



FREQUENCY OF ACHIEVING NORMAL LEVEL OF HIGH DENSITY LIPOPROTEIN BY USING STATINS IN PATIENTS WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION

Aamir Hussain^a, Muhammad Ammar Rashid^{a*}, Waqar Mustafa^a, Sehrish Javed^a, Zeeshan Malik^a, Muhammad Irfan Tahir Khan^a

^aDepartment of Cardiology,
Punjab Institute of Cardiology,
Lahore - Pakistan.

* Corresponding author:
drarashid90@gmail.com

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Author's Contribution

AH:Conducted the study and wrote the article. MAR:Helped in review the article. WM:Re-arranged data and corrected article. SJ:Tables and figures. ZM and MITK made corrections and did the proof reading.

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ABSTRACT

BACKGROUND AND OBJECTIVE:The concentration and composition of the lipids is modified during the acute episodes of myocardial ischemia. There are many risk factors of ischemic heart disease out of which hyperlipidemia has significance regarding its evaluation and management. Statin effects the levels of low density lipoprotein (LDL) as well as high density lipoproteins (HDL). If the levels of HDL are normal the process of atherosclerosis can be prevented. The purpose of this study was to assess the frequency of achieving normal level of high density lipoprotein by using statins in patients with acute ST elevation myocardial infarction (STEMI).

MATERIAL AND METHODS:This was a descriptive case series, conducted at Cardiology department of Punjab Institute of Cardiology, Lahore over a duration of six months from 04-08-2017 to 06-02-2018. 145 patients fulfilling the selection criteria were registered in the study. All patients received 40mg of simvastatin in addition to routine medication. Follow-up of patients was done after 8 weeks and HDL level was assessed. A level of >45mg/dl was considered normal HDL level.

RESULTS:The mean age of patients was 57.41 ± 13.05 years. There were 92 (64.8%) males while 51 (35.2%) were females. The mean BMI of patients was 25.04 ± 5.51 kg/m². Thrombolysis was done in 98 (67.6%) patients while 47 (32.4%) patients were not given thrombolysis due to late presentation. The mean HDL after 8 weeks of treatment was 53.89 ± 8.96 mg/dl. There were 130 (89.7%) patients in which normal HDL was achieved with stain treatment while in 15 (10.4%) patients normal HDL was not achieved.

CONCLUSION:The dyslipidemia can be treated with the use of stains which can help to improve the levels of HDL in short duration of time.

KEY WORDS: High density lipoprotein, normal HDL level, statin, acute ST elevation myocardial infarction

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INTRODUCTION

The dyslipidemia is one of the important pre-disposing factor for the development of atherosclerosis. Early treatment of lipid abnormalities has good beneficial effects on future outcomes. The lipid abnormalities may be combined hyperlipidemia or isolated abnormality of one component. Treating raised level of LDL and low level of HDL by the use of statin reduces the mortality of cardiovascular events and early treatment is recommended. Many previous trials and meta-analysis have shown and recommended the use of high doses of statin in patients with cardiovascular morbidities.¹⁻³

The assessment of HDL level in patients presenting in cardiac emergency is very important and has role in stratifying the patients into high risk category. It also has a prognostic impact on future cardiovascular complications. A study showed an increase of HDL level to normal range (i.e >45mg/dl) by the use of high dose statin therapy and it was estimated to increase in 95.3% patients.⁴⁻⁶

It is the need of time to collect data regarding the level of HDL in patients with ACS and if low level of HDL is found, it should be treated by using statins in high doses. This will lead to slow down the process of atherosclerosis and further complications. The current study was carried out to assess the above mentioned problem in our population and frequency of achieving normal level of high density lipoprotein by using statin was determined in patients presenting after acute ST elevation myocardial infarction.

MATERIAL AND METHODS:

This was a descriptive case series, conducted at Cardiology department of PIC, Lahore over a duration of six months from 04-08-2017 to 06-02-2018. 145 patients fulfilling the selection criteria were registered in the study. Sample size was calculated with confidence level of 95% considering margin of error of 3.5% and taking expected percentage of normal HDL level i.e. 95.3% with statin in patients presenting after acute STEMI.⁶ Consecutive non-probability sampling was done. Patients of age 35-80 years of either gender presenting with acute STEMI (More than 2mm ST elevation in precordial leads and more than 01mm elevation in limb leads on ECG plus trop-T > 100 u/L for < 1 week) with HDL < 35mg/dl. The patients with previous use of statin and HDL level more than 40mg/dl were excluded from the study.

