

# Cystatin-C marker in diabetic and non diabetic patients with ischemic heart disease

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## Summary:

**Background:** recent data indicate the prevalence of cardiovascular disease in patients with high cystatin-C level; it can be used as a good predictor for assessment of mortality in cardiovascular diseases regardless of the status of renal function.

**Patients and methods:** One hundred twenty (120) patients with ischemic heart disease admitted to this study at Baghdad teaching hospital for the period from January 2011 to September 2011. Those patients categorized into two groups (60) diabetic and (60) non diabetic in comparison to fifty healthy control. Fasting serum cystatin-C was measured in all patients and controls.

**Results:** The level of serum cystatin-C, in diabetic patients with ischemic heart disease was ( $2.05 \pm 0.55$   $\mu\text{g/L}$ ). Its level in non diabetic patients with ischemic heart disease was ( $1.19 \pm 0.59$   $\mu\text{g/L}$ ) both were significantly higher ( $p < 0.001$ ) than its level in healthy control ( $0.38 \pm 0.062$   $\mu\text{g/L}$ ).

**Conclusion:** Cystatin-C is a good prognostic biomarker in patients with ischemic heart disease with or without diabetes mellitus.

**Keyword:** cystatin-C, ischemic heart disease, diabetes mellitus.

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## Introduction:

Cystatin-C is a cysteine protease inhibitor involved in the catabolism of protein. It is produced in all nucleated cells as a chain of (120) amino acids (Non glycosylated 13 KD protein) (1). Cystatin-C or 3 formerly a gamma trace encoded by CYT3 gene (2) is freely filtered by glomeruli without secretion or subsequent reabsorption to the blood (3). Also it is less dependent on age, sex, race and muscle mass in comparison to creatinine (4). Using immunoassay methods cystatin-C is a good marker for prognostic stratification of morbidity and mortality of cardiovascular complication (5, 6, and 7). It also has been used as a marker for peripheral arterial disease and metabolic syndrome. Generally cystatin-C reference interval (1st 90th percentile) is 0.57-1.1 mg/L (or 0.6-1.11 for men, women 0.55-1.118) (8).

## Patients and methods:

Hundred and twenty (120) patients having coronary heart disease with or without diabetes mellitus were admitted in this study at Baghdad teaching hospital over the period January 2011 to September 2011 and fifty (50) healthy volunteers were taken as control. The age range of the

patients were 36 to 60 years with a mean of  $48 \pm 4.5$  SD with male to female ratio (2:1) While the age range of the control group was (37-56) years with a mean of  $42 \pm 6.7$  SD with male to female ratio (2:1). All patients with chronic disease like renal failure, malignancy, endocrine disorder and connective tissue disease were excluded from this study. Eight mls. of venous blood were aspirated from the fasting patients and control groups and transferred to tubes for required blood tests after centrifuging it at 3000 rpm for 10 minutes sera were stored at  $-20^\circ\text{C}$  for later analysis. The enzyme linked immunosorbent assay (Elisa) was used for the measurement of serum cystatin-C level (BuHL MANN cystatin C immunoassay Kit). Statistical analysis: Data expressed as mean  $\pm$  SD. statistical differences between the groups were determined according to ANOVA test and also used student t-test.

## Results:

The individual characteristic of patients and control groups were similarly matched together. The level of cystatin-C was significantly higher in both groups of ischemic heart disease (diabetic and non diabetic) in comparison to control group and significantly higher in diabetic group than non diabetic as shown in table 1 and table 2.

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**Table 1: Individual characteristics of patients and control group**

Parameters	Patients		Control		P. value
cystatin C	1.62 ± 0.56 µg/L		0.38 ± 0.06µg/L		<0.0001
Age	36-60 year		37- 56 year		>0.05
Sex	Male	Female	Male	Female	>0.05
	80	40	35	15	
BMI	24.02 kg/m2		24.03 kg/m2		>0.05
S.Creatinine	1.12 ± 0.24 mg/dl		0.84±0.04 mg/dl		>0.05

**Table 2: Distribution of cystatin-C in different types of ischemic heart disease**

Parameters	Cystatin-C µg/L	P	P.value
Diabetic patients with ischemic heart disease	2.053± 0.55	Between diabetic & non diabetic	< 0.0001
Non diabetic patients with ischemic heart disease	1.19± 0.59	Between diabetic & control	< 0.0001
Healthy control	0.38± 0.06	Between non diabetic & control	< 0.0001

**Discussion:**

This study showed that cystatin-C level was higher in patients with ischemic heart disease (diabetic and non diabetic) and this fit with the study done by (Lee, et al) (9) in which cystatin-C level was high in patients who had ST elevation with the Cardiac Troponin T, CRP and NT-pro BNP. This reflects that the elevation of these markers with high cystatin-C means that it is a good marker for the assessment of the severity of cardiac disease. These results fit with the study done by Windhansen et al(6), Keller(10), Ix et al(11) and the study done by Jaffe et al. (12) which indicated that cystatin-C level predict the development of heart failure and myocardial infarction. It is well known that diabetes per se is associated with ischemic heart disease due to higher incidence of atherosclerosis and more liability of thrombus formation due to more collagen deposition and these tally with studies done by deFilippi (13), Christensson et al (14), Xia LH et al(15) and Premartane et al(16) all of these studies showed that cystatin-c-level was higher than the cutoff point in patients with ischemic heart disease (diabetic and non diabetic). The present study also showed a significant variation between the two groups of ischemic heart disease (diabetic and non diabetic). Most of these studies used the cutoff point of 0.95mg/l (sensitivity 89% and specificity 80.76%, first and 95%percentile).

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