How to Control Dyslipidemia in Patients with Type 2 Diabetes?

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ABSTRACT: Cardiovascular diseases (CVDs) are one of the major causes of death in diabetic diseases. Dyslipidemia (increasing LDL or decreasing HDL) are among the major causes that increase risk of CVDs. In the present study, control and treatment of blood lipids in diabetic patients is studied. For this purpose, 54 diabetic patients has been studied from 2009 and followed up for 3 successive years. On the start of study, mean of total cholesterol, triglyceride, LDL-C, HDL-C were 202.12, 203.07, 113.90, 44.72, respectively. Repeated measure analysis used for examine of significant changes in variables levels during the 36 months. According this, statistical parameters obtained showed a significant decrease of variables study during the period. Generally the results obtained from the present study show that the control level of blood lipids was successful. Results of the study have been discussed in the end of article.

Key words: Diabetic Diseases, Total Cholesterol, Triglyceride, LDL-C, HDL-C

INTRODUCTION

Cardiovascular diseases (CVDs) are one of the major causes of death in diabetic diseases. The risk of CVDs in diabetic patients is 2-4 times bigger than non-diabetic patients (Stamler et al., 1993). Dyslipidemia (increasing LDL or decreasing HDL) are among the major causes that increase risk of CVDs (Kreisberg et al., 2003). More than 90% of the diabetic patients were at least with one abnormal blood lipids (Turner et al., 1998: Fagot-Campagna et al., 2000). Hyperlipidemia treatment plays a major role in decreasing risk of CV complications in these patients (Haffner et al., 1998; Smith et al., 1984; Miettinem et al., 1998). The present research investigates if glycemic control, i.e. measuring HBA1C, may have unfavorable effect on LDL level. For this reason, in present study control and treatment of blood lipids in diabetic patients is studied.

METHODS AND MATERIAL

Present study is a cross-sectional one. The population under study includes the staff of Hormozgan Petroleum Company and their families (their wives and offspring). The population under study included the patients who were proved to be with diabetes in screening. The study started from 2009 and followed up for 3 successive years. At the beginning of the study, screening was conducted from the target population. There were 2607 people. Those who were 30 or above without risk factor and those under thirty years old with BMI above 25 plus one diabetes risk factor were examined in terms of having diabetes risk factors. There were 434 of the patients. The risk factors included family history of diabetes, inactivity, hypertension equal or above 140.90 mmHg, triglyceride level above 250, HDL level below 35, history of IFG (Impaired Fasting Glucose) or IGT (Impaired Glucose Tolerance), history of gestational diabetes (or gestational diabetes mellitus, GDM) or birthweight above 4 kg, history of cardiovascular disease, history of PCO or acanthosis nigricans. The results of fasting blood sugar tests of the patients with one of the above risk factors were checked at least 8 hours after being fast. After screening and taking fasting blood sugar (FBS) test, 115 of them were diagnosed with diabetes. Diabetes was diagnosed according to ADA (American Diabetes Association) criterion (blood glucose exceeding 126 mg/dl after being fast for at least 8 hours within two separate periods or patient’s sugar blood exceeding 200 mg/dl 2 hours after consuming 75 g glucose or symptoms of hyperglycemia (bulimia, polydipsia, polyuria) with random glucose blood being 200 mg/dl or further.

Inclusion Criteria: The patients who have just been diagnosed with diabetes and those who were diagnosed with diabetes before while being under treatment.

Exclusion criteria: Those who had chronic kidney or liver failures, drug idiosyncrasy, drug intolerance and those who were not following up necessary tests, examination and receiving medication regularly and continuously.

At the beginning of the study, a file was made for each patient and following specifications were recorded in...
For each patient, patient’s blood pressure was measured in sitting position after 15 minutes rest using a mercury sphygmomanometer, and the average of these two blood pressures was recorded in his/her file as the patient’s blood pressure. Weight of patient was measured by the lightest clothing without wearing shoes. After that, Body Mass Index (BMI) was calculated and recorded in patient’s file. At the beginning of each study, fasting blood sugar, hemoglobin A1C, serum lipids and lipoproteins, blood urea, and creatinine were checked 2 hours after a meal. Then hemoglobin A1C and serum lipids and lipoproteins were checked once every three months. Fasting blood sugar of patients were checked once every six weeks.

