Journal Of Medical Science And Clinical Research

IGM Publication   An Official Publication Of IGM Publication

Prevalence of Complications in Diabetes Mellitus Type 2

Authors
Dr Sherry Garg, Dr Sophia Garg, Dr M.A. Jamadar
Dr. VMGMC Solapur

Introduction

Diabetes mellitus (DM) is a metabolic disorder resulting from defect of insulin secretion and /or insulin action which results in hyperglycemia. The incidence of diabetes mellitus has increased in recent decades predominantly because of changes in the life style, an increase in prevalence of obesity and longevity.

Diabetes currently affects more than 62 million Indians, which is more than 7.1% of the adult population.[1] The average age on onset is 42.5 years.[2] Nearly 1 million Indians die due to diabetes every year.[2]

According to the Indian Heart Association, India is projected to be home to 109 million individuals with diabetes by 2035.[3] A study by the American Diabetes Association reports that India will see the greatest increase in people diagnosed with diabetes by 2030.[4]

Diabetes mellitus is a chronic disease that requires long term medical attention both to limit the development of its devastating complications and to manage them when they do occur.

Type 2 diabetes is a very common disease characterized by asymptomatic phase between actual onset of diabetic hyperglycemia and clinical diagnosis. This phase has been estimated to last at least 4-7 yrs, and 30-50% cases of type 2 diabetes patients remain undiagnosed.

This leads to chronic complications of diabetes mellitus which remain chief problem in diabetic care and which causes lack of fitness to work, disability and premature death.

This study was undertaken to evaluate the patients with type II diabetes mellitus clinically as well as with relevant investigations to see spectrum of various complications of the disease.

Aims and Objectives

This study was done in tertiary care hospital with following
Objectives

1. To clinically evaluate the patients with Diabetes Mellitus Type II.
2. To study prevalence of various complications in patients with Diabetes Mellitus Type II.
3. To study correlation of various complications of Diabetes Mellitus Type II with the duration of disease.

Material and Methods

Study design: the present study was a cross sectional study, carried out in 100 diagnosed patients of diabetes mellitus admitted in the wards of the medicine department, of Tertiary Care Institute.

Study period: The study was from December 2014 to June 2016.

Inclusion criteria

1. Patients diagnosed with DM on basis of Fasting Plasma Glucose ≥ 126 mg/dl (7.0 mmol/dl) and Post Prandial Plasma Glucose ≥ 200 mg/dl.
2. Patients who gave written consent to participate in the study.

Exclusion criteria

1. Patients with Fasting Plasma Glucose ≤ 126mg/dl (7.0mmol/dl) and Post Prandial Plasma Glucose ≤ 200mg/dl were excluded.
2. Patients of type I Diabetes Mellitus were excluded.

Detailed Study Plan

The study was started after adequate approval from ethics committee. All the patients were explained about the study. Written and informed consent was taken from every subject for desired investigations. In patients who were unable to sign the consent form, the form was signed by relatives of the patient. All subjects were interviewed examined and investigated according to the proforma which was predesigned and pretested.

Waist circumference: it was recorded according to the national health and nutrition survey which states that the subject stands and the examiner, positioned at the right of the subject, palpates the upper bone to locate the iliac crest. Just above the uppermost lateral border of right iliac crest, a horizontal mark is drawn, and then crossed with vertical mark on the midaxillary line. The measuring tape is placed in a horizontal plane around the abdomen at the level of this marked point on the right side of the trunk. The plane of the tape is parallel to the floor and the tape is snug, but does not compress the skin. The measurement was made at minimal inspiration. Measurement was done using a non stretchable fibre measure tape. One

layer of light clothing was accepted. Waist circumference was measured to the nearest 0.1 cm.

Blood pressure measurement: it was recorded with the subject in lying down position in the right arm with a mercury manometer to nearest of 2 mmhg. Adequate cuff size was ensured. Cuff encircled 2/3rd length of arm with bladder on anterior side of arm covering the brachial artery. Its lower border was kept an inch above cubital fossa. The bladder was inflated and then deflated slowly. Two readings were taken 5 minutes apart and the mean of two was recorded as blood pressure reading.

Other Measurements

Height was measured with a stadiometer to the nearest of 0.1 cm. Subjects were requested to stand barefoot and upright with back against the wall, heels together, legs straight and knees together, arms at sides, shoulders relaxed, eyes looking forward with head in frankfort's plane. Head, shoulder blades, buttocks and heels were touching the measuring surface.

Weight was measured by platform scale. The scale was standardized to zero before each use. The subjects were asked to wear light clothing. Weight was recorded to the nearest of 0.1 kg.

Body mass index was calculated using the formula:

BMI= weight (kg)/height (m2)

Examination of diabetic peripheral neuropathy was done by foot sensitivity testing with Semmes Weinstein monofilament, deep tendon reflex testing by percussion hammer and vibration perception testing by 128HZ tunning fork. For diabetic autonomic neuropathy, parasympathetic tests i.e. heart rate response to valsalva maneuver and to deep breathing and sympathetic test. i.e. BP response to standing up, gustatory sweating, presence of erectile dysfunction, diabetic diarrhea and urinary incontinence were seen. Nerve conduction study, CT, MRI and carotid Doppler if required were done accordingly.

