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Original Article

The Effect of Glycemic control and improvement in Serum lipid profile achieved by Metformin in combination with other Oral hypoglycemic Agent (OHA) over Monotherapy in patients with Type-II diabetes Mellitus Dyslipidemia

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ABSTRACT

Aim: The aim of the study is to assess the effect of Glycemic control achieved by Metformin in combination with other OHA over Monotherapy and improvement on lipid levels; especially Triglycerides, HDL-C, LDL-C and Total Cholesterol levels in Type-II diabetes Mellitus Dyslipidemia.

Materials and methods: An observational, comparative Cross sectional study, prospective and Analytic study was carried out in sizeable number of patients (n=120) (who fulfilled inclusion and exclusion criteria) of established Type2 diabetes dyslipidemia were randomized into two Groups: group I with 60 patients to receive Metformin monotherapy and group II with 60 patients to receive Metformin + Glimepiride combination. Both the group I & II have received the same hypolipidemic and antihypertensive drugs. A case record form was administrated to these patients, which included details regarding the socio-demographic, anthropometric, metabolic, disease profile and diabetes self-care practices of the Type2 DM dyslipidemia Patients.

Results: After about one years of treatment, in Group –I and Group-II, FBG, HBA1C % and lipid profile were improved significantly ($P<0.05$) than the values before treatment started. Group-II patients on combination treatment (metformin + Glimepiride) was significantly more efficient & had slightly better glycemic control than group I patients (metformin monotherapy).Group –II patients had also better control over Total cholesterol & LDL level, LDL-C/HDL-C, TC/HDL-C than group –I patients. Addition of Glimepiride to Metformin in T2DM dyslipidemia patients inadequately controlled by metformin monotherapy resulted in superior Glycemic control and improvement in serum Lipid profile.

Conclusion: Metformin and Glimepiride combination therapy is well tolerated, more effective, good safety and consider due to improvements in glycemic parameters (HbA1C, FPG & PPG) along with favorable effects on lipid profiles (LDL-C,HDL-C,TGs) & compliances like minimal Gastrointestinal side effects & cardiovascular safety more effectively (in reducing overall cardio metabolic risk) over Metformin Monotherapy with Type-II Diabetes Dyslipidemia patients.

Keywords: *Type -II Diabetes mellitus(T2DM), Total cholesterol (TC), Triglycerides (TGs), High density lipoprotein (HDL-C), Low density lipoprotein (LDL-C),Cardiovascular safety, Dyslipidemia, Glycemic control, Monotherapy, Combination therapy.*

INTRODUCTION

Diabetes Mellitus, initially considered a carbohydrate metabolic disease, now described as a disorder of multiple etiologies with disturbances of carbohydrate, lipid as well as protein metabolism[1]. The nature of the dyslipidemia associated with diabetes mellitus is complex and is the major risk factor for atherosclerosis and coronary artery disease (dreadful complication)[2,3]. The increased vascular risk associated with T2DM is likely to be multifactorial, but Dyslipidemia, now called as 'Diabetes lipidus ', plays an important role. It is important to note that Dyslipidemia in Diabetes Patients is more atherogenic than that in Non-diabetics. A safe and efficacious intervention for Diabetic dyslipidemia is necessary to attenuate CVD in at risk individuals as Type II-DM is the most common form of diabetes occurring in the adult populations[4,5]. Epidemiological evidence shows an increasing worldwide burden. In 2019, 4.2 million deaths were attributed to diabetes, which affected 463 million adults between the ages of 30 and 79.By 2045, this figure is expected to surpass 700 million[2,6].

