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Comparative Study of Atorvastatin and Rosuvastatin on Serum Lipid Profile in Cardiac Patients with Diabetes

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Abstract
Hyperlipidemia is a disorder of lipoprotein metabolism, which includes a number of abnormalities such as hypercholesterolemia and hypertriglyceridemia. Recently World Health Organization (WHO) has declared that by 2020, 60% of cardiovascular cases will be of Indian origin. Treatment of hyperlipidemia with statins has become an integral part of management of vascular diseases. Indications of statins have been greatly extended over the last 5 years subsequent to the publication of many multicenter prospective trials. There are multiple statins available in the Indian market like atorvastatin, simvastatin, pravastatin, pitavastatin, fluvastatin, cerivastatin and rosuvastatin. Hypolipidemic effect of statins is due to inhibition of hydroxymethylglutaryl-CoA reductase (HMG-CoA) and decrease in LDL-C is due to up regulation of LDL receptor activity The objective of this study is to evaluate and compare the efficacy and safety of Rosuvastatin 20 mg and Atorvastation 20 mg among cardiac patients with hyperlipidemia in diabetics and non diabetics.

Introduction

Statins are the first line therapy for lowering lipid levels (Kumar T and Kapoor A 2005). Statins have become the leading prescription drug (Ravi GR et al 2004, Wierzbicki AS et al 1999). Most of the trials compared the fixed-dose regimens of more intensive statin therapy with less intensive statin therapy (Fleg JL et al 2008). Recent studies in patients with stable coronary disease showed greater reduction in C-reactive protein (CRP) with higher dose than with lower dose of statins (Josan K et al 2008). However, various studies suggest that efficacy and safety of various statins in hyperlipidemia differs considerably (Anderson KM et al. 1991). It is difficult for the medical practitioners to select suitable statins for their patients (Kinlay S et al. 2003).

Dyslipidemia is the commonest cause of the blood vessel diseases and their incidence has been rising all over the world thereby increasing the morbidity and mortality due to cardiovascular diseases. Dyslipidemia occurs due to disturbance in the lipid parameters like Total Cholesterol, LDL-C, VLDL, TGs and HDL-C (Brunzell JD et al. 2007, Talbert R L et al 2008).

Dyslipidemia is also one of the component of Metabolic syndrome along with other group of cardiovascular risk factors such as high blood pressure (BP), abdominal obesity, and insulin intolerance, whose concurrent appearance

increases the risk of atherosclerotic cardiovascular disease (Brewer HB Jr. 2003).

Combined or mixed hyperlipidemia (CHL) is a lipid disorder characterized by increased low-density lipoprotein cholesterol (LDL-C), elevated triglycerides (TGs) and decreased high-density lipoprotein cholesterol (HDL-C) which is more common in patients with type 2 diabetes mellitus (Farnier M, Picard S 2001).

National cholesterol education program–Adult Treatment Panel–III (NCEP-ATP III) has set a goal to treat these dyslipidemic patients and which canbe achieved by proper treatment with lipid lowering drugs especially statins (National CEP-ATP III, 2002).

A number of lipid lowering drugs e.g. statins, fenofibrate, niacin, ezetamibe, bile sequestrants etc. are being used to treat this disorder (Talbert RL 2008).

Many studies are carried out on these drugs out of which few have been made in the people of North India especially in the Majhar region of Punjab because their socio-economic background and standard of living is quite different from the people of Western countries (Bhopal Raj et al. 1999).

Hypolipidemic effect of statins is due to inhibition of hydroxymethylglutaryl-CoA reductase (HMG-CoA) and decrease in LDL-C is due to up regulation of LDL receptor activity (Ellen RL, Mc Pherson R 1998).

Outcome trials of statins have proved conclusively that these drugs decrease LDL-C levels, resulting in a significant reduction of cardiovascular events in many high-risk patients (Bakker-Arkema et al. RG 1996, Cannon CP et al. 2004).[15,16]

Rosuvastatin has been considered superior in achieving greater LDL-C level reductions as compared to atorvastatin, simvastatin, or pravastatin use (Mc Kenney JM et al. 2003).

