MEDWIN PUBLISHERS
Committed to Create Value for Researchers

Clinical Pathology & Research Journal
ISSN: 2642-6145

A Comparative Study of Serum C-reactive Protein Level Between Pre-eclampsia and Normal Pregnancy in Tertiary Level Hospital

Jannat S[1], Islam A[1], Yesmin S[2]*, Shanta FI[3], Jabin AM[3], Sanjida S[4] and Trishna D[5]

[1]Department of Pathology, International Medical College & Hospital, Bangladesh
[2]Department of Laboratory Medicine, Bangladesh Medical University, Bangladesh
[3]Department of Anatomy, International Medical College & Hospital, Bangladesh
[4]Department of Biochemistry & Moleculer Biology, International Medical College & Hospital, Bangladesh
[5]Department of Transfusion Medicine, International Medical College & Hospital, Bangladesh

***Corresponding author:** Shaila Yesmin, Associate Professor, Department of Laboratory Medicine, Bangladesh Medical University, Shahbag, Dhaka, Bangladesh; Email: shailarini@gmail.com

Research Article
Volume 9 Issue 1
Received Date: November 27, 2025
Published Date: December 16, 2025
DOI: 10.23880/cprj-16000217

Abstract

Pre-eclampsia is one of the most common causes of maternal and fetal morbidity and mortality in Bangladesh. The exact cause is unknown, but it is of serum C-reactive protein (CRP) is one of most accessible and easiest screening tests for Pre-eclampsia may be associated with alteration of serum C-reactive protein level. Many researches have been done to identify a unique screening test which will predict the risk of developing Pre-eclampsia before the classic symptoms arise. The present study was conducted to find out the relation between increased maternal serum CRP level and adverse maternal and fetal outcome. The cross sectional study was carried out in the Department of Clinical Pathology of International Medical College and Hospital (IMCH) and Digital Diagnostic and Hospital, Gazipur. The study period was from January 2018 to December 2018 with the total number of 150 subjects. Among them 75 pregnant woman in their third trimester of pregnancy with pre-eclampsia were selected as group I and 75 healthy pregnant woman as group II. Serum CRP level were assessed in both groups. The mean serum CRP level was significantly higher in group I compared to group II (12.5 ± 3.8 mg/L and 1.2 ± 0.9 mg/L respectively & $p = 0.001$). Here systolic blood pressure (SBP) and diastolic blood pressure (DBP) was also significantly high in group I compared to group II ($p < 0.05$). Body mass index (BMI) (25-29.9 kg/m2) was significantly more common in group I compared to group II (90% and 61% respectively, $p < 0.05$. Demographic characteristics of both groups were almost same in between two groups. Antenatal check up was more irregular in group I in compared to group II (48% and 25% respectively, $p < 0.05$). From this study high level of CRP in pre-eclampsia gives a clue about contributor in the aetiology & management of pre-eclampsia.

Keywords: Serum C-reactive Protein; Pre-eclampsia; Normal Pregnancy; Pathophysiology

Abbreviations

CRP: C-Reactive Protein; IMCH: International Medical College and Hospital; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; SPSS: Statistical Package for Social Science.

Introduction

Pre-eclampsia is most common medical complication during pregnancy. It is a multisystem disorder of pregnancy which is characterized by new onset of hypertension. It is recorded as one of the top five causes of maternal death in the world. Here hypertension (SBP and DBP is ≥140 and 90 mm of Hg respectively) on two occasions, at least two hours apart and proteinuria (protein excretion of ≥ 300 mg in a 2 hours' urine collection, or a dipstick of ≥ 2+), that develop after 20 weeks of gestation in previously normotensive woman [1]. The pathophysiology of pre-eclampsia remain is uncertain despite of a failure of the trophoblastic invasion of the uterine blood vessels. Immunological intolerance leading to maladaptation of maternal spiral arterioles which may be associated with a vascular resistance of the uterine artery and decrease perfusion of the placenta [2,3].

