Original Research Article

EFFECTS OF STATIN DRUGS ON NEW ONSET OF DIABETES MELLITUS IN POST MENOPAUSAL WOMEN

ABSTRACT

Aims & Objectives: The aim of this study was to see the effects of statin drugs on blood glucose levels & development of diabetes mellitus as new onset in postmenopausal women.

Methodology: This case comparative study was done at LUMHS Jamshoro. The sampling was done by Non Probability method. A total of 150 subjects were divided in 2 group's i.e A and B. The fasting glucose level was measured by glucose oxidase method while HbA1c% & serum cholesterol levels were determined by Kit method on auto analyzer. The statistical analysis was done by SPSS 21 by applying ANOVA test for multiple variants.

Results: The fasting blood glucose levels, HbA1c% levels and serum cholesterol was significantly ($P<0.05$) raised in postmenopausal women who were using statin drugs since last three years.

Conclusion: This study concluded that there was significant relation of statin drugs on increasing of blood glucose levels so they can induce the onset of type-2 diabetes mellitus.

Key Words: Statin Drugs, Type-2 Diabetes Mellitus, Post Menopause.

INTRODUCTION

Statin drugs have pleotropic effects in addition to being used to prevent primary and secondary morbidities of cardiovascular illnesses.[1,2] Pleotropic effects have been seen in individuals with hypertension, myocardial infarction, and cardiac arrhythmias.[3] Because statin medications are effective inhibitors of the rate-limiting enzyme of cholesterol production, 3-hydroxy-methylglutaryl coenzyme A (HMG-CoA) reductase, they are also used to treat hypercholesterolemia.[4] When the quantity of cholesterol in the liver falls, the activity of the receptors of low density lipoprotein (LDL) in the liver rises.[5] This aids in the removal of LDL particles from the bloodstream. When statin medicines lower LDL cholesterol levels, they accelerate the degradation of the Apo B100 molecule, resulting in an increase in Coenzyme Q10 synthesis through the mevalonate route.[6,7] The pleotropic effects of statin drugs is due to inhibition of isoprenoid synthesis.[8]

After the age of 50, the majority of males and females suffer from lipid and cardiovascular diseases, and doctors frequently prescribe statin medicines on a regular basis, sometimes for the rest of their lives. However, other researchers hypothesised that long-term use of statin medicines raised blood glucose levels, resulting in hyperglycemia and eventually diabetes mellitus in people who had never had diabetes before.[9] Statin drugs inhibit the signal transduction of insulin by inhibiting oxidative phosphorylation, which may cause a decrease in the action of GTPase, which inhibits the proliferation of beta cells in the pancreas and also causes the levels of leptins, resulting in a decrease in the rate of insulin secretion, resulting in hyperglycemia, according to the researchers.[10, 11]

This study aims evaluate the effects of statin medicines on blood glucose levels and glycemic control in postmenopausal women who do not take them versus women take them.

METHODOLOGY

In the year 2020, at the Liaquat University of Medical & Health Sciences Jamshoro, a case comparative research was carried out. A total of 150 postmenopausal women were chosen for this study and divided into two groups, each with 75 participants. Group A females do not take statin medications as a control group, whereas group B females have been using statin drugs for a few years as cholesterol lowering drugs. The sampling was done using a non-probability method. Females aged 50 to 70 years old, with a history of at least one year since their last menstrual cycle, and who have been on statin medicines for at least three years. Females over the age of 70, with their last menstrual cycle occurring within the last year, a history of statin drug use of less than three years, known cases of type II diabetes mellitus, renal disease, liver disease, endocrine disorders that cause hyperglycemia, and a history of drugs that cause hyperglycemia were all excluded from this study. The 5 ml of blood sample from each participants were taken early in morning before breakfast with 12 hours night fasting. The fasting blood glucose (FBS), HbA1c%, Serum Cholesterol levels was measured by biochemical methods. The Statistical analysis was done by SPSS version 21 and statistical mean and SD was measured by applying Independent student t test. The P. value <0.05 consider as significant.

