PREVALENCE OF METABOLIC SYNDROME IN NEWLY DIABETES MELLITUS PATIENTS

Dr. Mukund Ganeriwal[1], Dr. Mahendra Sawarkar[2], Dr. Shriram Kane[3]

[1]Associate Professor Dept. of General Medicine Datta Meghe Medical College and Shalinitai Meghe Hospital; and research Center Nagpur.

[2]Associate Professor Dept. of General Medicine Datta Meghe Medical College and Shalinitai Meghe Hospital; and research Center Nagpur.

[3]Professor and HOD Dept. of General Medicine Datta Meghe Medical College and Shalinitai Meghe Hospital; and research Center Nagpur.

Abstract

Introduction: Diabetes mellitus (DM) is defined or described as a group of metabolic disorders which is characterized by a high blood sugar level over a prolonged period. Metabolic syndrome (MS) is described as insulin resistance, clusters of abnormalities including abdominal obesity, hypertension, hyperglycaemia, increased triglycerides, and decreased high-density lipoprotein cholesterol (HDL-C). For the diagnosis of metabolic syndrome there are different diagnostic criteria. According to WHO modified criteria metabolic syndrome is defined as a presence of diabetes and e"2 of the following: 1) BMI >30 kg/m2 or Waist hip ratio>0.9 for men, >0.85 for women. 2) TG e"150 mg/dl or HDL. 3) BP e"140/90 mm Hg or on medication. According to the studies people having diabetes mellitus, at least 65% were associated metabolic syndrome die of some form of heart disease or stroke. So it is necessary to investigate a newly detected diabetes mellitus for signs of the metabolic syndrome so that complications can be prevented. One of the study showed that in India there is a highest increase in the population with diabetes from 19 million in 1995 to 66.8 million in 2015 and which is predicted to increase to 123.5 million by 2040. The prevalence rate of diabetes in urban areas is about 9% and the prevalence in rural areas has also increased to around 3% of the total population. According to the data of Third National Health and Nutrition Examination Survey (NHANES III) people without metabolic syndrome had the lowest risk for cardiovascular disease (CVD) whereas people with metabolic syndrome had an intermediate level of risk, and those with diabetes had the highest level of risk.

Aim: The main aim of this study is to find prevalence of Metabolic Syndrome in newly diagnosis of Diabetes Mellitus.

Material and methods: Total 100 patients were included in this study in which 80 were male and 20 were females with recently diagnosis as diabetes mellitus within 6 months prior to the date of presentation. From all the patients detail history was collected and other risk and associated factors. For all the patients detailed clinical examinations, including weight in kg, height in cm, body mass index (BMI) (weight in kg/height in m2) were recorded.

Result: Prevalence of metabolic syndrome among 100 study participants was found to be 70.0%. Prevalence of metabolic syndrome was found to be highest in the age group of 35 -45 years (65.4%).The mean value of FBS in the metabolic syndrome group was 178 mg/dl; post prandial blood sugar mean value was 250 mg/dl. Out of cases 100 cases with TG>150, 92 had metabolic syndrome (92%). In this study, 65 % of the cases with the criteria for WC, WC > 90 cm for males and >80 cm for females had metabolic syndrome.

Conclusion: Therefore in this study showed that diabetes significantly increases the risk for metabolic syndrome. Low HDL-C and evaluated TGs were seen to be associated with most cases of metabolic syndrome. Diabetic patients with morbid obesity, WC and central obesity have a high association with metabolic syndrome.

Keywords: Diabetes Mellitus, Metabolic Syndrome, triglycerides obesity

Introduction

Diabetes mellitus (DM) is defined or described as a group of metabolic disorders which is characterized by a high blood sugar level over a prolonged period[i]. Metabolic syndrome (MS) is described as insulin resistance, clusters of abnormalities including abdominal obesity, hypertension, hyperglycaemia, increased triglycerides, and decreased high-density lipoprotein cholesterol (HDL-C)[ii]. Globally about a quarter of adults have metabolic syndrome.