Metformin has become tremendously popular, only antidiabetic drug and the drug of choice (with diet and life style modification) for management of T2DM (Nasri H et al2014)[7] , owing to in hypoglycemic as well as hypolipidemic effects and does not cause weight gain (American Diabetes Association ,2017)[8]. The mechanism of Action of metformin appears to be through stimulation of AMP dependent Protein kinase (AMPK) activity (Xu et al, 2015)[9,10,11]. The active kinase then favors the peripheral utilization of glucose and mobilization of glycogen in muscle tissue. Metformin primarily inhibits hepatic gluconeogenesis, thereby reducing fasting glucose levels[12,13].Moreover, Metformin is an antioxidant that diminishes cancer risk and improves insulin sensitivity. When metformin alone is not sufficient to control hyperglycemia with optimum dose, sulfonylureas (eg: Glimepiride) or DPP-4 inhibitors are added. Patients are prescribed antilipidemic drugs (statin/fibrates etc) along with oral hypoglycemic ± insulin[10]. Metformin is highly effective in combination therapies, which have become standard in managing T2DM due to progressive beta-cell dysfunction. Its unique mechanism and low risk of hypoglycemic make it compatible with all other glucose-lowering drugs, and it is the most frequently used agent in fixed-dose combination (FDC) formulations.

In this Prospective study, it was tried to evaluate and investigates the effect of glycemic control and improvement in lipid profile achieved by metformin in combination with other OHA over monotherapy in patients with type II diabetes Mellitus Dyslipidemia.

MATERIALS AND METHODS

Study design: The study was an observational, Comparative Cross sectional study, prospective, Analytic type of study carried out in the department Medicine, LG hospital. Ahmedabad.

Inclusion criteria:

Study group –I : The patients with type 2DM dyslipidemia more than 30 years of age and who are on treatment with Metformin alone for minimum 4 months.

Control group-II: The patients with type 2DM dyslipidemia with same age matched and treatment with other OHA (Glimepiride) with Metformin combination for minimum 4 months.

Exclusion criteria:

Patient with type -I diabetes, pregnant women with gestation diabetes, ketoacidosis, Renal impairment, liver dysfunction, Septicemia, undergone gastric surgery, Anemic patient (Hb threshold (g/dl)-women nonpregnant-12.0 & men 13.0),malnutrition, infection, Drug abuse, Alcoholic smoker, Person taking anti HIV drugs, CHF patients, other serious medical or psychiatric disease, Patient undergone treatment with chemo drug therapy and Onco drug therapy.

Intervention criteria: A hospital based study conducted in the department of biochemistry which consist of Type- II diabetes patient Dyslipidemia more than 30 age group & the effect of glycemic control on lipid profile, treated with Metformin monotherapy in combination with other OHA over monotherapy between December 2022 and November 2025 were screened for eligibility who fulfilled the specified inclusion and exclusion criteria.

Sample eligible, size and data collection: All the samples received from L.G Hospital , at the clinical biochemistry laboratory, chosen for processing as well as reviewing clinical history, diagnosis & treatment and further follow up. Venous blood samples were collected after an overnight fast atleast 12-14hrs & before the morning doses of OHA in 120 patient diagnosed Type2 DM dyslipidemia. All data collected by trained study personnel using standardized protocols with extensive Quality measures. Demographic information including Age, Sex, systolic Blood Pressure, ECG ,BMI were recorded & the parameters like Fasting Plasma Glucose (hexokinase / G-6-PDH method)[15], HbA1c (Afinion method)[16], Total Cholesterol (Enzymatic method)[17] ,LDL-C, HDL-C (Accelerator selective detergent method),TGs (glycerol phosphate Oxidase method) levels etc were measured (Abbott -Architect machine) & estimated as a marker of diagnosis

of T2DM dyslipidemia in each groups and was analyzed to compare the efficacy between monotherapy and combination therapy.
All participants provided written Informed consent to take part in the study. Data & Statistical analysis was performed using the appropriate software IBM SPSSS version 22.0.

RESULTS

This study was conducted after screening individuals for eligibility in total 120 patients (83males, and 37 females) with the age group of 30-75 years with Type2 Diabetes mellitus dyslipidemia whose demographic features are summarized in table no:1 and Table no:2.

Table no: 1 Demographic features of participants at diagnosis of Type2DM dyslipidemia.