Statins have also been reported to produce "pleiotropic" effects such as vasodilatation, antioxidant, plaque stabilization, antithrombotic and anti-inflammatory effects (Guerin M et al. 2000).

Statins or fibrates affect different aspects of lipoprotein metabolism. Hence, statin or fibrate monotherapy becomes difficult to modify the lipid profile of patients with combined hyperlipidemia according to the recent investigations of the American Diabetes Association (Haffner SM, 2002).

Combined therapy with statins and fibrates is more effective in controlling lipid profile in patients with mixed hyperlipidemia (CHL) (Haffner SM 2002, Vega et al 2003, Fievet C, Staels B 2009, Athyros VG et al. 1997, Kiortisis DN et al 2000).

Aims and Objectives

The aims and objective of our study were as follows:

To compare efficacy of equivalent doses of Rosuvastatin and Atorvastatin lowering LDL- C levels.

Compare the safety and efficacy of Rosuvastatin and Atorvastatin in reducing cardiovascular events in patients with coronary artery disease and elevated lipid levels.

Material and Methods

Present study was randomize, parallel group, open-label study conducted at SRG hospital & Jhalawar Medical College, Jhalawar, Rajasthan, India. Hundred hyperlipidemia patients each taking atorvastatin 20 mg and rosuvastatin 20 mg tablets were selected for the study after clinical and baseline investigations. The patients reviewed after 5 th week of statin therapy for lipid profile.

The present study was carried out in the Department of Biochemistry in collaboration with Department of Medicine, Jhalawar Medical College, Jhalawar.

Nature of the study

Open label, randomize, parallel group, comparative, prospective clinical Study.

Source of patient

The patients attending outpatient department (O.P.D.) of Medicine enrolled into the present study.

Study population

A total of 100 subjects diagnosed with combined hyperlipidemia screened for the entry into the study and were randomly allocated into two groups of fifty each.

Inclusion criteria

Male patients (35-85 years) and female patients (35-85 years) having low density lipoprotein cholesterol (LDL-C) higher than 100 mg/dl and triglycerides (TG) more than 200 mg/dL will be included in the study. All patients with Hypertension, Diabetes mellitus, Obesity and coronary artery disease included in the study.

Exclusion criteria

Patients with Renal and hepatic failure, Pregnancy and lactation, Hypothyroidism, Malignancy, Myopathy, Patients undergoing bypass surgery and those with concurrent medications like warfarin, verapamil,

Methodology

The total hundred (n=100) patients enrolled in the study and randomly allocated into two groups of fifty (n=50) each, using a randomization chart.

Initial readings of plasma lipid levels like TC, TG, HDL, LDL and VLDL for both the groups were taken as baseline values before assigning the treatment.

Then, Group I received Tab.Atorvastatin 20 mg and Group II received Tab. Rosuvastatin 20 mg. Both the groups received 1 tablet once a day at night for 5 weeks. Patients assessed after 5 weeks and their Serum Lipid profile was done.

Biochemical Examination

Collected 5 ml blood in plane vial from subject and the serum is separated.

Following investigations were carried out:

Lipid Profile Determination of serum lipid profile:

Estimation of Serum Total Cholesterol: by kit reagents (supplied by ERBA Diagnostics) on Semi autoanalyzer.

Estimation of HDL Cholesterol: Estimation of serum HDL cholesterol will be carried out on semi automatic analyzer

Method: Burstein method (Burstein et al 1974).

Estimation of Triglycerides: The estimation of serum Triglycerides was carried out on semi automatic analyzer

Method: Modified Wako, McGowan and Fossati method. (Wako et al 1983).

Estimation of Low Density Lipoprotein Cholesterol

Serum LDL is calculated by Friedwald's equation

LDL cholesterol = Total Cholesterol – (HDL Cholesterol + VLDL Cholesterol)

LDL was estimated by direct method when TG values were > 400 mg/dl

Estimation of Very Low – Density Lipoprotein Cholesterol.

