mean Creatinine (0.65±0.18 mg/dl vs. 0.81±0.19 mg/dl), Cholesterol (189.28±12.69 mg/dl vs. 190.84±13.51 mg/dl) and LDL (103.84±31.12 mg/dl vs. 102.72±28.24 mg/dl) were comparable and statistically not significant as per Student t-test (p>0.05) as depicted in table 3.
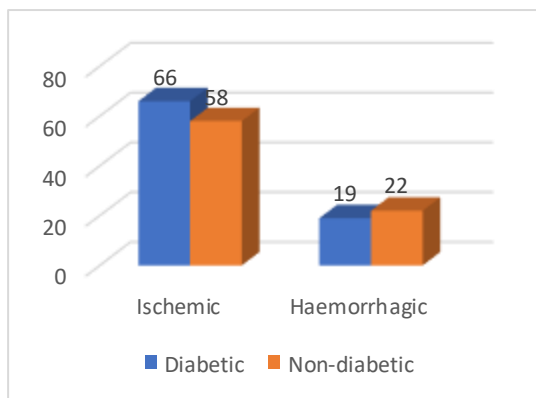

Figure 1: Type of stroke

Figure 1, represents that the most common type of stroke in both groups was ischemic stroke (77.7% and 72.5% respectively) while the incidence of haemorrhagic stroke in Diabetic and Non-- diabetic was 22.3% and 27.5% respectively. There was no significant difference between the groups as per Chi-Square test (p>0.05).

Table 4: Age vs Type of stroke

Age	Ischemic		Haemorrhagic	
	Mean	SD	Mean	SD
Diabetic	58.23	16.38	62.84	13.76
Non-diabetic	58.45	14.99	63.55	14.51

Table 4, shows that there was no significant difference in the mean age of patients with ischemic stroke and haemorrhagic stroke as per Student t-test (p>0.05).In Diabetic group, the mean age of patients with ischemic and haemorrhagic stroke was comparable (58.23±16.38 years vs. 62.84±13.76 years). Similarly, in Non--

diabetic group, the mean age of patients with ischemic and haemorrhagic stroke was comparable (58.45±14.99 years vs. 63.55±14.51 years).

Table 5: Gender vs Type of stroke

Gender	Ischemic		Haemorrhagic	
	Male	Female	Male	Female
Diabetic	40 (60.6%)	26 (39.4%)	14 (73.7%)	5 (26.3%)
Non-diabetic	39 (67.3%)	19 (32.7%)	12 (54.6%)	10 (45.4%)

Table 5, reported that in both the groups, the number of male and female patients with ischemic stroke and haemorrhagic stroke was comparable. It was observed that there was no significant association between gender and type of stroke as per Chi-Square test (p>0.05).
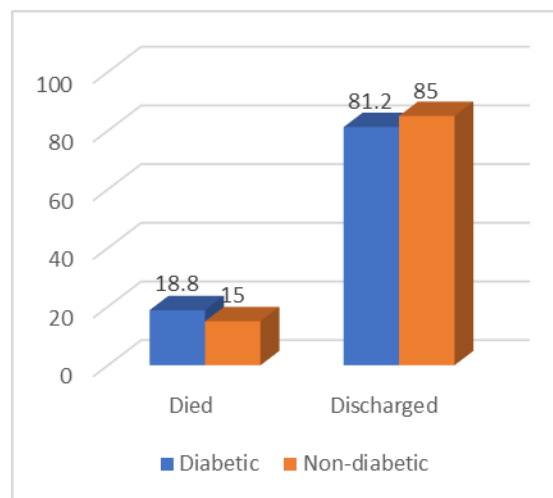

Figure 2: Outcome

Figure 2 showed that the 16 (18.8%) patients in Diabetic group died while 69 (81.2%) patients were discharged. 12 (15%) patients in Non-diabetic group died while 68 (85%) patients were discharged. There was no significant difference between the groups as per Chi- Square test (p>0.05).

Table 6: Association of Factors with Stroke among patients in Diabetic group

Parameters	OR	95% CI	P Value
Age	0.96	0.84-1.32	p>0.05
Gender	1.10	0.99–1.22	p>0.05
Hypertension	1.42	1.26–1.60	p<0.05
Diabetes Mellitus	1.01	0.83–1.54	p>0.05
Dyslipidemia	1.39	0.85–2.31	p>0.05
Past H/o of CAD	0.81	0.61–1.09	p>0.05
Smoking	0.93	0.71–1.23	p>0.05
Alcohol	0.82	0.61–1.11	p>0.05
SBP	1.12	0.88-1.36	p>0.05
DBP	1.13	0.54-1.66	p>0.05
FBS	0.75	0.54–1.03	p>0.05
PPBS	0.97	0.82–1.16	p>0.05
HbA1c	1.04	0.87–1.52	p>0.05
Creatinine	0.80	0.59–1.09	p>0.05
Cholesterol	1.23	0.92-1.73	p>0.05
Triglycerides	1.06	0.77-1.24	p>0.05
LDL	0.91	0.72–1.32	p>0.05
HDL	1.81	0.31 - 2.39	p>0.05

Table 6, observed that hypertension was significant risk factor for stroke among patients in diabetic group.

Discussion

The data was analysed and discussed with previously available literature.

