Original Research

Study on central obesity in newly diagnosed diabetes mellitus patients of Kashmir valley: a prospective study

Javid Ahmad Bhat[1], Sabhiya Majid[2], Himanshu Tripathi[1], Masood Tanveer[2], Showkat Ahmad Bhat[3], Haamid Bashir[2], Jasia Qadir[2]

[1]NIMS University, Jaipur, Rajasthan, India
[2]Govt Medical College, Srinagar, Jammu And Kashmir, India
[3]Govt Medical College, Doda, Jammu And Kashmir, India

ABSTRACT:
Background: Diabetes mellitus is a heterogeneous group of disease, resulting from a diversity of etiologies, genetic and environmental factors acting jointly. **Aim:** To study the scenario of central obesity in newly diagnosed patients of Kashmir valley. **Materials and methods:** This study was performed to evaluate central obesity in newly diagnosed T2DM patients and healthy controls of Kashmiri population. Study was conducted in the Department of Biochemistry, Govt. Medical College Srinagar. A total of 180 subjects were enrolled for study from OPD/IPD Department of Medicine, GMC, Srinagar. 100 T2DM patients were included in the study and were diagnosed according to ADA criteria and 80 normal age and sex matched healthy individuals were taken as controls. Dietary pattern, lifestyle, anthropometric parameters were documented after proper questionnaire. **Results:** There was increase in all 3 parameters in patients compared to controls and was strongly statistically significant (p<0.05). There was highly significant increase in TG, LDL & cholesterol levels in patients compared to controls, whereas HDL level decreased significantly and VLDL increased significantly in diabetic patients as compared to healthy controls. The glycemic profile (Glucose Fasting mg/dl and HbA1c %) and BMI in T2DM cases was higher as compared to healthy controls and found stastically significant (P<0.05). **Conclusion**: It can be concluded from this study that central obesity may be taken one of the reason to cause type 2 diabetes in new individuals and these patients are more prone to dyslipidaemia and HbA1c can be used as an indirect indicator of dyslipidaemia in type 2 diabetes in addition to as glycemic control biomarker. Thus early diagnosis of dyslipidaemia and central obesity can be used as a preventive measure for development of type 2 diabetes mellitus and other diseases like cardiovascular disease (CVD). Patients should be educated about regular monitoring of lipid profiles and if found to be abnormal, should control blood glucose and cholesterol very effectively and people should also educated about regular exercise to avoid central obesity so that T2DM should be minimized worldwide.

Corresponding author: Javid Ahmad Bhat, NIMS University, Jaipur, Rajasthan, India

INTRODUCTION

Diabetes mellitus is a heterogeneous group of disease, characterized by a state of chronic hyperglycemia, resulting from a diversity of etiologies, genetic and environmental factors acting jointly. The underlying cause of diabetes is the impaired production or action of insulin, a hormone that controls glucose, fat and amino acids metabolism Two broad categories of diabetes are designated as type 1 and type 2 diabete smellitus (DM). Type 2 DM is more common than type 1 DM. India is called the diabetic capital of the world. Type 2 diabetes mellitus in Indians is being increasingly seen in younger and obese persons than in western countries. Most of the long standing macro and microvascular complications are also more common among Indian diabetics as compared to other races and ethnic groups **(1-3)**. Changes in lipid-profile are a consequential event in DM. Due to these changes distribution and function of various fractions of lipids are affected. Many studies have evaluated the risk factors for CHD in DM patients and observed high fasting blood sugar (FBS) and,

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lipid levels when compared to controls. Glycated heamoglobin (HbA1c) is considered a gold-standard measure of chronic glycemic diabetic patients **(4, 5)**. Dyslipidemia, especially high LDL, is common in diabetes mellitus and strongly associated with poor glycemic control. Glycated hemoglobin (HbA1c) is main routinely used tool for measuring long term glycemic control. HbA1c is a main indicator for mean blood glucose level; HbA1c predicts the risk of diabetic complications in diabetic patients **(6-9)**. Thus, in the present study an attempt has been made to find any correlation of HbA1c with lipid profile in patients with type 2 diabetes mellitus and Study on central obesity in newly diagnosed diabetes mellitus. Hence, the present study was conducted to evaluate central obesity in newly daignosed T2DM patients of Kashmir valley.