DATA COLLECTION PROCEDURE:

The demographic data (name, age, gender,

BMI, thrombolysis) was noted. The patients were given 40mg of simvastatin in addition to routine medication. Follow-up of patients was done in OPD after 8 weeks. Blood sample was obtained under aseptic measures by using sterile 3cc BD syringe. Samples were stored in sterile container and were sent to the Pathology Lab for the assessment of HDL level. Reports were assessed and if level was more than 45mg/dl, it was labeled as normal HDL level.

DATA ANALYSIS:

SPSS version 21 was used for the analysis of the collected data, variables like age and BMI were assessed in the form of mean \pm S.D. Qualitative variables e.g. gender and normal HDL were presented in form of frequencies. Stratification of collected data about age, gender, thrombolysis (done / not done) and BMI was done. Chi-square method was used to compare the frequency of normal HDL in both groups. ≤ 0.05 was considered as significant p-value.

RESULTS

The mean of age was 57.41 ± 13.05 years. There were 92 (64.8%) males while 51 (35.2%) were females. The mean of BMI was 25.04 ± 5.51 kg/m². Thrombolysis was done in 98 (67.6%) patients while 47 (32.4%) patients were not given thrombolysis. The mean HDL after 8 weeks of treatment was 53.89 ± 8.96 mg/dl. There were 130 (89.7%) patients in which normal HDL was achieved with statin treatment while in 15 (10.4%) patients normal HDL was not achieved. Data was stratified for age of patients. In patients aged 35-50 years, normal HDL was achieved in 43 (91.5%) patients. In pa-

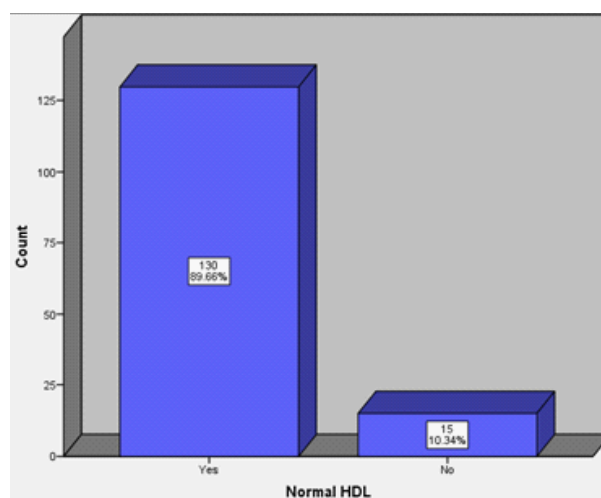


Fig - 1: Distribution of normal HDL achieved after treatment



tients aged 51-65 years, normal HDL was achieved in 47 (92.2%) patients. In patients aged 66-80 years, normal HDL was achieved in 40 (85.1%) patients. The difference was insignificant ($p > 0.05$). Data was stratified for gender of patients. In male patients, normal HDL was achieved in 86 (91.5%) patients. In female patients, normal HDL was achieved in 44 (86.3%) patients. The difference was insignificant ($p > 0.05$).

Data stratification for BMI of patients. In underweight patients, normal HDL was achieved in 18 (90.0%) patients. In normal weight patients, normal HDL was achieved in 44 (80.0%) patients. In overweight patients, normal HDL was achieved in 32 (94.1%) patients. In obese patients, normal HDL was achieved in 36 (100%) patients. The difference was significant ($p < 0.05$). Data was stratified for thrombolysis done. In patients in whom thrombolysis was done, normal HDL was achieved in 88 (89.8%) patients. In patients in whom thrombolysis was not done, normal HDL was achieved in 42 (89.4%) patients. The difference was insignificant ($p > 0.05$).

Table-1: Descriptive Statistics

	n	Mean	SD	Minimum	Maximum
Age (years)	145	57.41	13.05	35	80
BMI (kg/m ²)	145	25.04	5.51	16.3	34.9
HDL (mg/dl)	145	53.89	8.96	25	65

Table-2: Comparison of normal HDL achieved in age strata

		Age (years)			Total
		35-50	51-65	66-80	
Normal HDL	Yes	43 (91.5%)	47 (92.2%)	40 (85.1%)	130 (89.7%)
	No	4 (8.5%)	4 (7.8%)	7 (14.9%)	15 (10.3%)
Total		47 (100%)	51 (100%)	47 (100%)	145 (100%)

