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Study of Occurrence of Chronic Complications of Type 2 Diabetes Mellitus in Elderly Patients

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Abstract

Background: Chronic complications are the major outcome of type 2 diabetes mellitus, progress over years and reduce the quality of life of patients, incur heavy burdens to the health care system, and increase diabetic mortality.

Aims: This study was done to describe the occurrence of chronic complications among elderly type 2 diabetic patients.

Methods: This cross sectional hospital based study was carried out, among type 2 elderly diabetic patients with history of diabetes for >5yrs duration. Each patient was screened for diabetic complications, hypertension, and other co-morbidities. Standard protocols were used to make diagnosis of retinopathy, neuropathy, nephropathy, peripheral vascular disease and cardio-vascular complications. Data analysis was carried out using standard statistical techniques.

Results: Out of 100 elderly diabetic patients, 52 were females and 48 were males. The occurrences for diabetes-related complications were retinopathy (40%), nephropathy (30%), ischemic heart disease (15%), neuropathy (50%), and peripheral vascular disease (6%). The diabetic patients with chronic complications had a poor glycaemic control with HbA1c > 8.0%.

Conclusions: Chronic complications are highly prevalent among type 2 diabetic elderly patients, the glycaemic control of the diabetic complications was poor, and future efforts should be directed at intensive blood glucose control, to prevent and minimize the occurrence of complications.

Keywords: elderly, type 2 diabetes mellitus, diabetic complications, glycaemic control

INTRODUCTION

Type 2 diabetes is the commonest form of diabetes constituting 90% of the diabetic population. The global occurrence of diabetes is estimated to increase, from 4% in 1995 to 5.4% by the year 2025[1]. The World Health Organisation has predicted that the major burden will occur in the developing countries. A national survey of diabetes conducted in six major cities in India in the year 2000 showed that occurrence of diabetes in urban adults was 12.1 %[2]. The vast majority of older diabetic individuals have type2 diabetes rather than type1 diabetes.

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Complications of diabetes are divided into Micro vascular that includes diabetic retinopathy and diabetic nephropathy and macro vascular which includes coronary heart disease, cerebrovascular disease and peripheral vascular diseases.

Here we report the occurrence of these chronic complications of type 2 diabetes in elderly patients.

Fig 1: Diabetic Retinopathy – Moderate Non proliferative retinopathy

Fig 2: Peripheral vascular disease – Gangrene Right foot 2nd and 3rd toe

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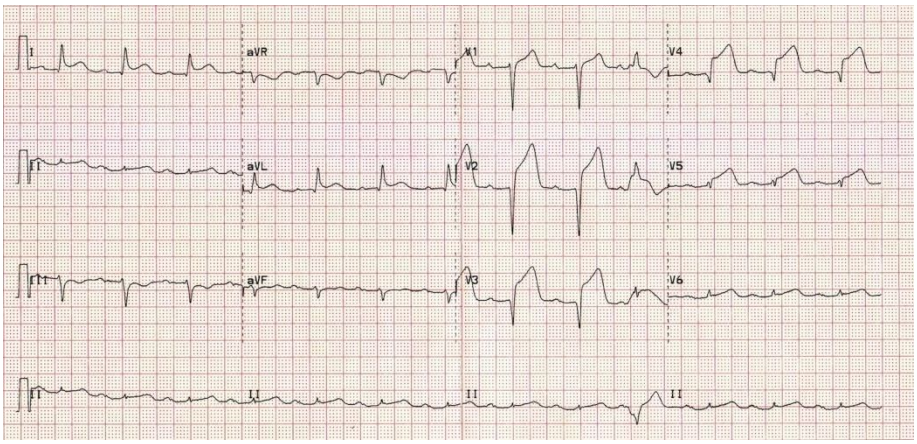

Fig 3: Electrocardiogram suggestive of Anterior wall MI

Fig 4: CT Brain suggestive of ischemic stroke

MATERIALS AND METHODS

Study populations, recruitment and data collection

This Prospective Cross Sectional Study was carried out among 100 consecutive cases of T2DM, which included both outpatients and inpatients. All T2DM patients fulfilling the inclusion and exclusion criteria detailed below were invited during the period of 5 months from January 2015 to May 2015 to participate in the study.

The inclusion Criteria were: (1) T2DM diagnosed in accordance to international standards, i.e. fasting plasma glucose ≥ 7.0 mmol/L or ≥126mg/dl and 2 hours postprandial glucose ≥200 mg/dl or ≥ 11.1 mmol/L[3]. (2) Under regular anti-diabetic drug treatment for at least 3 years. (3) Age >65 years. (4) Duration of DM >5 years. (5) HbA1c > 6.5%

The Exclusion Criteria were: (1) T1DM. (2) Chronic Kidney disease due to other causes. (3) Retinopathy due to other causes. (4) Peripheral vascular disease and Peripheral neuropathy due to other causes.

