



## Atorvastatin with Niacin in the Management of Hyperlipidaemia

**Dr. Bekkam Shobha**

Assistant Professor, Department of Pharmacology, VIMS, Bellary, Karnaataka

**Dr. M. Vanaja**

Assistant Professor, Department of Pharmacology, VIMS, Bellary, Karnaataka

**\* Dr. Ramesh. K**

Assistant Professor, Department of Community Medicine, VIMS, Bellary, Karnataka. \* Corresponding author.

### ABSTRACT

**Background:** The triglyceride (TG) level is one of several lipid parameters that can aid prediction of coronary heart disease (CHD) risk. An elevated plasma TG level is strongly associated with an increased risk of CHD. **Methodology:** A total of 50 patients for Atorvastatin and Niacin group were included in the study. The fasting blood samples were taken and serum (I<sup>o</sup>) were stored frozen until analysed for TG, TC, LDL-C, HDL-C, and Lp (a). Blood samples were taken again at follow up and serum (II<sup>o</sup>) was stored frozen until analysed for lipids by biochemical methods. **Results:** The mean cholesterol before treatment was 224.45 mg/dl and after treatment it was 192.14 mg/dl (p value < 0.001).

**Conclusion:** Combined statin with niacin may produce a more global and effective improvement in lipid blood levels than monotherapy and is generally safe and well tolerable.

**KEYWORDS :** Atorvastatin, Niacin, Combined therapy

### Introduction:

Elevated levels of low-density lipoprotein cholesterol (LDL-C) have been shown to be directly associated with increased risk for development of atherosclerotic cardiovascular disease and related deaths. Current prevention guidelines from the National Cholesterol Education Program (NCEP) recommend measurement of LDL-C to estimate lipoprotein-related risks for cardiovascular disease and form the basis of treatment recommendations for patients<sup>1</sup>. However, recent studies suggest that the quantity and size of LDL particles is a better predictor of cardiovascular disease risk and atherosclerosis than LDL-C levels<sup>2,3</sup> because patients with the same level of LDL-C may have higher or lower numbers of LDL particles, and, as a result, may differ in terms of cardiovascular disease risk<sup>4</sup>.

Atherosclerosis of the coronary and peripheral vasculature due to hyperlipidemia is the leading cause of death among men and women in the USA and rest of the world<sup>5,6,7,8</sup>. Recent evidences support the role of Low-Density Lipoprotein Cholesterol (LDL-C) in the pathogenesis of atherosclerosis and the risk of Coronary Artery/Heart Disease (CAD/CHD) events<sup>9,10,11</sup>. The development of the "statins" class of drugs provided a momental leap in the management by pharmacotherapy of hyperlipidemia and CHD risk reduction. Randomised clinical trials have provided strong evidence that lowering plasma cholesterol with statins reduces the risk of cardiovascular/CHD events<sup>9,10,11</sup>.

In cases of exceptionally elevated LDL-C levels, a statin treatment alone may be insufficient to achieve optional LDL-C reduction. In such cases, a combination therapy such as statin plus ezetimibe, statin plus niacin and statin plus cholestyramine may be considered keeping in mind intolerable adverse effects or drug interactions<sup>11</sup>. Although the principal focus is on plasma/serum LDL-C currently more rationale approach would be to reduce the concentrations of all cholesterol-bearing lipoproteins that contain apoprotein B. The lipoprotein (a) [Lp(a)] is the most important and relevant one in this regard<sup>9,10,11</sup>.

Niacin has a long-standing history as an effective lipid-altering therapeutic agent with well established clinical benefits<sup>12,13,14,15,16,17</sup>. Niacin is the most effective agent marketed for raising HDL-C and has also been shown to lower LDL-C, non-HDL-C, lipoprotein(a) (Lp(a)), and triglycerides, all factors believed to be associated with increased cardiovascular risk<sup>12,14,17</sup>. In addition to its beneficial effects on standard lipoprotein levels, niacin has shown further benefits in patients with coronary artery disease by significantly increasing HDL and LDL particle size<sup>17</sup>.

### Methodology:

A prospective cohort study was carried out among 76 patients for 6 weeks duration attending the cardiology outpatient department, Government general hospital, Guntur. Study subjects were both men and women aged 20 -70 years with previous history of acute MI or unstable angina. Initially 76 patients were taken into the study. Of these only 50 patients attended the outpatient department regularly till the end of the study.

These patients were selected and treated with atorvastatin & niacin combination (10 mg + 500 mg) once daily orally for 6 weeks.

