CORRELATION BETWEEN SERUM LEPTIN LEVELS AND BLOOD PRESSURE IN NORMAL PREGNANT AND PRE-ECLAMPSIA PATIENTS

Safia Rehman[1], Sajjad Ahmad[2], Zahoor Ullah[3]

[1]Department of Pathology, PGMI, Hayatabad Medical Complex, Peshawar - Pakistan

[2]Department of Pathology, Peshawar Medical College, Peshawar - Pakistan

[3]Department of Bio-Chemistry, Peshawar Medical College, Peshawar - Pakistan

ABSTRACT

Objective: To determine the co-rrelation between serum leptin levels and systolic and diastolic blood pressure in normal pregnant and pre eclampsia patients.

Material and Methods: This study was conducted at Gynae OPD Hayatabad Medical Complex, Lady Reading Hospital, Peshawar and Department of Pathology, Peshawar Medical College from January 2013 to July 2013. This was a case control study in which sample size was 80 subjects. These were divided into two groups, 40 cases and 40 controls. Inclusion criteria include all patients with mild and severe pre-eclampsia having gestational age more than 20 weeks. Exclusion criteria including pregnant females having heart disease or kidney disease and gestational age less than 20 weeks.

Results: Cases were divided into mild and severe pre-eclampsia. The mean age of cases was 27 years and controls were 24.9 years. Mean period of gestation of both cases and controls was 35.3 weeks. Mean B.P of cases was 153/100 mmHg, while that of controls was 111/75mmHg. The mean leptin levels were 9.57 ng/ml in controls. In mild pre-eclampsia, leptin levels were 25.57 ng/ml and in severe pre-eclampsia, the levels were 36.47 ng/ml. Mean systolic BP was found to be 140.0/95mmHg in mild and 160.8/111 mmHg in severe pre-eclampsia, while mean blood pressure in controls was 111.7/75.1 mmHg. Serum levels of leptin were found to be significantly correlated with systolic and diastolic blood pressure with a p-value of <0.001.

Conclusion: From this study, it is concluded that strong correlation exists between serum leptin levels and blood pressure in normal pregnant and in pre eclampsia patients, hence it may contribute to pathogenesis of pre-eclampsia.

Key Words: Leptin, pre-eclampsia, ELISA.

INTRODUCTION

Leptin is a 16-KDa protein, secreted by white adipose tissue, that is primarily involved in regulation of food intake and energy expenditure. Recent studies suggest that leptin is involved in cardiovascular complications of obesity including arterial hypertension. It is also synthesized and secreted by placenta and may contribute to pathogenesis of Pre-eclampsia. According to American society of hypertension 2008, 5-7%[1] of all pregnancies are complicated by hypertension.[2] According to American College of Obst and Gynecologists (2003), about 70% of women diagnosed with hypertension during pregnancy will have pre-eclampsia.[3]

Address for Correspondence:
Dr. Safia Rehman
Academic Registrar
PGMI, Hayatabad Medical Complex,
Peshawar - Pakistan
Cell: 0335-9793682
Email: safia.rehman@hotmail.com

The term gestational hypertension and pre-eclampsia is used to describe a wide spectrum of patients, who may have only mild elevation in blood pressure or severe hypertension with various organ dysfunctions including acute gestational hypertension; pre-eclampsia; Eclampsia and HELLP (hemolysis, elevated liver enzyme, low platelets) syndrome.[4] The incidence of Preeclampsia in the United States is estimated to range from 2% to 7% in healthy, nulliparous women.[3]

In developing nations, where access to health care is limited, pre-eclampsia is a leading cause of maternal mortality, causing an estimated more than 60,000 maternal deaths per year.[5] The incidence of the disease in developing countries is reported to be 4-18%[6] with hypertensive disorders being the second most common obstetric cause of stillbirths and early neonatal deaths in these countries.[4]

According to national high blood pressure education program working group report, pre-eclampsia is primarily defined as gestational hypertension (BP >

140/100 mmHg) plus proteinuria (300 mg or more per 24 hours). If 24 hour urine collection is not available, then proteinuria is defined as a concentration of at least 30 mg/dl (at least 1+ on dipstick), in at least two random urine samples collected 6 hours apart.[7]

MATERIAL AND METHODS

A total of 40 pregnant female with pre-eclampsia were selected for this case control study from the admitted patients and patients visiting outpatient departments of tertiary care hospitals of Gynae and Obstetrics Unit, Hayatabad Medical Complex and Lady Reading Hospital as per the inclusion and exclusion criteria. These patients were compared with 40 pregnant female without pre-eclampsia. After the full explanation of the study, written informed consent was obtained from each study subject. Demographic and anthropometric details like age, weight, period of gestation, number of previous pregnancies, previous history of other illnesses and related complications of pre-eclampsia were recorded for all the study subjects. Blood pressure was measured twice in all the study subjects using a standard mercury sphygmomanometer,6 hours part.