The mean age of patients in Non-Diabetic Group was 59.85 ±14.94 years. There was no significant difference between the groups as per Student t-test (p>0.05). There was male preponderance in both groups (63.5% & 36.5% respectively) while female patients constituted 36.5% & 36.2% respectively of the study population. These findings are similar to the study conducted by Subhash A et al. found that mean age in diabetic stroke patients was 57.5 ± 12.7 years and in non- diabetic stroke patients were 61.3 ± 12.9 years. Males out-numbered females in both the groups.[9]

It was reported that the most common clinical presentation in both groups in the present study was Hemiplegia (76.4% and 75% respectively) followed by Speech Involvement (36.5% and 38.7% respectively), Altered Sensorium (11.8% and 23.7% respectively),Convulsions (8.2% and 10% respectively), Instability of gait (7.1% and 6.2%respectively), Headache (3.5% and 3.7% respectively) and Vomiting (0% and 2.5%respectively). The findings are correlated with the study conducted by Eshwarappa P et al. observed stroke patients in both study groups presented with history of motor weakness as their most common presenting complaint (>85% in both the groups had hemiparesis/ hempilplegia and 10% had monoparesis/ monoplegia). History of cranial nerve involvement was in 27% in diabetics and 30% in nondiabetics. Visual disturbance was present in 10% of diabetic patients. Speech disorder was present in 27% of diabetics and 30% of non-diabetics.[10]

It was observed in the present study that hypertension was significantly the most common risk factor present in Diabetic group compared to Non-diabetic group (74.1% vs. 38.7%; p<0.05). These findings are consistent with the studies conducted by Eshwarappa P et al. Subhash A et al. and MahaLakshmi AK et al. noted similar observations in their studies.[9,10,11]

It was observed in our study that the mean SBP (141.84±14.74 mmHg vs. 128.16±14.87 mmHg; p<0.05), DBP (105.73±9.23 mmHg vs. 78.05±10.33 mmHg; p<0.05), FBS (160.24±11.64 mg/dl vs. 106.30±19.44 mg/dl; p<0.05), PPBS (211.85±16.09 mg/dl vs. 115.48±36.77 mg/dl; p<0.05), HbA1c (8.08±1.19% vs. 5.55±1.16%; p<0.05) and Triglycerides (217.84±36.18

mg/dl vs. 147.90±39.02 mg/dl; p<0.05) were significantly higher and HDL (38.91±6.38 mg/dl vs. 50.31±6.05 mg/dl; p<0.05) was significantly lower in Diabetic Group compared to Non-diabetic group as per Student t-test (p<0.05). The mean Creatinine (0.65±0.18 mg/dl vs. 0.81±0.19 mg/dl), Cholesterol (189.28±12.69 mg/dl vs. 190.84±13.51 mg/dl) and LDL (103.84±31.12 mg/dl vs. 102.72±28.24 mg/dl) were comparable and statistically not significant as per Student t-test (p>0.05). The results are in accordance with the study conducted by Subhash A et al observed that Hypertension, high-density lipoprotein (HDL) levels and triglyceride (TG) levels were significantly associated with DM. Stroke patients with DM had significantly higher levels of mean TG level and lower mean HDL level. The mean random blood glucose level was lower in strokes/patients with DM compared to patients without DM. The mean HDL cholesterol was lower in the diabetic group (38.8 ± 12.6 mg/dL) compared to that in the non-diabetic group (50.1 ± 6.9 mg/dL). The mean TG was significantly higher in the person with diabetes (216.9 ± 67.6mg/dL) than in the non-diabetic group (150.1 ± 60.6 mg/dL).[9]

The most common type of stroke in both groups in our study was ischemic stroke (77.7% and 72.5% respectively) while the incidence of haemorrhagic stroke in Diabetic and Non- diabetic was 22.3% and 27.5% respectively. There was no significant difference between the groups as per Chi-Square test (p>0.05). Thisfinding was like the studies of Subhash A et al, Kissela BM et al. and MahaLakshmi AK et al.[9,11,12]

There was no significant difference in the mean age of patients and gender with ischemic stroke and haemorrhagicstroke (p>0.05). The results are correlated with the studies conducted by Mulneir HE et al. and Kumar GS et al.[13,14]

It was observed in the present study that 16 (18.8%) patients in Diabetic group died while 69 (81.2%) patients were discharged. 12 (15%) patients in Non-diabetic group died while 68 (85%) patients were discharged. There was no significant difference between the groups. Similar observations were noted in the studies of Eshwarappa P et al, Subhash A et al, Kumar GS et al and MahaLakshmi AK et al.[9,10,11,14]

Hypertension was more and significant risk factor for stroke among patients in diabetic group. This is similar to the studies of Eshwarappa P et al andSubhash A et al.[9,10]

It was further reported that the HbA1c levels may influence severity in patients with stroke. So HbA1c level may be is an important predictor to evaluate the neurological impairment in patients of stroke with diabetes.

Conclusion

The present study concluded that commonest modifiable risk factors in stroke were hypertension, smoking, dyslipidemia, alcohol consumption, and diabetes mellitus. Commonest non modifiable risk factors were increasing age and male sex.Diabetes is an independent risk factor for stroke. Stroke in diabetes differs from that of stroke in non-diabetics with respect to age, sex, stroke type, stroke severity, prevalence of risk factors, and outcome. Dyslipidemia and Past H/o of Coronary Artery Disease (CAD) were more prevalent amongst Non- diabetic group. Thus, early diagnosis, treatment including lifestyle modification and prevention of diabetes may reduce the development of stroke and its complications and it presents a major challenge for health care professionals facing an epidemic of both diabetes and stroke.

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