TO COMPARE OCCURRENCE OF ISCHEMIC AND HEMORRHAGIC STROKE IN TYPE 2 DIABETIC PATIENTS AND NON DIABETIC PATIENTS

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Abstract

Diabetes mellitus increases the risk of stroke, and pathophysiological changes of diabetic cerebral vessels may differ in comparison with non-diabetic ones; nonetheless, the clinical and prognostic profile of stroke in diabetic patients is not yet fully understood.Diabetes mellitus is a well-established independent risk factor for stroke. Stroke in diabetic patients has been found to be associated with high case fatality in a long-term study.Whether diabetes mellitus affects the short-term prognosis of acute stroke patients is controversial A poor outcome in acute stroke has been linked to admission hyperglycemia. Whether this effect is equally important in diabetic as in non-diabetic patients is controversial. **Aim:** To study occurrence of ischemic and hemorrhagic stroke with type 2 diabetes mellitus patients.**Material and methods:** A single centre hospital based cross-sectional study was carried out in a tertiary care hospital, in medicine out patient department and ward patients for a period of 18 months from November 2020 to April 2022. Total 140 cases were studied having inclusion criteria:All acute completed stroke patients admitted in medical wards and ICU in Krishna Hospital, Karad. A total of 140 number of stroke patients were examined. All patients were screened for type2 diabetes mellitus according to the regulations by American Diabetes Association and divided into two groups diabetic and non diabetic. **Results:**Majority of cases had history of hypertension among group 1. Applying chi square test, p value=0.031, shows statistical significance.The present study was conducted to evaluate stroke and its subtypes in patients having type 2 diabetes mellitus and non-diabetic individuals. Out of 80 cases 69 had ischemic and 11 had hemorrhagic stroke in group 1 and in group 2, 52 and 28 ischemic and hemorrhagic respectively. Applying chi square test, p value=0.030, shows statistical significance. **Conclusion:**The present study was conducted to evaluate stroke and its subtypes in patients having type 2 diabetes mellitus and non-diabetic individuals. Present study states that type 2 diabetes mellitus is a significant risk factor for ischemic stroke. Hypertension was seen more commonly among individuals having type 2 diabetes mellitus. Raised random blood sugar, deranged lipid and raised creatinine was seen among type 2 diabetes mellitus group.

Keywords:diabetes mellitus, Stroke, ischemic, hemorrhagic

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1. Introduction

Stroke and diabetes mellitus are two separate conditions which share multiple common threads and contribute to a growing cardiovascular disease burden and mortality around the world. Both are increasing in prevalence, both are diseases which affect blood vessels, and both are associated with other vascular risk factors, such as hypertension and dyslipidemia. Diabetes mellitus is an established risk factor for stroke and maybe associated with poorer outcomes after stroke. Indeed, abnormal glucose regulation, of which diabetes is one manifestation, is seen in up to two-thirds of people suffering from an acute stroke and make diabetic patients more likely to die or be severely disabled and less likely to benefit from the one FDA-approved therapy, intravenous tissue plasminogen activator. On the other hand, cerebrovascular complications make diabetic patients 2–6 times more susceptible to a stroke event and this risk is magnified in younger individuals and in patients with hypertension and complications in other vascular beds. [(1)]

Hence, present study was carried out with the aim to compare occurrence of ischemic and hemorrhagic stroke in type 2 diabetic patients and non diabetic patients.

Aim: To study occurrence of ischemic and hemorrhagic stroke with type 2 diabetes mellitus patients.

