

Clinical Study of Type 2 Diabetes Mellitus Patients with or without Cerebrovascular Feature and Its Correlation with Other Comorbidity / Diabetic Complication

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ABSTARCT

Introduction: Type 2 Diabetes Mellitus (T2DM) is rapidly emerging as a Global health problem, which may reach pandemic level by 2030. India is a global capital of Diabetes. Many long term complication may develop in T2DM patients. Cerebrovascular complications are one of the major cause of morbidity and mortality in T2DM. **Aim:** our aim of study to estimate the prevalence of cerebrovascular complication in diabetic and its association with other risk factors and/or diabetic complication. **Materials and Methodology:** This study was conducted retrospectively enrolling 100 diabetic patients, admitted in medical ward in our institute during January 2014 to September 2015. **Results and Discussion:** Out of 100 patients, 27 patients had Cerebrovascular Stroke. In this Cerebrovascular (CV) Stroke group, 37.04% had retinopathy, 55.55% had urinary albuminuria, 48.15 % had hypertension and 25.92% had cardiac involvement. **Conclusion:** Cerebrovascular complications are more prevalent in diabetic due to more likely atherosclerotic event. In this study, comorbidity like Retinopathy, Urinary Albuminuria, loss of Cortico-medullary differentiation (CMD), Hypertension and Cardiac involvement, this are the factor which has a more incidence in CV Stroke group than in group without neurological deficit. So, identification of risk factor and aggressive control of such factor is the most important part of the management of diabetes.

Keywords: Cerebrovascular Stroke, Type 2 Diabetes Mellitus, Risk factors

Introduction

Type 2 Diabetes Mellitus (T2DM) is rapidly emerging as a Global health problem, which may reach pandemic level by 2030. India is a global capital of Diabetes. Many long term complications may develop in T2DM patients. Cerebrovascular complications make diabetic patients 2–6 times more susceptible to a stroke event and this risk is magnified in presence of associated hypertension, dyslipidemia, cardiac failure, obesity etc in T2DM patients have dramatically increased the risk of cerebrovascular complication.



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Aim

The present study was aimed to identify the current clinical profile of the T2DM patients admitted

at tertiary care centre and estimate the prevalence of cerebrovascular complication and its association with other risk factor/ diabetic complication.

Materials and Methodology

This study was conducted retrospectively analyzing available data of 100 diabetic patients, admitted in medical ward in our institute during eighteenth month period.

The patients selected were either known type 2 diabetic indoor patients or detected diabetic first time at the time of admission as American Diabetes Association Guidelines for Management of Type 2 Diabetes- 2014. The exclusion criteria for this study included patients who were having gestational diabetes, juvenile diabetes, tuberculosis, pregnancy and critically ill patients.

Results and Discussion

A total of 100 patients were studied of which 64 male and 36 were female. The mean age of patients was 66.33 years with maximum no. of patients were found in age group of 51-60 years which were 43. Only 25 patients had family history of diabetes. In present study, we observed 79 patients were from urban area and rest were from rural area.

In present study we observed following finding on clinical and lab evaluation of all diabetic patients. On assessment of BMI, we observed that 52 patients had BMI in the range of 22.5-25 (overweight). The mean BMI of male was 26.35 and of female was 27.03.

Though most of the patients were on anti-diabetic treatment, their diabetes was not well controlled and 84 patients had Fasting Blood Sugar (FBS) >130mg/dl and 85 patients had PPBS >180mg/dl. In study, HbA1C value of only 17 patients were available at the time of enrolment of study, which were >6.5 in all patients.

HbA1C was not done in majority of cases due to non-availability of the test in institute at the time of enrolment in the study.

Out of 100 patients, fasting lipid profile was done in 82 patients. In these 82 patients, 17.07% (n=14) patients had high total cholesterol level, 36.58% (n=30) patients had high triglyceride level, 42.68% (n=35) patients had high LDL level, 82.93% (n=55) patients had low level of HDL and 28.05% (n=23) patients had high ratio of Total cholesterol/ HDL level. Such type of lipid profile pattern typically seen in Asian diabetic people with mainly raise in triglyceride and LDL with low HDL.

Retinopathy was present in 22 patients, out of that 9 patients had associated hypertensive retinopathy, 8 patients had Non-proliferative Diabetic Retinopathy (NPDR) and 5 patients had Proliferative Diabetic Retinopathy (PDR).

In study 65 patients had serum creatinine >1.2 mg/dl and 62 patients had eGFR < 60, from that 10 patients had end stage renal disease with eGFR < 15. Urinary albuminuria was seen in 26 no of patients with majority having macro-albuminuria. Loss of CMD in USG was seen in 12 patients from that 8 patients had urinary albuminuria and 9 patients had serum creatinine >1.2.

eGFR is calculated by Modification of Diet in Renal Disease(MDRD) study equation.

$186 \times (\text{Creatinine}/88.4) - 1.154 \times (\text{Age}) - 0.203 \times (0.742 \text{ if female}) \times (1.210 \text{ if black})$.

Cut off value for microalbuminuria was level of albumin 30 to 300 mg in urine sample, and for macro albuminuria it was >300 mg in urine a sample.

Total 9 patients had history of ischemic heart disease and their 2D Echo finding suggestive of systolic dysfunction, while only 3 patients had diastolic dysfunction. Systolic dysfunction was determined on basis of Ejection fraction. Patients with EF <45% had considered as having systolic dysfunction. Out of 12 patients with cardiac dysfunction, total 8 no. of patients had raised total cholesterol. So patients with altered lipid profile will have high risk of development of cardiovascular complication.

