



INTERLEUKIN-6 AND LIPID PROFILE IN CORONARY HEART DISEASE PATIENTS.

Biochemistry

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ABSTRACT

Introduction :- India is having on going epidemic of Coronary heart Disease (CHD). Many biochemical markers such as lipid profile are well established in diagnosis or prognosis but some markers are still needs more study. IL-6, being an inflammatory cytokine, is a key player in inflammation since IL-6 regulates the acute phase response, one of the earliest responses to immunological stress. **Materials and Methods:** a cross sectional analytic study was done. total 100 cases and 100 controls were engaged in study after applying inclusion and exclusion criterion. **Results:** 50-59 age group was common, in lipid profile there was significant raised levels of cholesterol, triglyceride LDL and VLDL and significantly low levels of HDL. mean value of IL-6 was also significantly high in cases than controls. **Conclusion:** lipid profile is deranged in CHD patients and may be considered as primary indicator and IL-6 may also be added in battery of tests.

KEYWORDS

Coronary Heart Disease, lipid Profile, Interleukin -6, Biomarker

INTRODUCTION

Coronary Heart Disease has been defined as an impairment of heart function due to inadequate blood flow to the heart compared to its needs caused by obstructive changes in the coronary circulation.¹ It is a major cause of morbidity and mortality contributing to 20-25% deaths in the developed world affecting mostly young and middle aged (30-69 yrs) population². But recent studies shows that Coronary Artery Disease occurs a Decade earlier in the developing country like India as compared to same age group of patients in the developed countries. Inflammatory processes are involved in both progression and stability of atherosclerotic coronary plaque formation³. IL-6, being an inflammatory cytokine, is a key player in inflammation since IL-6 regulates the acute phase response, one of the earliest responses to immunological stress.⁴ Atherosclerosis, the leading cause of morbidity and mortality worldwide, is both a chronic inflammatory condition and a disorder of lipid metabolism. It involves a complex interplay between resident vascular wall cells and infiltrating immune cells. Plaque progression and later potential rupture may be attributed to vascular inflammation. IL-6 is an early and central regulator of inflammation found in high abundance in atherosclerotic plaques. It is synthesized by multiple cells of the artery wall including macrophages, vascular smooth muscle and endothelial cells. Lipid profile is a well-known biochemical marker and specially LDL is strong predictor of CAD mortality in women as well as in men.^{5,6} LDL level increases steadily by an average of 2 mg/dl/year between the ages of 40-60 years.⁷

MATERIAL AND METHODS

Study Design: Cross sectional Analytic study

Study period: July 2020- December 2021

Sample Population & Sample size: It was conducted on Subjects attending Pacific Medical College and Hospital Udaipur District fulfilling inclusion criteria. According to Rajeev Gupta, et al⁸ the prevalence of CHD was 10%. taking P= 10, marginal error 5% and confidence interval 95% the required sample size to be covered are 144, after including dropouts and round of the sample size we took total 200 subjects i.e. 100 case and 100 as control group.

The study population comprised of total 200 Subjects age group of 40 to 70 consisting of two groups:-

GROUP I: - It consist of age matched control subjects. By routine examination and tests, we ensured that all the subjects were healthy and there were no signs and symptoms or history of chronic diseases. (n=100)

GROUP II: - in this group Subjects included if they had CAD proved by either angiography or ECG changes and suggestive symptoms with elevated biomarkers (CK MB and troponin) belonging to the age group of 40 to 70 years (n=100)

Informed consent from all participants was obtained, after that 5 ml of venous blood was drawn from antecubital vein in a sterile plain vial under all aseptic precautions. REMI centrifuge at 3000 RPM was used for centrifugation for a period of 15 minutes. Serum thus separated was used for further analysis.

The lipid profile parameters were analyzed on Roche Cobas c311 by spectrophotometric method, TC by CHOD-POD method, TG by Lipoprotein Lipase Glycerol Method, HDL by PEG-cholesterol esterase, LDL and VLDL by calculation. IL-6 was estimated by chemiluminisenceon cobas e411.

Statically Analysis: Data thus collected entered in Microsoft excel 2011. Worksheet in the form of master chart. These data classified and analyzed as per the aims and objectives.

- Quantitative data is expressed in the form of Means and Standard Deviations.

Inferences are drawn with the use of appropriate test of significance as per the data yield, p value <0.05 is considered as significant.

RESULT

The mean age of cases was 56.36±7.33, and control was 59.76± 6.65. Most common age group was 50-59 followed by 60-69 and some cases were in 40-49 category. Out of total 100 cases 69 were male and 31 females and out of 100 controls 56 were male and 44 were females. Mean Serum total cholesterol of cases was 277.66 with SD 59.12 and while in control mean Serum cholesterol was 192.39 with SD 52.52. Mean Serum triglyceride of cases was 214.45 with SD 59.84 which was significantly (p<.001) higher than control mean Serum triglyceride level (138.14±62.55). Mean value of serum HDL in cases was 34.63 with SD 12.55 while in control mean serum HDL was 49.55 with SD 13.49 which was significantly (p<.001) higher than cases. Mean Serum LDL and VLDL of cases was 210.52 ±65.95 and 43.50±15.37 respectively which was significantly higher than control mean Serum LDL 126.55 ±41.55 and VLDL 27.22 ±13.39. Mean value of serum IL-6 in cases was 58.96 with SD 21.96 while in control mean serum IL-6 was 14.58 SD 4.50, and it was found statistically significant.