Pre-eclampsia is characterized by the development of hypertension, proteinuria and oedema at 20th week of gestation. Placenta into maternal plasma plays a central role in the ensuring endothelial dysfunction that is the prominent feature of this disease. Here the exact aetiology of eclampsia is still unknown.

This is a transient and serious complication of pregnancy that approximately affect 2-4% of all pregnancies. It is a major cause of maternal & perinatal morbidity & mortality worldwide particularly in developing countries. All over the world pre-eclampsia is in the third position for maternal mortality and in 7th position of the perinatal mortality. On average 50,000 to 60,000 woman dies in each year and it is now a global leading cause out of which 9% of maternal death is in Asia [4,5]. In spite of various attempts to understand the primary aetiology behind this vascular endothelial dysfunction and inflammation are considered to have a crucial role in pre-eclampsia. Pre-eclampsia developed in 4-5% of human pregnancies. Pre-eclampsia is characterized by elevated blood pressure and proteinuria which developed after 20 weeks of gestational age [3,5]. Pre-eclampsia can result in eclampsia when convulsions develop or other manifestations as haemolysis and increased liver enzymes & low platelet count which all together known as HELLP syndrome. Endothelial dysfunction and inflammation are considered to have a crucial role in a pathophysiological mechanism of pre-eclampsia [3]. CRP is an acute phase protein which is synthesized in hepatocytes. CRP is an important marker of systemic inflammation and it has been shown that CRP is elevated in woman with pre-eclampsia [4,5].

It is therefore important to identify woman who are in high risk of developing the disease early in pregnancy. This is because very early identification of CRP level as a biochemical marker of the disease would not only facilitate selective recruiting of those at increased risk for pre-eclampsia but also help in determining those patients who were more likely to get benefit from interventional measures. This study will also help to get idea about the level of serum CRP in pre-eclampsia and its relationship with the severity of the disease.

Material and Methods

A cross-sectional study was conducted in the clinical pathology department of IMCH, Gazipur from January 2018 to December 2018. Total number of 150 pregnant women in third trimester of pregnancy attending in Obstetrics' and gynaecology department of IMCH and Digital Diagnostic and Hospital were selected as study subjects.

Among them 75 patients were diagnosed as case of pre-eclampsia were selected as group I with age range 18-36 years and 75 age matched normal healthy woman as group II. Pregnant woman with pre-existing hypertension, diabetes mellitus and renal disease were excluded from the study by history, clinical examination and relevant laboratory investigations. After obtaining informed written consent from all the study subjects relevant data were documented in a predefined data sheet. With maintaining all aseptic precautions, blood samples were collected from all the study subjects for estimation of serum CRP level. Serum CRP level was measured by ELISA method.

Statistical analysis was performed by using computer-based software, Statistical package for social science (SPSS) for windows version 20. Mean values of differences between two groups by using students unpaired "t" test. Chi-square test was performed to find out the statistical difference regarding qualitative variables between two group. For all statistical analysis "p" value <0.05 was considered as a level of significant.

Results

The study included parameters in terms such as anti-natal checkup, Blood pressure (BP), BMI are shown in Table 1-3. There are 75 pregnant women with pre-eclampsia (severe pre-eclampsia) and 75 normal pregnant women. In this study, it was observed that anti-natal check-up of group I was significant compared to group II and on the other hand regular antenatal checkup more in group II (75.0%) than group I (52.0%). The difference was statistically significant (P<0.05) between two groups (Table 1).

In case of BP this study showed that the percentage of high SBP/DBP in group I was more compared to group II and

the difference was statistically significant (P<0.05) between two groups (Table 3).

In this study it was observed that BMI of group I was significantly high compared to group II shown in (Table 2).

Table 4 shows the comparison of mean serum CRP level between group I and group II. Majority of the subjects 70 (92%) in group I having increased serum CRP level >6 mg/L compared to group II (3 mg/L). The results was statistically significant (p<0.05) between two groups. Here CRP level <6 mg/L in group I (8%) and group II (97%). The results was statistically significant (P<0.05) between two groups.