2. Material and Methods:

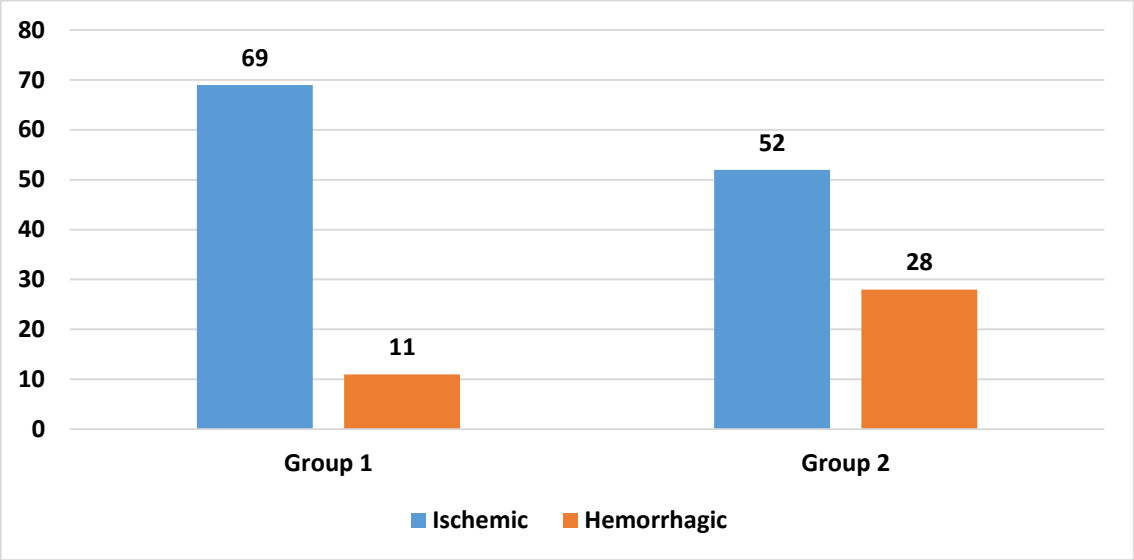
A single centre hospital based cross-sectional study was carried out in a tertiary care hospital, in medicine out patient department and ward patients for a period of 18 months from November 2020 to April 2022. Total 140 cases were studied having inclusion criteria:All acute completed stroke patients admitted in medical wards and ICU in Krishna Hospital, Karad. A total of 140 number of stroke patients were examined. All patients were screened for type2 diabetes mellitus according to the regulations by American Diabetes Association and divided into two groups diabetic and non diabetic.
Group 1= Type 2 diabetes mellitus
Group 2 =Non diabetic

Informed and written consent was taken from all patients and were explained about the same. All patients were subjected to detailed history, physical examination and further divided based on their stroke type, identified from either CT Brain or MRI Brain. Data analysis was collected data was compiled in Microsoft Excel 2010. Data describing quantitative measures were expressed as mean, median, mean + SD, standard deviation.
Results: In the present study, relation of hypertension in the study population was assessed. It was observed that in the group 1 (type 2 diabetes mellitus study population), 58 (72.5%) patients were hypertensive and 22 (27.5%) patients were non hypertensive. In the group 2 (non diabetic study population), 45 (56.3%) patients were hypertensive and 35 (43.7%) patients were non hypertensive. The patients with type 2 diabetes mellitus have more risk for hypertension.
Applying chi square test, p value=0.031, shows statistical significance.

Table 1: Relation of hypertension in study groups

Hypertension	Present	Absent	Total
Group 1	58 (72.5%)	22(27.5%)	80
Group 2	45 (56.3%)	35(43.7%)	80

Figure 1: Ischemic and hemorrhagic stroke in type 2 diabetes mellitus and non diabetic patients in study population



In the present study, MRI brain or CT brain was performed on all subjects. It was observed that, in group 1 (type 2 diabetes mellitus study population), 69 (86.3%) patients had ischemic stroke and 11 (13.7%) patients had hemorrhagic stroke. In group 2 (non diabetic study population), 52 (65%) patients had ischemic stroke and 28 (35%) patients had hemorrhagic stroke. Incidence of ischemic stroke was more among group 1 cases as compared to group 2. Applying chi square test, p value=0.03, shows statistical significance.

In the present study various parameters in study groups were evaluated. Parameters such as hemoglobin, random blood sugar, serum creatinine, serum cholesterol, serum triglyceride, High Density Lipoprotein, Low Density Lipoprotein were studied [Table 2].

Table 2: Frequency distribution of laboratory parameters across Group 1 and group 2

Laboratory investigation	**Group 1**		**Group 2**	
	Mean	**SD (±)**	**Mean**	**SD (±)**
Hemoglobin(gm%)	13.2	2.4	11.5	1.8
Random blood sugar (mg/dl)	222.6	11.4	108.6	8.4
Serum creatinine(mg/dl)	1.5	0.3	1.1	0.1
Serum total cholesterol (mg/dl)	214.3	86.7	145.3	43.2
Triglyceride level(mg/dl)	216.6	65.2	152.1	59.6
High Density Lipoprotein(mg/dl)	54.1	6.5	36.2	11.9
Low Density Lipoprotein(mg/dl)	125.6	29.6	102.1	23.4