Detailed information regarding the study procedure was provided to all eligible patients. The diagnosis of diabetes and its complications was confirmed by investigations such as Blood sugar levels-fasting and post prandial, glycosylated haemoglobin, Renal function test, Urine-routine and microscopy, Ultrasound abdomen, Fundus, CT/MRI, Lower limb Doppler, Electrocardiogram and Echocardiography and Nerve conduction studies where indicated.

RESULTS

General characteristics of study patients

A total of 100 eligible patients were enrolled for the study. Among them:

AGE GROUP	MALES	FEMALES	TOTAL
65-75	23	25	48
75-85	22	20	42
>85	3	7	10

Table 1: Patients according to specific age group

Out of 100 patients, 48 were between 65-75 years, 42 between 75-85 years and 10 were >85 years with 48 being males and 52 being females.
The mean of time span between the diagnosis of T2DM and enrolment in the study was 5 years.

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Occurrence of chronic complications

Overall, 50 of the 100 T2DM subjects (50%) had no recognised complications while 50 (50%) suffered from at least one diagnosed chronic complication. The categorised occurrence of the chronic complications is presented as follows:

RETINOPATHY (n=100)

RETINOPATHY	CASES	PERCENTAGE
Mild NPDR	20	20%
Moderate NPDR	15	15%
Severe NPDR	3	3%
PDR	1	1%
CSME	1	1%
No Retinopathy	60	60%

Table 2: Occurrence wise distribution of retinopathy in study group

NPDR - Non proliferative retinopathy, PDR - Proliferative retinopathy, CSME- Clinically significant macular oedema.

Out of 100 cases, 40% had changes of diabetic retinopathy while 60% had no changes of diabetic retinopathy.

AGE GROUP	% of RETINOPATHY	NO. OF CASES
65-75	37.5	15
75-85	50	20
>85	12.5	5

Table 3: age wise distribution in study group

Out of 40 cases, 50% belonged to the age group 75 – 85 years.

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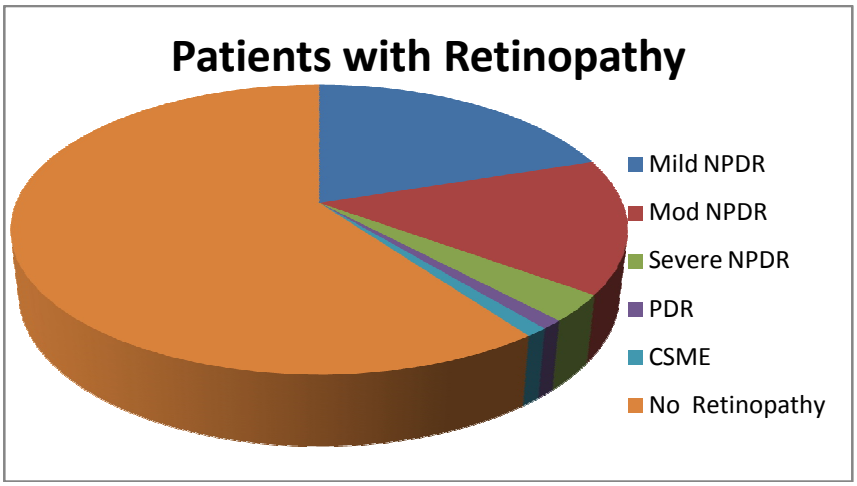

Chart 1: Occurrence wise distribution of retinopathy in study group

NEPHROPATHY (n=100)

NEPHROPATHY	CASES	PERCENTAGE
PRESENT	30	30
ABSENT	70	70

Table 4: Occurrence wise distribution of nephropathy in study group

Out of 100 cases, 30% cases had nephropathy while the other 70% had no changes3

AGE GROUP	CASES(n=30)	PERCENTAGE
65-75	5	17
75-85	15	50
>85	10	33

Table 5: age wise distribution of nephropathy in study group

Out of the 30 cases, 50% of the cases were found in the age group of 65 – 75 years.

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N=30 cases	CASES	PERCENTAGE
PROTEINURIA	30	100
RAISED CREATININE(>1.2)	20	66