In present study, 52 patients had associated hypertension. We observed that 12 patients had cardiac dysfunction on 2D Echo out of which, 11 patients had both hypertension and diabetes while 1 patient had only diabetes. This suggests that the risk of cardiac dysfunction is more when diabetes and hypertension both are present compare to diabetes alone.

Total 10 patients had fatty liver and 4 patients had significantly raised SGPT. Out of which 5 patients had raised total cholesterol. It is indicating that patients of fatty liver with raised serum amino-transferase levels may be having underlying non-alcoholic steatohepatitis (NASH).

As the present study was aimed to estimate the prevalence of cerebrovascular complication and its association with other risk factor/ diabetic complication, the following observation were made. In present study, 27 patients had history of cerebrovascular accident in form of recent event or past event.

Table.1 Fasting Lipid Profile in Patients with CV Stroke

S. Cholesterol		S. Triglyceride		S. LDL		S. HDL				
Value	Total	Value	Total	Value	Total	Male	Female	Total		
<200	16	<150	6	<130	4	<40	2	<50	3	5
200-239	6	150-199	11	130-159	17	40-49	16	50-59	2	18
>240	5	>200	10	>160	6	>50	3	>60	1	4

From 27 patients with CV stroke, 85.15% (n=23) patients had high S.LDL, 81.48% (n=22) patients had low S.HDL, 77.78% (n=21) had high S.TG and 40.74% (n=11) patients had high total S. cholesterol.

In this study, we observed that total 35 patients had high LDL level from that 23 patients had history of CV stroke, total 68 patients had low HDL from that 22 patients had history of CV stroke, total 30 patients had high TG level from that 21 patients had history of CV stroke, total 14 patients had high total cholesterol, from that 11 patients had history of CV Stroke. Serum cholesterol level >240, serum triglyceride level >200, serum HDL level <50 (females) & < 40 (males), serum LDL level <160 had considered in high risk group as per NCEP (National Cholesterol Education Program) ATP III Classification of Lipid values. So it suggests that presence of comorbidity like dyslipidaemia increase the risk of developing cerebrovascular accident in diabetes.

In present study, out of 100 patients, 27 patients were having CV Stroke while 73 patients had no neurological. Patients with clinical neurological findings confirmed by radiological imaging have been considered as having stroke. We compared the presence of other comorbidity and/or diabetic complication in this two group of with neurological deficit and without neurological deficit.

Table.2 Association of Presence of Comorbidity and Risk of Developing CV Stroke in Diabetic Patients

Comorbidity	Total No of Patients (n=100)		Patients Without CV Stroke (n=73)		Patients With CV Stroke (n=27)	
	Present	Absent	Present	Absent	Present	Absent
Retinopathy	22%	78	12 (16.43%)	61	10 (37.04%)	17
Urine Albumin	26%	74	11 (15.07%)	62	15 (55.55%)	12
Loss of CMD	12%	88	8 (10.95%)	65	4 (14.82%)	23
Hypertension	52%	48	39 (53.42%)	34	13 (48.15%)	14
Cardiac Dysfunction	12%	88	5 (6.84%)	68	7 (25.92%)	20

We observed that total 22 patients had retinopathy. In CV Stroke group, incidence of retinopathy was 37.04% (n=10) patients, while in group without CV Stroke incidence of retinopathy was only 16.43% (n=12). In patients with CV Stroke, 37.04% (n=10) patients had retinopathy from that 18.51% had associated hypertensive retinopathy, 14.81% had non proliferative diabetic retinopathy and 3.70% had proliferative diabetic retinopathy.

Total 26 patients had urinary albuminuria. In group with CV Stroke, 55.55% (n=15) patients had urinary albuminuria while in group without CV Stroke, only 15.07% (n=11) patients had urinary albuminuria.

Out of 100 patients, 52 patients had hypertension. In study 13 patients had CV Stroke while 39 patients had no neurological deficit. In patients with CV Stroke group, 48.15% (n=13) patients had hypertension. As per the JNC 7 report on high blood pressure, patients with systolic blood pressure >140 mm Hg & diastolic blood pressure >90 mm Hg had considered as hypertensive in this study.

In present study, 12 patients had cardiac involvement. In CV Stroke group, 25.92% (n=7) had cardiac involvement while in patients without CV Stroke group only 6.84% (n=5) patients had cardiac involvement on comparing the data of both group; it is very obvious that the presence of other comorbidities, there is an increased risk of cerebrovascular complication in diabetes.

Conclusion

Cerebrovascular complications are more prevalent in diabetic due to more likely atherosclerotic event. In this study, it was observed that comorbidity like Retinopathy, Renal involvement, Dyslipidemia, Hypertension and Cardiac dysfunction were the factors having more incidences in CV Stroke group rather than in group without neurological deficit.

Along with primary prevention of cardiovascular event in T2DM like antiplatelet, statin and meticulous diabetic control, strategy aimed to prevent the end organ damage or

early detection of comorbidities and/or complication may improve incidence of the cerebrovascular events.

So, identification of risk factors and aggressive control of such factors are the most important step in the management of diabetes. Screening and intervention program should be implemented early at the diagnostic stage and risk factor should be treated aggressively to reduce the cerebrovascular events.

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