VLDL Cholesterol is calculated by Friedwald's equation

The criteria for selection of the patients was that they must have a total serum cholesterol level >200 mg/dl, LDL Cholesterol level of > 130 mg/dl and serum triglyceride level of <350 mg/dl measured within first 24 hours after the onset of the acute coronary syndrome or upto six months earlier if no sample had been obtained during first 24 hours.

The patients were studied under two groups as follows:

Groups	No. Of Patients	Drug With Dose
A	50	ATORVASTATIN 20 mg
B	50	ROSUVASTATIN 20mg

All patients were followed up after 5 weeks.

Results & Discussion

The present study is conducted to make the best and most effective results and the 5 lipid parameters are evaluated statistically in this study to show the significant actions of therapies.

In order to describe the results, table 1 shows The mean age of subjects which received atorvastatin is 60.42 and the age of patients receiving rosuvastatin is 59.76 and there is no significant difference between the mean age of treatment groups. ($p>0.05$). it means patient have age matched in both treatment groups.

There is equal ratio of gender for both treatment group and have no significant difference in gender receiving the treatment. (p>0.05)

There is no significant difference in mean glucose level in both treatment groups. (p>0.05). the mean glucose level of atorvastatin group is 258.84 and in rosuvastatin group is 275.3.

There is no significant difference in mean serum cholesterol level in both treatment groups (p>0.05). The mean serum cholesterol level of atorvastatin group is 258.84 and in rosuvastatin group is 247.68. There is no significant difference in mean HDL Cholesterol level in both treatment groups (p>0.05). The mean HDL Cholesterol level of atorvastatin group is 42.7 and in rosuvastatin group is 44.12. There is no significant difference in mean LDL Cholesterol level in both treatment groups. (p>0.05). the mean LDL Cholesterol level of atorvastatin group is 158.74 and in rosuvastatin group is 146.57. There is no significant difference in mean Triglyceride level in both treatment groups. (p>0.05). the mean Triglyceride level of atorvastatin group is 287 and in rosuvastatin group is 284.94. There is no significant difference in mean VLDL level in both treatment groups. (p>0.05). the mean VLDL level of atorvastatin group is 57.4 and in rosuvastatin group is 56.98.

According to Distribution of Serum lipid profile After treatment in relation to Groups There is significant difference in mean serum cholesterol level in both treatment groups (p<0.05). the mean serum cholesterol level of atorvastatin group is 193.08 and in rosuvastatin group is 176.5. And according to mean rosuvastatin 20 mg have less serum cholesterol in respect to atorvastatin group after treatment. There is significant difference in mean HDL Cholesterol level in both treatment groups (p<0.05). The mean HDL Cholesterol level of atorvastatin group is 44.42 and in rosuvastatin group is 46.74. And according to mean rosuvastatin 20 mg have less HDL cholesterol in respect to atorvastatin group after treatment. There is significant difference in mean LDL Cholesterol level in both treatment groups (p<0.05). The mean LDL Cholesterol level of atorvastatin group is 115.77 and in rosuvastatin group is 98.97. And according to mean rosuvastatin 20 mg have less LDL cholesterol in respect to atorvastatin group after treatment. There is significant difference in mean Triglyceride level in both treatment groups. (p<0.05). The mean Triglyceride level of atorvastatin group is 164.44 and in rosuvastatin group is 153.92. And according to mean rosuvastatin 20 mg have less Triglycerides in respect to atorvastatin group after treatment. There is significant difference in mean VLDL level in both treatment groups. (p<0.05). the mean VLDL level of atorvastatin group is 32.88 and in rosuvastatin group is 30.78. And according to mean rosuvastatin 20 mg have less VLDL in respect to atorvastatin group after treatment

Distribution of Serum lipid profile before treatment according to Gender in Atorvastatin 20mg shows no significant difference in mean serum cholesterol level in both gender (p>0.05). The mean serum cholesterol level of male is 255.85 and in female is 262.63. There is significant difference in mean HDL Cholesterol level in both genders (p<0.05). The mean HDL Cholesterol level of male is 41.17 and in female is 44.63. And according to mean male have less HDL cholesterol in respect to female before treatment. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 156.88 and in female is 161.1. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 288.96 and in female is 284.5. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 57.79 and in female is 56.9.

