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Research Article

PREVALENCE OF INADEQUATELY TREATED LIPID PROFILE IN ISCHEMIC HEART DISEASE PATIENTS AT A TERTIARY CARE HOSPITAL

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ABATRACT

Background: National Cholesterol Education Program (NCEP) guidelines prepared by Adult Treatment Panel III provide clinicians with recommendations for the clinical management of abnormal blood cholesterol to reduce the risk of cardiovascular events. While the introduction of the NCEP ATP III guidelines has the potential to improve the primary and secondary prevention of coronary heart disease, the reality of under treatment should not be forgotten. With this regard in this study an attempt has been made to find the prevalence of inadequately treated lipid profile in CHD patients.

Methodology: A total of 100 IHD patients fasting blood samples were collected from a tertiary care hospital (MGM Hospital, Warangal) during Jan to Dec-2011. Subjects were excluded for co-existing illness i.e. diabetes mellitus and other cardiovascular diseases. By using proper standardization techniques levels of serum total cholesterol, it sub fractions [low density lipoprotein (LDL), and high density lipoprotein (HDL) cholesterol] and triglycerides (TG) were measured.

Results: The study group consists of 100 IHD patients (63 male; 37 female) with mean age of 58±11 years and mean duration of disease was 28 months. More percentage of patients was fall in the age group of 60-69. When classified according to the recommendations of the ATP-III guidelines of the treatment goal for lipid profile, 80 subjects (84% male and 72.9% female) had high TC levels (>5.17 mmol/l) and 88 (87% male and 89% female) had high TG levels (>1.69 mmol/l). Seventy seven patients (85% male and 67% female) had LDL-C (>2.6 mmol/l). Low HDL-C (<1.04 mmol/l in males and <1.56 mmol/l in females) levels were found in 25% and 48% respectively.

Conclusion: A significant number of patients at elevated risk for CHD remain untreated or have LDL-C levels above target; these patients are either not receiving lipid modifying therapy or their current regimens are suboptimal.

Keywords: Ischemic Heart Disease, Low Density Lipoprotein (LDL) cholesterol, and High Density Lipoprotein (HDL) cholesterol.

INTRODUCTION

Cardio Vascular Disease (CVD) has become the most important cause of morbidity and mortality worldwide [1]. The National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III issued an evidence based set of guidelines on cholesterol management [2, 3]. Patients at higher coronary heart disease (CHD) risk have low LDL-C goals and require more aggressive lipid-modifying therapy to achieve these goals than patients at lower CHD risk yields greater relative benefits in reducing the risk of CHD events compared with such treatment in patients at lower CHD risk [4]. Despite of awareness of the importance of appropriately managing patients with dyslipidemia, evaluations of current practice reveal that only about 40% to 75% of all patients with dyslipidemia achieve goal LDL-C levels [5-8]. The likelihood of goal attainment is inversely associated with cardiovascular (CV) risk [6, 9].

Reduction of LDL-C with statin represents the cornerstone of dyslipidemia management in patients with established cardiovascular disease (CVD) [2, 10], yet even among statin-treated patients who achieve LDL-C targets (<2.59 mmol/l), the residual risk of further cardiovascular events remains unacceptably high [11, 12].

MATERIALS AND METHODS

Setting

The study was conducted at outpatient department of cardiology MGM Hospital (Government), Warangal, Andhra Pradesh, India. It is a largest medical care centre in Northern Telangana region. Practitioner at this centre was a combination of specialization and general physician.

Subjects

Between Jan 2011 to December 2011, 100 IHD patients including men and women were screened for possible participation in the study. Eligible subjects were between 30 and 80 year of age with documented IHD, no change in lipid lowering therapy for longer than 3 months. Subjects were excluded for co-existing illness i.e. diabetes mellitus and other cardiovascular diseases. Written informed consent form was obtained from all participants before study testing in accordance with MGM Hospital and all aspects of the study protocol including access to use of the patient clinical information were authorized by the human ethical committee of Kakatiya Medical College.

Study design

After eligibility was established, subjects completed a detailed interview and medical record verification to obtain the information regarding their current lipid lowering therapy. Overnight fasting blood samples were collected on the next day morning. After estimation of lipids we evaluated achievement of secondary prevention goals and treatment targets.