Table 6: Occurrence wise distribution of type of nephropathy in study group

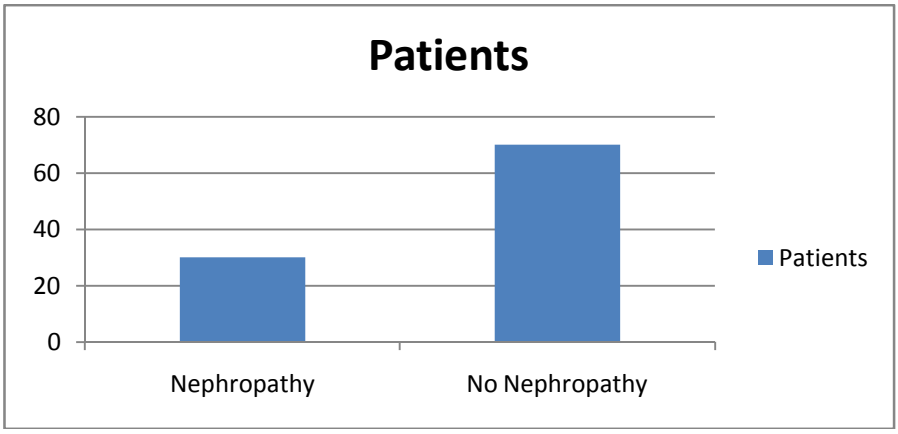

Chart 2: Occurrence wise distribution of nephropathy in study group

CARDIOVASCULAR

	CASES	PERCENTAGE
ANGINA	15	15
MI	5	5

Table 7: Occurrence wise distribution of cardiovascular complaints in study group

Out of 100 cases, 15 patients had cardiovascular complaints while the rest had no complaints.

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AGE GROUP	ANGINA	PERCENTAGE	MI	PERCENTAGE
65-75	3	20	1	40
75-85	8	53	3	40
>85	4	27	1	20

Table 8: age wise distribution of cardiovascular complaints in study group

Out of the 15 cases, 8 cases of angina and 3 cases of MI were found in the age group 75 – 85 years.

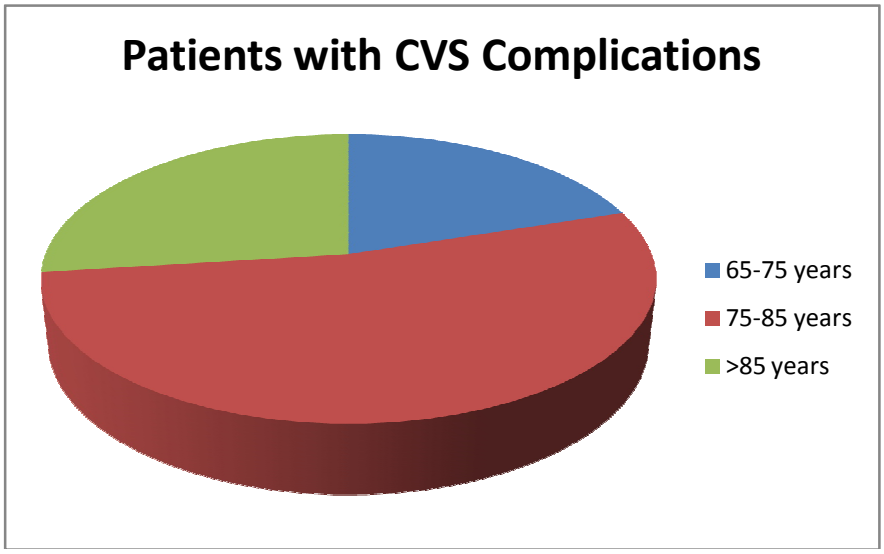

Chart 3: Occurrence wise distribution of cardiovascular complaints in study group

CEREBROVASCULAR

COMPLICATION	CASES	PERCENTAGE
STROKE	7	7
PERIPHERAL NEUROPATHY	50	50

Table 9: Occurrence wise distribution of cerebrovascular complaints in study group

Out of 100 cases, 50 cases had peripheral neuropathy, 7 had stroke while the rest did not have any changes.

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AGE GROUP	STROKE	PERCENTAGE
65-75	1	15
75-85	2	50
>85	4	35

Table 10: age wise distribution of stroke in study group

Out of the 7 cases of stroke, incidence was higher in age group >85 years.

AGE GROUP	NEUROPATHY	PERCENTAGE
65-75	10	20
75-85	25	50
>85	15	30

Table 11: age wise distribution of neuropathy in study group

Out of the 50 cases of neuropathy, Occurrence was higher in the age group of 75 – 85 years.