Blood sugar was measured through glucose oxidase method and total cholesterol, triglyceride, and cholesterol were measured using Enzyme Chem Pars Azmun kits. Cholesterol level was measured using Friedewald Formula (in case triglyceride level was lower than 400 mg/dL) (Friedewald et al., 1972). NCEP-ATP criteria were used for classifying different levels of blood lipids (NCEP 2001), National Cholesterol Education Program (NCEP) - Adult Treatment Panel (ATP III): ATP III Classification of LDL, Total, and HDL Cholesterol (mg/dL): LDL Cholesterol – Primary Target of Therapy <100 Optimal, 100-129 near optimal/above optimal, 130-159 Borderline high, 160-189 High, >190 Very high Total Cholesterol: < 200 Desirable, 200-239 Borderline high, >240 High HDL Cholesterol: < 40 Low, >60 High

Union Exchange Chromatography method was used by a DSS system to measure hemoglobin A1C (HbA1C).

SPSS software was used for statistical analysis. To analyze the data, mean and standard deviation indices were calculated in the descriptive statistics section and repeated measure analysis was used in the inferential section.

RESULTS

Of 115 people included in the study, 53 people (30 males and 23 females) completed the study. The results obtained from the patients were analyzed. Range of patients’ age is between 26 and 72 and the mean age of the patients was 50.58 years old. Mean ages of males and females were 50.33 and 50.91 years old, respectively. On the start of study, mean of total cholesterol, triglyceride, LDL-C, HDL-C were 202.12, 203.07, 113.90, 44.72, respectively. Following table 1 shows descriptive indexes (mean and standard deviation) of the variables during the period of study.

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<th>Cholesterol</th>
<th>Mean</th>
<th>SD</th>
<th>Triglyceride</th>
<th>Mean</th>
<th>SD</th>
<th>HDL-C</th>
<th>Mean</th>
<th>SD</th>
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As previously mentioned, repeated measure analysis used for examine of significant changes in variables levels during the 36 months. According this, statistical parameters obtained showed a significant total cholesterol decrease during the period (F1, 53 = 6.39, P<0.001). Diagram of changes in total cholesterol levels (diagram 1), shows a general pattern of continuous decline in total cholesterol levels. In addition, statistical parameters obtained showed a significant triglyceride decrease during this period too (F1, 53 = 9.27, P<0.001). Diagram of changes in triglyceride levels (diagram 2), shows a general pattern of continuous decline in triglyceride levels. Third analysis shows a significant HDL decrease during the period (F1, 53 = 2.21, P<0.01). Diagram of changes in HDL levels (diagram 3), shows a considerable decline in HDL levels. Finally, statistical parameters obtained showed a significant LDL increase during this period (F1, 53 = 8.69, P<0.001). Diagram of changes in LDL levels
(diagram 4), shows a general pattern of continuous increase in LDL levels.

**Diagram 3. Changes in level of HDL-C during study**

**Diagram 4. Changes in level of triglyceride during study**

**Diagram 1. Changes in level of total cholesterol during study**

**Diagram 2. Changes in level of LDL-C during study**

**DISCUSSION**

The results obtained from the present study show that the control level of blood lipids was successful. These diagrams indicate that control program principally has decreased blood lipids of the patients. Results of present study are agreed with result of earlier studies. Some studies have also conducted in other countries. In a research carried out in Malaysia on the diabetic patients with hyperlipidemia, 52.8 percent of the patients with hyperlipidemia, 32 percent with total cholesterol problems, and 51.1 percent of the patients with triglyceride problems reached a normal level after treatment and control (Mafauzy, 2006). In a study
conducted in Korea, 72.2 percent of the patients with hyperlipidemia and 52.6 percent of the patients with total cholesterol and triglyceride problems reached the target level after treatment and control (Noh et al., 2010). Research conducted by Ford et al. (2000) on the diabetic patients with hyperlipidemia during 1999-2000 indicates that 29.7 percent of the patients with hyperlipidemia reached the target level after treatment and control .In a study carried out by Harris, (2002) on the diabetic patients with hyperlipidemia, 25.1 percent of the patients with LDL and cholesterol problems and 50 percent of the patients with HDL and triglyceride problems reached a normal level (Ford et al., 2000). In a study carried out in the Unites States on 733 diabetic patients with hyperlipidemia, 32.1 percent with total cholesterol, 38.4 percent with triglyceride, 15.4 percent with LDL, and 36.8 percent with HDL problems reached a normal level after treatment and control (Beaton et al., 2004). Generally, it may be concluded that control and treatment of blood lipids can lead to control and improve of coronary artery disease in diabetic patients. It is recommended that study effects of control of weight and BMI on coronary artery disease in diabetic patients, in future studies.

REFERENCES


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