MATERIALS AND METHODS

This study was performed to evaluate central obesity in newly diagnosed T2DM patients and healthy controls of Kashmiri population. The study was conducted in the Department of Biochemistry, Govt. Medical College Srinagar Kashmir India. The ethical clearance for the study was approved from the ethical committee of the govt. Medical college sgr kmr India, under no. 92/ETH/GMC/ICMR dated 28/10/2017. A total of 180 subjects were taken for the study. The patients were enrolled for study from OPD/IPD Department of Medicine, GMC, Srinagar. 100 T2DM patients were included in the study and were diagnosed according to ADA criteria and 80 normal age and sex matched healthy individuals were taken as controls. Dietary pattern, lifestyle, anthropometric parameters were documented after proper questionnaire. Fasting blood samples were collected from patients and healthy controls after proper informed consent after that 5ml of blood were collected by venipuncture in heparinized and EDTA Vials. Plasma was obtained by centrifugation at 4000rpm at 2 minute and Glycated hemoglobin (HbA1c), glucose and lipid profile levels were determined for all individuals at the clinical Laboratory of Department of Biochemistry, GMC, Srinagar on Abbott c4000 auto analyzer (USA) using same company reagent kits.

Statistical analysis

Standard descriptive statistics (mean±standard deviation) were determined for directly measured variable. Unpaired t test were applied to establish the correlations of anthropometric variables, FBG, HbA1c, Lipid profiles, atherogenic indices. Data were analyses using SPSS (Statistical Package for Social Science) version 20.0. A $p < 0.05$ was used to indicate statistical significance.

RESULTS

Table 1 shows the demographic distribution between patient and control group. Table 2 gives the results of FBS & HbA1c levels of patients and control group presented as Mean ± SD. There is increase in all 3 parameters in patients

compared to controls which is statistically strongly significant ($p < 0.05$).

Table 1: Demographic distribution between patient and control group

Sex	Cases (n= 100)	Control (n= 80)
Male	60	50
Female	40	30
Total	100	80

Table 2: The results of FBS & HbA1c levels of patients and control group presented as Mean ± SD

Parameters	Case (n= 100)	Control (n= 80)	p-value
BS	200.03±49.67	96.20±8.28	<0.05
HbA1C	7.73±0.76	5.11±0.27	<0.05

Table 3 gives the results of lipid profile levels of patients and control group expressed as Mean ± SD. There is strongly significant increase in TG, LDL & cholesterol levels in patients compared to controls, whereas HDL showed statistical decrease. No significant change in VLDL of case compared to control.

Table 3: Results of lipid profile levels of patients and control group expressed as Mean ± SD

Lipid parameter	Diabetes mellitus (n= 100) Mean± SD	Controls (n=80) Mean± SD	P value (<0.05)
Cholesterol (mg/dl)	296.5±53.3	107.1±26.8	<0.05
Triglycerides (mg/dl)	318.5±56.3	145.1±29.4	<0.05
HDL (mg/dl)	33.4±21.7	52.9±11.0	<0.05
LDL (mg/dl)	147.3±8.0	68.8±28.9	<0.05
VLDL (mg/dl)	45.20±6.07	40.80±4.9	<0.05

Table 4 gives the results of association between HDL, LDL, Chol and with HbA1c (HbA1c/HDL, HbA1c/LDL, HbA1c/Chol) levels of patients and control group. HbA1c/HDL, HbA1c/LDL & HbA1c/Chol ratios shows statistically strongly significant results in patients when compared to controls.

Table 4: Results of association between HDL, LDL, Chol and with HbA1c (HbA1c/HDL, HbA1c/LDL, HbA1c/Chol) levels of patients and control group

Parameters	Case	Control	P value
HbA1C/CHOL	0.07±0.08	0.29±0.01	p<0.05
HbA1C/HDL	0.28 ±0.04	0.15±0.03	p<0.05
HbA1C/LDL	0.10±0.07	0.05±0.04	p<0.05

Table 5 shows increased MBI as compared to controls. It was observed that in T2DM patients the mean (SD) of Body mass index (BMI) was 41.5±7.1 kg/m2 and in healthy controls BMI was 20.4±2.2 kg/m2 which is statically significant (p=0.001), while there was no significance

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(p=0.471) found in waist-circumference (WC) within T2DM patients and healthy controls.

