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PATTERNS OF DIABETIC DYSLIPIDEMIA AND GLYCEMIC CONTROL AT TERTIARY CARE HOSPITAL SINDH.

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ABSTRACT

Diabetes is recognized as the coronary heart disease risk equivalent condition. Dyslipidemia affects 70% to 97% of people with diabetes. It is characterized by a low level of HDL, increased levels of Triglycerides and LDL. The objective of this study is to describe the various patterns of diabetic type 2 dyslipidemia and compare it in controlled& uncontrolled glycemic groups.

MATERIALS & METHODS:

This descriptive comparative study was conducted at Department of Medicine at LUH Jamshoro & Hyderabad from March 2005 to march 2006 over a period of one year. A sample size of 120 patients was collected. Data collection procedure was convenient sampling. Diagnosed patients of type2 diabetes, admitted in the ward or attending the medical OPD were selected. With informed consent blood sugar fasting & random, glycosylated hemoglobin, lipid profile was tested. Patients having fasting blood glucose < 130mg/dl and HA1cb <7 were labeled as good glycemic control and vice versa. Data analysis was done by SPSS 17 statistical software. Results were finally checked by test of significance ANOVA test.

RESULTS: *Among 120 patients patterns of dyslipidemia found were elevated levels of LDL-C, reduced levels of HDL-C and some having triglycerides above the target levels. There were significant differences in the concentrations of serum LDL-C (P=. 001), HDL-C (P=. 083) and triglycerides (P=.000). Hence significant difference in dyslipidemia of controlled and uncontrolled diabetics is proved.*

CONCLUSION: *A large majority of type 2 diabetic patients suffered from dyslipidemia especially with poor glycemic control. In female diabetic dyslipidemia is more prevalent.*

KEY WORDS: Diabetes mellitus, Dyslipidemia, Glycemic control, LDL, HDL

INTRODUCTION:

Diabetes mellitus is a major healthcare problem globally, and by 2030 there will be approximately 360 million patients worldover.[1] Dyslipidemia affects people with type 2 diabetes more often than those with type 1 diabetes[2] It affects 70% to 97% of people with diabetes.[3] Dyslipidemia means too high or low levels of lipid in blood, it is characterized by a low level of HDL, increased levels of Triglycerides and LDL.[4,5] People with diabetes are more likely to develop atherosclerosis, heart disease, poor circulation, and stroke. Dyslipidemia not only raises the risk of atherosclerosis but of related complications too.2,3 Dyslipidemia in diabetic patients is associated with insulin resistance.[5] which leads to the increased free fatty acid influx to the liver the resultant is enhanced production of VLDL also hydrolysis of triglycerides enriched LDL and HDL by hepatic lipase results in the formation of small cholesterol poor HDL and LDL particles.[6] Latest research suggests that decreased adiponectin level has been related with insulin resistance, dyslipidemia, and atherosclerosis. [7]

Type 2 diabetes is associated with higher frequency and accelerated progression of atherosclerosis[8] Tight glycemic control significantly reduces the incidence of microvascular disease but it's role in preventing the macrovascular complications of diabetes is uncertain.[9] Patients with diabetes have a worse prognosis following an atherosclerotic event thus patients with type 2 diabetes require aggressive management of lipid abnormalities for which initial lipid screening is essential.[8] The objective of this study was to check the pattern of lipid abnormalities along with assessment of their glycemic control in diabetics.

MATERIAL & METHODS

This prospective comparative study was conducted at Department of Medicine, Unit

IV, Liaquat University Hospital Jamshoro & Hyderabad from March 2005 to March 2006 over a period of 6 months. A sample size of 120 patients with type 2 diabetes, admitted in the ward or attending the OPD were included in the study after obtaining the informed consent. Data collection procedure was convenient sampling. Clinical diagnosis was made after history evaluation, clinical examination &previous or recent laboratory investigations (blood sugar fasting & random, glycosylated hemoglobin, lipid profile, Urine DR serum creatinine, blood urea, LFT, Thyroid profile, pregnancy test), with their informed consent.Questionnaire about diagnosis of DM After written consent of the patient, the data containing history, examination & laboratory values of blood sugar (fasting =126mg/dl & 2h postprandial =200 mg/dl) along with other necessary tests, was entered in a predesigned proforma. Patients' glycemic control was checked by HbA1c (Roche HbA1c Kit) & lipid profile by (Roche LDL, HDL, Triglyceride kit). Data analysis was done by using Statistical Package of Social Sciences, SPSS 17. Test of significance ANOVA wa applied to calculate the data where needed.