According to Distribution of Serum lipid profile After treatment according to Gender in Atorvastatin 20mg There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 190.92 and in female is 195.81.There is significant difference in mean HDL Cholesterol

level in both genders (p<0.05). The mean HDL Cholesterol level of male is 42.96 and in female is 46.27. And according to mean male have less HDL cholesterol in respect to female before treatment. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 115.12 and in female is 116.6. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 164.21 and in female is 164.72. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 32.84 and in female is 32.94.

Distribution of Serum lipid profile before and after treatment in Atorvastatin 20mg shows significant difference in before and after treatment mean serum cholesterol level(p<0.05). and according to mean serum cholesterol level is reduced in after treatment in atorvastatin group. There is significant difference in before and after treatment mean HDL cholesterol level(p<0.05). and according to mean HDL cholesterol level is increased in after treatment in atorvastatin group.There is significant difference in before and after treatment mean LDL cholesterol Level (p<0.05). and according to mean LDL cholesterol level is reduced in after treatment in atorvastatin group. There is significant difference in before and after treatment mean Triglyceride level(p<0.05). and according to mean Triglyceride level is reduced in after treatment in atorvastatin group.There is significant difference in before and after treatment mean VLDL level(p<0.05). and according to mean VLDL level is reduced in after treatment in atorvastatin group.

Distribution of Serum lipid profile before treatment according to Gender in Rosuvastatin shows no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 244.83 and in female is 252.31. There is no significant difference in mean HDL Cholesterol level in both genders (p>0.05). The mean HDL Cholesterol level of male is 44.32 and in female is 43.78. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 143.54 and in female is 151.5. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 284.83 and in female is 285.1.There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 56.96 and in female is 57.02.

Distribution of Serum lipid profile After treatment according to Gender in Rosuvastatin shows no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 177.96 and in female is 174.1. There is no significant difference in mean HDL Cholesterol level in both genders (p>0.05). The mean HDL Cholesterol level of male is 46.93 and in female is 46.42. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 99.5 and in female is 98.11. There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 157.64 and in female is 147.84.There is no significant difference in mean serum cholesterol level in both gender (p>0.05). the mean serum cholesterol level of male is 31.52 and in female is 29.56.

Distribution of Serum lipid profile before and after treatment in Rosuvastatin shows significant difference in before and after treatment mean serum cholesterol level(p<0.05). and according to mean serum cholesterol level is reduced in after treatment in atorvastatin group. There is significant difference in before and after treatment mean HDL cholesterol level(p<0.05). and according to mean HDL cholesterol level is reduced in after treatment in atorvastatin group.There is significant difference in before and after treatment mean LDL cholesterol level (p<0.05). and according to mean LDL cholesterol

level is reduced in after treatment in atorvastatin group. There is significant difference in before and after treatment mean Triglyceride level ($p<0.05$). and according to mean Triglyceride level is reduced in after treatment in atorvastatin group. There is significant difference in before and after treatment mean VLDL level ($p<0.05$). and according to mean VLDL level is reduced in after treatment in atorvastatin group.

Percentage changes in biomedical parameters shows no significant difference found in percentage changes (before to after) in serum cholesterol level in both treatment groups ($p>0.05$). and mean changes in atorvastatin group is 24.78 and in rosuvastatin group is 28.29.There is significant difference found in percentage changes (before to after) in HDL cholesterol level in both treatment groups ($p<0.05$). and mean changes in atorvastatin group is -4.09 and in rosuvastatin group is -6.11. And according to mean HDL cholesterol level is higher in atorvastatin group. There is no significant difference found in percentage changes (before to after) in LDL cholesterol level in both treatment groups ($p>0.05$). and mean changes in atorvastatin group is 25.12 and in rosuvastatin group is 31.2. There is no significant difference found in percentage changes (before to after) in Triglyceride level in both treatment groups ($p>0.05$). and mean changes in atorvastatin group is 42.62 and in rosuvastatin group is 45.5. There is no significant difference found in percentage changes (before to after) in VLDL level in both treatment groups ($p>0.05$). and mean changes in atorvastatin group is 27.69 and in rosuvastatin group is 32.45.