Table 5: Anthropometric characteristics of the study group

Variables	Diabetes mellitus (n= 100) Mean± SD	Controls (n=80) Mean± SD	P value (<0.05)
BMI (kg/m²)	41.5±7.1	20.4±2.2	(<0.05)
WC(Inches)	47.5±4.6	29.3±4.5	(<0.05)

DISCUSSION

Diabetes Mellitus (DM) is a metabolic disease of great concern worldwide and is a global pandemic disease characterized by chronic hyperglycemia. The term Diabetes Mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion and/or insulin action. The present study shows FBS values of patients higher than upper limit which correlated well with the clinical diagnosis. HbA1c is done to monitor the control of blood glucose in diabetes mellitus. Several studies have shown the positive correlation of HbA1c with duration of DM and as a strong predictor of risk other diseases like cardiovascular diseases for diabetes complications. In our study, the results showed that the lipid profile were higher in diabetic patients. There was highly positive significant correlation observed between HbA1c and Lipid profiles (TC, TG and LDL). HbA1c has significant positive correlation (p<0.016) with FBG, TC, TG, LDL-C and LDL-C/HDL-C. The Diabetic complication established HbA1c as the gold standard of glycemic control. The HbA1c value <7.0 % reduced the risk of cardiovascular diseases and value >7.0 % leads to dyslipidemia to the patients. Controlling the glycemic levels may significantly decrease the risk of cardiovascular diseases in diabetes. Kiros KG et al assessed magnitude of overweight and associated factors among type 2 diabetes mellitus patients, in which they showed the magnitude of overweight among study participants from urban residence and alcohol consumers was 138 (92.6%) and 93 (62.4%) respectively. Central obesity and dietary intake were the determinant factors for overweight among type 2 diabetes mellitus patients. Chaudhary GMD et al studied the association of waist circumference (WC), waist to hip ratio (WHR) and body mass index (BMI) with hypertension in type 2 diabetes mellitus (DM) patients in a tertiary care hospital. Data of 4556 type 2 DM patients, 2549 (55.9%) females, and 2007 (44.1%) males, was analyzed. The mean systolic blood pressure (SBP) was 130.84 mmHg, while the mean diastolic blood pressure (DBP) was 82.65 mmHg. Central obesity was found in 80.7% and 94.7% of type 2 DM patients according to the WC and WHR cutoff, respectively. Hypertension was significantly associated with all the obesity indicators. Type 2 DM patients with higher than normal WC was significantly associated with hypertension. They concluded that diabetes is more prevalent in females and middle-aged people. Hypertension and obesity are two very common comorbidities of diabetes. Hypertension is strongly associated with all the parameters (WC, WHR, and BMI) of obesity [10, 11]. Chaudhary GMD *et al* analyzed the demographic profile of type 2 diabetes mellitus (DM) patients. They showed in their study that seventy-nine percent of the patients belonged to urban areas. Symptoms of polyuria, polydipsia, and polyphagia were found in 72%, 67%, and 59% of patients, respectively. Females were more likely to be obese than males in all parameters of obesity. Central obesity was much more common in female diabetics as compared to male diabetics (odds ratio 4 in WHR criteria versus odds ratio 1.8 in BMI criteria for obese). They concluded that diabetes is more prevalent in females than males and especially affects the middle age group. Obesity are important comorbid associations of DM. WC and WHR are more reliable indicators of obesity in type 2 DM patients especially in this part of the world. Central obesity was more prevalent in female type 2 DM patients. Lopatynski J et al in their study showed there was increase of all the studied indices was correlated with the increase of glicaemia, especially after an oral glucose load. The weakest correlation was shown by WHR. WC showed the strongest correlation with fasting glycaemia (except for men, where closer relationship with BMI was observed). Glicaemia after the load was stronger correlated with BMI and WHtR. They concluded that all the studied indices have a similar value for DM 2 risk assessment. Waist circumference (WC) is especially noteworthy for the family doctor's practice both because of its high diagnostic precision and exceptional simplicity of its determination. The cut-off points of the studied indices should be differentiated according to sex [12, 13].

CONCLUSION

It can be concluded from this study that central obesity may be taken one of the reason to cause type 2 diabetes in new individuals and these patients are more prone to dyslipidaemia and HbA1c can be used as an indirect indicator of dyslipidaemia in type 2 diabetes in addition to as glycemic control biomarker. Thus early diagnosis of dyslipidaemia and central obesity can be used as a preventive measure for development of type 2 diabetes mellitus and other diseases like cardiovascular disease (CVD). Patients should be educated about regular monitoring of lipid profiles and if found to be abnormal, should control blood glucose and cholesterol very effectively and people should also educated about regular exercise to avoid central obesity so that T2DM should be minimized worldwide.

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