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COMPARATIVE PROSPECTIVE STUDY OF EFFECTIVENESS AND SAFETY OF ATORVASTATIN AND ROSUVASTATIN IN PATIENTS WITH DYSLIPIDEMIA AT A TERTIARY CARE TEACHING HOSPITAL OF BIHAR

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ABSTRACT

Background: Hyperlipidemia is a major cause of atherosclerosis and atherosclerosis-associated conditions, such as coronary heart disease (CHD), ischemic cerebrovascular disease and peripheral vascular disease.

The aim and objective of this study was to compare effectiveness and safety of the hypolipidemic drugs Atorvastatin (10mg) and Rosuvastatin (5mg) in patients with Dyslipidemia.

Materials & Methods: The study was conducted at Nalanda Medical College & Hospital,Patna during the period from october 2018 to march 2019. It was a open,randomized, prospective, comparative & observational study. 100 patients of age group 30 - 69 yrs were selected on basis of inclusion and exclusion criteria from Medicine OPD. They were randomly divided into two groups of 50 each. Atorvastatin 10mg once daily was given to Group A and Rosuvastatin 5 mg once daily was given to Group B. The level of TC, TG, LDL, VLDL and HDL were assessed at Start of therapy (baseline) and at the end of 3 months and 6 months.

Result: LDL was reduced significantly more with 5mg Rosuvastatin than with Atorvastatin 10 mg [43.68% vs. 40.74% (P 0.0049)] after 3 month of therapy.

Rosuvastatin 5mg reduced LDL significantly more than Atorvastatin 10 mg [48.69% vs. 43.85% (P 0.00)]. TC, HDL, TG and VLDL were more favourably modified by Rosuvastatin at 6 months (P <0.005). Reduction of total cholesterol levels in Rosuvastatin group was not statistically significant when compared with Atorvastatin group.

Conclusion: Rosuvastatin 5mg was more effective than Atorvastatin 10mg for the improvement of lipid profile after 6 months of drug therapy in patients with dyslipidemia

KEYWORDS : Dyslipidemia, Atorvastatin, Rosuvastatin

INTRODUCTION

Worldwide, hypercholesterolemia cause about 56% of ischemic heart disease and 18% of strokes, resulting to 4.4 million deaths annually. Hyperlipidemia and the rates of hypercholesterolemia (total cholesterol ≥201.1mg/dl) increased from 18% to 31% in adults aged 35-59.[1] Studies have shown that the risk of ischemic heart disease in individuals with hypercholesterolemia is about thrice as great as in those with normal plasma cholesterol level indicating that reduction in plasma cholesterol does reduce the risk of myocardial infraction.[2]

There is increasing evidence that Hyperlipidemia is a major cause of atherosclerosis and atherosclerosis-associated conditions, such as Coronary Heart Disease(CHD),ischemic cerebrovascular disease and peripheral vascular disease and reduction of TC and LDL below 442.86mg/dl and 116mg/dl, respectively, lowers the incidence of CHD. The lifetime risk of developing CHD after 40 years of age is 49% in men and 32% in women. Even at 70 years of age, the risk is 35% for men and 24% for women.[3]

Numerous epidemiologic investigations have suggested that age, sex, elevated LDL level, low HDL level, DM, alcoholism and smoking are key risk factors for CHD.[4,5] There is growing evidence that Statins, beyond their LDL cholesterol-lowering effects, possess so-called pleiotropic effects that could be have beneficial effects for patients with cardiovascular disease.[6] Several observational studies suggest a large reduction in mortality in patients with Acute Coronary Syndrome (ACS) who were treated with Statins that were started prior to hospital discharge.[7] In contrast, a recent meta-analysis concluded that initiation of Statin therapy within 14 days following onset of ACS does not reduce death, MI, or stroke as evaluated at 4-month follow-up.[8] Additional studies evaluated the efficacy of an intensive Statin therapy in ACS patients.