Distribution of SERUM CHOLESTEROL/HDLC before treatment according to Groups shows significant difference in mean serum cholesterol/HDLC level in both treatment groups ($p<0.05$). the mean serum cholesterol/HDLC level of atorvastatin group is 6.16 and in rosuvastatin group is 5.66. And according to mean rosuvastatin 20 mg have less serum cholesterol/HDLC in respect to atorvastatin group before treatment.

Distribution of SERUM CHOLESTEROL/HDLC After treatment according to Groups shows significant difference in mean serum cholesterol/ HDLC level in both treatment groups ($p<0.05$). the mean serum cholesterol/HDLC level of atorvastatin group is 4.40 and in rosuvastatin group is 3.81. And according to mean rosuvastatin 20 mg have less serum cholesterol/HDLC in respect to atorvastatin group after treatment.

Distribution of SERUM CHOLESTEROL/HDLC before and after treatment in Atorvastatin 20mg shows significant difference in mean serum cholesterol /HDLC level($p<0.05$). and according to mean serum cholesterol/HDLC level is reduced in after treatment in atorvastatin group.

Distribution of SERUM CHOLESTEROL/HDLC before and after treatment in Rosuvastatin shows significant difference in mean serum cholesterol /HDLC level($p<0.05$). and according to mean serum cholesterol/HDLC level is reduced in after treatment in Rosuvastatin group.

Table 17 There is no significant difference found in percentage changes (before to after) in LDL/HDL level in both treatment groups ($p>0.05$). and mean changes in atorvastatin group is 27.98 and in rosuvastatin group is 35.26.

Distribution of LDL/HDL before & after treatment according to Groups shows significant difference in mean serum LDL/HDL level in both treatment groups ($p<0.05$). the mean LDL/HDLC level of atorvastatin group is 3.79 and in rosuvastatin group is 3.36. And according to mean rosuvastatin 20 mg have less serum LDL/HDLC in respect to atorvastatin group before treatment. There is significant difference in mean serum LDL/HDL level in both treatment groups ($p<0.05$). the mean LDL/HDLC level of atorvastatin group is 2.65 and in rosuvastatin group is 2.15. And according to mean rosuvastatin 20 mg have less serum LDL/HDLC in respect to atorvastatin group after treatment.

There is significant difference in before and after treatment mean LDL /HDLC level($p<0.05$). and according to mean LDL/HDLC level is reduced in after treatment in Atorvastatin 20mg group.

There is significant difference in before and after treatment mean LDL /HDLC level($p<0.05$). and according to mean LDL/HDLC level is reduced in after treatment in Rosuvastatin group.

Atorvastatin and Rosuvastatin significantly decreased Total cholesterol, Triglycerides, LDL-C, VLDL-C. There is significant difference in mean HDL Cholesterol level in both treatment groups ($p<0.05$).

And according to mean rosuvastatin 20 mg have less LDL cholesterol in respect to atorvastatin group after treatment

There is significant difference found in percentage changes (before to after) in HDL cholesterol level in both treatment groups ($p<0.05$). and mean changes in atorvastatin group is -4.09 and in rosuvastatin group is -6.11. And according to mean HDL cholesterol level is higher in atorvastatin group

There is significant difference in mean serum cholesterol/HDLC level in both treatment groups ($p<0.05$). the mean serum cholesterol/HDLC level of atorvastatin group is 4.40 and in rosuvastatin group is 3.81. And according to mean rosuvastatin 20 mg have less serum cholesterol/HDLC in respect to atorvastatin group after treatment.