Sr.No	Variables	Study population (n=120)
1	HbA1C (%)	7.90 ± 1.89
2	Systolic blood pressure (SP) (mmHg)	134 ± 15.86
3	Metformin dose (mg per day)	1387 ± 436.7
4	Triglycerides (TGs)(mg/dl)	131± 69.1
5	High Density lipoprotein cholesterol (HDL)(mg/dl)	45.09 ± 11.90
6	Low Density lipoprotein cholesterol (LDL)(mg/dl)	112 ± 32.8
7	Total cholesterol (TC) (mg/dl)	161 ± 36.5

Metformin monotherapy treated in type2DM dyslipidemia was study group - I (n=60) consists of 44 males & 16 females with mean age of 55.0 ± 9.90 (30 -75years).The mean duration of disease was found 7.0 ± 5.8 years (table no2).While in Control group- II the patients with T2DM dyslipidemia treated with other OHA (Glimepiride) with metformin combination was (n=60) consists of 39 males and 21 females with the mean age 52.45±7.8 (30-75 years). The mean duration of diseases was 8.2 ± 6.0 years (table no:2).

In Control group- II the patients with T2DM dyslipidemia treated with other OHA (Glimepiride) with metformin combination had expectedly much better clinical profile and blood parameters than study group I patients with T2DM dyslipidemia treated with Metformin alone. Mean Body weight of Control group- II who are on treatment in combination with Metformin & Glimepiride have mean 65.5 ± 16.20 kg (baseline value) which was reduced to 62.0 ±13.90 kg, while in study group I treated with Metformin Monotherapy have mean body weight of 63.8± 14.5kg at baseline negligle reduced/no change to 63.2 ±15.7kg (mean ± SD) respectively ie: harbored higher mean body weight reduction in Control group-II. Mean BMI of Control group- II who are on treatment in combination with Metformin & Glimepiride have 27.28 ± 3.78 kg/m2 , while study group I who are treated with Metformin have mean BMI 26.82 ± 3.72 (table no:2).

Table no:2 General patients demographic profile In Study Group I & Control Group II :

Serial no	Characteristic		Group-I (Study group) Metformin monotherapy in T2DM dyslipidemia (n=60)	Group-II (Control group) Metformin combination with Glimepiride in T2DM dyslipidemia (n=60)
1	Gender	Male Female	44 (73.3%) 16 (26.6%)	39(65%) 21 (35%)
2	Age (years)	Mean ± SD	55.0 ± 9.90	52.45 ± 7.80
3	Body weight (kilograms)	Mean ± SD Baseline 0 12 months	 63.8 ± 14.5 63.2 ± 15.7	 65.5 ± 16.20 62.0 ± 13.90
4	Duration of disease (years)	Mean ± SD	7.0 ± 5.8	8.2 ± 6.0
5	BMI	Mean ± SD	26.82 ± 3.72	27.28 ± 3.78

Fasting Plasma Glucose(FPG) of the Control Group II in T2DM Dyslipidemia (Metformin and Glimepiride) was measured to 137.5 ± 21.68 mg/dl, while in study group I in T2DM dyslipidemia (Metformin monotherapy) were found to be 124.18 ± 22.2 mg/dl; which was found improved in both the group I and II respectively (table no:3). Expectedly, the mean % HbA1C of group I was reduced to 7.45 ± 1.73 whereas in Group II it dropped down to mean % HbA1C of 6.9 ± 2.03 (fig:1)

