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STUDY OF LIPID PROFILES IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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ABSTRACT Serum lipids and lipoproteins were estimated in 29 patients with acute myocardial infarction during acute phase I , pre discharge and after three months. Serum total lipids, total cholesterol and LDL-cholesterol showed no significant change during the hospital stay and after three months follow up. HDL-cholesterol, however, started falling from day 2 onwards with statistically significant reduction at pre-discharge and remained so at 3 months. The ratios of TC/ HDLc and LDLc/HDLc showed significant increase on pre discharge day as compared to day 1. Serum triglycerides also showed an increasing trend after myocardial infarction with a significant increase on day 3 and pre discharge as compared to day 1. it is concluded that the optimum time for assessment of serum lipid profile in patients with myocardial infarction seems to be within 1 day of the acute episode.

KEYWORDS : Lipids, Lipoproteins, Myocardial Infarction.

INTRODUCTION

Opinion is divided on the changes that occur in serum lipids and lipoproteins following myocardial infarction (MI). Most workers have reported a reduction in total cholesterol (1), HDL-cholesterol and LDL- cholesterol after acute MI. Others have, however, reported no change in serum total cholesterol and HDL-cholesterol (7,11) .Similar variations have also been noted in serum triglycerides levels(4) . From these reports it is clear that phase changes do occur in patients following MI and therefore there is a recommendation for detection of hyper lipidaemia in patients with acute MI that the serum lipids should be assessed either within 24 hours after infarction or after 2-3 months of acute MI .While the recommendation may hold true for absolute levels there is no consensus on when ratios of various fractions of lipids should be assessed. Further, the magnitude, pattern and mechanism of these phasic changes in lipids is also not clearly outlined for our Indian subjects.

The present study was, therefore, undertaken to examine the changes in serum lipids and lipoproteins including ratios of total cholesterol/HDL-cholesterol and LDL-cholesterol/HDL- cholesterol in our Indian subjects with acute myocardial infarction.

MATERIALS AND METHODS

The study was carried over in 29 patients (24 male and 5 female) aged between 40 to 70 years, admitted with acute myocardial infarction. The diagnosis of MI was established by clinical, ECG and serum cardiac enzymes examination. None of the patients had thyroid dysfunction, liver or kidney disease. No separate control group of patients was taken as in a sequential study like this each patient is his/her own control .

Fasting blood samples were taken as soon as possible after admission (day 1, average 14 hours after chest pain), 24 hours later (day 2), 48 hours later (day 3), pre discharge (average day 7) and after 3 months. The dietary and life style changes where noted at 3 months follow up. Only those patients where finally included who were not taking any hypo lipidemic drug.

Serum total lipid concentration was measured according to the method of Zollner and Kirsch whereas serum total cholesterol, HDL-cholesterol and triglycerides were estimated by readymade kits using enzymatic methods. LDL-cholesterol was calculated by Friedewald equation. Inter-assay coefficients of variation for total lipids, total cholesterol, HDL- cholesterol and triglycerides were 1.08%, 1.01%, 6.28% and 1.52% respectively.

RESULTS AND DISCUSSION

The results of the present study have been shown in table 1. We found no significant change in serum total lipid and total cholesterol levels either during the acute phase or after 3 months of MI. While confirming the findings of Berlin and Helden berg *et al*, our study provides information which is in direct contrast to that by others who found either a decrease (2,4,6) or an increase during the acute phase of MI Although there was a decline in total cholesterol level on day 3 but it failed to reach statistical significance. Moreover, the pattern was almost same in males and females. Considering the pattern in individual patients the TC either did not change or decreased a bit (about10%) on day 3.