The PROVE-IT (Pravastatin or Atorvastatin Evaluation and Infection Therapy) trial enrolled 4162 patients with a recent diagnosis of ACS (STEMI in one-third of the total) and demonstrated that an intensive (Atorvastatin 80mg daily, target LDL <70mg/dl) versus amoderate (Pravastatin 40mg daily, target LDL <100mg/dl) lipid-lowering strategy is more effective in reducing the incidence of death or major cardiovascular events.[9]

Plasma lipids consist of cholesterol (14%), triacylglycerols (16%), phospholipids (30%), and cholesteryl esters (36%) and a much smaller fraction of unesterified long-chain fatty acids (free fatty acids) (4%). The free fatty acids (FFA), is metabolically the most active of the plasma lipids.[10]

Table 1: As per modified NCEP ATP III guideline recommended total cholesterol level [11]

Unit mg/dl	
<200mg/dl	Desirable
200-239mg/dl	Borderline high
≥240mg/dl	High

MATERIALS & METHODS:

The study was conducted at Nalanda Medical College& Hospital, Patna in OPD and Pharmacology Department during the period from october 2018 to march 2019 with an aim to find out the effectiveness and safety of two Statins i.e. Atorvastatin and Rosuvastatin on lipid profile.

100 cases of dyslipidemia were selected on the basis of inclusion & exclusion criteria.

Inclusion criteria: Total cholesterol more than 200mg/dl.

Exclusion criteria:

1. Pregnant and lactating women 2. malignancy, 3. active

arterial disease such as unstable angina, myocardial infarction, cerebrovascular accident, coronary artery bypass surgery, or angioplasty within 2 months prior to study. 4.Liver disease, 5.Malnutrition, 6.Hyperthyroidism, 7.Infection with hepatitis C virus (HCV), and 8.Patients taking oral contraceptives. Written & Inform consent form was taken from each patient before start of therapy.

They were randomly divided into 2 groups.Each group comprising 50 patients. Atorvastatin 10mg was given to Group A and Rosuvastatin 5mg was given to Group B.

After taking history and clinical examination, Fasting Serum TC, TG, HDL, LDL and VLDL level were measured. Each case was followed up after 3 months and 6 months.

Results were expressed as mean, standard deviation and Least squares mean(LSM %) change. Different statistical test of significance (student's 't' test and chi square test) were applied to find the p value. P value less than 0.05 was considered statistically significant. Data was entered in Microsoft excel database analysed with the help of SPSS software version 24.

RESULTS

Total of 100 patients were involved in the study. The age of the patients in both groups ranged from 30 years to 69 years. Among 50 patients of GroupA receiving Atorvastatin, 30 were male and 20 were female and the mean age was 47.64±10.39 years. The mean age of groupB receiving Rosuvastatin was 50±8.26 years of which 24 were male and 26 were female.

Number of male and female patients was 54 and 46 respectively. This indicated higher incidence of dyslipidemia in male patients. The maximum number of dyslipidemia patients was found in age group between 41-60 (41%) .

History of patients showed that 89% were involved in smoking or in consumption of alcohols or having past history of either of them.

Patients mean baseline at initial stage of study (Table 2), at three months (Table 3) and six months (Table 4) were obtained with LSM change in percentage in lipid parameters.

Table 2: Patients lipid profile at baseline characteristics (randomized population).

	Atorvastatin 10mg (group A)	Rosuvastatin 5mg(groupB)
	Mean±SD	Mean±SD
TC	265.39±15.57	272.03±17.39
TG	220.51±40.77	227.13±38.49
HDL	38.14±7.43	40.15±6.18
LDL	183.12±13.72	186.54±13.39
VLDL	44.1±8.20	45.45±7.7

Table 3: Change in lipid profile after 3 months of treatment.

Atorvastatin 10mg			Rosuvastatin 5mg		
lipid profile	Mean Baseline level, Mg/dl±SD	LSM percentage change	Mean Baseline level, Mg/dl±SD	LSM percentage change	p-value
TC	177.87±11.35	32.9	185.64±13.9	31.67	0.03
TG	149.81±20.66	31.12	181.66±26.75	19.61	0.00
HDL	39.75±7.41	4.12	44.69±6.79	10.19	0.001
LDL	108.39±8.52	40.74	104.74±10.34	43.68	0.049
VLDL	29.94±4.12	31.16	36.31±5.35	19.69	0.00

Table 4: Change in lipid profile after 6 months of treatment.