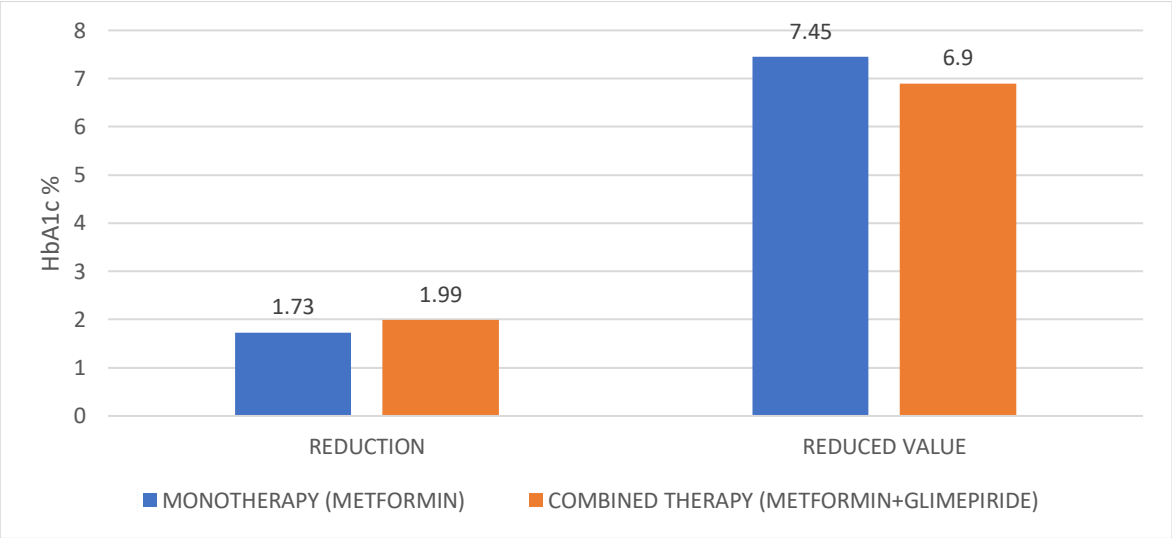

Fig:1 Comparision of reduction of HBA1C values with monotherapy and combination therapy.

Table No: 3 Comparative evaluation of all parameters levels with clinical effect of Metformin Monotherapy (study group-I) and with other OHA (Glimepiride) with Metformin combination (control group-II) with diagnosed T2DM dyslipidemia.

Sr. No	Parameters Duration month	Study Group-I (Metformin Monotherapy) (n=60) Mean ± SD (mg/dl)	Control group -II (Metformin & Glimepiride combination) (n=60) Mean ± SD (mg/dl)	P values
1	**TGs** **0 (baseline)** **12**	163 ± 53.8 148 ± 38.7**	149 ± 42.2 137 ± 36.8*	*p (<0.05) as compared to the baseline values. **p(<0.01) as compared to the baseline values.
2	**HDL** **0 (baseline)** **12**	42.0 ± 8.8 47.0 ± 8.33**	43.0 ± 8.93 45.9 ± 9.82*	*p (<0.05) as compared to the baseline values. **p(<0.01) as compared to the baseline values
3	**LDL** **0 (baseline)** **12**	103 ± 35.8 106 ± 35.4*	116 ± 32.1 110 ± 29.4**	*p (<0.05) as compared to the baseline values. **p(<0.01) as compared to the baseline values
4	**TC** **0 (baseline)** **12**	161 ± 36.5 153 ± 32.5*	176 ± 35.2 160 ± 30.8*	*p (<0.05) as compared to the baseline values.
5	**Glycated HBA1C (%)** **0 (baseline)** **12**	7.89 ± 1.82 6.88 ± 1.72*	7.90 ± 1.31 6.24 ± 0.68*	*p (<0.05) as compared to the baseline values.
7	**SBP(mmHg)** **0 (baseline)** **12**	134 ± 15.8 decreased*	140 ± 14.9 decreased**	*p(<0.05) as compared to the baseline values. **p(<0.01) as compared to the baseline values

Statistically significant mean reduction of Serum triglycerides (TGs) of 15 mg/dl (a 15.1% reduction from baseline value) and by 12mg/dl (5.4% reduction from baseline value) in the group I and II respectively. Present study also shows statistically significant improvement in serum HDL cholesterol levels with study Group –I by 3.1% while its almost twice

observed in Control group –II (5.3%).Present study also shows increase in serum LDL cholesterol levels with Group –I by 3.1% is just opposite to group – II (6% decrease).