HDL-cholesterol levels, in our study, started falling from day 2 onwards, the reduction achieving statistical significance in pre-discharge specimens (p<0.001) and remained so at 3 months follow up (p<0.01) as compared to day 1. have also reported a significant reduction in HDL-cholesterol on pre discharge day but in their study it tended to normalize after 3 months. In contrast to our findings of reduction in HDLc concentration other studies have shown either a rise (10) or no change (11) in HDLc. An inverse relationship between TG and HDLc has been reported (27) and in our subjects too, this appears true. However, the low levels of HDLc at 3 months in our study indicate an irreversible decrement rather than an acute reversible change and since there were no preinfarction values of HDLc known, the effect of infarction can only be assumed and by no means proven LDL cholesterol recorded no significant change throughout the study period 1(Table 1) in our subjects. However, a significant decrease in LDL-cholesterol following MI has been reported by others. increasing trend after MI with a significant increase on day 3(p<0.01) and pre discharge (p<0.001) as compared to day 1. The values at 3 months were higher than day 1 but the difference was not statistically significant. This finding was in accordance HDLc and LDLc/HDLc on predischarge day as compared to day 1(p<0.01 and <0.05 respectively). increasing trend after MI with a significant increase on day 3(p<0.01) and pre discharge (p<0.001) as compared to day 1. The values at 3 months were higher than day 1 but the difference was not statistically significant. This finding was in accordance HDLc and LDLc/HDLc on predischarge day as compared to day 1(p<0.01 and <0.05 respectively).

Several studies have advocated the value of ratios of LDLc/HDLc and TC/ HDLc as a correlate of the severity and extent of coronary artery stenosis. The Several studies have advocated the value of ratios of LDLc/HDLc and TC/ HDLc as a correlate of the severity and extent of coronary artery stenosis . The present study showed an increase in

the ratios of TC/ This was due to significant decrease in HDLc on pre discharge day. Serum triglycerides showed an with those by others. On the contrary, Vetter *et al*. recorded a progressive fall in triglycerides levels from the second hour after MI and Ryder *et al*. found no significant change in triglycerides present study showed an increase in the ratios of TC/

This was due to significant decrease in HDLc on pre discharge day. Serum triglycerides showed an with those by others. On the contrary, Vetter *et al*. The mechanism of increase in triglycerides after MI may be due to elevated flux of fatty acids and impaired removal of VLDL from the plasma . Another possible mechanism for elevated TG levels may be the effect of b-blockers but this contention seems to be invalid for increased TG levels on day 3 and pre-discharge (day 7) as b-blockers take about 2 weeks to show their effect on serum lipids . Moreover, the TG levels came down to near day 1 values even in patients taking b-blockers. However, the normalization of TG levels at 3 months nearing day 1 levels could be due to diet restrictions and changes in overall lifestyle of the patients.

Thus, our study reveals some significant alterations in serum HDL-cholesterol, triglycerides and ratios of TC/ HDLc and LDLc/HDLc after MI. However, we did not find significant changes in serum total lipids, total cholesterol and LDL-cholesterol. Therefore, the optimum time for estimation of serum lipids in patients with MI appears to be within 24 hours of acute episode. To the best of our knowledge there is no such study.

available in Indian subjects residing in India. The mechanism of

Table 1: Serum lipids and lipoproteins in patients with acute myocardial infarction

Schedule	Total Lipids (mg/dl)	Total cholesterol (mg/dl)	HDLc (mg/dl)	LDLc (mg/dl)	Triglycerides (mg/dl)	Tc/HDLc	LDLc/HDLc
Day-1	484.8+142.6	187.9+38.7	41.7+8.3	123.7+55.8	112.7+55.8	4.68+1.44	3.11+1.13
Day-2	478.9+135.05	187.3+42.9	40.9+7.6	118.4+7.6	137.7+52.8	4.70+1.30	2.97+1.11
Day-3	481.4+137.0	176.9+40.9	38.1+7.65	106.6+33.5	161.7+57.4**	4.78+1.26	2.90+1.01
Pre-dis charge	496.5+142.6	190.5+38.1	33.8+7.46***	123.0+33.5	168.2+54.6***	5.85+1.65**	3.83+1.35*
3 months	462.3+112.9 n = 29	183.2+37.4 n = 29	35.3+6.0** n = 29	121.8+6.0 n = 29	130.8+51.8 n = 29	5.33+1.44 n = 29	3.55+1.19 n = 29
Values are mean + S.D. *, * *, * * * significance of difference as compared to Day 1: *p<0.05, **p<0.01, *** p<0.001							

these changes is still not clear. Could it be a metabolic effect of stress, hormones etc.? One recent study has shown that acute myocardial infraction causes a profound up regulation of cholesterol synthesis as acute phase response and the observed decrease of plasma cholesterol levels after acute myocardial infarction must, therefore, be explained by the parallel increase of LDL receptor activity and thus increased cholesterol catabolism (26). The mechanistic aspect of these changes deserves further investigations with larger number of patients.

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