Bioassays

Serum samples were separated and kept at 4°C. All the samples were analyzed within 48 hours of their collection at our laboratory. Proper standardization techniques were used. Total-cholesterol levels were estimated using cholesterol oxidase-phenol 4-aminophenazone peroxidase and HDL-cholesterol levels using a precipitation enzymatic method after the precipitation of non HDL-cholesterol with manganese-heparin substrate. Triglyceride levels were measured using the glycerol phosphate oxidase-peroxidase enzymatic method. LDL cholesterol and very-low-density-lipoprotein-cholesterol levels were derived from the above using Freidewald's formula.

Statistical analysis

Appropriate statistical methods were used to analyze the data to fulfill the objectives. All values are represented as mean (SD). All statistical analysis was performed on Graph Pad prism software, version 5.0.

RESULTS

A total of 100 IHD patients were examined in the prevalence study (63 male; 37 female; Table 1) with mean age of 58±11 years and mean duration of disease was 28 months. More percentage of patients was fall in the age group of 60-69.

Table 1: Showing gender distribution of all study participants in the various age groups

Age in years	Male N=63 (63%)	Female N=37 (37%)	Total N=100
30-39	05	-	05
40-49	06	04	10
50-59	21	09	30
60-69	21	14	35
≥70	10	10	20

Table 2 shows the statin type and dose per day, among 100 patients 29 members on atorvastatin 20 mg dose per day.

Table 2: Gender wise distribution of type of statin with dose per day

Statin type and Dose in mg/day	Male	Female	Total
A 10	20	8	28
A 20	15	14	29
A 40	4	5	9
R 5	16	7	23
R 10	7	3	10
R 20	1	0	1

A- Atorvastatin; R- Rosuvastatin

The mean±SD serum total-cholesterol levels were 7.96±2.59 mmol/l in men and 7.61±3.44 mmol/l in women, the mean LDL-cholesterol levels 5.23±2.59 mmol/l in men and 4.84±3.18 mmol/l in women, the mean HDL cholesterol levels 1.59±0.71 mmol/l in men and 1.70±1.01 mmol/l in women and the mean fasting serum triglyceride levels 5.69±3.4 mmol/l in men and 6.01±4.3 mmol/l in women (Table 3). Levels of total cholesterol, LDL-cholesterol and triglycerides tended to increase with increasing age.

Table 3: Lipoprotein lipid levels (mmol/l) in various age groups

Age /Gender	Number of patients	Total cholesterol	LDL cholesterol	HDL cholesterol	Triglycerides
30-39					
Men	05	7.03±0.86	4.3±1.03	1.17±0.5	7.5±4.2
Women	--	--	--	--	--
40-49					
Men	06	7.92±1.9	4.75±2.7	2.05±0.7	6.04±4.8
Women	04	7.18±3.0	6.45±3.3	2.11±1.1	8.27±7.7
50-59					
Men	21	8.04±2.5	5.17±2.6	1.6±0.7	6.18±2.6
Women	09	7.35±3.6	4.73±2.5	1.32±1.1	6.22±3.5
60-69					
Men	21	7.84±3.1	5.37±2.8	1.45±0.6	5.35±3.0
Women	14	7.48±3.8	4.72±3.7	1.52±0.7	4.69±2.9
≥70					
Men	10	8.56±2.7	5.83±2.6	1.78±0.6	4.2±4.7
Women	10	7.97±3.2	4.46±3.0	2.12±1.09	6.27±5.1
Total					
Men	63	7.96±2.5	5.23±2.5	1.59±0.7	5.69±3.4
Women	37	7.61±3.4	4.84±3.1	1.70±1.0	6.01±4.3

HDL-c- High Density Lipoprotein cholesterol; LDL-c- Low Density Lipoprotein cholesterol

Patients in our study were classified according to the recommendations of NCEP guidelines by ATP III [1] for the determination of the prevalence of inadequately treated lipid profile (Table 4). High cholesterol levels (>5.17 mmol/l) were present in 80 patients [men (n=53) 84% and women (n=27) 72%. High LDL-cholesterol levels (>2.6 mmol/l) were found in 77 patients [85% (n=54) men and 67% (n=25) women)]; low HDL-cholesterol levels (<1.04 mmol/l) were found in 16 male (25%) and HDL-cholesterol levels (<1.56 mmol/l) were found in 18 female (49%). High triglyceride levels (>1.69 mmol/l) were found in 88 patients [87% (n=55) men and 89% (n=33) women].