The Plasma Total cholesterol of different groups I & II were measured, that of Study group-I, was found 161 ± 36.5 mg/dl (at baseline value)and which reduced to 153 ± 32.6 mg/dl (Mean ± SD) after the treatment with metformin alone for 12 months And in the Control group-II was found 176 ±35.2 mg/dl (at baseline value) which reduced to 160 ± 30.8 mg/dl (Mean ± SD) after the treatment of Metformin and Glimepiride for 12 months respectively. Greater reduction of plasma cholesterol was noted in Group-II T2DM dyslipidemia patients treated with Metformin & Glimepiride combination (Gr II: 20.4mg/dl Vs Gr I:12 mg/dl).The patients to receive combination therapy ie: Control group-II had shown better improvement in LDL Profile than their peers to receive only Metformin ie: study Group –I . In the Group –II Patients with Metformin Monotherapy the mean LDL was 106 ± 35.4 mg/dl and for Group –II patients there was much greater improvement to be 110 ± 29.4 mg/dl. However, greater reduction of initial plasma values of HDL, and triglyceride are observed in Metformin Monotherapy study group than combination treatment group which is not commensurate with the findings of LDL and total cholesterol. As shown in table no 3, the dosage of metformin alone had less significant effect on its lipid-lowering efficacy compare to that of combined metformin & Glimepiride therapy. Other atherogenic lipid profile like LDL-C/HDL-C, TC/HDL-C, were better controlled with combination therapy.

DISCUSSION

The Present Prospective, randomized, cross sectional, open parallel study was conducted with an aim to compare the superiority of combination therapy on lipid parameters in addition to glycemic control in patients with T2DM dyslipidemia. The Study was conducted on patients with T2DM dyslipidemia those were attending outpatient dept. of Medicine & Endocrinology of a tertiary care teaching LG hospital, Ahmedabad for a period of 12 months. In 120 patients of either sex in age range from 30 to 75 years of T2DM dyslipidemia, who passed the screening were randomly enrolled in the study and equally divided into two groups (n=60); inadequately controlled by Metformin monotherapy doses (500-1500 mg daily) for atleast 04 weeks were randomized to either metformin or metformin + Glimepiride.

The major therapeutic goal in patients with type2 diabetes dyslipidemia is to optimize glycemic control by controlling blood pressure and lipid levels, in order to reduce the development & or the severity of diabetic complications. Metformin may counter the derangements in lipid metabolism in T2DM through several pathways[7]. Through increasing insulin sensitivity, metformin reduces the rate of lipolysis, thereby slowing the conversion of free fatty acids to lipoprotein precursors in the liver. By reducing plasma glucose levels, metformin lowers the fraction of irreversibly glycated LDL-C, which is removed less efficiently from the body[9,10,11]. Metformin also improves dyslipidemia by inducing weight loss in people with impaired glucose metabolism. Following metformin treatment, weight loss is in general modest and attributable to fat loss rather than to energy expenditure. In present study the combination of metformin and glimepiride for T2DM dyslipidemia showed neutral to slight reduction in BMI with weight stability or modest reduction, balancing metformin's weight-loss effects with Glimepiride's potential for weight gain. While glimepiride alone can cause weight increase, combining it with metformin helps manage BMI, often leading to minimal weight gain. Hence the combination therapy is considered safe in terms of BMI & regarding weight which is beneficial for managing cardio vascular risks associated with T2DM Dyslipidemia[2,3,12,13,14].

As observed in the current study, Metformin monotherapy lowered also LDL-C level after few months of therapy, whereas serum TGs and HDL-C did not significantly improve until after 12 months. This lipid-modifying effect is concordant with existing evidence that hypertriglyceridemia & diminished HDL-C require a longer therapeutic duration to counteract than lowering LDL-C. Clinical implications arise from the observation that metformin monotherapy improves dyslipidemia in diabetes patients but Metformin is highly more effective in combination therapies (OHA), which have become standard in managing T2DM dyslipidemia due to progressive β-cell dysfunction. Its unique mechanism and low risk of hypoglycemia make it compatible with all other glucose-lowering drugs and it is the most frequently used agent in fixed-dose combination (FDC) formulations[10]. Glimepiride is a second- generation sulfonylurea that causes the pancreatic β-cells to secrete more insulin. It also has extra pancreatic benefits, like improving peripheral tissues sensitivity to insulin, which helps to enhance glycemic control. Glimepiride efficiently lowers the levels of glycated hemoglobin (HBA1C), PP2Bs and fasting plasma glucose (FBG).it can be used either alone or in combination with other anti-hyperglycemic medications, such as insulin & metformin, for patients whose blood sugar levels are not sufficiently managed by dietary and lifestyle changes. Glimepiride, like all sulfonylureas, carries a risk of hypoglycemia, but has a safer profile in individuals with CV disease since it does not negatively impact ischemia preconditioning, in contrast to certain sulfonylureas and hence cost effective option for T2DM dyslipidemia management[18].