Age group of 20 -70 years, LDL-C > 100mg/dl, HDL-C < 40 mg /dl, Serum creatinine < 1.2 mg/dl and Normal LFT were considered as inclusion criteria for patients to fit for the study and patients with Acute illness, Renal failure, Hepatic dysfunction, Diabetes mellitus, Thyroid disease, Alcoholics, Gout, Active peptic ulcer, Pregnancy and lactation were excluded from the study.

Before starting the study the risk factors like smoking, hypertension, h/o unstable angina and MI were noted for each patient. All the patients underwent routine clinical examinations encompassing routine laboratory tests like Hb%, blood sugar, blood urea, serum creatinine, serum uric acid, liver function tests and lipid profile. Patients were advised to visit hospital every week. During the whole they were followed for any adverse effects.

The lipid profile and all the other investigations were done before starting the treatment and repeated after 6 weeks of follow up in all the patients.

Data was entered in Microsoft excel and analyzed using SPSS

Written informed consent was taken from each patient and Institutional ethical committee approval was also obtained.

### Results:

Among 50 patients, 5 (10%) were between 31 – 40 years, 19 (38%) between 41 – 50 years, 19 (38%) between 51 – 60 years and 07 (14%) were between 61 – 70 years of age group. So the incidence of coronary heart disease with hyperlipidaemia was more at the age of 41 – 60 years.

Among total study subjects, 34 (68%) were males and 16 (32%) were females. So the incidence of coronary heart disease with hyperlipi-

daemia was more in males.

In atorvastatin plus niacin group, the mean cholesterol before treatment was 224.45 mg/dl and after treatment it was 192.14 mg/dl (p value < 0.001). The percentage decrease in total cholesterol was 14.93

The mean HDL-C level before treatment was 38.88 mg/dl and after treatment, it was 41.44 mg/dl. The percentage increase in HDL-C levels was 6.58

The mean LDL-C level before treatment was 144.93 mg/dl and after treatment, it was 115.60 mg/dl. The percentage decrease in LDL-C levels was 20.23%

The mean TG level before treatment was 205.24 mg/dl and after treatment it was 174.78 mg/dl (p value < 0.001). The percentage decrease in TG levels was 14.84.

The mean VLDL-C level before treatment was 39.06 mg/dl and after treatment it was 34.98 mg/dl (p value < 0.001). The percentage decrease in VLDL-C was 10.5%.

In our study, during 6 weeks of treatment there were no serious side effects.

**Table.no1: Profile of patients**

Profile	Atorvastatin and Niacin group (n=50)
Age:	
20 – 30 years	00
31 – 40 years	05 (10.0%)
41 – 50 years	19 (38.0%)
51 – 60 years	19 (38.0%)
61 – 70 years	07 (14.0%)
Gender	
Male	34 (68.0%)
Female	16 (32.0%)
Hypertension	
Yes	36 (72.0%)
No	14 (28.0%)
MI	
Yes	41 (82.0%)
No	09 (18.0%)
Unstable angina	
Yes	09 (18.0%)
No	41 (82.0%)

**Table.no2: Mean Lipid levels before and after treatment**

Lipid profile	Atorvastatin and Niacin group		
	Baseline	End of 6 weeks	% change
TC (mg/dl)	224.4+/-17.2	192.1+/-13.6	14.9%
LDL-C(mg/dl)	144.9+/-16.6	115.6+/-13.7	20.23%
HDL-C(mg/dl)	38.8+/-1.8	41.4+/-1.7	6.58%
TG(mg/dl)	205.2+/-15.5	174.7+/-14.2	14.84%
VLDL-C(mg/dl)	39.0+/-3.7	34.9+/-2.9	10.5%

### Discussion:

The results in the present study suggested that the combination of atorvastatin and niacin was more effective in improving the HDL-C and triglyceride levels from the base line. The combination group improved the lipid profile particularly HDL-C levels very significantly. These results were consistent with those of Bay HE et al<sup>18</sup>. In their study it was concluded that statin with niacin combination was more effective in increasing HDL-C levels than with statin monotherapies.

The combination of statin and niacin showed significant decrease in triglyceride levels and increase in HDL-C levels. These results were consistent with the study of J.M.Morgan et al<sup>19</sup>. In their study, they concluded that combination therapy of statin with niacin significantly increased HDL-C levels and reduced triglyceride levels from the base line.

In our study, the difference between the mean LDL-C levels before and after treatment was 29.3mg/dl. These results were similar to other studies<sup>20</sup>. They concluded that atorvastatin had a preferred LDL-C effect where as niacin had preferred HDL-C effect.

In our study, during 6 weeks of treatment there were no serious side effects. However 4 patients complained of flatulence, constipation, epigastric pain and cutaneous flushing.

### Conclusion:

Combined statin with niacin has a favorable effect in modulating the blood lipid profile, especially in reducing TG and elevating HDL-C.

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