Individuals with metabolic syndrome are twice as likely to die from and three times as likely to have a heart attack or stroke compared with people without the syndrome. Up to 80% of the 200 million individual with diabetes globally will die of cardiovascular disease. In morbidity and mortality terms, metabolic syndrome and diabetes was puts way ahead yet the problem is not as well recognized[iii]. For the diagnosis of metabolic syndrome there are different diagnostic criteria. According to WHO modified criteria metabolic syndrome is defined as a presence of diabetes and e"2 of the following: 1) BMI >30 kg/m2 or Waist hip ratio>0.9 for men, >0.85 for women. 2) TG e"150 mg/dl or HDL. 3) BP e"140/90 mm Hg or on medication. According to the studies people having diabetes mellitus, at least 65% were associated metabolic syndrome die of some form of heart disease or stroke. So it is necessary to investigate a newly detected diabetes mellitus for signs of the metabolic syndrome so that complications can be prevented[iv]. DM patients have an increased prevalence of lipid abnormalities which contribute to higher rates of CAD. Low HDL cholesterol levels and High triglyceride were significantly related to all coronary heart disease events and to coronary mortality in patients DM[v]. Countries in which highest rates of diabetes were found included as United States, China and India with alarming rates of prevalence of diabetes[vi]. One of the study showed that in India there is a highest increase in the population with diabetes from 19 million in 1995 to 66.8 million in 2015 and which is predicted to increase to 123.5 million by 2040. The prevalence rate of diabetes in urban areas is about 9% and the prevalence in rural areas has also increased to around 3% of the total population[vii]. In diabetes patients there is growing evidence that like diabetes, metabolic syndrome besides resulting in macrovasular complications also causes microvascular complications[viii],[ix]. In DM patients there in increase in risk of vascular complications increases with metabolic syndrome in combination with diabetes due to associated dyslipidemia, hypertension and obesity[x]. One of the studied in India showed that Kerala is the diabetic capital of India with a prevalence of 20% (compared to 8% national prevalence). Studied also showed that cardiac mortality is the highest in country and 2 times of Japan and China[xi]. According to the data of Third National Health and Nutrition Examination Survey (NHANES III) people without metabolic syndrome had the lowest risk for cardiovascular disease (CVD) whereas people with metabolic syndrome had an intermediate level of risk, and those with diabetes had the highest level of risk[xii]. The main aim of this study is to find prevalence of Metabolic Syndrome in newly diagnosis of Diabetes Mellitus.

Material and methods:

This is prospective study conducted in Department of General Medicine of Datta Meghe Medical College, Shalinitai Hospital Research Center Nagpur. Total 100 patients were included in this study in which 80 were male and 20 were females with recently diagnosis as diabetes mellitus within 6 months prior to the date of presentation. In this study all the patients with different age were included between 30 to 65 years old who visited in our hospital in Out Patient and In Patient Departments of General Medicine. According to American, International and European Diabetes Association "Diabetes mellitus was defined as – fasting blood sugar (FBS) > 126 mg/dl (fasting for at least 8 h) or 2 h postprandial sugar > 200 mg/dl (capillary and venous) or HbA1c > 6.5% or symptoms of diabetes + random blood sugar > 200 mg/dl"[xiii],[xiv]. From all the patients detail history was collected and other risk and associated factors. For all the patients detailed clinical examinations, including weight in kg, height in cm, body mass index (BMI) (weight in kg/height in m2) were recorded.

Result:

This study was conducted in 100 patients who were diagnosed with diabetes mellitus within 6 months. A modified NCEP ATP 3 criterion for Asians was used for diagnosing metabolic syndrome. Prevalence of metabolic syndrome among 100 study participants was found to be 70.0%. In this study in which 80% were male and 20% were females. Among total studied of male and female, about 70% of males and 45% of males had metabolic syndrome. Prevalence of metabolic syndrome was found to be highest in the age group of 35 -45 years (65.4%).
In this study all patients were diagnosis as diabetics irrespective of their blood glucose levels all were assumed to be positive for these diagnostic criteria. The mean value of FBS in the metabolic syndrome group was 178 mg/dl; post prandial blood sugar mean value was 250 mg/dl.
Out of cases 100 cases with TG>150, 92 had metabolic syndrome (92%). In this study, 65 % of the cases with the criteria for WC, WC > 90 cm for males and >80 cm for females had metabolic syndrome.

Table 1: Factors associated with metabolic syndrome

Factor	Metabolic syndrome (N (%))			
	No	%	Yes	%
SBP >130 DBP >85	28	28	72	72
HDL Males<40 mg/dl Females <50 mg/dl	26	26	74	74
TG >150 mg/dl	8	8	92	92
WC	63	35	65	65
>90 cm male				
>80 cm female				
High socio-economic status	34	34	66	66
Alcoholics	32	32	68	68
Smoking	25	25	75	75
Sedentary lifestyle	40	40	60	60
Central obesity W/H >0.9 BMI >30	9	9	91	91
Uric acid>8 mg/dl	44	44	56	56

Discussion:

In India as increase in population there are increase in a high-risk population with respect to diabetes and cardiovascular disease, and the numbers are consistently on the rise. The e prevalence of metabolic syndrome in Indians varies according to the region, the extent of urbanization, lifestyle patterns, and socio-economic/cultural factors. A study conducted by Linu Mohan et al[xv] in OP patients in Kerala in 2012 showed a prevalence of 38.5% which is similar to this study. Studied conducted in 2012 by Thayyil et al showed that prevalence is 16.8% in Kerala's police population[xvi]. Another studies in Mumbai in 2011 by Sawant et al[xvii] observed the prevalence of 19.52% in general population. Various studied in India showed that diabetes mellitus significantly increases the risk for metabolic syndrome when compared to general population, but there was no significant difference in prevalence between the north and the south of India. this study showed that there is significant increase in the metabolic syndrome with age. Maximum prevalence was seen in the age group of 35-45 years old. With metabolic syndrome there is seen that Low HDL in males and females frequently. Metabolic syndrome cases also had shown hypertriglyceridemia in this study which is similar to the study of Supriya et al[xviii].

