Original Research Article

Comparative study of clinical profile of patients with stroke in diabetic and non-diabetic patients admitted to SIMS Shivamogga

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ABSTRACT

Background: Diabetes mellitus is one of the major risk factor for stroke. Stroke in diabetic patients is different from stroke in non-diabetics in many aspects. This study was carried out to with the aim to compare the clinical profile of patients with diabetic non-diabetic stroke, and its outcome. The objective of the study was to compare the clinical profile of stroke in diabetics and non-diabetics.
Methods: The present study is a prospective case control observational study, carried out at Shivamogga Institute of Medical Sciences, Shivamogga. 100 patients with stroke were enrolled (out of which 50 patients were diabetic or found to have diabetes during hospital stay, and 50 were non-diabetic stroke patients). Other risk factors, clinical presentation and the pattern of stroke were evaluated.
Results: The mean age in diabetic stroke patients was 56±9.93. and in non-diabetic stroke patients was 59.92±13.26. Percentage of male population in both groups were higher. Stroke patients in both study groups presented with history of motor weakness as their most common presenting complaint. 69% of diabetic patients had past history of hypertension compared to 21% in non-diabetic group. The mean blood sugar on admission was higher in diabetic group (221.87±76.16) compared with in non-diabetic group (133.12±44.68). Diabetic patients had greater percentage of ischemic stroke (65%) as compared to non-diabetic patients (33%). Hemorrhages were less in diabetic stroke patients (35%) as compared to non-diabetics (67%).
Conclusions: Stroke in diabetic patients has a specific clinical pattern and a poor prognosis, which emphasizes the need for early diagnosis and treatment of every case of diabetes.

Keywords: Stroke, Diabetic, Hemorrhage

INTRODUCTION

A stroke, or cerebrovascular accident, is defined by the abrupt onset of a neurologic deficit of vascular origin.[1]

World Health Organization (WHO) defines the clinical syndrome of "stroke" as, rapidly developing clinical signs of focal (or global) disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin.[2] The majority (about 80%) of stroke is ischemic; the remainder result from primary hemorrhage either intracerebral or into the subarachnoid space.

Most ischemic strokes in diabetic patients are due to occlusion of small paramedical penetrating arteries. The occlusions cause small infarcts within the white matter of the brain. Diabetic persons with retinopathy and autonomic neuropathy appear to be a group at particularly high risk for ischemic stroke.

In the last two decades, according to the American Heart Association, the mortality rate from stroke has declined by

12 percent, but the total number of strokes may again be rising Further, there is probably a very high prevalence of "silent" cerebral infarction that can be documented by the new noninvasive techniques.[3]

One large14 prospective European multicentre study calculated that stroke in diabetic patients was different from stroke in non-diabetics from several perspectives.

In diabetic patients, the frequency of intracerebral haemorrhage was lower, the rate of lacunes was higher, recovery of handicap by Rankin scale score was worse and mortality was not increased.

Whereas according to COPENHAGEN study the diabetic stroke patient was 3.2 years younger than the nondiabetic stroke patient (p<0.001) and had hypertension more frequently (48% versus 30%, p<0.0001). Intracerebral hemorrhages were six times less frequent in diabetic patients (p=0.002). Initial stroke severity, lesion size, and site were comparable between the two groups. However, mortality was higher in diabetic patients (24% versus 17%, p=0.03), and diabetes independently increased the relative death risk by 1.8.[4]

Hyperglycemia is common among patients with acute stroke, occurring in upto 60% of patients overall and approximately 12-53% of acute stroke patients without prior diagnosis of diabetes.[5-7]

Recent evidence that glucose lowering with insulin reduces ischemic brain damage in animal models of stroke suggests that stress-induced hyperglycemia may be a modifiable risk for brain damage.

The present study was undertaken in a prospective manner to comparatively evaluate stroke in diabetic and non-diabetic patients and to study the outcome of strokes.

