

The Role of the Total Cholesterol Level in the Assessment of the Severity of Myocardial Infarction

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Cardiovascular diseases are the emerging causes of the mortality which is looming large in India also. Particularly, the Indian populations are genetically more susceptible to them [1]. Dyslipidaemia (especially high LDL-C levels) is the promoter of atherosclerosis, whereas the HDL-C fraction is protective [2]. The oxidatively modified LDL associated conversion of macrophages to foam cells is reportedly atherogenic [3]. The pro-inflammatory oxidative milieu favours this process [4]. The dyslipidaemia associated acute phase response was shown to develop a pro-inflammatory state which promoted atherosclerosis [5, 6]. The usual practice of assaying the entire lipid profile may not be cost effective for predicting the cardiovascular risk burden. Oxidized-LDL and/or malondialdehyde modified-LDL, appear as informative markers [7]. However, technically, they do not appear to be suitable for a routine clinical laboratory setting. Hence, there is an ardent need of reasonably effective and affordable tests. In this study, the plasma lipid profile parameters, namely HDL-C (high density lipoprotein), LDL-C (low density lipoprotein), TG (triglyceride) and TC (total cholesterol) were assessed in both myocardial infarction (MI) cases and in healthy controls; each parameter was correlated with the lipid peroxidative parameter, MDA to find out any possible single parameter which was most closely associated with its oxidative pathology, so as to draw any meaningful association for prognostic purposes. A case cohort was formed by selecting 42 clinically as well as electrocardiographically confirmed and previously untreated cases of MI (median age 58 years). Diabetes Mellitus, or any other major diseases and a past history of smoking were ruled out. Similarly, an age and sex matched cohort was formed by selecting 38 healthy volunteers from among the hospital staff (median age 54 years). Plasma samples were collected from all the individuals of both the groups after taking informed consents from them. The patients' samples were collected within 12 hours of their admissions. Their lipid profiles, along with the direct LDL measurements, were assessed by using commercial kits as per the manufacturer's protocol. The MDA estimation was done by a spectrophotometric method [8].

Except for HDL-C which was found to be significantly low in the cases, the mean levels of the lipid profile parameters in the cases were significantly high as compared to those in the corresponding control group; the MDA levels were also found to be significantly high among the cases [Table/Fig-1]. This showed a marked dyslipidaemia in the patient populace. Pearson's correlation analysis showed a high degree of positive correlation between MDA and TC and also with LDL cholesterol ($r = 0.79$ and 0.72 respectively) in the MI cases. The positive correlation between MDA and the TG level was not comparably high. Similarly, the negative correlation

Group	Total Cholesterol (mg/dl)	Triglyceride (mg/dl)	HDL-C (mg/dl)	LDL-C (mg/dl)	MDA (nM/ml)
Control (n=33)	177.2±15.7	129±21.3	49±4.8	103.2±15.4	2.8±0.9
Cases (n=42)	252±24.22*	209±24.3*	36.6±7.5*	159.9±22*	6.62±0.8*

[Table/Fig-1]: Comparative display of lipid Profile parameters and malondialdehyde (MDA) in MI patients and control groups
* P value <0.05; significant, as compared to control.

between HDL-C and the MDA level was also not very significant. The control group parameters did not show any significant correlations. This result conformed to the view of the oxidative pathology being associated with such metabolic abnormalities. Total cholesterol and LDL-C, being significantly associated with lipid peroxidation in the cases, suggested a direct contribution of these fractions in the pathogenesis. However, in the general practice, LDL-C is calculated from the Friedwald's formula and it may thus incorporate considerable error [9]. Moreover, the highest correlation value was observed between total cholesterol and MDA. This finding corroborated with that of an earlier study which reported a relative risk predictive efficacy of TC, which showed its direct association with the mortality in coronary heart disease [10, 11]. Hence, with the perspective of this small scale pilot type study (considering the huge prevalence of cardiovascular diseases in the general population), total cholesterol alone, as a single parameter, demands a large-scale multi-centric trial for being considered as an effective and an economic option for the prediction of the severity of cardiovascular health hazards in the MI cases.

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