Rationale of combination therapy: Complementary mechanisms of action: Metformin primarily decreases hepatic glucose production & enhances peripheral insulin sensitivity, addressing insulin resistance. Glimepiride targets insulin insufficiency by stimulating pancreatic β-cells to secrete more insulin. Their combination aims to tackle both core defects of T2DM

dyslipidemia. (fig: 2) shows the combined synergistic mechanism & clinical advantages of metformin & glimepiride therapy[18].

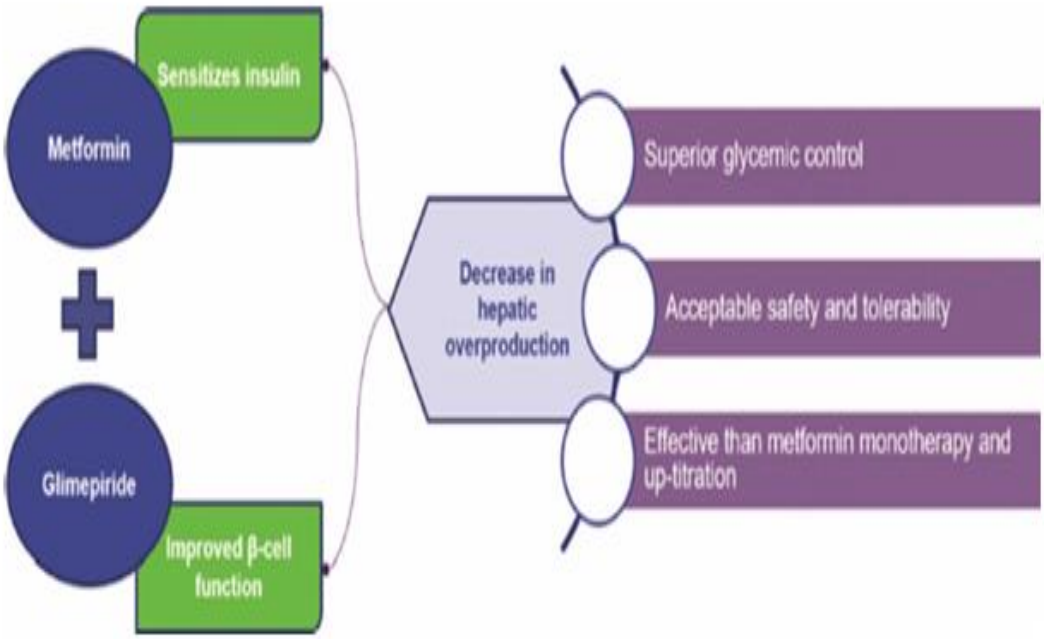

Figure -2 : Synergistic mechanisms and therapeutic benefits of the metformin-glimepiride combination