- All pre-eclampsia patients from 20-35 years age were included in the study and classified as mild and severe pre-eclampsia, with Gestational age more than 20 weeks. Those patients who had Twins/triplets pregnancy, with heart disease, kidney disease and liver diseases with essential hypertension, Diabetese mellitus were excluded from the study.

RESULTS

Average systolic/diastolic blood pressure and leptin levels were found in increasing order from normotensive to severity of pre-eclampsia.

- In mild pre-eclampsia group, the mean systolic B.P was 140mmHg and diastolic B.P was 95mmHg, while mean leptin levels were 25ng/ml.
- In severe pre-eclampsia, the mean systolic B.P was 160 mmHg and diastolic 111mmHg, while mean leptin levels were 36.47ng/ml.
- In control group the mean systolic B.P was 111.75 mmHg, mean diastolic B.P was 75mmHg and mean leptin levels were 9.5 ng/ml.

Serum leptin levels were found to be significantly correlted with systolic and diastolic blood pressure with a p value of <0.001.

DISCUSSION

Pre-eclampsia is a complication in pregnancy caused by factors released from a dysfunctional placenta.[13] Delivery of the placenta results in clinical resolution, so placenta is viewed as the essential organ in the development of pre-eclampsia.[14]

Table 1: Socio demographic and reproductive characteristics of the study subjects

	Group	No. of patients	Mean	SD±
Age (years)	Cases	40	27.02	5.33
	Control	40	24.90	5.23
Systolic BP (mmHg)	Cases	40	153.0	17.42
	Control	40	111.7	7.80
Diastolic BP (mmHg)	Cases	40	105.5	15.62
	Control	40	75.1	5.48
Leptin level (ng/ml)	Cases	40	32.38	14.69
	Control	40	9.57	8.95
Urine Proteins	Cases	40	1.85	0.73
	Control	40	0.05	0.034

Table 2: Comparison of signs and symptoms in both groups

Clinical Features		Cases & percentage	Control & percentage	P-value
Swelling on face	Yes	29(36.2%)	3(3.8%)	<0.001
	No	11(13.8%)	37(46.2%)	
Edema Feet	Yes	18(22.5%)	2(2.5%)	<0.001
	No	22(27.5%)	38(47.5%)	
Changes in reflexes	Yes	29(36.2%)	4(5.0%)	<0.001
	No	11(13.8%)	36(45.0%)	
Abdominal Pain	Yes	20(25.0%)	3(3.8%)	<0.001
	No	20(25.0%)	37(46.2%)	
Severe Headache	Yes	25(31.2%)	1(1.2%)	<0.001
		15(18.8%)	39(48.8%)	

Table 3: Correlation test between serum leptin levels and systolic and diastolic blood pressure

Correlation test between serum leptin levels andsystolic and diastolic blood pressure		
	Systolic BP	Diastolic BP
Pearson Correlation	0.603	0.574
p-value	<0.001	<0.001

Leptin is a major placental protein which exhibit metabolism and physiologic function in normal pregnancy[15]. The present study was designed to investigate the correlation between serum leptin levels and raised systolic and diastolic blood pressure in pregnancy, which is strongly related to IUGR and foetal demise.

Sucak A et al in his study also investigate changes in plasma leptin concentration in 57 pregnant women's

pre-eclampsia and 46 normal pregnant women during preeclampsia treatment and found that severe pre-eclampsia group had significantly higher systolic and systolic blood pressures and lower platelets count[16]. In a prospective, cross sectional, case control study by Ozkam S, serum leptin levels of 58 pregnant hypertensive women and 54 normal pregnant women showed positive correlation between hypertension measures and serrum leptin levels in two groups[17].

A study by Dalamaga M et al on serum adiponectin and leptin in relation to risk for pre-eclampsia was carried out in which a large sample (106 cases with pre eclampsia and 262 controls) was taken. The study was case control study and the serum leptin levels were determined in pre-eclampsia and control groups but no significant difference was observed between the case and control group. It was also found that serum leptin levels were not associated with higher risk of pre-eclampsia. (odds ratio 0.93 with 95% confidence interval).[18] In present study a strong positive correlation was found between systolic and diastolic blood pressure in pregnancy and serum leptin levels which suggest that antihypertension treatment aimed at decreasing leptin levels may improve fetal demise. It is also possible that leptin released from placenta stimulates central receptors that regulate blood pressure and hence contribute to pathogenesis of pre-eclampsia.

CONCLUSION

Higher levels of serum leptin is a risk factor for pathogensis of pre-eclampsia. Therefore it is advised that those patients who are prone to pre-eclampsia must have done serum leptin levels regularly.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Rehman S: Idea and data collection.

Ahmad S: Data interpretation.

Ullah Z: Data analysis and statistics.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.