COMPARISON OF ROSUVASTATIN WITH ATORVASTATIN IN LOWERING LOW DENSITY LIPOPROTEIN CHOLESTEROL AMONG DYSLIPIDEMIC PATIENTS

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ABSTRACT

Objective: To compare the efficacy of Rosuvastatin with Atorvastatin therapy on low density lipoprotein cholesterol (LDL-C) in patients with dyslipidemia after 12 weeks of treatment in a tertiary care hospital.

Material and Methods: This parallel-group, randomized, prospective, comparative, single center trial was conducted in Department of Medicine, District Headquarter Teaching Hospital Dera Ismail Khan from June 2015 to January 2016. This study included 200 patients with dyslipidemia, having LDL-C level of ≥ 130 mg/dl. Patients from both outpatient department (OPD) and admitted were included in the study. Two groups of patients were made randomly. Patients in Group A were treated with Rosuvastatin 10 mg/day and group B were treated with Atorvastatin 10 mg/day. Fasting blood samples were collected from all designed patients in the start of study and after 12 weeks of treatment.

Results: Two hundred patients with dyslipidemia, having a serum low density lipoprotein levels ≥ 130 mg/dl were included in the study. These patients were randomly divided into Group A and Group B, 100 in each group. There were 70 male and 30 female in group A while 75 male and 25 female in group B. Mean age in group A was 52.4 years while in group B it was 53.3 years. The age ranged between 38 years and 70 years. Mean base LDL-C level was 160 mg/dl in the start of study. Low density lipoprotein levels were reduced by 29% with 10 mg/day of Rosuvastatin and 19% with 10 mg/day of Atorvastatin after twelve weeks treatment. The reduction in LDL-C for Rosuvastatin was more, than for Atorvastatin. The independent sample-t test showed a statistically significant difference between the efficacy of the two drugs, t (198) = 7.6, P<0.05, Cohen’s D= 5.14, effect size= 0.93.

Conclusion: Rosuvastatin 10 mg/day is more effective in reducing LDL-C levels as compared to Atorvastatin 10 mg/day.

Key Words: Dyslipidemia, Rosuvastatin, Atorvastatin, Low Density Lipoprotein Cholesterol.

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reduce many CAD related morbidity and mortality. Remarkable progress has been made regarding lipid lowering therapy. Currently, the most commonly used agents for lowering LDL-C levels are hydroxymethylglutaryl-coenzyme A reductase inhibitors (HMG-CoA reductase) or Statins. HMG-CoA reductase is an enzyme in cholesterol synthesis pathway.7,8

Numerous local and international trials have been conducted to compare the efficacy and side effect profile of various lipid lowering drugs in comparable as well as higher doses in patients with impaired cholesterol levels. A major trial, Statin Therapies for Elevated Lipid Levels compared Across doses to Rosuvastatin (STELLAR), compared the efficacy of Rosuvastatin with atorvastatin, simvastatin, and pravastatin in different doses and results showed that Rosuvastatin was more efficacious than other commonly used statins in lowering high cholesterol levels9. In Atorvastatin Versus Revascularization Treatment Trial (AVERT), Atorvastatin significantly lowered low density lipoprotein cholesterol level by 46% and thus ischemic event was reduced by Atorvastatin therapy.10

The purpose of current study is to compare the efficacy of two commonly used statins, Rosuvastatin with Atorvastatin in similar doses because they have different pharmacokinetics and pharmacodynamics and hence may have different efficacy.

MATERIAL AND METHODS

This parallel-group, randomized, prospective, comparative, single center trial was conducted in Medical Department of District Headquarter Teaching Hospital, Dera Ismail Khan. This study was conducted on 200 patients (both male and female) with dyslipidemia who were taking either Rosuvastatin or Atorvastatin 10mg/day. Informed, written consent was taken from all patients undergoing the trial. Fasting lipid profile of all patients included in the study was performed before start of statin treatment (June 2015) and end of study (January 2016). All patients having fasting low density lipoprotein cholesterol levels of ≥ 130 mg/dl and aged ≥ 20 year were included in the study. Patients from both medical OPD and medical ward were enrolled. Patients already taking statins before start of trial, pregnant ladies, alcohol abuse, patients with any genetic disorder, patients with hypothyroidism or nephropathy, active liver disease, patients taking immunosuppressants like steroids or other agents, patients who are physically inactive or taking any hormonal replacement therapy were excluded from the study.

After taking thorough history and clinical examination, all patients were subjected to relevant investigations like peripheral blood smear, liver enzymes, thyroid function tests were performed from the hospital laboratory to exclude the diseases mentioned in exclusion criteria. Tests which could not be performed in hospital laboratory were sent to a reliable laboratory outside the hospital.

Two groups of patients were formed randomly. Group A patients was given Rosuvastatin 10 mg/day and Group B patients was given Atorvastatin 10 mg/day. Fasting blood samples from the all patients in the start of study and after 12 weeks of therapy were analyzed in hospital laboratory under supervision of single expert biochemist. The patient detailed history, clinical examination with physical findings and results of relevant investigations were noted on questionnaires, devised in accordance with the objectives of the study. Informed, written consent was taken from all patients. Data analysis was performed using SPSS Version 16.

