Original Article

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Efficacy of Different Statins Among Newly Diagnosed Dyslipidemic Patients in Dhulikhel Hospital

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Abstract

Background and Aims: Cardiovascular Disease is the leading cause of death. Prevention of cardiovascular disease is the major aim of treatment of anyone who has risk. Dyslipidemia lies in the center of cardiovascular disease risk. Not only there is difference in pattern of dyslipidemia and response to statins in different ethnic groups, there is difference in mortality due to cardiovascular disease in different race and ethnic group. Atorvastatin and Rosuvastatin are the first line statins. This study is carried out to see how our population responds to these statins in terms of change in lipid profile.

Methods: It is a real world observational study. Dyslipidemia patients requiring statins were given either Atorvastatin 10 mg or Rosuvastatin 5 mg according to physician's discretion. Demographic profile and baseline lipid was recorded. Lipid profile was again recorded after 3 to 4 months of treatment.

Result: Out of 343 enrolled only 304 data was analyzed. Total cholesterol decreased by 21.9 % (p = 0.002) in Atorvastatin group and by 22.9 % (p= 0.002) in Rosuvastatin group. Low Density Lipoprotein (LDL) decreased by 22.3 % (p = 0.004) in Atorvastatin group and 21.5% (p=0.005) in Rosuvastatin group. There was no significant difference between two groups.

Conclusion: Both Atorvastatin 10 mg and Rosuvastatin 5 mg can reduce the lipids significantly in our population. There is no difference in using Atorvastatin 10 mg or Rosuvastatin 5 mg. However, reduction was only mild to moderate with the given doses.

Keywords: Cardiovascular disease, Dyslipidemia, Total cholesterol, Triglyceride, Low Density Lipoprotein, High Density Lipoprotein

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Introduction

Cardiovascular Disease (CVD) has become the leading cause of death worldwide. In 2013, CVD caused an about 32% of all deaths and 13% of all disability adjusted life-years (DALYs) lost.[1]As with many high-income countries during the last century, low- and middle-income countries are now experiencing an alarming and accelerating increase in CVD.[2]

Prevention of CVD is the major aim in treatment of anyone who has risk. Dyslipidemia lies in the center of CVD risk. According to AHA/ACC and also ESC guidelines treatment of dyslipidemia is the one of the major goal in primary as well as secondary prevention of CVD.[3,4,5] Most current guidelines include LDL as a primary target for starting and adjusting dose for dyslipidemia management. Number of trials have shown that a 1.0 mmol/L (40 mg/dL) reduction in low-density lipoprotein cholesterol (LDL) is associated with an overall 21 % reduction in major vascular events and 20 % reduction in coronary death.[6]

Not only there is difference in pattern of dyslipidemia and response to statins in different ethnic groups mortality due to CVD is also different among racial and ethnic variation. Much of the data on race/ethnic differences in statin metabolism have shown that some Asian subgroups are slower to metabolize statins compared with non-Hispanic whites, which leads to higher systemic drug concentrations[7,8]. Pharmacokinetic studies indicate Rosuvastatin plasma concentrations are 2-fold higher in Japanese relative to non-Hispanic white individuals. Notably, in Japan, starting doses for most statins are one-half of what is recommended in the United States.[9,10]

Apart from diet control and exercise, statins lie in the center of dyslipidemia treatment.[11,12] Atorvastatin and rosuvastatin are the first line statins. Statins have been proven in primary as well as secondary prevention. The dosing of statin is however a bit confusing as the guidelines advocate moderate to high intensity of statin. Looking at the risk benefit ratio clinician has to make a decision to choose between high-intensity and moderate-intensity statin.[13]

The recommendation high or moderate intensity of statin comes from studies conducted in developed countries. We know the dyslipidemia can vary with ethnicity, food habit, exercise and economic status, recommendation of dose of statin for American or European population may not be applicable for our population. But unfortunately, we have very limited studies.[14] It is important to know how our population responses to different statins in terms of change in lipid profile value, thus this study is conducted.

Methods

It is prospective real world observational study done at Kathmandu University Hospital. Patients presenting to cardiology OPD from 1st of March 2022 to 30th June 2022 who were diagnosed as having dyslipidemia and indicated for statins but not already on statin were included in the study. Baseline demographic and lipid profile was recorded. Lipid profile sample was taken after 12 hours of fasting. All patients were counselled for dietary control and exercise and were started on either atorvastatin 10 mg once daily or rosuvastatin 5 mg once daily according to physician's discretion. The dose being taken is the most common prescriptions found being used by treating physicians and no interference was done to change physician's decision. Patients were asked to follow up in around 3 to 4 months and repeat lipid profile was done. The baseline and repeat lipid profile was compared.