ANC	Group I (n=75)		Group II (n=75)		p value
	n	%	n	%	
Regular	39	52	55	75	0.021S
Irregular	36	48	20	25	

Table I: Distribution of study subjects by Antenatal check up.

BMI (Kg/m²)	Group I (n=75)		Group II (n=75)		p value
	n	%	n	%	
Normal weight (18.5-24.9)	7	10	29	39	0.043S
Over weight (25.5-29.9)	68	90	46	61	

Table 2: Distribution of the study subjects by BMI.

BP (mm of Hg)	Group I (n=75)		Group II (n=75)		p value
Systolic BP	n	%	n	%	
100-119	0	0	64	85	
120-139	8	10	11	15	
140-159	62	82	0	0	
160-180	5	8	0	0	
Mean + SD	149.6 + 8.52		113 + 7.18		0.001S
Range (min-max)	(143-158)		(105 - 120)		
Diastolic BP	n	%	n	%	
60-69	0	0	8	10	
70-79	0	0	64	85	
80-89	5	8	3	5	
90-100	70	92	0	0	
Mean + SD	94.2 + 2.72		84.5 + 3.86		0.001S
Range (min-max)	(91 - 97)		(80 - 88)		

Table 3: Distribution of the study subjects by BP.

CRP (mg/L)	Group I (n=75)		Group II (n=75)		p value
	n	%	n	%	
>6 (mg/L)	70	92	2	3	
<6 (mg/L)	5	8	73	97	
Mean ± SD	1.3 ± 0.23		2.03 ± 0.15		0.001S
Range (min-max)	(1.04 – 1.50)		(1.8 – 2.2)		
Mean ± SD	3.52 ± 0.75		4.34 ± 0.47		0.001S
Range (min-max)	(2.77 – 4.27)		(3.87 – 4.81)		

Table 4: Distribution of serum CRP in study subjects.

Discussion

Pre-eclampsia is not merely hypertension unmasked by pregnancy. It is a significant cause of maternal and perinatal mortality and morbidity. Hypertension seems to be a marker of the disorder rather than a causal factor. Thus success in treating pre-eclampsia is not merely reducing BP rather ameliorating the syndrome itself including improved perinatal outcome, the major complication of the management strategy of early delivery.

This cross sectional study was carried out with an aim to compare CRP level in pre-eclampsia woman and normal pregnant woman. Frequency of regular antenatal check up was more in normal pregnant group compared to pre-eclampsia group. The difference was statistically significant (p<0.5) between two groups which was similar with one previous study [6].

In measurement of BP, SBP (140 mm of Hg) was significantly more (p= 0.001) observed in group I than group II. Similarly, there was significantly high in DBP (> 90 mm of Hg) in group I (100%) compared to group II (8%) (Table 3). Another previous study showed the mean SBP and DBP were high in pre-eclampsia group compared to normal pregnant group. The difference was statistically significant (p<0.05%) between two groups [3,7]. In this current study it was observed that majority 90.0% subjects had over weight (25 – 29.9 kg/m²) in group I and 61.0% in group II (Table 2). The difference was statistically significant (p<0.05%) between two groups. This observation was consistent with another study [4].

In this study mean serum CRP level was found 1.3 ± 0.23 mg/Lin group I and 2.03 ± 0.15 mg/L in group II. The difference was statistically significant (p<0.05%) between two groups (Table 4). This result was consistent with the result of a previous study that showed serum CRP level was higher in pre-eclampsia group compared to normal pregnant group [8,9].

Another few studies showed that there was significant difference in serum CRP among normal pregnant and both mild and severe pre-eclampsia and they concluded that measurement of this elements may be used for the early diagnosis of pre-eclampsia condition [1,3]. Another study reported an increase in serum CRP level in pregnant woman with pre-eclampsia [10].

Other study showed serum CRP level was significantly increased in pre-eclampsia women compared to the healthy group. This study also revealed that the level of CRP in pre-eclampsia women was not only significantly high when the diagnosis was confirmed but also the initial level from early in the pregnancy was higher than the healthy pregnant group. Their observation suggested that raised CRP level may be one of the etiology of pre-eclampsia [5,11]. A study suggested that the increased level of CRP since the beginning of pregnancy may reduce the rate of pre-eclampsia among pregnant women [8].

