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Research Article

Original Research article: A Study of Lipoprotein (a) and other risk factors in middle aged coronary heart disease subjects

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Abstract: Ischemic heart disease (IHD) is one of the most important causes of morbidity and mortality. Lipoprotein 'a' modulates the risk of IHD in patients with hypercholesterolemia and lipoprotein excess is commonly detected in man and women with premature IHD. The main aim is To measure and Compare the level of Lipoprotein 'a' and lipid profile between young patients of acute myocardial infarction (MI) and in healthy normal controls. The method was in these study 250 patients of acute MI below 40 year age group along with age and sex matched 45 healthy controls are selected. Fasting Blood samples were collected from all participants for estimation of serum lipid profile and Lipoprotein 'a'. The results were the mean concentration of serum cholesterol(mg/dl), Serum TG(mg/dl), Serum HDL(mg/dl), Serum VLDL(mg/dl), serum LDL(mg/dl)and Lipoprotein 'a'(mg/dl) in Acute MI patients is 198.52± 27.94, 187.28 ± 49.25, 38.52 ± 4.82, 37.45 ± 9.85, 122.64± 30.04, 28.44 ± 5.06 as compared to 177.23 ± 28.69, 146 ±32.5, 45.80 ± 4.69, 29.20 ± 6.5, 102.73 ± 28.43, 16.43 ± 4.02 in control group. The conclusion In this present study serum cholesterol, Serum TG, Serum LDL, Serum VLDL level were found to be raised along with low level of serum HDL and elevated level of serum Lipoprotein 'a' in patients of acute MI as compared to controls.
Keywords: Lipoprotein 'a', young age group, IHD

INTRODUCTION

Cardiovascular diseases cause 3%of all deaths in North America being the most common cause of death in European men less than 65 years of age and the second most common cause in women. These facts suggested us to consider new strategies for prediction, prevention, and treatment of cardiovascular disease [1]. Inflammatory mechanisms play a central role in the pathogenesis of atherosclerosis and its complications [2]. It has been demonstrated that atherogenic lipoproteins such as Apo (B-100), oxidized low-density lipo- protein (LDL), remnant lipoprotein (beta-VLDL), and lipoprotein (a) play a critical role in the pro inflammatory reaction. High-density lipoprotein (HDL) is anti atherogenic lipoproteins that exert anti-inflammatory functions [3–5]. Plasma LDL cholesterol is a well-established predictor of coronary artery disease (CAD),and many observations have pointed out that Lp(a) and a polipoprotein (a) (Apo(a)) levels may be risk factors for cardio vascular diseases (CVD) [6–8].

MATERIALS AND METHODS

The study was carried in the department of Biochemistry of B.J medical college and new civil hospital, Ahmadabad, Gujarat, India. Study Group- 250 young patients of Acute MI below 40 year age group Controls Group- 45 young age and sex matched normal healthy volunteer

Exclusion criteria:

Patients with DM, Hypertension, smoker, patients with disease affecting the serum lipid level like malignancy, pregnancy, hepatic disease, hypothyroidism, lipid lowering drug etc. was excluded from this study.

After overnight fast of 10-12 hr venous blood samples were drawn from all participants and collected in a clean, disposable plastic tube from anterior cubital vein under aseptic condition for estimation of cholesterol, Serum TG, Serum LDL, Serum VLDL and Lipoprotein 'a'.

Serum cholesterol was estimated by CHOD-PAP method, Serum TG by GPO method, Serum HDL by phosphotungstate precipitation method, Lipoprotein 'a' by turbi latex method, S.VLDL and S.LDL calculated by friedewald's formula. All above biochemical parameter was estimated in biochemistry semi automated analyzer along with Quality control material.

Statistical analysis:

Comparison of various parameters between study group and control group was done by calculating p-value by using Graph pad prism software to see the difference of significance. P-value <0.01 was consider as a significant

RESULTS

Results of all participants (Mean SD,N) are described in tabulated from at along with age wise distribution of participants. P-value was calculated between study group and control group to see the significance of difference among them.

Table 1: Age wise distribution of control and patients of Acute MI

Age group(year)	Control(45)	Acute MI(250)
20-25	0(0%)	10(4%)
26-30	3(6.67%)	10(4%)
31-35	15(33.33%)	50(20%)
36-40	27(60%)	180(72%)
Total	45(100%)	250(100%)
Mean Age ± SD	**33.74 ± 2.89**	**34.76± 3.57**

Table 2: Sex wise distribution of control and patients of Acute MI

Sex	Control(45)	Acute MI(250)
Male(M)	42(93.33%)	240(96%)
Female(F)	3(6.67%)	10(4%)
Total	**45(100%)**	**250(100%)**

Table 3: The mean concentration of Serum Cholesterol, TG, HDL, VLDL, LDL and Lipoprotein 'a' of control and patients of Acute MI

Parameter	Control(45) Mean ± SD	Acute MI(250) Mean ± SD
S.Cholestrol(mg/dl)	177.23 ± 28.69	198.52± 27.94
S.Triglyceride(mg/dl)	146 ±32.5	187.28 ± 49.25
S.HDL(mg/dl)	45.80 ± 4.69	38.52 ± 4.82
S.VLDL(mg/dl)	29.20 ± 6.5	37.45 ± 9.85
S.LDL(mg/dl)	102.73 ± 28.43	122.64± 30.04
S. Lipoprotein 'a'(mg/dl)	16.43 ± 4.02	28.44 ± 5.06