RESULTS

A total of 120 patients including 70 males (58.33%) and 50 females (41.66%) with type 2 diabetes were studied. Mean age of the patients was 54.3±10.1 (78.8%), age ranged from 40-85 years. Only 46 (21.1%) (25 male and 21 female) patients who fulfilled the criteria of glycemic control were labeled as patients with good glycemic index, but majority of the patients 74 (78.9%) fallen into the category of poor glycemic index .Out of these 74 patients,45 were male and 29 were female. The lipid patterns were analyzed and along with sex distinction shown in Tables 1, 2 and 4 for LDL, Triglycerides and HDL respectively. Mean triglyceride came out as 203.52, mean LDL-C came out as 127.86 and mean HDL-C was 35. The standard deviation of LDL-C, DHL The standard deviation of LDL-C, HDL-C and triglycerides came out to be 31.3, 10.09 and 115.5 respectively. Relation of dyslipidemia with glycemic index was calculated by cross tabulation method and shown in Table 1, 3 and 4. ANOVA was applied on LDL, HDL and triglyceride and p values of the LDL, HDL and triglyceride came out to be .001, 0.083 and .000 respectively. It showed significant differences in the concentrations of serum LDL-C, HDL-C and triglycerides among controlled and uncontrolled type 2 diabetic patients.

TABLE 1
RELATION OF SEX & GLYCEMIC INDEX TO LDL (CROSS TABULATION)

	LDL < 100mg/dl	LDL > or equal to 100mg/dl
Male	15	55
Female	11	39
Good glycemic control	12	34
Poor glycemic control	13	61

TABLE 2
RELATION OF SEX TO TRIGLYCERIDES

SEX	TG less than 200mg/dl	TG greater than or equal to 200mg/dl	Total
Male	43	27	70
Female	36	14	50
Total	79	41	120

TABLE 3
RELATION OF TRIGLYCERIDES TO GLYCEMIC INDEX

	TG less than 200mg/dl	TG greater than or equal to 200mg/dl	Total
Good glycemic control	34	12	46
Poor glycemic control	45	29	74
Total	79	41	120

TABLE 4
RELATION OF SEX AND GLYCEMIC INDEX TO H D L GROUPS

SEX	HDL groups	Glycemic index		Total
		Good glycemic control	Poor glycemic control	
Male	HDL less than 45mg/dl	17	37	54
	HDL 45mg/dl to 55mg/dl	7	6	13
	HDL greater than 55mg/dl	1	2	3
	Total	**25**	**45**	**70**
Female	HDL less than 45mg/dl	19	22	41
	HDL 45mg/dl to 55mg/dl	1	5	6
	HDL greater than 55mg/dl	1	2	3
	Total	**21**	**29**	**50**

DISCUSSION

Type 2 diabetes mellitus affects large number of people in the world and its incidence is increasing rapidly.[10] In Pakistan; 6.9 million people are affected by diabetes, with the International Diabetes Federation estimating that this number will grow to 11.5 million by 2025. In 2007, 246 million people worldwide suffered from diabetes making the disease one of the most common non-communicable global diseases and the fourth leading cause of death in the world.[11] In diabetic patients particularly women increased cardiovascular mortality has been observed. Diabetes has a deleterious effect on mortality independently of other risk factors, resulting in a two-fold increase in the mortality rate.[12] Diabetics have 2-4 times

greater risk of vascular disease than those without diabetes with cardiovascular disease the primary causes of deaths.[13] Epidemiological data shows that 70% of patients with type 2 diabetes will die of some form of cardiovascular disease.[9]

In our study overall female patients were more dyslipidemic as compared to male, except for triglycerides which were higher in males 38.5% as compared to 28% females. Female preponderance in diabetic dyslipidemia is a well known fact especially for LDL, therefore this gender difference found in our study is comparable to other studies.[14] There are many theories proposed to account for the excess risk from diabetes in female. These include difference in coagulation, pattern of obesity between male and female and hyperinsulinomia. Diabetes also alters estrogen related protective mechanism. Low grade inflammation may have a more perturbing insulin action in female or inflammatory factors may interact with female sex hormones.[15] In males alcohol consumption BMI, WHR and age were the most important factors associated with elevated plasma lipid levels.[16]