Table: Distribution of age according to Groups

Group Statistics

	Group	N	Mean	Std. Deviation	T value	P value
Age	Atorvastatin 20mg	50	60.4200	13.09633	0.287	0.775
	Rosuvastatin	50	59.7600	9.64166		

Table : Distribution of Gender according to Groups

		Group		Total	Chi sq	P value
		Atorvastatin 20mg	Rosuvastatin			
Gender	Female	22	19	41	0.372	0.542
		44.0%	38.0%	41.0%		
	Male	28	31	59		
		56.0%	62.0%	59.0%		
Total		50	50	100		
		100.0%	100.0%	100.0%		

Table : Distribution of BLOOD GLUCOSE according to Groups

Group Statistics

	Group	N	Mean	Std. Deviation	T value	P value
BLOOD GLUCOSE	Atorvastatin 20mg	50	258.8400	40.19613		
	Rosuvastatin	50	275.3200	52.88510	1.754	0.083

Table : Distribution of Serum lipid profile before treatment according to Groups

Group Statistics

	Group	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL BEFORE	Atorvastatin 20mg	50	258.8400	36.61569		
	Rosuvastatin	50	247.6800	30.58974	1.654	0.101
HDL CHOLESTEROL BEFORE	Atorvastatin 20mg	50	42.7000	5.70803		
	Rosuvastatin	50	44.1200	4.56535	1.374	0.173
LDL CHOLESTEROL BEFORE	Atorvastatin 20mg	50	158.7400	34.65643		
	Rosuvastatin	50	146.5720	26.79735	1.964	0.052
TRIGLYCERIDES BEFORE	Atorvastatin 20mg	50	287.0000	21.84267		
	Rosuvastatin	50	284.9400	36.78643	0.340	0.734
VLDL BEFORE	Atorvastatin 20mg	50	57.4000	4.36853		
	Rosuvastatin	50	56.9880	7.35729	0.340	0.734

Table : Distribution of Serum lipid profile After treatment according to Groups

	Group	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL AFTER	Atorvastatin 20mg	50	193.0800	27.53094		
	Rosuvastatin	50	176.5000	30.40089	2.858	0.005*
HDL CHOLESTEROL AFTER	Atorvastatin 20mg	50	44.4200	5.76439		
	Rosuvastatin	50	46.7400	4.26093	2.289	0.024*
LDL CHOLESTEROL AFTER	Atorvastatin 20mg	50	115.7720	23.33745		
	Rosuvastatin	50	98.9760	30.73748	3.077	0.003*
TRIGLYCERIDES AFTER	Atorvastatin 20mg	50	164.4400	25.54081		
	Rosuvastatin	50	153.9200	20.18975	2.285	0.024
VLDL AFTER	Atorvastatin 20mg	50	32.8880	5.10816		
	Rosuvastatin	50	30.7840	4.03795	2.285	0.024

Atorvastatin 20mg

Table : Distribution of Serum lipid profile before treatment according to Gender in Atorvastatin 20mg

	Gender	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL BEFORE	Male	28	255.8571	37.75036		
	Female	22	262.6364	35.62442	0.646	0.521
HDL CHOLESTEROL BEFORE	Male	28	41.1786	5.57145		
	Female	22	44.6364	5.39440	2.209	0.032*
LDL CHOLESTEROL BEFORE	Male	28	156.8857	35.18116		
	Female	22	161.1000	34.65150	0.423	0.674
TRIGLYCERIDES BEFORE	Male	28	288.9643	23.96832		
	Female	22	284.5000	19.05068	0.714	0.479
VLDL BEFORE	Male	28	57.7929	4.79366		
	Female	22	56.9000	3.81014	0.714	0.479

Table : Distribution of Serum lipid profile After treatment according to Gender in Atorvastatin 20mg

Group Statistics

	Gender	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL AFTER	Male	28	190.9286	25.74077		
	Female	22	195.8182	30.04384	0.619	0.539
HDL CHOLESTEROL AFTER	Male	28	42.9643	5.82130		
	Female	22	46.2727	5.24796	2.082	0.043*
LDL CHOLESTEROL AFTER	Male	28	115.1214	22.65610		
	Female	22	116.6000	24.68969	0.220	0.827
TRIGLYCERIDES AFTER	Male	28	164.2143	24.26300		
	Female	22	164.7273	27.65981	0.070	0.945
VLDL AFTER	Male	28	32.8429	4.85260		
	Female	22	32.9455	5.53196	0.070	0.945