Examination of diabetic retinopathy was done by direct opthalmoscopic examination of fundus.

For diabetic nephropathy, each patient was screened for microalbuminuria. And ultrasound of abdomen was done for determining the size of kidney.

Ischemic heart disease was assessed by electrocardiogram and echocardiography.

Statistical Analysis

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Qualitative variables were correlated using Chi-Square test /Fisher's exact test. A p value of <0.05 was considered statistically significant. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

Discussion

We reviewed a total of hundred cases of diabetes mellitus type II admitted in the department of medicine, Tertiary Care Hospital from December 2014 to June 2016.

In our study, the patients presenting with complications of diabetes were in the age group of 39 to 87 years with the mean age of 58.44 ± 10.59. Peak incidence of complications was seen in the age group of 61- 70 years. 56% of the patients were males and 44% females, with male female ratio of 1.27:1.

In our study, most (66%) of the patients presenting with complications of diabetes mellitus had the disease for 1- 10 years followed by those (32%) with disease duration more than 10 years. Only two patients with disease duration less than 1 year presented with complications of the disease.

This is also comparable to study by Ankush etal [5] where mean duration of being diabetic when enrolled in study was 9.1±7.6 years.

In our study, 21% of the patients had a positive family history of the disease while 79% had no family history of diabetes mellitus. This is comparable to study by Ankush et al where 971 (29.8%) gave a positive family history out of which 299 (9.2%) reported only father as diabetic, 514 (15.4%) reported only mother and 158 (4.8%) reported both parents as diabetic.

In our study, a total of 9% patients presented with acute complications of diabetes mellitus, 59% had macrovascular complications while 59% had microvascular complications. 39% patients had more than 1 complication. Microvascular and macrovascular complications coexisted in 24% patients.

Among the microvascular complications, 33% had retinopathy, while 18 % had neuropathy and nephropathy. Among macrovascular complications, 50% patients presented with ischemic heart disease or had a history of previous myocardial infarction, 10% patients presented with stroke and 7% patients had peripheral vascular disease

This is comparable to study by Liu et al[6] where the prevalence of cardiovascular and cerebrovascular complications, neuropathy, nephropathy, ocular lesions and diabetic foot disease were 30.1%, 6.8%, 17.8%, 10.7%, 14.8% and 0.8%, respectively.

In our study, it was seen that microvascular complications were common (60.52%) in the younger age group while macrovascular complications were more common (85.71%) in the elderly age group.

Ischemic heart disease was the most common complication irrespective of the age group. Maximum patients (21) of ischemic heart disease were in the sixth and fifth decade.

Studies carried out among British outpatients as well as Chinese inpatients also pointed to cardiovascular conditions as the predominant chronic complication of diabetes mellitus type 2.[7,8]

The next most common complication in our study was retinopathy seen maximum in age group <50 years. Neuropathy was seen most commonly in the elderly age group i.e. >60 years. Cerebrovascular accidents were more frequent in the elderly age group i.e.>60 years. Nephropathy was seen more commonly in the sixth decade

Nephropathy was also more common (18.75%) when duration of diabetes was greater than 10 years. Retinopathy (50.00%) and ischemic heart disease (100%) were seen even patients who were newly diagnosed or where duration of diabetes was less than a year.

Peripheral vascular disease (9.09%) and cardiovascular accidents (10.61%) were common when the duration of diabetes was between 1-10 years. Neuropathy was most common (34.38%) when duration of diabetes was greater than 10 years and the result is clinically significant.

Microvascular complications were also seen to be maximum (78.13%) when duration of diabetes was greater than 10 years and this is clinically significant. this is comparable to study by Liu et al where prevalence of complications was positively associated with the duration of disease, irrespective of the patients' age. Study by Ankush et al also showed similar results.

Bibliography

1. Diabetes can be controlled in 80 percent of cases in india."IANS. News, biharprabha.com. Retrieved july 2014.

2. Gale, Jason. "India Diabetes Epidemic Cuts Down Millions Who Escape Poverty."Bloomberg. Retrieved july 2014.

3. Indian Heart Association Why South Asians Facts Web. 30 April 2015.<http://indianheartassociation.org/why-indians-why-south-asians/overview/

4. Wild, Sarah, Gojka Roglic, Anders Green, Richard Sicree, and Hilary King. "Global Prevalence of Diabetes." Diabetes Care. American Diabetes Association, 26 Jan. 2004. Web. 22 Apr. 2014

5. Ankush, Dias A, Gomes E, Dessai A. Complications in Advanced Diabetics in a Tertiary Care Centre: A Retrospective Registry-Based Study. J Clin Diagn Res. 2016;10(4):15–9.

6. Liu Z, Fu C, Wang W, Xu B. Prevalence of chronic complications of type 2 diabetes mellitus in outpatients a crosssectional hospital based survey in urban China. Health and Quality of Life Outcomes 2010;8:62.

7. Morgan CL, Currie CJ, Stott NC, Smithers M, Butler CC, Peters JR: The prevalence of multiple diabetes related complications. Diabet Med 2000,17(2):146–151.

8. Shi W, LI X, LI J: The morbidity of chronic diabetic complication with logistic analysis of related potential factor. Chin J Epidemiol 2004,25(1):60–64.