RESULTS

Efficacy data of 200 patients was obtained through randomized sampling, 100 in the Rosuvastatin group (Group A) and 100 in Atorvastatin group (Group B). Group A comprised of 70 male and 30 female while Group B comprised of 75 male and 25 female as shown in Fig 1. Mean ages were 53±7.43 years and 52±8.12 years in Group A and Group B respectively. The age range in study population was 38-70 years.

Table 1 shows efficacy of both statins in comparable doses (10 mg/day) at the end of study duration (12 weeks of treatment). More reduction in LDL-C was seen in patients treated with Rosuvastatin 10 mg/day as compared to patients used Atorvastatin 10 mg/day.

<table>
<thead>
<tr>
<th>LDL-C</th>
<th>Rosuvastatin (%)</th>
<th>Atorvastatin (%)</th>
<th>t-test p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>160 mg/dl</td>
<td>29.6% (−47.4 mg/dl)</td>
<td>19.1% (−30.6 mg/dl)</td>
</tr>
</tbody>
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Comparison of rosuvastatin with atorvastatin in lowering low density lipoprotein.............

(19.1%). The reduction in LDL-C for Rosuvastatin was more, than for Atorvastatin. The independent sample-t test showed a statistically significant difference between the efficacy of the two drugs, t (198) = 7.6, P<0.05, Cohen’s D= 5.14, effect size = 0.93.

DISCUSSION

In modern era, preventive medicine is the main focus of primary care practitioners. Diagnosing and managing hyperlipidemia is the prime responsibility of primary care physician and is a simple way of preventing cardiovascular disease. According to data received from Center for Disease Control (CDC), hyperlipidemia is 2nd only to hypertension in list of 10 most common chronic illnesses. High levels of low density lipoprotein cholesterol (LDL-C) increases the risk of cardiovascular diseases while high levels of high-density lipoprotein cholesterol (HDL) decrease the risk of cardiovascular diseases. Well-balanced diet, exercise are compulsory components along with statins that have been proven to lower the risk of coronary artery disease and stroke, lessen the need for invasive cardiac procedures and reduce the mortality significantly.14-17

The Third Report of National Cholesterol Education Program Adult Treatment Panel and the Third Joint Task force of European have recommended Low density lipoprotein cholesterol levels < 100mg/dl in patients with coronary artery disease patients18-19.

Rosuvastatin 10 mg/day lowered Low density lipoprotein levels by 29.6% after 12 weeks of treatment in our study. The results of our study were matching with results of Barakat L, in which LDL-C level were reduced by 29%.20 This study was conducted on diabetic population. Another study conducted by Arshad AR showed reduction of 24% in LDL-C levels in 6 weeks trail. This result nearly coincides with our result.21 In a local study conducted by Fahim Ullah, LDL-C level was reduced by 24% after six weeks of treatment with Rosuvastatin 5mg/day.22 A Study conducted by Nicholls SJ documented that 10 mg of Rosuvastatin reduced LDL-C level by 44% which is higher than our study. In this study Nicholls SJ also found that doubling statins dose brought more reduction in LDL-C by 4-6%.23 Adsule SM also showed 44% reduction LDL-C in patients taking Rosuvastatin 10 mg/day. This study was conducted on a small population (sample size n=60).24 A similar study conducted by Khan S showed 44.3% reduction from baseline in Rosuvastatin group.25

Atorvastatin reduced LDL-C levels by 19% after 12 weeks of treatment. A 6 week trial conducted abroad compared the efficacy of three commonly used statins (Atorvastatin, Simvastatin, Pravastatin) with Rosuvastatin for lowering plasma low-density lipoprotein cholesterol (LDL-C) levels. In this trial, comparable and higher doses of above 3 statins were compared with Rosuvastatin. Atorvastatin 10 mg/day reduced LDL-C levels by 18% while Rosuvastatin 10 mg/day reduced it by 53%.26 Chaudhry A found in his study that Atorvastatin 10 mg/dl reduced LDL-C by 35%.27 This result is in accordance with our study. A study conducted by Shah M showed that Atorvastatin reduced LDL-C level by 35%.28 These two local studies showed higher levels of reduction as compared to our study. Two studies conducted in United States showed 26% and 28% reduction in LDL-C levels. These results are nearly comparable to our study.27,28 Pharmacokinetics and pharmacodynamics properties of all statins are different from each other and hence differ in clinical efficacy and side effects too. Two most commonly statins are simvastatin and atorvastatin. Evidence from local as well as abroad studies show that Rosuvastatin is more efficacious in reducing LDL-C levels and thus has a greater effect on overall morbidity and mortality due to cardiovascular diseases as discussed above.

CONCLUSION

In treating dyslipidemia, Rosuvastatin is superior to Atorvastatin in efficacy in comparable doses.

RECOMMENDATIONS

However large multi-center trials across the country are the need of time.

LIMITATIONS

One limitation of our study was that only one center was involved in study with small catchment area. Secondly, patients admitted to medical ward or seen in OPD only were included in the study.

REFERENCES

9. CziraKY MJ, Watson KE, Talbert RL. Targeting low HDL-cholesterol to decrease residual cardiovascular
lar risk in the managed care setting. J Manag Care Pharm. 2008; 14: 3-10.


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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Khan Z: Main idea.
Fida Z: Data collection.
Haider I: Bibliography.
Khan A: Bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.