Table : Distribution of Serum lipid profile before and after treatment in Atorvastatin 20mg

	Mean	N	Std. Deviation	T value	P value
SERUM CHOLESTEROL BEFORE	258.8400	50	36.61569		
SERUM CHOLESTEROL AFTER	193.0800	50	27.53094	15.054	<0.0001*
HDL CHOLESTEROL BEFORE	42.7000	50	5.70803		
HDL CHOLESTEROL AFTER	44.4200	50	5.76439	15.031	<0.0001*
LDL CHOLESTEROL BEFORE	158.7400	50	34.65643		
LDL CHOLESTEROL AFTER	115.7720	50	23.33745	9.604	<0.0001*
TRIGLYCERIDES BEFORE	287.0000	50	21.84267		
TRIGLYCERIDES AFTER	164.4400	50	25.54081	31.612	<0.0001*
VLDL BEFORE	57.4000	50	4.36853		
VLDL AFTER	32.8880	50	5.10816	31.612	<0.0001*

Rosuvastatin

Table : Distribution of Serum lipid profile before treatment according to Gender in Rosuvastatin

Group Statistics

	Gender	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL BEFORE	Male	31	244.8387	30.43145		
	Female	19	252.3158	31.10029	0.836	0.407
HDL CHOLESTEROL BEFORE	Male	31	44.3226	4.98924		
	Female	19	43.7895	3.88128	0.397	0.693
LDL CHOLESTEROL BEFORE	Male	31	143.5484	27.31563		
	Female	19	151.5053	25.88078	1.020	0.313
TRIGLYCERIDES BEFORE	Male	31	284.8387	35.28937		
	Female	19	285.1053	40.10250	0.025	0.980
VLDL BEFORE	Male	31	56.9677	7.05787		
	Female	19	57.0211	8.02050	0.025	0.980

Table : Distribution of Serum lipid profile After treatment according to Gender in Rosuvastatin

Group Statistics

	Gender	N	Mean	Std. Deviation	T value	P value
SERUM CHOLESTEROL AFTER	Male	31	177.9677	33.15568		
	Female	19	174.1053	25.96128	0.432	0.667
HDL CHOLESTEROL AFTER	Male	31	46.9355	4.57483		
	Female	19	46.4211	3.79057	0.411	0.683
LDL CHOLESTEROL AFTER	Male	31	99.5032	33.58916		
	Female	19	98.1158	26.27338	0.153	0.879
TRIGLYCERIDES AFTER	Male	31	157.6452	17.09103		
	Female	19	147.8421	23.66259	1.698	0.096
VLDL AFTER	Male	31	31.5290	3.41821		
	Female	19	29.5684	4.73252	1.698	0.096

Table : Distribution of Serum lipid profile before and after treatment in Rosuvastatin

	Mean	N	Std. Deviation	T value	P value
SERUM CHOLESTEROL BEFORE	247.6800	50	30.58974		
SERUM CHOLESTEROL AFTER	176.5000	50	30.40089	16.096	<0.0001*
HDL CHOLESTEROL BEFORE	44.1200	50	4.56535		
HDL CHOLESTEROL AFTER	46.7400	50	4.26093	13.687	<0.0001*
LDL CHOLESTEROL BEFORE	146.5720	50	26.79735		
LDL CHOLESTEROL AFTER	98.9760	50	30.73748	11.290	<0.0001*
TRIGLYCERIDES BEFORE	284.9400	50	36.78643		
TRIGLYCERIDES AFTER	153.9200	50	20.18975	26.746	<0.0001*
VLDL BEFORE	56.9880	50	7.35729		
VLDL AFTER	30.7840	50	4.03795	26.746	<0.0001*

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