METHODS

The present study is a prospective case control observational study. This study was conducted on 100 patients with stroke (out of which 50 patients were diabetic or found to have diabetes, and 50 were non-diabetic stroke patients) admitted to Shivamogga Institute of Medical sciences, Shivamogga during the period from November 2019 to November 2020. Patients who were admitted with history of acute stroke and confirmed by thorough physical examination and CT brain to have stroke and were satisfying the inclusion and exclusion criteria were studied. The patient population was limited due to financial restraints and non-compliance during follow-up.

Inclusion criteria

All stroke patients of age group more than 18 years. Neurologic deficits should be lasting for more than 24 hours. Non-diabetics admitted with high blood sugar levels underwent repeat blood sugar (48 hours after admission)

and HbA1C estimation. Those satisfying WHO criteria were labeled as newly detected diabetics and included as cases otherwise were labeled as stress hyperglycemics and included as controls.

Exclusion criteria

Patients receiving diabetogenic drugs. Patients having severe stroke who died before it could be established whether they had diabetes or not. Patients with severe stroke who died before it could be established whether they had stroke or not. All uncommon strokes caused by hypercoaguable disorders, venous sinous thrombosis, vasculitis etc.

After admission detailed history regarding temporal profile of stroke and risk factor like hypertension, diabetes mellitus, smoking, alcohol intake, previous strokes were taken. Detailed neurological examination was done and stroke score based on Medical Research Council scale was obtained during admission. Three stroke severity categories were developed.

Statistical analysis

All these data are collected and compiled and statistical analysis performed. Tests of significance were used wherever required, appropriately. Descriptive statistics like mean, standard deviation was calculated. Inferential statistics like Mann - whitney test was used to compare the parameters between two groups.

RESULTS

The mean age in diabetic stroke patients was 56±9.93 and in non-diabetic stroke patients was 59.92±13.26. Maximum patients were in the age group from 45-54 (42%) in diabetic stroke and 55-64 (23%) in non- diabetic group. Difference in mean age in study was not statistically significant.

Table 1: Percentage age distribution years.

Age (years)	Diabetic	Non-diabetic
35-44	10	17.5
45-54	42.5	22.5
55-64	25	25
65-74	15	20
75-84	7.5	15

Out of 50 diabetic stroke patients 35 were males and 15 were females whereas in non- diabetics 32 were males and 18 were females. Percentage of male population in both the groups were higher.

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 non-diabetics. Visual disturbance was present in 10% of diabetic patients. Speech disorder was present in 27% of diabetics and 30% of non-diabetics.

Table 2: Sex distribution.

Sex	Diabetic (%)	Non-diabetic (%)
Male	35 (75)	32 (67)
Female	15 (25)	18 (33)

Table 3: Clinical presentation.

Symptom	Diabetic	Non-diabetic
Weakness		
Hemiparesis	41	40
Brachi mono paresis	9	10
Speech disorder		
Absent	31	31
BA	10	10
WA	5	5
GA	4	4
Cranial nerve involvement		
Involved	16	17
Not involved	34	33
Visual disturbance		
Present	9	0
Absent	41	50
Past history		
HTN	27	11 p<0.05
IHD	10	2
Previous stroke	13	5
CT brain		
Infarct	31	18 p value< 0.05
Hemorrhage	19	32
Outcome		
Fair recovery	34	40
Poor recovery	11	5
Death	10	5

67% of diabetic stroke patients had past history of hypertension compared to 27% in non-diabetic group which was statistically significant. Previous history of IHD was present in 25% of diabetics and 5% of non-diabetic stroke patients. Previous history of stroke was present in 33% of diabetics and 13% of non-diabetic stroke patients.

65% of diabetics had 33% of non-diabetics had infarction on CT 35% of diabetics and 67% of non-diabetics had hemorrhage on CT. Haemorrhagic strokes were more frequent in the non-diabetics and ischemic strokes in the diabetic stroke groups. The difference was statistically significant.

65 % had fair recovery in diabetic group as compared to 80% in non- diabetic group. 25% had poor recovery in

diabetic and 10% had poor recovery in non- diabetic group. Death was seen in 10% of patients in both the groups. Overall outcome was better in the non- diabetic stroke patients.