Table-1 Distribution of participants according to Age Group

Age group	Group		Total (percentage)
	Case	Control	
40-49	15	11	26(13)
50-59	48	49	97(48.5)
60-69	37	40	77(38.5)
Total	100	100	200

Table-2 Distribution of participants according to sex

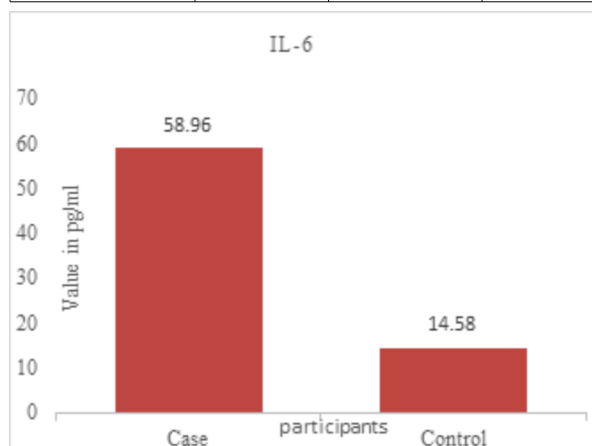
	Male	Female	Total
Case	69	31	100
Control	56	44	100

Table 3: lipid profile of cases and controls.

S.No	Parameter in mg/dl	Case(n -100)	Control(n-100)	p-value
1	TC	277.66±59.12	192.39±52.52	<0.001
2	TG	214.45±59.84	138.14±62.55	<0.001
3	HDL	34.63±12.55	49.55±13.49	<0.001
4	LDL	205.54±59.95	126.55±41.55	<0.001
5	VLDL	43.50±15.37	27.22±13.39	<0.001

Table 4:-level of IL-6 in cases and control

Parameter in pg/ml	Case(n -100)	Control (n-100)	p-value
IL-6	58.96±21.96	14.58±4.50	<0.001

**Figure :1**

DISCUSSION

Present study is conducted in a tertiary care hospital of southern Rajasthan. Patients were of mostly 50-59 age group but disease was also present in 40-49 category which may be representative of early shift of epidemic of CAD. Our results are consistent with study done by Milind P. Ullewar⁹ in 2017 which also report around 35 percent cases under 50 years of age. Out of 100 case 69% were male and 31 % were females which represents male predominance in cad disease ,these results are consistent with Milind P. Ullewar et al⁹ where 63 percent were males. In our study Mean Serum total cholesterol of cases was 277.66 with SD 59.12 which is significantly high than control. Our results are consistent with studies done by Goel et al¹⁰ who found mean cholesterol level in cases were 178.5±42.1 mg/dl while in normal subjects it was 154.1±40.2 mg/dl and results were statistically significant. (p<0.001), another study done by Rajmohan L et al¹¹ found that the prevalence of coronary artery disease was significantly high among patients with isolated hypercholesterolemia .Triglyceride ,S.LDL and VLDL levels were also statistically significantly high in results are in concordance with study done by Laltesh Kumar et al¹²; in which LDL and VLDL were significantly high and triglyceride levels were high but statistically non significant. Erem et al¹³ and Maclean et al has found similar results with higher cholesterol levels in cases both in men as well as women. In our study we found mean value of serum IL-6 in cases was 58.96 with SD 21.96 while in control mean serum IL-6 was 14.58 SD 4.50 which was found statistically significant. Results of our study are in parallel with the study done by Tentolouris et al. (2004)¹⁴, which states that IL-6 levels are greater in patients with Ischemic cardiomyopathy. Marco V. Wainstein et al¹⁵ in their study also found that the area under the receiver operating characteristic (ROC) curve of IL-6, hs-CRP and ASCVD were respective 0.72, 0.60 and 0.54 which means finding levels of il6 may predict coronary artery disease and its severity.

In addition, the study of St-Pierre, et al. (2005)¹⁶⁰ states that elevated IL-6 level is an independent risk factor of ischemic heart disease in men. The abovementioned study also states that high plasma IL-6 levels were associated with a 70% greater risk of IHD which further supports the findings of our study.

According to Tousoulis, et al. (2006),³⁷ and Assier et al. (2010),³⁸ IL-6, being an inflammatory cytokine, is a key player in inflammation since IL-6 regulates the acute phase response, one of the earliest responses to

immunological stress. A recent study done by martin josephs to et al¹⁶¹ in 2015 show that there is a significant difference (p<0.001) in the IL-6 levels of IHD patients (median of 33 pg/mL) from patients without IHD (median of 3.8 pg/mL). Based on these findings, those with an increased IL-6 level (> 5 pg/mL) are 25.0 times more likely to have IHD than those without increased IL-6 levels.

CONCLUSION

lipid profile is deranged in CHD patients and may be considered as established risk factor and IL-6 was also raised significantly in cases so may be considered as decent biomarker for CHD.

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