Table 4: Prevalence of inadequately treated lipoprotein lipids

Parameters in mmol/l	No of patients		Total Percentage
	Male(63)	Female(37)	
	Percentage		
Total cholesterol (>5.17)	53 (84.12%)	27 (72.97%)	80%
HDL-c (<1.04 in male; <1.56 in female)	16 (25.39%) (87.30%)	18 (48.6%) (89.18%)	34%
LDL-c (>2.6)	54 (85.79%)	25 (67.56%)	77%

HDL-c- High Density Lipoprotein cholesterol; LDL-c- Low Density Lipoprotein cholesterol.

DISCUSSION

The intent of our study was to identify inadequately treated lipid profile. Clearly, the data support attention in the higher CHD risk categories. There are several agents available for modifying the lipid profile in patients with and without established CHD. Statins are effective across the lipid profile, can be used to treat a variety of lipid disorders, and are the most effective agents for lowering elevated LDL-C. In this study patients were prescribed with statin as lipid lowering agent to prevent secondary events. Data from primary and secondary prevention studies have demonstrated that the use of statins is associated with a marked reduction in the risk of CHD and cardiovascular events [13].

About two thirds of the patients in this study did not achieve goal LDL-C levels. These patients represent the largest healthcare burden. National guidelines have stressed the importance of aggressively managing this population, yet current practice yields suboptimal results [2, 3].

Thus, the available evidence indicates that the current focus on LDL-C lowering in dyslipidaemic patients with established CVD does not sufficiently suppress the residual risk of further events over the next 3–5 years, even among those patients who achieve target, or below target, LDL-C levels [14]. There is a need to re-evaluate dyslipidaemia management beyond statin therapy, with additional intervention to target other important lipids, in an effort to reduce this residual cardiovascular risk.

New data demonstrate that low HDL-C levels are predictive of cardiovascular risk in statin-treated patients. Analysis by Baigent *et al.* of 14 statin studies showed that patients with a low level of HDL-C had up to 60% higher risk of further cardiovascular events than patients with higher HDL-C levels. Statin treatment did not affect this excess risk. 34% our study participants reported with low HDL-C levels.

Realistically, in order to achieve target HDL-C levels in most statin-treated patients with CVD and suboptimal HDL-C levels, pharmacological agents capable of raising HDL-C by 20–30% are required. Currently available therapeutic options for raising HDL-C include fibrates [peroxisome proliferator activated receptor (PPAR α) agonists] and nicotinic acid [14]. This study was conducted at a government hospital, by considering economical burden on patients and availability of statins at this hospital set up patients and physicians in our study faced restrictions in choice of lipid-modifying therapy. The restricted lipid-modifying therapy options were atorvastatin and rosuvastatin. These data indicate that HDL-C levels are an important consideration in dyslipidaemic patients with CVD, even those intensively managed with high-dose statin therapy, and raising suboptimal HDL-C levels in these patients could be expected to provide additional clinical benefit.

The Veterans Affairs HDL Intervention Trail (VA-HIT; 2003) group found that 33% of 8500 patients with established CHD had TG > 1.69 mmol/l [15], we observed that 88% patients with established CHD had TG >1.69 mmol/l, and also observed that patients with TC > 5.17 mmol/l was 80%.

Another study demonstrated that clinical pharmacist involvement improved LDL-C goal attainment rates by 17%, after a therapeutic conversion from one statin to other statins or statin combination products [16]. This low level of goal attainment occurred despite a protocol that instructed the study sites to titrate the prescribed statin as necessary to achieve LDL-C goal. Clinical inertia (e.g. lack of titration) or patient non adherence to lipid-modifying therapy can partly explain why even after longer follow-up, LDL-C goal attainment remains elusive.

CONCLUSION

Clearly, reduction of LDL-C levels with statin therapy has an important role in reducing cardiovascular risk, as reflected in current treatment guidelines. However, among dyslipidaemic patients with established CVD who achieve target – or below target – LDL-C levels, statin therapy alone appears to be insufficient in suppressing the high level of residual risk of further cardiovascular events (which remains at 50–75% of that of control groups). Furthermore, absolute cardiovascular risk remains high; nearly one in six patients treated with statin mono therapy experiences further cardiovascular events over a five-year period and one in five patients with a history of acute coronary syndrome who is treated with a statin dies within 30 months.

