Cystatin (C) and its correlation to ischemic heart disease

Dr. Basil N. Saeed

ABSTRACT

Background: Cystatin C is recently considered to be a good predictor of cardiovascular morbidity and mortality in patients with coronary artery disease (CAD)

Objectives: Correlation between cystatin and ischemic heart disease.

Methods :One hundred forty patients (140) with ischemic heart disease admitted to thin study at Baghdad teaching hospital from the period June. 2011 to Jan. 2012. Those patients was categorized into three groups.

Group (A): patients with ischemic heart failure.

Group (B): Patients with myocardial infarction.

Group (C) patients with unstable angina.

All these groups were in comparison to fifty (50) healthy controls. Fasting serum citation (C) were measured in all patients and control in addition to all other routine investigations.

Results: All results of serum cystatin C in all three groups of patients were higher in comparison to control group (P. value < 0.05) while it was not significantly different between the three groups (P. value 0.05)

Conclusion: Cytstatin C can be used as prognostic biomarker in patients with ischemic heart and its complicated.

Key words: serum cystatin C, coronary artery disease, Baghdad Teaching Hospital

Al-Kindy College Medical Journal Vol.11 No.2.Page:15-16

** Received at 1st June 2013, accepted in final 27th June 2013.*

Corresponding author to Dr : Dr. Basil N. Saeed

Different cardiac markers have been studied thoroughly to evaluate the incidence, risk of complications of coronary artery disease [1, 2]. Recent data showed that cystatin (C) which is a protein inhibitor cystatin protease that is produced at certain concentration in all nucleated cells [3]. Cystatin (C) is not affected by age, sex, muscle mass, physical activity, diet, and medications. Many studies showed that the level of cystatin (C) is higher in patients with all types of ischemic heart disease while can be used as a marker for assessing any complication in addition to its value as prognostic factor for cardiovascular morbidity and mortality [4]

patients*:* hundred forty (140) patients with coronary artery disease was categorized into three groups, Group A (30) patients with ischemic heart failure and Ejection fraction < 30%, Group B (60) patients with myocardial infarction, Group C (50) patients with unstable angina their age range was (36-60) years and mean ± SD was (48 ± 4.5) years. The control group was of (50) fifty healthy individuals their age range and mean ± SD were (37- 56) (42 ± 6.7) years respectively. Any individual who is having any chronic disease like (failure), malignancy, endocrine disorder respiratory as liver failure, connective tissue disease, and any other long standing chronic disorder was excluded from this study which is done at Baghdad teaching hospital over the period June 2011- Jan 2012.

Methods: five milliters of venous blood aspirated from the fasting patients and control groups were transferred into sterile test tube. The blood was allowed to clot and centrifuged at 3000 rpm for 10 minutes. Sera were then separated and stared at 20 ˚C until further work and study. The enzyme linked immunesorbant assay (Elisa) was used for the measurement of serum cystatin C level. All patients and control have the blood tests including (PCV, lipid profile, urea and creatinine, FBS, liver function test and troponin level and CXR, echo study done for them at the admission to this study.

Results.

The demographic characters of patients and control groups were matched similarly with no significant deference (P. vale > 0.05) as in table I which showed also that the serum cystatin C level (mean ± SD) in all patients with coronary artery disease was higher in comparison to control group. All other parameters in this table were similar (P. > 0.05) measuring the serum cystatin (C) in the three different groups of coronary artery disease showed that the highest value were in group (A) patients with ischemic heart failure preceded by lesser value in group (B) patients with myocardial infarction and the least value was in group (C) patients with unstable angina. Assessing significance between these three groups. The p. value was (> 0.05) but still all the result were higher in all three groups patients in comparison to the control group.

Table I: Demographic characters of patients and control

Parameter	Patients		Control		P value
Cystatinc	1.175 ± 0.70		0.345 ± 0.09		<0.01
Age	36- 60 years		37- 56 years		>0.05
Sex	Male	Female	Male	Female	>0.05
	100	40	30	20	
BMI (Body Mass Index)	24.02 Kg / m^2		24.03 Kg / m^2		>0.05
DM (diabetes mellitus)	0		0		-
Sicreatinine	1.12 ± 0.24 mg /DL		0.84 ± 0.04 mg/ DL		>0.05

Smoking	-	-	-
Hypertension	20	-	-
Dyslipidema	5	-	-

Table II*:* distribution of serum cystinc in the three groups of ischemic heart disease.