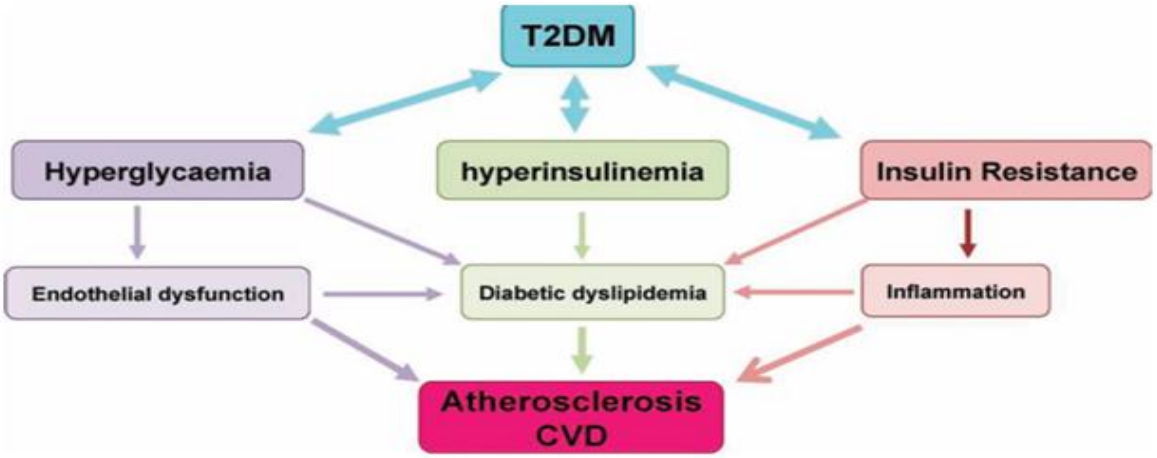

Figure-3: Factors contributing to cardiovascular risk in type 2 diabetes mellitus and their inter-relationship

HBA1c has been taken as the primary endpoint of hypoglycemia efficacy. Reduction of glycated Hb is proportional to the reduction of CVS risk & other Macrovascular & Microvascular complications [19,20](Fig.3).As described before, 2.2% reduction of HBA1c statistically significant ($p < 0.001$) was observed in group –II patients with combination therapy from initial value of 7.90 ±1.31. In monotherapy ie: group I patients 1.89% reduction was observed from initial value of 7.89 ±1.82 also statistically significant ($p < 0.05$ from baseline value). In the present study HBA1c decreased significantly in all patients, but non-diabetic levels of < 7.2% of HBA1c achieved only in 18.1%of patients after few weeks of treatment with metformin and Glimepiride + metformin combinations. A combination of metformin and glimepiride was more effective in which 28.67 % of T2DM dyslipidemia patients achieved the optimum levels of glycosylated Hb levels and No patient withdrew from the study because of hypoglycemia. Similar observation of effectiveness of combination of metformin and glimepiride was made by Haupt E et al 1999 & Riddle M et al 2000. However Kim MK et al (2015) reported to achieve < 7% of HbA1c in 64.71% of T2DM with combination of Metformin with other OHA[21].

Present study also shows increase in serum LDL cholesterol levels with study Group –I metformin monotherapy by 3.1% is just opposite to Control group – II combined Metformin + Glimepiride therapy (6% decrease) (table no:3).The combination therapy of Metformin and glimepiride was better in reducing of LDL-C. These findings fall in the line with the observations made by Hanefeld, M et al (2004)[22], Sukanta Sen et al (2013)[23] who reported a small but significant

decrease of 0.16 mmol/L & 5.66 mg/dl (5% & 4.92% decrease from baseline value) in SU plus Metformin group. However, a meta-analysis by Hongmei Zhu et al [24] found that in T2DM patient Metformin was more effective than glimepiride in reducing TC, TGs as well as LDL-C. Similarly, a meta-analysis by Wulffle MG et al [25] showed efficacy of Metformin in reducing TC, TGs and LDL-C in their study with at least 6 weeks of treatment in T2DM. Small, dense LDL particles may confer increased atherogenecity by virtue of their intrinsic physiochemical and metabolic properties, including reduced LDL receptor affinity, greater propensity for transport into the subendothelial space, increased binding to arterial wall proteoglycans and susceptibility to oxidative modifications (Chait A et al 1993)[26], Magri CJ et al (2018)[27], (Hussian A et al 2017)[28] .Oxidative modification confers atherogenic properties on LDL-C particles and it a measurable risk factor in diabetes (Steinberg D et al (1989)[29], Tontonoz P et al (1998)[30]. Metformin activate AMPK (AMP- activated protein kinase)[9,10,11] , which then inactivates other critical enzymes that regulate lipid and glucose metabolism(Hardie D.G et al 1997)[11] . The metformin also lowers lipid profile by (i) increasing insulin sensitivity, therefore reduces lipolysis and lipoprotein precursors to TG/VLDL synthesis in liver, (ii) Improving hyperglycemia reduces irreversible glycation of LDL and hastens removal from body (iii) inducing weight loss augments dyslipidemia correction.(Lin SH et al).The net effect of Metformin is: (b) increased fatty acid oxidation (2) decreased fatty acid synthesis, with the resulting effects of (c) lowered blood glucose following a reduction of glucose synthesis in liver and increased metabolism in muscle (Najim HD etal 2013 ,Wood. P.A.2006)[31,32] .Along with greater reduction of HBA1C, greater reduction of LDL-C, cholesterol, LDL-/HDL ETC were observed in our combined therapy patients. Since both the group I & II were having same dyslipidemic drugs, there is obvious positive correlation between glycemic control (HBA1c level) and dyslipidemia correction (Magri CJ et al, 2018, Hussian A et al 2017)[27,28].

