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Elevated circulatory levels of inflammatory marker IL-6 in Acute Coronary Syndrome patients in a tertiary care hospital

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ABSTRACT
Inflammation is considered to play a major role in atherosclerosis. Acute coronary syndrome is one of the types of cardiovascular disease which is also affecting the younger population. IL-6 is a proinflammatory cytokine, which is mainly associated with setting inflammation. The aim of this study was to compare circulatory IL-6 in ACS patients and controls. The study evaluated IL-6 levels in ACS sub groups-unstable angina, Non ST elevation MI and MI. The study reported that IL-6 levels were elevated in ACS patients than controls [13.6 (±4.7)/ 2.6 (±1.51). Further a significant difference was observed in the sub groups of ACS and their comparison with controls. **Conclusion:** The study concluded that the increased levels of IL-6 in circulation of ACS patients which indicates the degree of inflammation and severity of the disease.

Keywords: Acute coronary syndrome (ACS), inflammation, IL-6

INTRODUCTION

Atherosclerosis is a subclinical process which is mainly results due to up regulation of various inflammatory pathways and over expression of proinflammatory molecules [1]. Cardiovascular diseases are affecting all age groups. Acute coronary syndrome is a fatal event and now younger population is also experiencing this, without any known conventional risk factors. The need of an hour is to identify the subclinical molecular events to understand the path physiology of ACS and its severity.

Inflammation is the key subclinical event in atherosclerotic changes. Various inflammatory molecules play a crucial role in setting inflammatory events [2]. Interleukin-6 (IL-6) is a pleiotropic cytokine which mediates its effects through its receptor present on the plasma membrane of the target cells. The IL-6 receptor consists of two subunits-alpha and beta subunits. Deregulated continual synthesis of IL-6 plays a pathological effect on chronic inflammation [3]. Inflammation plays an important or key role in the pathogenesis and progression of atherosclerosis – an indicator for CAD [2]. Studies have shown that inflammatory biomarkers such as interleukin - 6 (IL-6) are seen to be associated with or predict the onset of cardiovascular events [4-7]. It has been also observed that IL-6 levels are positively correlated to the severity and extent of CAD [8]. Predictive value of these markers, including IL-6, has been demonstrated for subjects with existing coronary artery disease (CAD) and apparently healthy subjects [9].

Materials and Methods-

In the present study 102 patients which were sub grouped as 42 unstable angina patients, 29 Non S T segment MI (NSTEMI) and 31 ST elevation MI (STEMI) patients. Total 110 controls were included without previous coronary heart disease, stroke, or angina-like chest pain and were not taking medication for dyslipidemia, hypertension, or diabetes. Fasting venous blood samples were collected. The serum was stored at –20ºC in duplicates until analysis. The inclusion criteria for both cases and controls were aged in between 25-55 years. The clinical symptoms, biochemical investigations and electrocardiogram (ECG) were considered for the classification of subjects. The diagnosis of ACS was made on the basis of the standard guidelines based on ECG and Cardiac markers. The ACS patients were sub divided into three groups- Unstable angina, Non ST elevation MI (NSTEMI) and MI. The study is approved by the institutional Ethics committee. A written consent was obtained from all the study participants.

Results: The clinical and biochemical parameters were determined. Classical conventional risk factors were reported to be normal. The study did not find any significant correlation between IL-6 and any anthropometric measurement, lipid profile as well cardiac markers in any of the sub groups of ACS. A significant statistical difference was observed in circulating IL-6 concentration in ACS patients than controls. IL-6 levels were elevated in ACS patients than in controls [13.6 (±4.7) / 2.63 (±1.51). Further it was observed that IL-6 levels were associated with the degree of severity of the disease.It was also observed that in unstable CAD showed low levels of IL-6 than that in NSTEMI and MI patients- 10.10(±7.10), 12.26(±2.35) and 15.38(±2.5).

Discussion: Inflammation does play a key role in setting atherosclerosis and cardiovascular diseases. Many studies reported that interleukin-6 (IL-6) suggests a link atherosclerosis and inflammation [9]. IL-6 levels also found to be increased in obesity and type 2 diabetes. The study results indicate its role in subclinical inflammation and atherosclerosis [10, 11]. The present study supported the previous study observations that IL-6 was significantly higher in the ACS patients than the control group. Elevated IL-6 may reveal increased inflammatory activity in the plaques which are vulnerable for myocardial damage. Lindmark et al, reported a moderate but significant correlation between levels of troponin T and IL-6 [13]. IL-6 level and serum CK –MB has shown a good degree of association [14]. Further it was reported by a study that there is a close association between serum interleukin-6 concentration and mortality in patients with coronary artery disease [15].

Conclusion: Elevated levels of IL-6suggest higher inflammatory status in the ACS patients. It has been correlated with the severity of the disease.

Study Limitations: The study population is from a hospital and not a cohort study.

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Tables:

Table 1: Descriptive statistics for ACS and Control groups

Parameter	ACS Mean(S.D.±)	Control Mean(S.D.±)	'p' value
TAG (mg %)	172.3(±36.21)	142.9 (±20.23)	0.00
Cholesterol (mg %)	185.5 (±27.56)	160.5(±20.21)	0.00
VLDL (mg %)	35.4 (±8.2)	30.6 (±10.05)	0.00
LDL (mg %)	102.3 (±16.4)	82.6 (±22.49)	0.00
HDL (mg %)	42.3 (±5.32)	49.5(±6.28)	0.00
BMI	26.6 (±1.32)	24.1 (±1.82)	0.00
WC (cm)	86.2 (±6.35)	84.3 (±4.7)	0.00
Waist hip ratio	0.94(±0.06)	0.90(±0.05)	0.00
FBS (mg %)	137.5 (±58.3)	100.4 (±10.70)	0.00
IL-6(ng/ml)	13.6 (±4.7)	2.6(±0.51)	0.00

Table 2: IL-6 levels and subgroups of ACS and Control

Parameter	IL-6 Mean(S.D.±)
Unstable MI	10.1 (±7.10)
NSTEMI	12.2 (±2.35)
STEMI	15.3 (±2.5)
Control	2.6 (±0.51)

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