Atorvastatin 10mg			Rosuvastatin 5mg		
lipid profile	Mean Baseline level, Mg/dl±SD	LSM percentage change	Mean Baseline level, Mg/dl±SD	LSM percentage change	p-value
TC	172.54±11.21	34.94	176.51±12.83	35.01	0.103
TG	140.62±19.48	35.42	167.95 ±23.56	25.56	0.00
HDL	41.72 ±7.58	8.71	47.47 ± 6.75	15.51	0.00
LDL	102.69 ± 8.2	43.85	95.44 ± 9.73	48.69	0.00
VLDL	28.12 ± 3.89	35.42	33.59 ± 4.71	25.6	0.00

Rosuvastatin 5mg increased HDL levels to a significantly greater extent than atorvastatin 10mg (mean change 6.4% and 3.1%, p <0.001), while similar reductions in TC, TG, and non HDL levels were observed with both treatments.

DISCUSSION

Data from two groups were analyzed. Baseline values of all parameters were similar between the two groups. The mean Serum TC, TG, LDL and VLDL levels were significantly reduced on therapy. Simultaneously, the mean level of HDL was highly significantly increased after therapy with both Atorvastatin and Rosuvastatin.

In this study At 3 months duration of drug treatment with Atorvastatin 10mg reduced the level of TC by 32.9% ,TG by 31.12%,LDL 40.74 % , VLDL 31.16% [13] & HDL was increased by 4.12% & at 6 months duration Atorvastatin 10mg reduced the level of TC by 34.94%, TG by 35.42%, LDL 43.85 % and VLDL 35.42% which is similar with the findings of Kuryata et al[12] who found reduction of TC by31%, TG by 23%,LDL by 35%,HDL by 8% & also consistent with the finding of Zhonghu et al[13] who found reduction of TG by 22.8% ,LDL by 39%,HDL by6.6%.

At 3 months duration of drug treatment, Rosuvastatin 5mg reduced the level of TC by 31.67% and LDL 43.68%, VLDL 19.69% HDL was increased by 10.19% and at 6 months of duration Rosuvastatin 5mg reduced the level of TC by 35.01%, TG by 25.56%, LDL 48.69% and VLDL 25.6% The level of HDL was increased by 15.5%. Which is similar with the findings of Teramoto et al[14] who reported decrease in TC by 31.7%,LDL by 43.68%,VLDL by 31.16%,HDL was increased by10.19% .

Rosuvastatin enabled more patients to achieve the National Cholesterol Education Program (NCEP) goals compared to Atorvastatin with LDL (74% vs 48%), TC (100% vs 98%), HDL (male 52.94% vs 48%, female 50% vs 26%). Number of patients to achieve the National Cholesterol Education Program (NCEP) goals for TG were found more in Atorvastatin group compared to Rosuvastatin (66% vs 30%). As many clinical trail observations have demonstrated the superiority of Rosuvastatin over Atorvastatin in lowering level of LDL, TG, TC, VLDL and raising level of HDL, my study also has similar pattern of findings. At 6 months of drug treatment, Rosuvastatin 5mg produced a significantly greater reduction in TC, LDL, TG and VLDL in compared to Atorvastatin 10mg. Rosuvastatin 5mg also significantly raised HDL level than Atorvastatin 10mg in this study.

Both drug were well tolerated by all the patients. There was no dropout due to any disabling adverse event. Only few complained of Body aches and pains.

CONCLUSION

The result of this study shows that at recommended dose, Rosuvastatin (5mg/day) was more effective than Atorvastatin (10mg/day), in terms of improving lipid profile in the period of 6-month treatment. Therefore rosuvastatin may be used in preference to atorvastatin in patient of dyslipidemia.

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