Studies conducted by Daliparthy Devi et al[xix,xx] also showed sensitivity of 71% in males and 86% in females for detecting metabolic syndrome which was also observed in this study. Another studied conducted by Vijay Kumar et al[xxi] in central Kerala also shows a high prevalence of central obesity (85.6%) which is similar to this study.

Conclusion:

Therefore, in this study showed that diabetes significantly increases the risk for metabolic syndrome. The prevalence of metabolic syndrome may increase with age. Low HDL-C and evaluated TGs were seen to be associated with most cases of metabolic syndrome. Diabetic patients with morbid obesity, WC and central obesity have a high association with metabolic syndrome.

References:

1. *"About diabetes". World Health Organization. Archived from the original on 31 March 2014. Retrieved* 4 April *2014.*
2. Grundy SM. Hypertriglyceridemia, insulin resistance, and the metabolic syndrome. Am J Cardiol 1999; 83: 25F-29F.
3. Kunti K, Davies M. Metabolic Syndrome. BMJ 2005; 331: 1153-1154.

4. Dhanaraj E, Bhansali A, Jaggi S, Dutta P, Jain S, Tiwari P, et al. Predictors of metabolic syndrome in Asian north Indians with newly detected type 2 diabetes. Indian J Med Res 2009;129:506-14.

5. Lehto S, Ronnemaa T, Haffner SM, Pyorala K, Kallio V, Laakso M. Dyslipidemia and hyperglycemia predict coronary heart disease events in middle-aged patients with NIDDM. Diabetes 1997; 46: 1354-9.

6. Shaw JE, Sicree RA, Zimmet PZ (2010) Global estimates of the prevalence of diabetes for 2010 and 2030. Diabetes Res Clin Pract 87: 4-14.

7. http://diabetesindia.com/diabetes/itfdci.htm

8. Isomaa B, Henricsson M, Almgren P, Tuomi T, Taskinen MR, et al. (2001) The metabolic syndrome influences the risk of chronic complications in patients with type II diabetes. Diabetologia 44: 1148-1154.

9. Szalat A, Raz I (2006) Metabolic syndrome and microangiopathy. Isr Med Assoc J 8: 424-425.

10. Shimajiri Y, Tsunoda K, Furuta M, Kadoya Y, Yamada S, et al. (2008) Prevalence of metabolic syndrome in Japanese type 2 diabetic patients and its significance for chronic vascular complications. Diabetes Res Clin Pract 79: 310-317.

11. Linu Mohan P, Jishnu NA, Remya PJ. Prevalence of metabolic syndrome in psychiatric OP patients in tertiary care hospital, Kerala. Indian J Pharm Pract 2012;5:58-61.

12. Alexander CM, Landsman PB, Teutsch SM, Haffner SM. Third National Health and Nutrition Examination Survey (NHANES III); National Cholesterol Education Program (NCEP). NCEP defined metabolic syndrome, diabetes, and prevalence of Dhanaraj et al: Metabolic Syndrome in Newly Detected T2 DM 513 coronary heart disease among NHANES III participants age 50 years and older. Diabetes 2003; 52: 1210-4.

13. Vijayakumar G, Arun R, Kutty VR. High prevalence of type 2 diabetes mellitus and other metabolic disorders in rural Central Kerala. J Assoc Physicians India 2009;57:563-7.

14. Dhanaraj E, Bhansali A, Jaggi S, Dutta P, Jain S, Tiwari P, et al. Predictors of metabolic syndrome in Asian north Indians with newly detected type 2 diabetes. Indian J Med Res 2009;129:506-14.

15. Mohan PL, Jishnu NA, Remya PJ. Prevalence of metabolic syndrome in psychiatric OP patients in tertiary care hospital. Kerala. Indian J Pharm Pract 2012;5:57-61.

16. Th ayyil J, Jayakrishnan TT, Raja M, Cherumanalil JM. Metabolic syndrome and other cardiovascular risk factors among police offi cers. N Am J Med Sci 2012;4:630-5.

17. Sawant A, Mankeshwar R, Shah S, Raghavan R, Dhongde G, Raje H, et al. Prevalence of metabolic syndrome in urban India. Cholesterol 2011;2011:920983

18. Supriya Simon A, Dinesh Roy D, Jayapal V, Vijayakumar T. Biochemical and genetic studies on cardiometabolic syndrome. Indian J Clin Biochem 2010;25:164-8.

19. Pratyush DD, Tiwari S, Singh S, Singh SK. Waist circumference cutoff and its importance for diagnosis of metabolic syndrome in Asian Indians: A preliminary study. Indian J Endocrinol Metab 2012;16:112-5.

20. Pratyush DD, Tiwari S, Singh S, Singh SK. Waist circumference cut off and its importance for diagnosis of metabolic syndrome in Asian Indians – A preliminary study. Indian J Endocrinol Metab 2012;l16:112-5.

21. Vijayakumar G, Arun R, Kutty VR. High prevalence of type 2 diabetes mellitus and other metabolic disorders in rural Central Kerala. J Assoc Physicians India 2009;57:563-7.