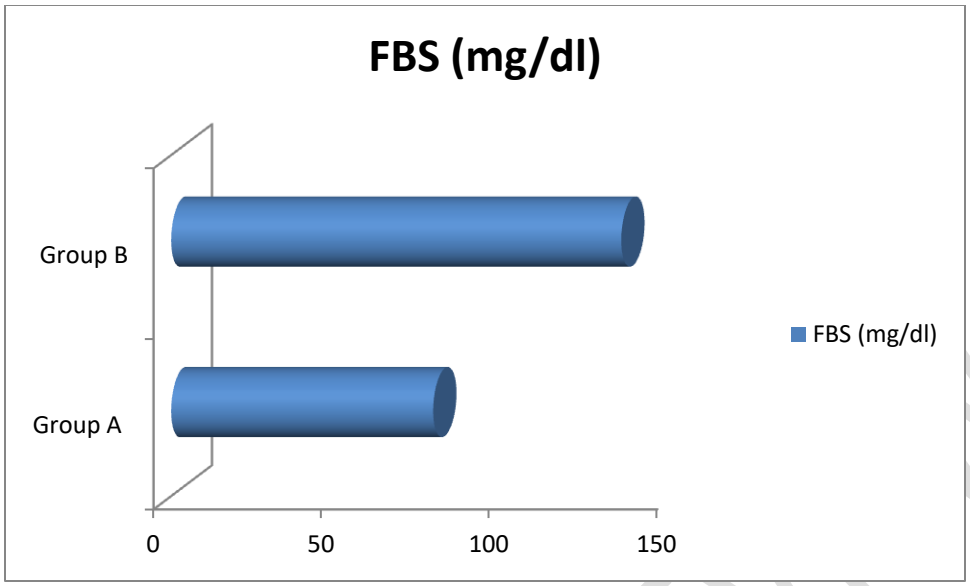
RESULTS

This study found a statistically significant increase in the values of fasting blood glucose levels and glycemic index in group B patients who have been taking statin drugs for more than three years. Another important finding was that serum cholesterol levels were near borderline levels in group B patients who were also taking statin drugs, but serum cholesterol levels were statistically ($p < 0.05$) higher in group B than in group A. (control group). Table No: 01 and graph no: 01, 02 & 03 presented the graphical presentation of data of this research.

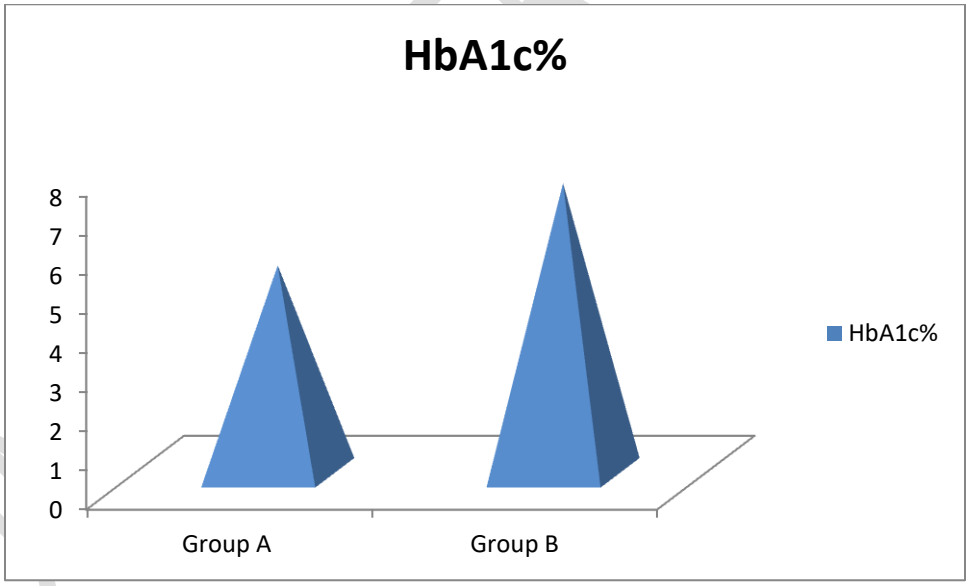
Table No:01.