CRP monitoring during pregnancy may be able to reduce intrauterine growth retardation and pre-eclampsia and safe the birth weight of baby. There are also few studies concerning CRP level due to severity of pre-eclampsia. It has been shown that level of CRP was positively related to the degree of blood pressure elevation [12].

Regarding this study and other previous established study can make a conclusion that increased CRP might have an important role in the etiology of pre-eclampsia. So early diagnosis of this parameter may reduce the incidence of pre-eclampsia and increase the maternal and perinatal outcomes.

Conclusion

The findings of this study showed that higher CRP level was associated with pre-eclampsia. This supports the hypothesis that alteration of this serum marker CRP may take a role in the etiology of pre-eclampsia. So far early diagnosis and prevention of pre-eclampsia, regular antenatal checkup and routine investigation of CRP should be advocated. As well as further trials are needed regarding the role of early detection of CRP in reduction of systemic complications and maternal death due to pre-eclampsia.

References

1. Sibai B, Baha M, Dekker G (2003) Diagnosis and management of gestational hypertension and pre-eclampsia, Obstetrics and Gynaecology. Journal of Dental and Medical sciences 102(1): 181-192.

2. Luis B, Alice S, Murlel C, Irene R (2003) Neutrophil activation and c reactive protein concentration in pre-eclampsia. American journal of Obstetrics and Gynaecology 22(2): 129-141.

3. Anil B, Jayashree A, Ganu J, Nitin N (2011) Serum Hs-CRP and uric acid as indication of severity in Pre-eclampsia. International Journal of Pharmacology and Bio-sciences 2(3): 340-345.

4. Kameswaramma K, Lim K, Jeffery L, Cher E (2014) Estimation of C-reactive Protein, Magnesium and uric acid levels in pre-eclampsia patients in comparison with noemal pregnant woman. Scientific Journal of Applied Medical Sciences 2(23): 628-632.

5. Power R, Bodnar L, Ness R, Cooper K (2006) CRP concentrations in early pregnancy among pre-eclampsic women and normal pregnant women. American journal of Obstetrics and Gynaecology 28(6): 160-172.

6. Mandal K, Premchandra Y, Arpita D, Gyaneshwar W (2015) Serum uric acid and CRP in pre-eclampsia. International Journal of Clinical Biochemistry 14(2): 116-123.

7. Ayatollah H, Hasanzade N, Farzadnia Mahdi, Rahmanian A (2007) Serum level of HS-Creactive Protein in normal and Pre-eclampsic Pregnancies. Iranian Journal of Pathology 2(3): 100-104.

8. Guvan M, Coskun A, Ertas E, Aral M (2009) Association of maternal serum CRP, IL-6, TNF α, Vit B12 levels with the severity of Pre-eclampsia and fetal birth weight, Hypertersion in pregnancy. International Journal of Clinical Biochemistry 28(3): 190-200.

9. Qin C, Luthy D, Zhang C, Walash S (2004) A progressive study of maternal serum C-reactive Protein concentration and risk of Pre-eclampsia. American journal of Obstetrics and Gynaecology 17(2): 154- 160.

10. Yu H, Rafai N, Leveno K, Gant N (2000) High sensitivity C-reactive Protein in pre-eclampsia and Normal Pregnant women. British journal of Obstetrics and Gynaecology 33(8): 601-610.

11. Kupfermine M, Aderka D, Sokal M, Wallach D (2009) Soluble tumour necrosis factor receptors and Interleukin-6 and CRP levels in patients with Severe Pre-eclampsia. International Journal of Obstetrics and Gynaecology 88(3): 420-427.

12. Belo L, Caslake M, Sritos S, Cooney J (2003) Neutrophil activation and C-reactive protein Concentration in Pre-eclampsia. European Journal of Obstetrics. Gynaecology and Reproductive Biology 22(2): 121-125.