Is there any relation between Circulating Endothelial-Leukocyte adhesion molecule -1 and extent of coronary artery involvements in men with angina pectoris?

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Abstract

Background-Selectins as a group of adhesion molecule arise from the surface of activated cell and involved for atherosclerotic plaque production.

Objective-To evaluate the relationship between Circulating Endothelial-Leukocyte adhesion molecule -1 (E-selectin) and the extent of coronary artery involvement in male Patients with coronary heart disease (CHD).

Methods- Participants were 103 male patients with symptoms of CHD. Patients underwent coronary angiography and according to angiography results they were divided to 80 patients with severe CHD and 23 with mild coronary involvements according to angiographic score. The Circulating E-selectin level was compared in both groups by ELISA method. Anova and analysis of covariant (ANCOVA) were used for evaluating possible association of E-selectin level and severity of coronary artery involvement by adjusting age, history of diabetes mellitus, hypertension, and dyslipidemia.

Results- The mean age of 103 male patients was 58.32±9.42 years. The E-selectin level was not significantly different in both groups with sever and minimal (CHD) (P=0.78). ANCOVA test could not show after significant association between E-selectin level and the extent of coronary artery involvement adjusting age (P=0.94) as well as history of diabetes mellitus, hypertension, and dyslepidemia respectively (P=0.43).

Conclusion- The circulating E-selectin level have no association with the severity of CHD in male patients***(Iranian Heart Journal 2011; 12 (4):37-42*).**

Key Word : Adhesion molecule■ E-selectin■ CAD■ coronary angiography■ extent

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Mechanisms which led to atherosclerosis were evaluated in many literatures[1,2] and advances in cellular and molecular basis of atherosclerosis have shown coronary artery plaque is an accumulation of complex lipids, fibrin and inflammatory molecules.[3] Severity of coronary artery disease accompanied with more disability for patients with coronary heart disease (CHD).[4] It seems traditional cardiovascular risk factors such as dyslipidemia, diabetes mellitus in addition to producing atherosclerosis plaque associated with more sever coronary artery involvements.[5,6]

Recent data have suggested that inflammation associated with coronary heart disease (CHD).[7] It was mentioned when endothelium of arteries is injured circulating leukocytes bind and recruitment to the vascular endothelium and then migrates to subendothelial spaces which cause atherosclerosis plaque. This procedure initiated by selectins which mediates rolling of leukocytes along the endothelium.[8, 9]

Endothelial-Leukocyte adhesion molecule -1 (E-selectin) is a kind of selectins which can be measured in plasma and presumed arise from surface of activated cell.[10] The association of E-selectin level and CHD has been suggested in few studies.[7, 11, and 12] As it was suppose that factors which cause atherosclerosis plaque may led to severe coronary artery involvements, we hypotheses that E-selectin level as a novel cardiovascular risk factors must be higher in patients with severe CHD, so we test this hypothesis in an Iranian male sample with CHD.

Methods and Materials:

Study population and design:

This survey is a cross-sectional study which was performed in Isfahan cardiovascular research institute in 2010.Participants were consecutive 35-75 aged male patients who had the American Heart Association criteria for CHD and referred to angiographic department for coronary angiogram.[13] Participants who had these criteria and were agree to contribute considered as the study group. One trained nurse measured participants systolic and diastolic blood pressure and fulfilled a questionnaire which consisted of questions about patients history of hishypertension, dislepidemia, and diabetes mellitus,renal and lung diseases as well as history of using any antihypertensive, anti dislepidemic, and anti diabetes mellitus drugs, also history of using any kinds of nonsteroidal anti inflammatory drugs (NSAIDS), glococorticoids as well as immunosuppressive drug was obtained .Finally patients who had history of renal failure, acute asthma, thrombosis, surgery in previous two month, Class III or IV of chronic heart failure according to NHA criteria as well as patients who consumed any kind of NSAIDs and anti-inflammatory drugs were excluded.

Physical and Biochemical Measurements:

Systolic and diastolic blood pressure of 103 study populations were measured in calm and comfortable room with 5 minutes intervals and the mean of these two measures were used for analyses.[14]

On catheterization day 14 hours fasting blood samples of participants were taken to measure fasting plasma sugar (FPS), total cholesterol (TC), triglyceride (TG), and high density lipoprotein cholesterol (HDL-C). Friedewald formula.[15] was used for calculating low density lipoprotein cholesterol (LDL-C) level except in individuals with TG≥400 which LDL level was measured directly. These measures carried out by enzymatic method. E-selectin was assessed by ELISA method (Bender Med-system, Biocenter , Austria).

Patients considered hypertensive if using any hypertensive drugs, and /or SBP≥140 and /or DBP≥90, participants with TC≥200 and/or TG≥150 and/orLDL-C≥100 and/or HDL-C≤40 in men malesand≤50in female were known as dislepidemic patients, and FBS≥126 and / or anti diabetic drug usage, and/ or

history of the diabetes mellitus use for knowing diabetic patients.[16]

Determination of coronary artery involvement

Coronary angiography was carried out by left-heart catheterization and arteriography using JUDKINS method[17], angiography film had seen by two cardiologist and the percentage of left anterior desending (LAD), left circumflex(LCX), and right coronary artery(RCA) involvements were turned to decimal number and then added together, if this number was equal or more than 1.5 coronary artery involvements was considered sever and in cases which this quantity was less than 1.5 coronary artery involvements was considered mild[18]

Statistical Analyses

Statistical analyses were carried out using SPSS software (version 15.0, Chicago, IL, USA) and analysis of covariebt (ANCOVA) by adjusting age as well as history of diabetes mellitus, hypertension, and dyslepidemia was used for evaluating any possible association of the E-selectin level and extent of coronary artery involvements.