On laboratory investigation among group 1 (type 2 diabetes mellitus study population) mean Hemoglobin was 13.2(SD±2.4) , Random blood sugar 222.6 (SD±11.4) , serum creatinine 1.5 (SD±0.3), serum total cholesterol 214.3 (SD±86.7), serum triglyceride 216.6 (SD±,65.2), high density lipoprotein 54.1 (SD±,6.5), low density lipoprotein 125.6 (SD±29.6) and among group 2 (non diabetic study population) mean hemoglobin was 11.5 (SD±1.8), Random blood sugar 108.6 (SD±8.4), serum creatinine 1.1(SD±0.1), serum cholesterol 145.3 (SD±43.2), serum triglyceride 152.1 (SD±59.6), high density lipoprotein 36.2 (SD±11.9), low density lipoprotein 102.1 (SD±23.4). It was seen that blood sugar, serum creatinine, serum total cholesterol, serum triglyceride, low density lipoprotein levels were on a higher side among type 2 diabetes mellitus patients.

3. Discussion:

Incidence of stroke was more among diabetic cases as compared to non-diabetic. Out of 80 cases 69 (86.3%) had ischemic and 11 (13.7%) had hemorrhagic stroke in group 1 and in group 2, 52 (65%) and 28 (35%) ischemic and hemorrhagic respectively. Applying chi square test, p value=0.03, shows statistical significance. Tuttolomondo A, et al [2] showed some significant differences in acute ischemic stroke among diabetics in comparison with non-diabetics. Study by Lihua Guo et al [3] showed that incidence of stroke and stroke subtypes among patients with T2DM was significantly higher than in general population. Compared to males, the standardized incidence ratio (SIR) was higher in females, although the incidence of stroke for the diabetic in females was lower than in males. Yang T et la [4] showed that 114(22.9%) patients had hemorrhagic stroke and incidence of hemorrhagic stroke in the diabetic group was 10.6%. Arboix, A et al [5] showed that people with diabetes compared to people without diabetes presented more frequently atherothrombotic stroke (41.2% vs 27%) and lacunar infarction (35.1% vs 23.9%) ($P < 0.01$). The clinical picture of these patients was characterized by a more frequent concomitant ischemic heart disease and hyperlipidemia and a more frequent presence of atherothrombotic and lacunar infarcts as compared with ischemic stroke in people without diabetes.

On laboratory investigation among group 1 mean Hemoglobin was 13.2, Random blood sugar 222.6, serum creatinine 1.5, serum total cholesterol 214.3, serum triglyceride 216.6, high density lipoprotein 54.1, low density lipoprotein 125.6 and among group 2 mean hemoglobin was 11.5, Random blood sugar 108.6, serum creatinine 1.1, serum total cholesterol 145.3, serum triglyceride 152.1, high density lipoprotein 36.2, low density lipoprotein 102.1. It was seen that levels were on a higher side among type 2 diabetes mellitus patients. Study by Morsy, E.Y et al [6]showed that among diabetic group mean total cholesterol was 214.1, triglyceride 154.2, LDL cholesterol 116.2, serum creatinine 1.36 and HDL cholesterol 49.7 and among group 2 mean total cholesterol was 189.3, serum triglyceride was 136, LDL cholesterol 105.8, HDL cholesterol 53.76 and serum creatinine 1.17. Karapanayiotides et al. [7] demonstrated that hypercholesterolemia was significantly higher in diabetic patient compared to nondiabetic ($p < 0.0001$). Likewise, in Laio et al. [8]study, hyperlipidemia was more prevalent in stroke patients with diabetes, $p < 0.0001$. Yang T et la [4] study shows that however, the blood lipid disorders after admission showed statistically significant differences between the 2 groups: TG, TC, and LDL were significantly higher in the diabetic group than in the non-diabetic group.

4. Conclusion:

The present study was conducted to evaluate stroke and its subtypes in patients having type 2 diabetes mellitus and non-diabetic individuals. Present study states that type 2 diabetes mellitus is a significant risk factor for ischemic stroke. Hypertension was seen more commonly among individuals having type 2 diabetes mellitus. Raised random blood sugar, deranged lipid and raised creatinine was seen among type 2 diabetes mellitus group. Present study states that type 2 diabetes mellitus is a significant risk factor for stroke, so, we conclude that the patients with type 2 diabetes mellitus coming to the hospital should be evaluated thoroughly, so as to avoid further disease and its complications.

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