In case of Total cholesterol (TC), the difference in reduction between two groups is statistically significant ($p<0.05$). Mean reduction of TC was 12mg/dl in monotherapy whereas it is 20.4mg/dl in case of combination therapy (Table no:3).The combination therapy has demonstrated favorable effects on lipid profiles in our study. A study by Pareek et al, reported that metformin combined with glimepiride significantly improved dyslipidemia in drug- native T2DM patients, with reductions in TC & TGs and increases in HDL cholesterol levels[34].

In our study, improving lipid parameters in patients with type-II diabetes dyslipidemia with combined oral hypoglycemic therapy (Metformin + Glimepiride, Group –II): statistically significant mean reduction of triglycerides (TGs) of 15 mg/dl (a 15.1% reduction from baseline value) and by 12mg/dl (5.4% reduction from baseline value) in the Study group I Metformin monotherapy and Control group –II Metformin + Glimepiride respectively (table 3). These findings are in line with the observations made by Kipnes, MS et al (2001)[34], Hanefeld, M et al (2004)[22] and Sukanta Sen et al (2013)[24]. Similarly ,monotherapy with Metformin was better in reducing mean TGs levels in this study , but combination of Metformin with glimepiride was superior in reduction of mean TG levels more significantly (Table no :3).However,≤ 150 mg/dl of TG was achieved only in 3.9% in this study with combination therapy. These similar findings were also reported by other authors in Turkish patients Cagatay P,et al (2009)[35] ,Robinson AC et al (1998)[36].The beneficial effects of metformin on lipids could be due to inhibition of fatty acids release from adipose tissues, its direct effect on VLDL-C metabolism and/or secondary to improved insulin sensitivity[37].

In the Present study also shows statistically significant improvement in serum HDL cholesterol levels with study Group –I treatment metformin alone by 3.1% while its almost twice observed in Control group –II treatment with combined OHA with Metformin (5.3%) ,this findings are consistent with the observations made by Kipnes, MS et al (2001)[34] , Hanefeld, M et al (2004)[22] , Sukanta Sen et al (2013) [23] , who reported mean increase of 8%, 8.06%,12% and achieving the lipid control goals with Glimepiride+ metformin combination therapy in T2DM in their studies. The increased secretion of apo-B containing lipoprotein may be the result of increased FFA flux to the liver. Because of increased endogenous secretion of Apo B-containing lipoprotein particles, the increased plasma levels of TGs can drive a metabolic process that results in reduced HDL cholesterol levels. HDL functions in cellular cholesterol efflux and has direct anti-oxidative as well as anti-inflammatory properties (Hopkins, GJ and Barter, PJ- 1986 and Kontush A & Chapman,M.J-2006)[38,39].The association between reduced HDL-C levels and increased risk of heart diseases is well established (Gordon, DJ et al, 1989)[40].Plasma HDL-C levels are generally increased almost doubled with combined glimepiride+ metformin therapy in present study, in control group –II approx. 5.3% and in metformin monotherapy study group I was 3.1% .For patients with Type2 Diabetes and dyslipidemia, Metformin combined with other OHA is more effective than monotherapy at achieving targets for both glycemic control (HbA1c) and lipid management (LDL-C targets),offering better cardiovascular risk reduction including optimal blood pressure levels maintained.

CONCLUSION

Metformin and Glimepiride combination therapy is well tolerated, more effective & Good safety than Metformin Monotherapy And consider due to improvements in glycemic parameters (HbA1C, FPG & PPG) along with favorable effects on lipid profiles (LDL-C, HDL-C,TGs) & compliances like minimal Gastrointestinal side effects & offering better cardiovascular risk reduction in Type II diabetes Dyslipidemia.

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Ethical approval: Approved.

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