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Evaluation the Role of Interleukin-8 and Interleukin-10 in Myocardial Infarction Patients in Al- Najaf City

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Abstract:-

This study conducted to evaluate the interleukin-8 and interleukin- 10 level in hypertension and myocardial infarction patients in the period from March to December 2018 by using ELISA technique .A total of thirty three (33) patients from which (5 women and 8 men) with MI and (7 women and 4 men) with hypertension and a total of 19 (7 women and 12 men) healthy individuals were considered as control group .Resulting in, the mean of interleukin-8 level of hypertension and myocardial infarction patients (416.6 pg/ml) and (433.2pg/ml) respectively, with significant elevation comparing with non hypertension (292.03 pg/ml), non myocardial patients (378.9 pg/ml) and control (123.1 pg/ml), furthermore, mean of interleukin-10 level of hypertension and myocardial infarction patients (320.5pg/ml) and (102.9 pg/ml) respectively, with significantly different compared with non patients and control, where show significant increase mean of interleukin-10 level of hypertension compared with non hypertension patients (260.5 pg/ml) and control (129.4 pg/ml), also show a significant decline mean of interleukin-10 level for myocardial in comparison with non myocardial patients (146.3 pg/ml) and control (129.4 pg/ml) .(Concluded that interleukin-8) pro and anti-inflammatory (significantly raised in hypertension and myocardial infarction in coronary artery patients, in contrast, this result observed decrease production of anti-inflammatory cytokines IL-10 in myocardial patients.

Key word: Cytokines, interleukin-8, interleukin-10, myocardial infarction, coronary artery disease.

Introduction:-

Myocardial infarction(MI) commonly known as heart attack leads to changes in size, shape, and functions of the heart (Yang, 2011). Acute myocardial infarction is myocardial necrosis occurs when blood flow stops to a fragment of the heart leading to the damage of the cardiac muscle (Anjuman *et al*., 2013). The disease can be manifested by clinical characteristics, including electrophysiological changes, ventricular dilatation, myocyte hypertrophy, and interstitial fibrosis (Yang, 2011). Myocardial infarction may be the first feature of coronary artery disease (CAD), or it may have repeated occurrence, in patients with the well-known disease (Thygesen *et al*., 2012). The last decade its part in the focus of attention immunological from cardiologists (Anjuman *et al*., 2013).

Cardiovascular diseases are commonly manifested by myocardial infarction and the World Health Organization (WHO) has recommended that MI rates can be used as a proxy for cardiovascular disease rates in epidemiological studies (Mendis *et al*., 2011).

Hypertension is a major risk factor for CAD besides the risk of sudden death, heart failure and arrhythmias (Elliot, 2006) increase in hypertensive patients which may be attributed to extension of coronary disease and association with other risk factors that occur more in hypertensive patients than in non-hypertensive patients (Libby *et al*., 2008; Lingman *et al*., 2011).

Twenty two IHD patients (31.4%) were observed to have hypertension, and around 95% of them were over the age 40 years. Hypertension results from increased peripheral vascular smooth tone, which leads to increased arteriolar resistance and reduced capacitance of the venous system. These consequences can lead to CHD (Rubattu *et al*., 2007).

A positive correlation between hypertension and CHD (coronary heart disease) has been documented, and an estimate in the USA (united states)

has demonstrated that approximately 71 million individuals have one or more types of CVD cardiovascular disease, and at least 65 million of whom have hypertension, therefore blood pressure can be considered as one of the major risk factors for the development of the disease, but the bases of such correlation may be subjected to speculations (Lynch *et al*., 2008).

There is substantial evidence implicating an inflammatory process in the pathogenesis of AMI. Local inflammatory cells can generate and release cytokines that have the potential to activate endothelium, transforming its natural anti-adhesive and anticoagulant properties (Mulvihill and Foley, 2002).Cytokines are key regulatory glycol-proteins allied to inflammatory/immunological processes which modulate all aspects of vascular inflammation by altering the proliferation, differentiation and function of an extensive array of cell types (Schonbeck *et al*., 2002).

Interleuken-8 (IL-8) is a pro-inflammatory polypeptide belonging to the CXC chemokine super family, characterized by the presence of two cysteine residues separated by an intervening amino acid in the first three positions, and is secreted by several cell types, including adipocytes, monocytes / macrophages, T-lymphocytes, endothelial and epidermal cell (Remick, 2005).