Results

This study concluded 103 male patients with coronary artery involvements. The mean age of study population was 58.32±9.42.Eighty three participants were patients with severe coronary artery involvements and 20 of study population had mild coronary artery involvements. Study population characteristics were presented in Table I.

The mean level of E-selectin in patients with severe and mild coronary artery involvements were respectively 49.60±23.33 and 48.00±25.07, and t-test could not show the significant differences between E-selectin in both group(P=0.78).

Table II presented the association of E-selectin and severity of coronary artery involvements and as it was seen age adjusting (P=0.94) as well as age adjusting plus history of diabetes mellitus, hypertension, and dyslepidemia (P=0.43) could not show the significant association between E-selectin and extent of coronary artery involvements.

Table I. Study Population Characteristics

	Patients with Mild coronary artery involvements	Patients with Severe coronary Artery involvements	P.value
SBP	132.71±14.92	133.53±14.46	0.84
DBP	76.20±14.74	79.00±9.29	0.48
TG	156.35±68±35	161.95±90.63	0.75
TC	180.20±45.29	181.10±34.71	0.934
LDL	101.71±98.90	98.90±23.16	0.69
HDL	39.72±8.42	40.65±8.17	0.65
FPS	99.74±34.49	114±45±47.45	0.11
E-selectin	48.00±25.07	49.60±23.33	0.78

SBP=systolic blood pressure, DBP=diastolic blood pressure, TG=triglyceride, TC=total cholesterol, LDL=low density lipoprotein, HDL=high density lipoprotein, FPS=fasting plasma sugar

Table II. The association of E-selectin level with coronary artery involvements

	E-selectin level			
	Age adjusted		Full adjusted*	
	β	P. value	β	P. value
Severe coronary artery involvements	1		1	
Mild coronary artery involvements	5.86	0.94	6.100	0.43
Age	-4.56	0.06	-0.58	0.2
history of diabetes mellitus	-	-	0.171	0.97
hypertension	-	-	-3.15	0.52
Dyslepidemia	-	-	12.37	0.26

age, history of diabetes mellitus , hypertension, and dyslepidemia , were adjusted.

Discussion

Present study findings suggested that there is not significant association between circulating E-selectin level and severity of coronary artery involvements in male patients with coronary heart disease.

Results of Peter et al[19] cross-sectional study along with our results did not show the higher level of E-selectin in patients with severe coronary artery involvements; however the other survey[20] in Japanese patients with coronary heart disease showed the higher level of E-selectin in patients with mild coronary artery involvements in comparing with patients who suffer from severe CHD, in contrast with these findings Nasuno et al[21] study suggested that E-selectin level in patients with severe coronary artery disease is higher but in Nasuno[21] study the E-selectin level was measured directly in aorta and coronary sinus while the other two studies like the method of present research assessed this molecule level through peripheral blood circulating.The other reason for this conflicting finding with regarding to this point is E-selectin level is higher in female due to estrogen[3,22] but in our study only male patients were studied.

As it was mentioned one group of proteins which initiated adhesion of leukocyte on endothelial cells and their transendothelial migration are named selectins. E-selectin is one this protein group member and suggested in some studies forming the atherosclerotic plaque[8,9] Regarding to this point studies evaluated the E-selectin level in patient with coronary artery disease and results could not reach the agreements about this molecule role in patients with coronary artery disease For instance some studies declare that E-selectin level is higher in patients with acute coronary syndrome while other findings could not show this result.[23- 25]

It was documented that age, sex, dyslepidemia and history of hypertension affect the severity of coronary heart disease involvements.[26,28] Few studies evaluated the E-selectin association with CHD risk factors and in the number of this studies the correlation of this molecule with some cardiovascular risk factors such as hypertension and diabetes mellitus were documented[29-31], but the strong association of E-selectin with other risks factors could not be suggested. [21]

According to pervious evaluations the strong association of E-selectin level with coronary heart disease could not be documented and in addition, the strong correlation of this kind of selectin with cardiovascular risk factors which affect the severity of coronary artery involvements could not be suggested .

Conclusion

Based on present study findings it could be concluded that circulating E-selectin level could not show the severity of coronary artery involvements in male patients with coronary artery disease.

Study limitation

Cross-sectional study design, male sex which only concluded as the study population and using peripheral E-selectin level instead of using blood sample from coronary sinus must be consider as present study limitation.

Recommendation

conducting study in box sex which evaluated the association of E-selectin level in coronary sinus circulation with coronary heart disease risk factors and CHD severity in Iranians patients was suggested.

Authors' Contributions

MS participated in the design and conducting the Study and edited the manuscript, ZP conducted the statistical analysis and drafted the manuscript, AAS collected samples and performed the study and this manuscript was derived from his thesis (Dissertation number:38906), MB participated in design the proposal and helped in done laboratory tests, SY helped in collect samples and executive

partner, NZ participated in designing and conducting the study and edited the manuscript.

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