Correlation Between Highly Sensitive C-Reactive Protein Level in Cases of Preeclampsia with or without Intrauterine-Growth Restriction

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Abstract

Background: Preeclampsia is one of hypertensive disorder that affects 4% of pregnant women, the exact cause cannot be identified and it is one of the major causes of both maternal and fetal morbidity and mortality , also it puts a burden on perinatal outcome as prematurity and Intrauterine growth restriction.Continuous search for predictive markers of severe PE is important and can be used to target high risk women for effective preventive treatment. **Aim of study**: to evaluate Highly Sensitive C-Reactive Protein role used as predictive factor for severity of preeclampsia and whether it can be used to predict development of Intrauterine growth restriction. **Patients and methods**: this is a cross-sectional study includes 80 pregnant women with their age 18-35 years , their gestational age range between 32- 40 weeks , admitted to AL-Zahraa teaching hospital in Najaf, whose diagnosed as PE based on blood pressure measurement and proteinuria. Full history and clinical examination were performed, venous blood aspirated for each women for biochemical analysis, Liver functions tests, Renal function tests, Highly Sensitive C- Reactive Protein, and Doppler ultrasound. **Results**:The patients divided into those with mild PE and severe PE, with or without IUGR. No significant difference between the level of Highly Sensitive C-Reactive Protein and the severity of PE as p value was[0.779], but there is significant difference between the presence of IUGR and the level of Highly Sensitive C-Reactive Protein when it is≥ 2mg/L as the p value was[0.020]. **Conclusion**: We conclude that Highly Sensitive C-Reactive Protein is not significantly associated with the severity of Preeclampsia but associated with intra uterine growth restriction.

Keywords: *Preeclampsia, hsCRP, intra uterine growth restriction*

Introduction

CRP [C-reactive Protein] is one of acute phase protein which is increased in many systemic inflammation. It is the first acute phase protein to be described by many studies and is sensitive systemic marker of inflammation in different tissues and tissue damage [1].CRP is important sensitive index of systemic inflammation that predicts adverse outcome in atherosclerotic events, including myocardial infarction, cerebrovascular accident, peripheral vascular disease, and even death [2]. Elevated CRP level are also correlated with obesity [3]. It is to be Known whether CRP and obesity are associated or predisposes to PE[4]. The response of systemic maternal inflammatory to pregnancy is responsible for endothelial dysfunction which may be responsible for the clinical and pathological picture of PE,and there is a many factors that cause abortion like bacterial infection [5]. The association between first trimester high level of CRP levels and subsequent PE supports the hypothesis that systemic inflammation may be involved in the pathogenesis of PE [6]. hsCRP introduced and can be used as one early marker of low grade inflammation and may further helping in detecting pathophysiological process

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happened early in pregnancy so as to predict possible adverse pregnancy outcome and try to use preventive therapies well in time. Normal human placenta produces hsCRP and release it mainly into the maternal blood, and also it can be found in amniotic fluid and fetal urine , its increased amount can directly relates to poor pregnancy outcome . however, the real origin of amniotic fluid hsCRP, its regulation and its exact function during human pregnancy is not clear [7].

Patients and Methods

This is a cross-sectional study including 80 pregnant women, their ages between 18-35 years, admitted to Al-Zahraa teaching hospital for maternity and pediatric over period of 8 months, their GA between[32-40] weeks , as proven by last menstrual period or early pregnancy U/S. An approval on the study were taken from gynecology and obstetrics department then ethical committee in the college of medicineKufauniversity.

We clarify the procedures included in the study for the patients and take their agreement for participation in the study and in taking information, investigations, and subsequent blood aspiration. WE classify our patients into 2 groups:

Group A: mild PE→BP systolic 140−160 and diastolic 90−109 With Albumin ≥+

Group B:Severe PE→BP systolic ≥160 and diastolic ≥110 With Albumin ≥++ or Oliguria <500ml/24hrs ,Thrombocytopenia, Epigastric pain, Pulmonary edema,Persistent Cerebral or visual disturbances. Full history was taken from the patients including obstetrical history, previous medical history, previous hypertension, previous APH ,drug used and family history. We exclude diabetes mellitus, chromic renal disease and chronic hypertension. Full examination including blood pressure[in left lateral position], pulse rate , edema , done for all patients . Venous blood had been aspirated from each patients with the following investigations: CBC, RFT, LFT, Doppler U/S. hsCRP levels were estimated from the sera of the patients using ELISA [enzyme linked immune sorbent assay] method by commercial kit SIGMA-ALDRICH

Results:

This is a cross-sectional study including 80 pregnant women having PE with age range 18-35 years.; it includes the patients with PE as follows:25 patients with mild PE with mean age of [26.84±5.22], 55 patients with severe PE having mean age of [27.84±7.28].The result was assist using T-Test at a level of significance P value ≤0.05. As Shown in Table (1) there is no significant difference between patients with mild PE and those with severe PE regarding their age, parity, GA or RBS level, but there is highly significant difference between the two groups regarding the systolic and diastolic BP as the P value is [0.000].