Inclusion criteria: Any patient presenting to Medicine OPD with diagnosis of Dyslipidemia and indicated for statin therapy by clinician.

Exclusion criteria: Any patient who was not willing to participate in the study or who was already on statin therapy and if the prescribed dose was different then the proposed dose in study then those patients were excluded from the study.

Statistical analysis was done using SPSS 28.0 and paired t test was applied wherever applicable.

Results

Total of 343 patients were enrolled for the study but only 304 patient's data was available for analysis. Out of which 148 were in atorvastatin 10 mg group and 156 were in rosuvastatin 5 mg group. There was no significant difference in variables like gender, age, BMI, smoker, Diabetic and hypertensive among both the group as shown in table 1. There was no significant difference in baseline lipid profile value in both groups as shown in table 2.

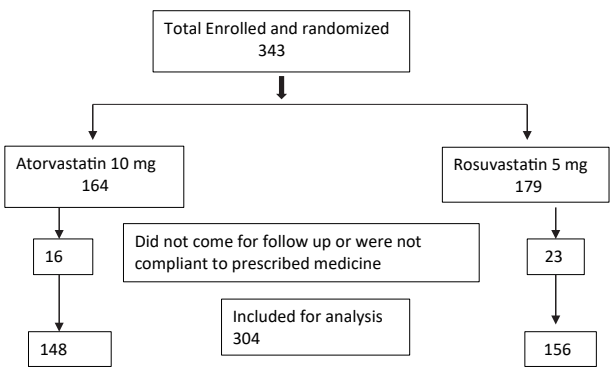

Figure 1. Study population

Table 1. Demographic profile

	Atorvasttatin 10 mg	Rosuvastatin 5 mg	P - value
Male	77	81	0.860
Female	71	75	0.832
Age (mean +/-SD) / Years	56.23+/-3.05	55.97+/-3.62	0.350
BMI (mean +/-SD)/ kg/m^2	23.54+/-0.56	23.72+/-0.71	0.415
Smoker	53	56	0.721
Diabetic	82	83	0.712
Hypertensive	123	128	0.369

Table 2. Lipid profile baseline and after treatment

	Lipids	Baseline mg/dl	After treatment mg/dl	% Change	P value
Atorvastatin 10 mg	Total cholesterol	242+/-14.5	189+/-13.4	21.9	0.002
	Triglyceride	198+/-12.8	169+/-11.6	14.6	0.007
	LDL	158+/-9.6	123+/-9.3	22.2	0.004
	HDL	37+/-3.6	42+/-3.7	13.5	0.013
Rosuvastatin 5mg	Total cholesterol	246+/-15.2	191+/-12.8	22.3	0.002
	Triglyceride	194+/-12.9	170+/-11.2	12.3	0.008
	LDL	153+/-10.2	120+/-8.6	21.5	0.005
	HDL	36+/-3.9	41+/- 4.1	13.8	0.010

Table 3. Comparison of Atorvastatin 10 mg and Rosuvastatin 5 mg

	Lipids	Atorvastatin 10 mg	Rosuvastatin 5 mg	P value
Baseline	Total cholesterol	242+/- 14.5	246+/- 15.2	0.735
	Triglyceride	198+/- 12.8	194+/-12.9	0.812
	LDL	158+/- 9.6	153+/-10.2	0.762
	HDL	37+/- 3.6	36+/-3.9	0.632
After treatment	Total cholesterol	189+/-13.4	191+/- 12.8	0.532
	Triglyceride	169+/-11.6	170+/- 11.2	0.645
	LDL	123+/-9.3	120+/- 8.6	0.752
	HDL	42+/-3.7	41+/- 4.1	0.823

There is significant change in lipid level with treatment. Total cholesterol decreased by 21.9 % (p =0.002) in atorvastatin group and by 22.9 % (p= 0.002) in rosuvastatin group. Triglyceride decreased by 14.6% (p=0.007) in atorvastatin group and 12.3% (p= 0.008) in rosuvastatin group. LDL decreased by 22.3 % (p = 0.004) in atorvastatin group and 21.5% (p=0.005) in rosuvastatin group. HDL increased by 13.5% (p=0.013) in atorvastatin group and 13.8% (p= 0.010) in rosuvastatin group. Atorvastatin 10 mg and rosuvastatin 5 mg had similar effect in change in lipid level.

Discussion

It is well known that there is difference in prevalence, pattern and response to treatment for dyslipidemia in different race and ethnic groups in the world.[7,8] This study was done in a small part of Nepalese population. Our study shows that there is significant change in lipid profile with treatment. LDL value decreased by 20 to 25%. However, there was no significant difference between 10 mg of Atorvastatin and 5 mg of rosuvastatin.