Parameter	Type of ischemic heart disease	P value
Ischemic heart failure	1.184 ± 0.6	> 0.05
Myocardial infarction	1.172 ± 0.04	> 0.05
Unstable angina	1.154 ± 0.05	> 0.05

Discussion: This study showed that serum cystatin (C) is higher in all groups of patients with ischemic heart disease in comparison with control whatever the type of ischemic complication even though that there was no significant difference between the three groups of this study and this fit with study done by Zethelium et al[(2)] and Mmntner et al[(5)]. Still ischemic heart failure was showing the highest figure and this fit with study done by Ck wnd et al. Also this study fit with study done by Wind Hausen et al[(6)] in which he found also that in the presence of the elevated cardiac treponin in acute coronary syndrome the cystation (C) will be elevated and can give a hint about cardiovascular complication and even death[(2, 7)]. The explanation why cystatin (C) is elevated in ischemic heart disease probably due to enhanced promotion of atherosclerosis [(7, 8)]. It also causes changes in blood presser, lipid, lipoprotein and homocysteine in associatation with the presence of other risk factors [(4)]. This will lead to more adverse outcome in cases of serum heart failure and complicated myocardial infarction and death as studies done Jose M et al [(9)], Rajat Deo et al [(10)], Deo R[(11)]. The cutoff point of cyctatin C level in this study and other studies in 0.95 mg/ L giving a sensitivity 89% and specificity 80.26% using mephlometic method and 95 percentile.

References:

1- deFilippi CR, Seliger SL., Biomarkers for Prognostication After Acute Coronary Syndromes: New Times and Statistics; *Journal of the American College of Cardiology* 2009; 54(4): 365-7.

2- Zethelius B, Berglund L, Sundstrom J, Ingelsson E, Basu S, Larsson A, Venge P and Arnlov J. Use of Multiple Biomarkers to Improve the Prediction of Death from Cardiovascular Causes. *N Engl J Med* 2008; 358(20): 2107-16.

3- Taglieri N, Koenig W, Kaski JC. Cystatin C and cardiovascular risk. *Clin Chem*. 2009; 55 (11): 1932-43

4- Lee M, Saver JL, Huang WH, Chow J, Chang KH, Ovbiagele B. Impact of elevated cystatin C level on cardiovascular disease risk in predominantly high cardiovascular risk populations: a meta-analysis. *Circ Cardiovasc Qual Outcomes.* 2010; 3(6): 675-83.

5- Muntner P, Mann D, Winston J, Bansilal S, Farkouh ME. Serum cystatin C and increased coronary heart disease prevalence in US adults without chronic kidney disease. *Am J Cardiol.* 2008; 102(1): 54-7.

6- Windhausen F, Hirsch A, Fischer J, van der Zee PM, Sanders GT, van Straalen JP, Cornel JH, Tijssen JG, Verheugt FW, de Winter RJ. Cystatin C for enhancement of risk stratification in non-ST elevation acute coronary syndrome patients with an increased troponin T*. Clin Chem.* 2009; 55(6): 1118-25.

7- Arinell K, Christensen K, Blanc S, Larsson A, Frobert O. Effect of prolonged standardized bed rest on cystatin C and other markers of cardiovascular risk. *BMC Physiol.* 2011; 11(1): 17.

8- Bengtsson E, To F, Håkansson K, Grubb A, Brånén L, Nilsson J, Jovinge S. Lack of the cysteine protease inhibitor cystatin C promotes atherosclerosis in apolipoprotein E-deficient mice. *Arterioscler Thromb Vasc Biol.* 2005; 25(10): 2151-6.

9- Jose P, Skali H, Anavekar N, Tomson C, Krumholz HM, Rouleau JL, Moye L, Pfeffer MA, Solomon SD. Increase in creatinine and cardiovascular risk in patients with systolic dysfunction after myocardial infarction. *J Am Soc Nephrol.* 2006; 17(10): 2886-91.

10- Deo R, Shlipak MG, Ix JH, Ali S, Schiller NB, Whooley MA. Association of cystatin C with ischemia in patients with coronary heart disease. Clin Cardiol. 2009; 32(11): E18-22.

11- Luc G, Bard JM, Lesueur C, Arveiler D, Evans A, Amouyel P, Ferrieres J, Juhan-Vague I, Fruchart JC, Ducimetiere P; PRIME Study Group. Plasma cystatin-C and development of coronary heart disease: The PRIME Study. Atherosclerosis. 2006 Apr; 185(2):375-80.