Interleukin-10 (IL-10) is an acid-labile anti-inflammatory cytokine that limits and controls inflammatory response (Francesco, 2006). Induction of IL-10 was demonstrated in reperfused myocardium following ischemia, and it helped to suppress the acute inflammatory response by modulating macrophage cytokine function and promote metabolic steps associated with tissue repair.(Frangogiannis *et al*., 2000).

IL-10 plays a central role in regulating immune response and it suppresses inflammation. IL-10 also down regulates the release of reactive oxygen species (ROS) and nitrogen intermediates antigen presentation capacity and suppression of proliferative and cytotoxic T-cell responses (Saraiva and Garra, 2010).

The aim of this study is evaluated the IL-8 and IL- 10 level in hypertension and MI in coronary artery patients in Al –Najaf province.

Subjects and Methods:-

Subjects:-

A total of thirty three (33) patients from which (5 women and 8 men) with MI and (7 women and 4 men) with hypertension and (20) and (22) patients with non MI or non hypertension suffering from other findings who were admitted to Al- Sader Hospital/ Cardiac center /Najaf/ Iraq to perform coronary artery bypass graft and atrial septal defect surgical operation in the period from March to December 2018, and a total of 19 (7 women and 12 men) healthy individuals were considered as control group with no history of CAD or diabetes mellitus, their ages were varied between 20-70 years. The diagnosis was made by the consultant medical staff at the hospital. It was based on a clinical examination and other confirmatory investigations.

Blood collection:-

Five ml of the venous blood were obtained from each subjects, using 5 ml disposable syringe and transferred in to sterile tubes (without anti-coagulant). The tubes were centrifuged at(3,000 rpm for 15 min). The collected serum was frozen at -20°C until use. The levels IL-18, IL-10 and IL- 10 were measured by enzyme-linked immunosorbent assay (ELISA) kits from Bio-Source, Europe S.A. The absorbance was read at a wave length of 450 nm using ELISA reader. The sample results were calculated by interpolation from a standard curve using a curve fit equation.

Statistical Methods:-

Social Package for Statistical Analysis (SPSS) version 19 was used**,** chi - square test was performed to test the significant difference between age groups and sex. The values of other parameters were presented as mean ± standard error (S.D.), and significant differences between means were assessed by (ONE WAY ANOVA) test, the least significant difference (LSD), in which a probability (P) equals or less than 0.05 was considered significant.

Results:-

A total of 33 patients and 19 control in this study, the results show no significant different among men and women of all studied groups, and the rate of hypertension in male and female were 36.3 and 63.6 respectively, on the other hand the rate of MI in male and female were 61.5 and 38.4 respectively as shown in (table 1).

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Table 1: statistical distribution of sample according to

P- value	X^2	Myocardial patients (N%)	Hypertension (N%)	Finding / Sex
0.219 Non	1.510	8 (61.5)	4 (36.3)	Male
		5 (38.4)	7 (63.6)	Female
		13	11	Total

X^2: Chi-square test, Non: no significant different, N: number

Table (2) in present study showed higher significant ($p < 0.05$) of younger age (72.7) with hypertension as compared with elderly age (27.2), otherwise there was higher significant ($p<0.05$) elevation in elderly age (100) of MI sample.

Table 2: statistical distribution of sample according to age

P- value	X^2	Myocardial patients (N%)	Hypertension (N%)	Finding / Age group(year)
0.001	14.182	0	8 (72.7)	20-39
		13 (100)	3 (27.2)	40-70
		13	11	total

X^2: Chi-square test, N: number

Evaluating serum level IL-8 showed total (416.6pg/ml) hypertension, (292.03 pg/ml) non-hypertension had a significant increased($p < 0.05$) as compared to controls (123.1 pg/ml) and total of (320.5 pg/ml), hypertension and (260.5pg/ml) non-hypertension patients showed a significant increased ($p < 0.05$)serum level of IL-10 as compared to controls (129.4 pg/ml). The hypertension patients also showed a significantly higher ($p < 0.05$)level than non-hypertension patients of all IL-8 and IL-10. (Table3).