ASCOTT-LLA trial was done in 10,305 patients with atorvastatin 10 mg which found a 35% reduction LDL from baseline of 133 mg/dl. In our study we found a reduction of 22.2% in LDL from baseline of 158 mg/dl with atorvastatin 10 mg.[15] The difference could have been due to the selection of patients as the ASCOTT-LLA included patients with lower than average cholesterol and also was done in Anglo-Scandinavian population which is has very different race and ethnic group and also has different dietary habit than our population.

2823 patients of UK and Ireland were included in CARDS trial where they also used 10 mg of atorvastatin 10 mg and found 40% reduction in LDL.[16] The difference with our study could have been due to different population. Both ASCOTT-LA and CORDIS trial has long term follow up more than three years. ASPEN trial showed 29 % reduction in LDL with 10 mg of Atorvastatin.[17] It was done in diabetic patients only.

JUPITER is one of the largest trial which included 17802 patients who were treated with 20 mg of rosuvastatin and found 50% reduction in LDL.[18] In our study we found 21.5% reduction in LDL with 5 mg of rosuvastatin. Though both study showed significant reduction in LDL but because of difference in dose we cannot make a comparison. URANUS trial compared atorvastatin 10 mg and rosuvastatin 10 mg and found rosuvastatin significantly reduced LDL in comparison to atorvastatin.[19] In our study there was no difference between atorvastatin and rosuvastatin but we used Atorvastatin 10 mg and rosuvastatin 5 mg. If we had used equal dose of Atorvastatin and rosuvastatin probably we could have got similar results.

Arshad et al. compared atorvastatin 10 mg and rosuvastatin 5 mg in Pakistani population and found reduction of total cholesterol of 13.82% with atorvastatin and 19.84% with rosuvastatin. In our study total cholesterol reduction was 21.9% and 22.3% with Atorvastatin and rosuvastatin respectively. Similarly, they found TG reduction by 5.92% and 3.52% whereas we found 14.6% and 12.3% reduction with atorvastatin 10 mg and rosuvastatin 5 mg respectively. In their study they found LDL reduction of 13.66% and 24.34% and we found LDL reduction of 22.2% and 21.5% with atorvastatin and rosuvastatin respectively. HDL increased by 7.63% and 5.76% in their study where as our study showed an increase of 13.5% and 13.8% with atorvastatin and rosuvastatin respectively. Their study showed significant difference in LDL reduction whereas there was no significant difference in Total Cholesterol, TG and HDL. In our study there was no significant difference in change in Total cholesterol, TG, LDL and HDL.[20] Henock G Yebyo et al , Alexander Hodkinson et al and Abdulbari Bener et al. did meta-analysis and found that all statins had class effect in reducing cardiovascular disease outcome and atorvastatin and rosuvastatin were most effective.[21-23] Park et al did comparative study between atorvastatin 10 mg and rosuvastatin 10 mg and found that there was greater reduction in Total cholesterol and LDL in rosuvastatin group as compared to atrorvastatin group.[24]

Nihkil raj et al did study in Indian population and found that atorvastatin 10 mg reduced Lipids by 24.16% which is very similar to our study.[25] We could not find many studies where comparison was made between atorvastatin 10 mg and rosuvastatin 5 mg. And we could find lot of variation in reduction of LDL by statins. So these difference could be due to multifactorial reasons like the racial, ethnic, cultural, individual characteristics, food habit, life style and even quality of drugs being used. So it is important for us to know our own data and how our population responds to different statins. However, we could not find any studies to compare our finding. In our studies we found that both atorvastatin and rosuvastatin were effective in reducing lipids especially LD. 10 mg of atorvastatin and 5 mg of rosuvastatin were equally effective but the reduction was only mild to moderate. Mild reduction considered as <30% reduction in LDL, moderate reduction as 30 to 49% and high intensity as ≥50% reduction in LDL.[26]

Limitation

The study population is small and done in one local area which may not be applicable for others. The quality of drugs may vary. There could be confounding factors like food habit, exercise which are difficult to address. The study looks at the lipid value as parameter rather than the outcome like atrherosclerotic cardiovascular events which requires long term follow up and beyond scope of this study.

Conclusion

Both atorvastatin 10 mg and rosuvastatin 5 mg can reduce the lipids significantly in our population. there is no difference in using atorvastatin 10 mg or rosuvastatin 5 mg. However, reduction was only mild to moderate with given dose. Moderate to high reduction in LDL requires higher dose. We will require a large randomized controlled study to make definitive conclusion.

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