In the diabetic group; patients with a fair recovery had a mean RBS of 190.03±63.07, patients with poor recovery had a mean RBS of 266.33±34.32, patients who died had a mean RBS of 316.33±88.44.

In the non-diabetic group; patients with a fair recovery had a mean RBS of 115.95± 25.65, patients with poor recovery had a mean RBS of 161.00±7.07, patients who died had a mean RBS of 224.66±10.41.

Overall, in both the groups patients with a higher admission RBS value had a poor outcome. The difference was statistically significant in both group.
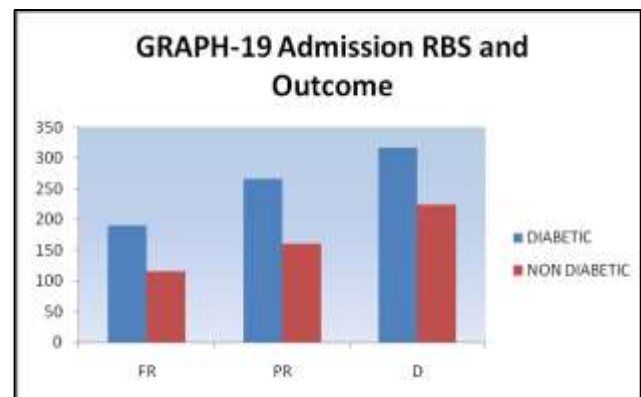

Figure 1: Association between outcome and RBS.

DISCUSSION

Stroke is a common clinical problem, current treatment for patients with established stroke is relatively ineffective. Approximately 50% of patients are left with permanent disability. Effective risk factor intervention offers a real hope of reducing stroke morbidity and mortality. Certain risk factors have been consistently identified as significant predictor of stroke outcome, while some are less consistent.

In the present study, the mean age in Diabetic stroke patients was 56±9.93 and in non-diabetic stroke patients was 59.92±13.26. Maximum patients were in the age group from 45- 54 (42%) in Diabetic stroke and 55-64 (25%) in non- diabetic group. In the Copenhagen Stroke Study (Jorgensen et al) the diabetic stroke patient was 3.2 years younger than the nondiabetic stroke patient (p<0.001).

The observation in the present study, that Stroke occurs at a younger age in diabetics than in non- diabetics was similar to the other studies.

The observation in the present study, that men were at greater risk for stroke in both the diabetic and non-diabetic group was similar to the above studies. Our observation was contrary to that by Seppo Lehto et al, who found women at greater risk for stroke than men.Stroke patients in both study groups presented with history of motor weakness as their most common presenting complaint (90% in both the groups had hemiparesis/hempilplegia and 10% had monoparesis/monoplegia). History of cranial nerve involvement was in 27%-30% of patients. Visual disturbance was present in 81. 10% of diabetic patients. Speech disorder was present in 23% of diabetics and non diabetics.

The observation in the present study, that previous history of hypertension was more common in the diabetics than in the non-diabetics was similar to the above studies. Similar results were also found by Kiessla BM10 et al 2005 and in the Copenhagen Stroke Study (Jorgensen et al).

Diabetic versus non-diabetic stroke

In the present study, stroke patients with diabetes had a poor outcome compared to stroke patients without diabetes. Similar observations were made by Megherbi12 et al, Kamel et al and in the Copenhagen Stroke Study (Jorgensen et al).[8]

In the present study, patients with high admission blood sugar had a poorer outcome as compared to those with lower blood sugar values in both the diabetic and non-diabetic study groups.

Similar observations were made by McCall et al and Fuentes.[9,11]

In the Copenhagen Stroke Study (Jorgensen et al) increased glucose levels on admission independently increase mortality from stroke in nondiabetic but not in diabetic patients.[8]

CONCLUSION

Commonest modifiable risk factors in stroke are hypertension, smoking, dyslipidemia, alcohol consumption, and diabetes mellitus. Commonest non modifiable risk factors are increasing age, male sex and family history of stroke. 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. 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.

Hyperglycemia at stroke onset is associated with higher risk of poor outcome independent of the other variables. Treatment or prevention of modifiable risk factors can reduce the mortality and morbidity of stroke.

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