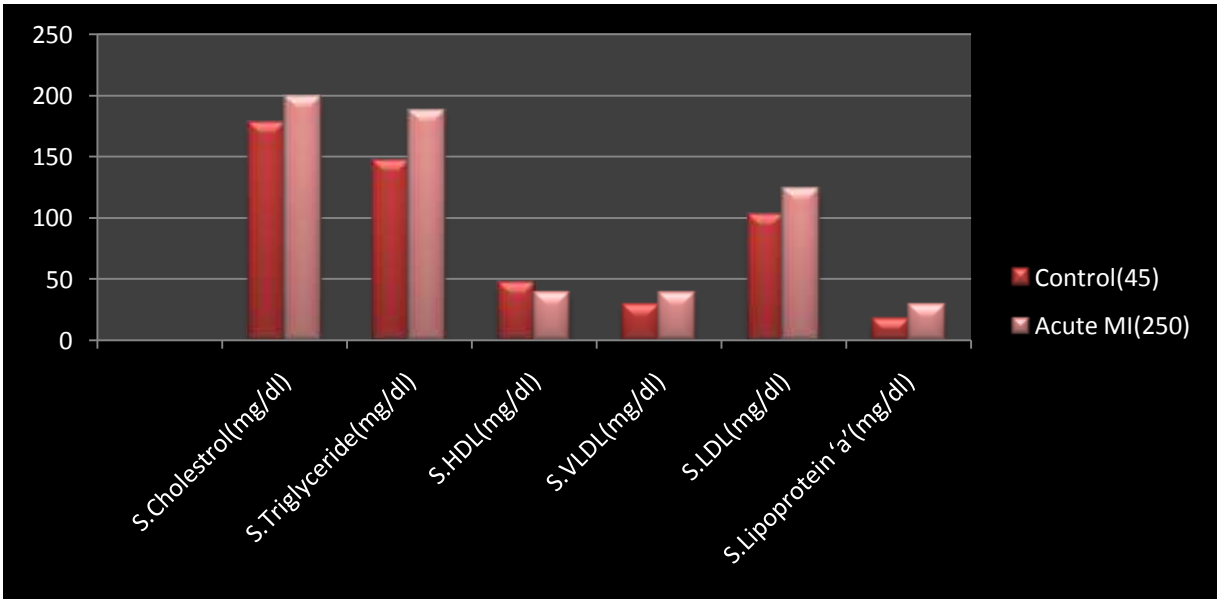

Fig 1: Graphical presentation showing comparison of various parameter between control and Acute MI

Table 4: The Comparison of mean concentration of various parameter between control and Acute MI

Parameter	Group	Number(n)	Mean SD	p-value
S. Cholesterol(mg/dl)	Control	45	177.23±28.69	<0.01 (Significant)
	Acute MI	250	198.52±27.94	
S. Triglyceride(mg/dl)	Control	45	146 ±32.5	<0.01 (Significant)
	Acute MI	250	187.28±49.25	
S.HDL(mg/dl)	Control	45	45.80 ± 4.69	<0.01 (Significant)
	Acute MI	250	38.52 ± 4.82	
S.VLDL(mg/dl)	Control	45	29.20 ± 6.5	<0.01 (Significant)
	Acute MI	250	37.45 ± 9.85	
S.LDL(mg/dl)	Control	45	102.73±28.43	<0.01 (Significant)
	Acute MI	250	122.64±30.04	
S. Lipoprotein 'a'(mg/dl)	Control	45	16.43 ± 4.02	<0.01 (Significant)
	Acute MI	250	28.44 ± 5.06	

DISCUSSION

Present study was conducted to correlate serum lipoprotein 'a' level with occurrence of acute MI in young age group (<40 year). In the study done by J.K. Ghambhir *et al.;* 2000,mean age of control group was 32.6 5 year and that of patient group was 36.2 3.8 years as this study was conducted to assess lipoprotein 'a' level and its role as a marker of IHD in patients below age of 40 years[9].

In the recent study done by D. Rajashekhar *et al.;* 2004 there was no significant difference between level of serum cholesterol in control v/s patients of Ischemic heart disease (p>0.05). These observation of serum total cholesterol in above mentioned studies were consistent with the fact that serum total cholesterol level is determined largely by dietary habits and environmental factor, so there was significant difference in control v/s patients in present study and study done by J.K Gambhir *et al.;* As dietary factor and environmental factor were not taken in account in these studies which largely affect serum total cholesterol level[9].

So present study is consistent with the proven fact that elevated serum cholesterol level is associated with increased risk of ischemic heart disease by causing and promoting atherosclerosis due to influx, retention and modification of atherogenic lipoprotein LDL in the intima [10,11].

There seems to be a combined effect of both internal and external environment in the development of premature ischemic heart disease in the form of MI. Internal environment responsible for the levated level of lipoprotein 'a' as an important power full independent risk factor for premature ischemic heart disease that's level strongly determined genetically. The risk is future accentuated by external environment like sedentary life style, consumption of food rich in fat leading to dyslipidemia characterized by high level of serum cholesterol, TG, LDL, VLDL and low level of serum HDL. These factors combined with genetically determined elevated level of serum lipoprotein 'a' results in acute MI at a young age.

CONCLUSION

In present study serum cholesterol, Serum TG, Serum LDL, Serum VLDL level were found to be raised along with low level of serum HDL and elevated level of serum Lipoprotein 'a' in patients of acute MI as compared to controls.

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