A significant number of patients at elevated risk for CHD remain untreated or have LDL-C levels above target; these patients are either not receiving lipid modifying therapy or their current regimens are suboptimal. In this study, although patients receiving restricted lipid-modifying therapy agents were more likely to achieve LDL-C goal, the use of these agents was relatively low. These patterns of lipid-modifying therapy use may be helpful to discern approaches to achieve higher LDL-C goal attainment rates. Removing barriers to the use of restricted agents in patients at elevated CHD risk provides an opportunity to achieve goal LDL-C levels aimed at decreasing the risk of subsequent CV disease events. It is imperative that clinicians have the opportunity to individualize lipid-modifying therapy according to the patient's CHD risk status and LDL-C goal, with the intent of achieving goal LDL-C with the initial therapy prescribed. Strategies for treating more patients to target may include initiating the currently available statins at higher dosing levels, implementation of effective outpatient systems for adjusting dosing, developing more efficacious statins, developing additional lipid-lowering therapies, and combining statins with other agents to maximize the effect on the lipid profile.

Treating dyslipidemia to targets in accordance with ATP-III guidelines is an integral part of management in patients suffering with IHD to prevent progression and to achieve regression of atheroslclerosis, under treatment in this regard leads to recurrent ischemic episodes thereby increasing morbidity and mortality of patients and adds economic burden to family and society.

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REFERENCES

1. Andrew PS, Eugene B. Ischemic heart disease. Text book of Harrison's principle of internal medicine. 16th ed. New York: McGraw Hill medical publication division; 2006. P. 1434-44.
2. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive summary of the third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 2001; 285: 2486–2497.
3. Grundy SM, Cleeman JI, Merz CN, *et al.* Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. Circulation. 2004; 110: 227-239. Erratum in: Circulation. 2004; 110: 763.
4. John T. Lynch, Catherine E. Cooke, Jonathan Rosen, *et al*. Managing dyslipidemia in primary care with restricted access to lipid modifying therapy. Clinical. 2010; 3(5): 340-349.
5. Van Ganse E, Soucher T, Laforest L, *et al*. Ineffectiveness of lipid lowering-therapy in primary care. Br J Clin Pharmacol. 2005; 59: 456-463.
6. Stacy TA, Egger A. Results of retrospective chart review to determine improvement in lipid goal attainment in patients treated by high-volume prescribers of lipid-modifying drugs. J Manag Care Pharm. 2006; 12: 745-751.
7. Waters DD, Brotons C, Chaing CW, *et al*. Lipid treatment assessment project 2: a multinational survey to evaluate the proportion of patients achieving low-density lipoprotein cholesterol goals. Circulation. 2009; 120: 28-34.
8. Van Ganse E, Laforest L, Alemao E, *et al.* Lipid-modifying therapy and attainment of cholesterol goals in Europe: the Return on Expenditure Achieved for Lipid Therapy (REALITY) study. Curr Med Res Opin. 2005; 21: 1389-1399.
9. Laforest L, Moulin P, Soucher T, *et al.* Correlates of LDL-cholesterol goal attainment in patients under lipid lowering therapy. Atherosclerosis. 2008; 199: 368-377.
10. De Backer G, Ambrosioni E, Borch-Johnsen K, *et al.* Executive summary. European guidelines on cardiovascular disease prevention in clinical practice. Third Joint Task Force of European and other Societies on Cardiovascular Disease Prevention in Clinical Practice. Eur Heart J. 2003; 24: 1601-1610.
11. Baigent C, Keech A, Kearney PM *et al*. Efficacy and safety of cholesterol lowering treatment: prospective meta-analysis of data from 90,056 participants in 14 randomized trials of statins. Lancet 2005; 366: 1267-78.

12. La Rosa JC, He J, Vupputuri S. Effect of statins on risk of coronary disease. A meta-analysis of randomized controlled trials. JAMA 1999; 282: 2340-6.
13. Gregg C Fonarow. Treating to goal: new strategies for initiating and optimizing lipid-lowering therapy in patients with atherosclerosis. Vascular Medicine 2002; 7: 187–194.
14. Terje R Pedersen, Gerd Assmann, Jean-Pierre Bassand, M John Chapman et.al. Reducing residual cardiovascular risk: the relevance of raising high-density lipoprotein cholesterol in patients on cholesterol-lowering treatment. Diabetes and Vascular Disease Research 2006; 3: S1-S12.
15. Michael Miller, MD. Niacin as a Component of Combination Therapy for Dyslipidemia. Mayo Clin Proc 2003; 78: 735-742.
16. Miller AE, Hansen LB, Saseen JJ. Switching statin therapy using a pharmacist managed therapeutic conversion program versus usual care conversion among indigent patients. Pharmacotherapy. 2008; 28: 553-561.