Pattern of dyslipidemia found in our study of 120 patients was as under, lower levels of HDL in 79% of patients while 17.5% had border line levels, second most frequent abnormality was elevated LDL levels which was present in 78% of patients elevated triglycerides were found in only 34% of patients so this well known fact that abnormal lipid metabolism is often present in patients with type 2 diabetes is also proved in our study.[16]

The results of our study and the patterns of dyslipidemia was comparable to a similar study conducted in Karachi Pakistan for patterns of diabetic dyslipidemia in which commonest pattern of dyslipidemia found was high LDL and low HDL cholesterol levels.[4] This is also favored by other international studies.[17, 18] Contrary to this some other studies and report from ADA suggest that most common pattern is elevated triglyceride and low HDL cholesterol.[19-21] Patients were divided into good and poor glycemic groups on the basis of HbA1c less than 7 or greater, fasting blood sugar less than 130 mg/dl or greater respectively. 74 (61.6%) patients were found in poor glycemic control while the remaining in good glycemic control group. overall 64% of total males and 58% of total females were found with poor glycemic control .This is a serious situation with regard to the health status of our patients as diabetes mellitus itself is recognized as the coronary heart disease risk equivalent condition.[16]Dyslipidemia and prolonged hyperglycemia provoke an increase in oxidative stress, inflammation, and vascular damage, encouraging endothelial dysfunction and are associated with complications.[22] In one study conducted in 2003 in Rawalpindi Pakistan also show high prevalence of poor glycemic control, atherogenic dyslipidemia and cardiovascular risk. In that study researchers found HbA1c greater than 7.5 in 46.7% while we found 61.6%diabetic patients with HbA1c greater than 7. [23]

The correlation between various lipid fractions and good and poor glycemic control is shown in tables which indicated that only 12 patients (29.68%) with good glycemic index were having triglyceride level ^{3}200 mg/dl as compared to 29 patients (70.73%) with poor glycemic index who were having triglycerides ^{3}200 mg/dl, 33 patients (35.10%) with good glycemic index were having LDL-C ^{3}100 mg/dl as compared to 61 patients (64.89%) with poor glycemic index who were having LDL-C ^{3} 100mg/dl and 17 (31.48%) of the males with good glycemic index were having HDL-C < 45 mg/dl as compared to 37 (68.51%) of the males with poor glycemic index who were having HDL-C < 45 mg/dl and 20 (42.55%) of the females with good glycemic index were having HDL-C<55mg/dl while 27 (57.45%) of the females with poor glycemic index were having HDL-C < 55mg/dl, this showed significant differences in the concentrations of serum HDL, LDL and triglycerides levels among controlled and uncontrolled type-2 diabetics This relation of dyslipidemia to glycemic index is also similar to a local study conducted at Allama Iqbal Medical College Lahore which concluded that all lipid fractions were found to be deranged in both the groups, more so in the patients with uncontrolled diabetes.[24] Poor glycemic control and dyslipidemia in Pakistani population has also been reported by other authors.23 The UKPDS study concluded that 1% decrease in HbA1c reduced 21% risk of any complication, 14% the risk of myocardial infarction and 37% the risk of microangiopathy.[12]

The treatment of dyslipidemia includes most importantly therapeutic lifestyle change. Pharmacological treatment includes statins, fibrates and niacin .An early intervention to normalize circulating lipids is needed as it has been shown to reduce cardiovascular complications and mortality.[25]

CONCLUSIONS

Dyslipidemia is common among type 2 diabetic patients. Females are more prone to suffer from this complication. Patterns of dyslipidemia found more commonly were decreased HDL levels, increased LDL and Triglycerides levels. Although there is significant difference in the concentration of serum HDL, LDL and Triglycerides levels among good and poor glycemic controlled groups of type 2 diabetic patients , dyslipidemia found in both groups. There is a need for early detection and treatment of this problem in type 2 diabetic patients.

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