Parameters Understudy of Control & Case Study Groups

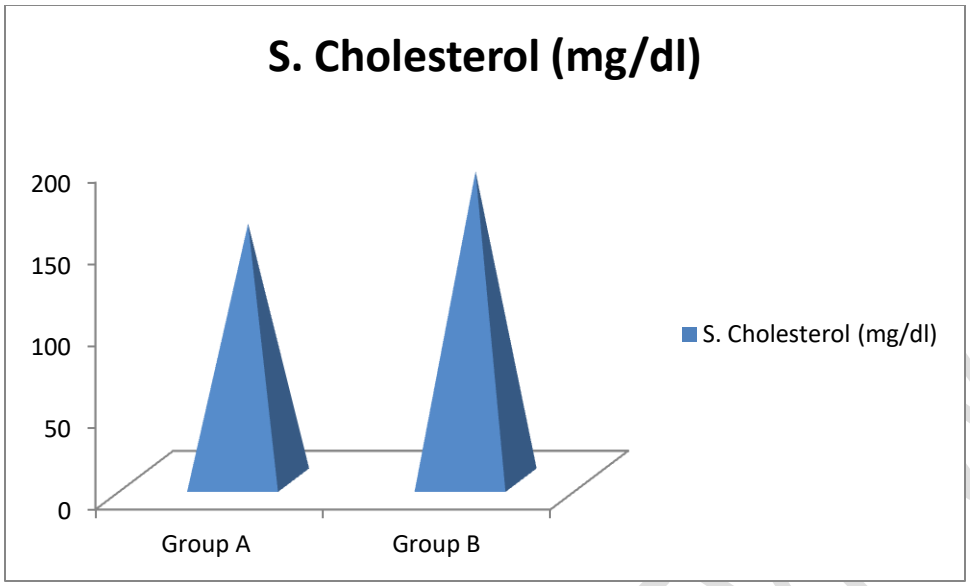
Parameters	Group A	Group B	P.Value
FBS (mg/dl)	78± 9.05	134 ± 12.15*	< 0.05
HbA1c%	5.3 ± 1.1	7.4 ± 1.3*	<0.05
Cholesterol (mg/dl)	157± 9.75	195 ± 8.78*	<0.05



Graph No: 01 Fasting Blood Glucose Levels



Graph No: 02 HbA1c% Levels



Graph No: 03 Serum Cholesterol Levels

DISCUSSION

This is a contentious subject since it is still unclear if statin medicines might cause hyperglycemia. On the other hand, dialectologists use statin drugs to avoid diabetic cardiovascular problems. Diabetes type 2 and its complications are the leading cause of morbidity and death worldwide.[12] Dyslipidemia has a negative correlation with diabetes.[13] As a result, statin medicines are used to prevent a variety of vascular problems.

According to the American Diabetic Association (ADA)[14], statin medicines should be started in diabetics with serum cholesterol levels greater than 220 mg/dl and LDL levels greater than 100 mg/dl for the management of dyslipidemia and the avoidance of cardiac problems. On the other hand, a study published in 2012 by the Food and Drug Administration Safety Communication found that while there was a reduction in cardiovascular complications in the statin group compared to the placebo group, there was an increase in the rate of new onset diabetes in the statin drug user group compared to the placebo group.[15] Colver Al et al (2012)[16] conducted a study on over 15000 postmenopausal women and concluded that statin drugs have a statistically significant effect in the induction of diabetes. The same theory was proposed by Mora S et al (2010)[17], but they also concluded that diabetes developed due to statin drugs is due to drug effects because when they stopped taking statin drugs, the diabetes went away within a few months. n general, statin medications cause hyperglycemia through two mechanisms. One is that statin medicines may promote downregulation of glucose transporter 4 (GLUT 4) in adipose tissues because statin drugs limit the formation of isoprenoid molecules, resulting in lower glucose absorption from cells and glucose intolerance.[10] Second, statin medicines inhibit the formation of CoQ10 enzyme, which inhibits the release of insulin from pancreatic beta cells, causing blood glucose levels to rise.[18] This notion is confirmed by Davidson MH et al (2011),

who found that high doses of statin medicines increased the risk of diabetes development by 12% in younger onset diabetes. As a result of these many types of study, there is debate on whether statin medicines are useful or harmful. This research has some pitfalls that are there is short sample size in future this study can apply on large scale sample size to rule out proper significant relation of statin drugs with induction of diabetes. Second in this study there is no difference between dosages of statin drugs, in future there is need for comparative study between effects of dose dependent statin drugs on blood glucose level.

CONCLUSION

According to the findings, statin medicines have a considerable effect on raising blood glucose levels, which can lead to the formation of type 2 diabetes mellitus.

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