The result also shows that there is no significant difference between the severity of PE and presence or absence of IUGR as shown in Table (2). The result also shows that there is significant difference between patients with PE and IUGR and PE without IUGR when hsCRP ≥ 2mg/l [high risk], but there is no significant difference in those with or without IUGR when the hsCRP level < 2mg/l as shown in chart Table (3). The Result also shows that there is no significant difference between mild and severe PE when level of hsCRP< or ≥ 2mg/l as shown in Table (4).

Table [1]: Demographic and clinical characteristics of women with two group Mild & Severe PE

characteristics	Group A	Group B	P value
Number	25	55	
Age	26.84±5.22	27.84±7.28	0.489
Parity	0.911±1.7	0.777±0.849	0.646
Gestational age	37.40±2.08	36.89±2.19	0.324
Random blood sugar	93.48±7.97	96.8±11.2	0.135
Systolic blood pressure	144.00±5.77	161.6±16.4	0.000
Diastolic blood pressure	96.80±4.54	106.64±9.67	0.000

Table [2]: Patients with mild and severe PE with and without IUGR[P Value=0.210]

	IUGR	Without IUGR
Mild preeclampsia	4	21
Severe preeclamsia	17	38

Table [3] correlation between patients with IUGR and level of hsCRP.

Parameter	**PE with IUGR Number= 21**	**PE without IUGR Number= 59**	**P value**
	Mean ±SD	**Mean ±SD**	
Low risk	1.063±0. 537 mg/l	1.106±0.442mg/l	0.846
High risk	7.52±3.65 mg/l	5.28±2.21mg/l	0.020

Table [4] level of hsCRP between mild and severe PE

Parameter	**Mild preeclampsia Number= 25**	**Severe Preeclampsia Number= 55**	**P value**
	Mean ±SD	**Mean ±SD**	
Low risk	1.263±0. 523 mg/l	1.072±0.324 mg/l	0.240
High risk	8.323±4.884 mg/l	6.729±3.580mg/l	0.233

Discussion

C-reactive protein is one marker of tissue damage, necrosis and inflammation. CRP are found to be raised in pre-eclampsia, but there is still a debate about its usefulness as predictive marker for pre-eclampsia during both the first and second trimester of pregnancy [4]. In present study we found that there is significant difference in the level of hsCRP when it is ≥2 between women with PE who have IUGR baby and those without IUGR , as the mean level of those with PE and IUGR is 7.52± 3.65, and for those without IUGR is 5.28±2.21. This is similar to study from Gandevani SB 2012[8] ,who found that there were significant relationship between hsCRP level in mild and severe PE and with IUGR and birth weight. Also, Adali E. 2011[9], found that hsCRP has shown a correlation with IUGR and birth weight and Savvidou et al 2002[10], reports an elevated CRP level at 10-14 weeks of pregnancy in women who develop PE or who delivered IUGR babies. While Tjoa et al. 2003[11] reported no difference in hsCRP between PE with IUGR group and normal gestational outcome. These differences from our study may be due to the cutoff value of hsCRP used in different studies. In current study there was no significant difference in the level of hsCRP between mild and severe PE , this is similar to the result of ZohreTavana 2011 [12] who found that serum concentration of CRP did not show statistically significant changes among mild PE , severe PE , chronic HT and normal pregnancy. Hossein Ayatollah 2007 found that higher level of hsCRP in both mild and severe PE than normal pregnancy and this result suggest that hsCRP are increased more in cases of severe PE than mild PE and may be used as useful in prediction and diagnosis of degree of severity of PE. SelahattinKumru2005 , who found that hsCRP levels increase in women with PE . elevated serum levels of hsCRP in preeclampsia women are correlated well with different clinical and biochemical parameters of PE. Determination of S.hsCRP levels may be used as a marker for the severity of PE[13], and this is not an agreement with our study and alsoT.Sarala Devi 2013 who found that hsCRP may be used as good predictive marker for PE[14].It was observed that there was strong association between high TSH level and development of PE[15].

Conclusion

We conclude that hsCRP is not statistically different between mild and severe PE , while it is significantly higher in IUGR group.

Conflict of Interest: we declare that there is conflict of interest

Ethical Approval: the research approved by scientific and ethical committee at our department

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