Chi-Square Tests = 1.563, P-value = 0.458 (Insignificant)

Table-3: Comparison of normal HDL achieved in gender strata

		Gender		Total
		Male	Female	
Normal HDL	Yes	86 (91.5%)	44 (86.3%)	130 (89.7%)
	No	8 (8.5%)	7 (13.7%)	15 (10.3%)
Total		94 (100%)	51 (100%)	145 (100%)

Chi-Square Tests = 0.969, P-value = 0.325 (Insignificant)

Table-4: Comparison of normal HDL achieved in BMI strata

Normal HDL	BMI				Total
	Under-weight	Normal	Over-weight	Obese	
Yes	18 (90.0%)	44 (80.0%)	32 (94.1%)	36 (100%)	130 (89.7%)
No	2 (10.0%)	11 (20.0%)	2 (5.9%)	0 (0.0%)	15 (10.3%)
Total	20 (100%)	55 (100%)	34 (100%)	36 (100%)	145 (100%)

Chi-Square Tests = 10.415 P-value = 0.015 (Significant)

Table 5: Comparison of normal HDL achieved in thrombolysis strata

		Thrombolysis		Total
		Done	Not done	
Normal HDL	Yes	88 (89.8%)	42 (89.4%)	130 (89.7%)
	No	10 (10.2%)	5 (10.6%)	15 (10.3%)
Total		98 (100%)	47 (100%)	145 (100%)

Chi-Square Tests = 0.006 P-value = 0.936 (Insignificant)

DISCUSSION:

In the field of cardiovascular disease, statin have a revolutionary role in reducing the morbidity and there is strong evidence that LDL level is reduced significantly by the use of statins while it may increase the level of HDL which is a protective cholesterol by reductions in Cholesteryl Ester Transferase Protein (CETP) activity. There is circumstantial proof that the increase in the level of HDL cholesterol has a protective role for cardiovascular system. There is an inverse relationship between the level of HDL and development of atherosclerosis of coronary arteries. HDL is responsible for promoting efflux of cholesterol from foam cells thereby leading to decreased deposition of cholesterol in the arteries. This removed cholesterol is transported into liver for excretion and resultant regulation of cholesterol in the body. HDL has an anti oxidant and anti-inflammatory action. Many studies have been conducted in the past to see such effects.⁷⁻¹⁰

Different statins have been used to treat hyperlipidemia out of which rosuvastatin has the greatest effect on both HDL and LDL cholesterol. The approximate percentage increase by different statins have been estimated and it is shown that Rosuvatin increase HDL by 8.5%, Pravastatin increases by 6.5%, Atorvastatin by 5.5%. The statin use in our study was Simvastatin and previous studies have shown it increases HDL level by 6.4%.

In our study there was an increase of HDL level to normal range by using of 40mg of Simvastatin and approximately 89.7% patients showed a significant increase in HDL level.

Lewin et al., observed that 93.5% of the enrolled patients showed increase in HDL level by using statin.⁶ In another study by Li et al., reported that a 5% increase in the level of HDL was noticed after 2weeks of statin treatment. It can be concluded that high doses of simvastatin i.e, 40mg can lead to appreciable increase in HDL level.¹¹

In another study by Jones and McTaggart showed 4-10% rise in HDL level after the use of statin. It was also reported by them that this increase in HDL was noticed more in patients with low initial levels.⁹



Hunninghake et al., in his research done over the response of a range of doses of pravastatin. After stabilization of diet, the patients were treated with Pravastatin for 12 weeks and it was noticed that HDL increases by its maximum level at 4 weeks with approximate 6-7% rise. It was also shown that there was significant reductions in LDL cholesterol and triglycerides. He recommended that to see the significant effects of statin on HDL level a period of six weeks seems adequate.¹² In another study, Pravastatin showed 7% increase in HDL.¹³⁻¹⁶

The matter of concern is whether the increase in HDL level by using statin is maintained for a long period of time or it is just a transient response.

Keech et al. used 20-40 mg of Simvastatin over a period of 3 years in patients having considerable risk of CAD. In this study dietary stabilization was not done, only the significant increases in HDL cholesterol was noted. It was reported that 8-10% patients had increased level of HDL which may lead to reduced progression of atherosclerosis.¹⁷

CONCLUSION:

Statins are responsible for moderate increase in HDL cholesterol probably mediated by reduced activity of CETP. This can lead to beneficial cardiovascular effects and further studies are required to explore this possibility.

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