Table 3: statistical comparison of interleukin 8 and interleukin-10 level hypertension finding

P value	IL-10	IL- 8	Finding/ total patient / N = 33
	Mean ± std. de.	Mean ± std. de.	
0.001	320.5±26.3*	416.6±11.0*	Hypertension / 11
	260.5 ±6.6*	292.03 ± 4.3*	Non hypertension / 22
	129.4 ±4.2*	123.1± 3.9*	Control / N=19

std.de.: standard deviation.*: mean significant different

Total (433.2pg/ml) Myocardial infarction and (378.9 pg/ml) non-myocardial showed a significant increased($p < 0.05$)serum level of IL-8 as compared to controls (123.1 pg/ml) and total of (102.9pg/ml), MI showed a significant decreased ($p < 0.05$)serum level of IL-10 as compared to non myocardial(146.3pg/ml) and control samples (129.4 pg/ml), and non myocardial patients show significant elevation ($p<0.05$) in level of IL-10 in comparison with control samples . The MI patients also showed a significantly higher($p < 0.05$)level than non-myocardial of IL-8.(Table 4).

Table 4: statistical comparison of interleukin 8 and interleukin-10 level Myocardial infarction finding

p- value	IL-10 Mean ± std. de.	IL- 8 Mean ± std. de.	Finding/total patient / N = 33
0.001	102.9 ±3.3*	433.2±8.4*	Myocardial infarction/ 13
	146.3 ±2.4*	378.9 ± 4.6*	Non myocardial /20
	129.4±5.3*	123.1 ± 2.9*	Control /19

std.de.: standard deviation. *: mean significant different

Discussion:-

The results showed no significant difference among men and women in hypertension and MI patients. The infected with coronary artery syndrome (CAs) can be explained by decreasing the production of estrogen in women and testosterone in males especially after menopause in females and andropause in males (Straub, 2007).

Although no significant effect among men and women in MI patients, the level of infection among men higher than women. This result is in agreement with the result of Abdulkareem *et al*. (2013), who demonstrated that, acute coronary syndrome (MI and unstable angina) were common among male patients comparing with female patients, on the other hand, our study are demonstrated that the infection in elderly age patients (40- 70) old year were significantly increased in MI as comparing with younger age patients this observation in agreement with the reported of Rachel and Ramarson (2003), who mention that the incidence of cardiovascular events it more predominant in elderly peoples, as well as the results reported that the males over 45 years and 55 years old females are at a greater risk to develop a (CVD) (Katan ,2009), also the result of Abdulkareem *et al*. (2013) observed that (MI and unstable angina) were elevated above the age of 40 years and there was a significant increase in the frequency of Ischemic Heart Disease (IHD) with increasing age.

Comparing myocardial infarction and hypertension patients with non (hypertension and myocardial) and control sample, this study demonstrate there was high significant increase of IL-8 concentration among them. This agree with Al-Hassan (2012), Shakib (2013) and Abdulkareem *et al*. (2013), Sarhat and Mahmood (2018) who demonstrate significant increase in IL-8 in myocardial infarction. IL

-8 appeared to be a direct pathogenetic mediator of the atherosclerotic process (Panichi *et al*., 2006). Also Choi *et al*. (2016) were mentioned that the IL-8 is considered as an important cytokine in the inflammatory process, it is a member of the CXC chemokine family that has potent chemo attractant activity for leukocytes and potent promoters for angiogenesis. It's main sources are several cell types, including adipocytes, monocytes / macrophages, T-lymphocytes, endothelial and epidermal cell.

The present results observed the concentration of IL-10 hypertension patients significantly higher than non (hypertension and myocardial) and control samples. Ren and She (2015) suggests that IL-10-1082A/G polymorphism has association with an increased risk of (CAD), especially in hypertension, diabetes mellitus and smokers.

In MI patients there was significantly decline of IL-10 level than control samples and non (hypertension and myocardial), this disagree with Blake and Ridker (2001) and Mizia *et al*. (2003) when they showed increase in level of IL -10 in acute coronary syndrome (ACS), and disagree with Abdul kareem *et al*. (2013) in Baghdad when he observed no significant different among patients and control, but agree with Al-Hassan (2012) in Baghdad and Sarhat and Mahmood (2018) in Tikrit when they show the interlukin-10 in myocardial patients significantly lower than non patients.

Smith *et al*. (2001) reported that the measurement of IL-10 levels in 50 patients with stable angina was a higher than unstable angina. Welsh *et al*.(2011) concluded IL-10 is positively associated with risk of CVD among the elderly without history of CVD events, but this association is weaker in patients with a history of CVD events.

Conclusion: Present study concluded that interleukin-8 (pro and anti- inflammatory) significantly raised in hypertension and myocardial infarction in coronary artery patients, in contrast, this result observed decrease production of anti-inflammatory cytokines IL-10 in myocardial patients.

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