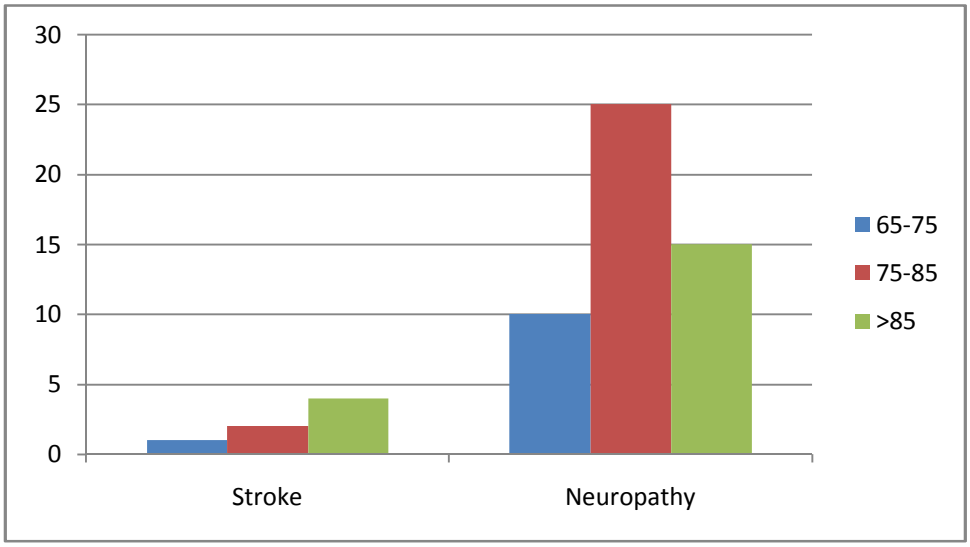

Chart 4: Occurrence wise distribution of cerebrovascular complaints in study group

PERIPHERAL VASCULAR DISEASE

PVD	CASES	PERCENTAGE
ULCER	6	6%
GANGRENE	3	3%

Table 12: Occurrence wise distribution of peripheral vascular disease in study group

Out of 100 cases only 9 cases had peripheral vascular disease.

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AGE GROUP	CASES	PERCENTAGE	GANGRENE	PERCENTAGE
65-75	2	33	1	33
75-85	3	50	1	33
>85	1	17	1	33

Table 13: age wise distribution of peripheral vascular disease in study group

Out of the 9 cases, the age group between 75 – 85 years had higher incidence.

Study of glycaemic control in subjects with chronic complications with T2DM

The average level of HbA1c for the 50 cases with chronic complications was 8.0% whereas it was 7.0% for the other patients without diabetic complications.

DISCUSSION

Many reports on incidence of Complications of diabetes have been studied but very fewer studies have been conducted in elderly.

Diabetic retinopathy is the most specific of all diabetic complications. Remaet al[4] studied the occurrence of retinopathy in 6792 NIDDM patients seen at M.V Diabetes centre at Chennai. The overall occurrence was 34.2% of which 30.8% was NPDR and 3.4% PDR. It was found that occurrence of retinopathy (23.7%), among which NPDR was 20% and proliferative was 3.7%[6, 7].In our study Out of total of 100 cases of diabetes in elderly, 40 patients were found to have retinopathy with most common being MODERATE NPDR. Out of the 40 cases of retinopathy, 50% of the cases were between the age group 75-85 yrs.

A study conducted by Mohan V et al[5] suggested that occurrence of nephropathy in Indians was 27.5%, which was more as compared to Hong Kong. In our study out of the 100 cases, 30 cases found to have nephropathy, out of the 30 cases, 20 cases i.e.66% were found to have raised creatinine levels; nephropathy is more prevalent between the age group of 75-85yrs.

Patients with diabetes are at very high risk for developing cardiovascular disease (CVD) and associated morbidity and mortality, and this risk increases dramatically with age [8, 9]. A study conducted by Ramachandran A et al[6] suggested that occurrence of cardiovascular complications in Indians was 11.4% which was higher than other Asian countries. In our study Out of the 100 cases of diabetes 20 cases were found to have cardiovascular complications with angina being more prevalent, out of the 20 cases,8 cases were present in the age group of 75-85yrs.

In the same study conducted by Ramachandran A et al[6] the occurrence of PVD in Asian Indians was comparatively low as compared with white population (9.3%). Although the occurrence of PVD was low, but peripheral neuropathy is very common cerebrovascular and peripheral vascular complaint. However, the majority of community or hospital based estimates suggest diabetes is present in about 10–25% of people with stroke disease and stress related hyperglycaemia is found in up to two-thirds of people with an acute stroke[10]. In our study out of 100 cases, only 9 cases were found to have PVD, out of which the age group between75-85yrs. were found to have 50% incidence while only 3 progressed to gangrene, 57 patients were found to have vascular complications, out of which 7 patients had stroke and 50 patients had peripheral neuropathy. Patients more than 85 yrs. old were found to have higher incidence of stroke while patients with 75-85yrs. were found to have high incidence of neuropathy.

CONCLUSIONS

The present study provides detailed estimates of the occurrence of T2DM-related chronic complications among elderly patients. The occurrence of complications is quite high in elderly patients. This is probably because of poor glycaemic control, insidious onset of diabetes and long duration of asymptomatic disease before symptom develop. Hence screening tests for complications are strongly recommended not only for early detection, but also to prevent the progression to severe disability. More such studies are suggested to find out the prevalence of incidence of chronic complications of T2DM in elderly populations.

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