Original Article

Whether Hematological Parameters are Predictor of Pregnancy Induced Hypertension

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ABSTRACT

Objective: To find role of hematological parameters in predicting hypertension in pregnant women.
Study Design: Case control study.
Place and Duration of Study: Department of Gynecology and Obstetrics, Nishtar Hospital Multan from October 2017 to January 2018.
Materials and Methods: The sample size of this study was 125 patients. They were divided in three groups as 60 patients in pre-eclamptic group, 20 patients in severely pre-eclamptic and 45 pregnant women in control group. . One way ANOVA was used to calculate mean and standard deviation of given data. In all the statistical calculation, the p value of ≤ 0.05 was considered to be significant.
Results: A total number of 125 patients were included in this study. All the pregnant women were divided into three groups. 48% (n=60) pregnant women were in pre-eclamptic group, 16% (n= 20) women in severe pre-eclamptic group and 36% (n=45) pregnant women were in control group. In pre-eclamptic group, the mean cell value, mean cell Haemoglobin, mean cell Haemoglobin concentration, RBC distribution width, mean platelet value and MPV / platelet count was 82.62±4.99, 27.52±2.68, 34.12±1.85,14.22±2.30, 225.96±36.50, 8.9±1.03 and 0.0415±0.018 respectively. In severe pre-eclamptic group, the mean cell value, mean cell Haemoglobin, mean cell Haemoglobin concentration, RBC distribution width, mean platelet value and MPV / platelet count was 83.67±9.43, 29.63±2.81,34.20±0.83,15.02±2.89, 9.15±1.23 and 0.0481±0.010 respectively. When pre-eclamptic and severely pre-eclamptic patients were compared with control group, the difference was statistically insignificant according to CBC, platelet count, and MPV.
Conclusion: From this study, we have concluded that hematological parameters like CBC, platelet count and mean platelet volume (MPV) values are not predictor of pregnancy induced hypertension.

Key Words: Hematological parameters, pregnant women, Pre-eclampsia, hypertension

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INTRODUCTION

Pre-eclampsia is multisystem, heterogeneous disorder characterized by onset of proteinuria, peripheral oedema and hypertension that usually arises in third trimester of gestation period. It influences almost 3-6% of pregnant women worldwide[1]. It is highly related to intrauterine growth restriction, Preterm delivery, Placental abruption and perinatal mortality. It also affects maternal mortality and morbidity[2]. Hypertension may cause raise of intraocular pressure and visual abnormalities. It also causes abnormality of maternal-fetal vascular interface in the placenta and it could only be resolved by delivery[3,4].

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Seizures associated with Pre-eclampsia leads to onset of Eclampsia[5,6]. It is also associated with HELLP syndrome and pre-eclamptic liver dysfunction. Hypertension, oliguria, Edema, proteinuria and seizures all characteristics of pre-eclampsia and severe pre-eclampsia, they often cause intrauterine growth retardation, perinatal mortality, mental abnormalities, placental abruption and preterm delivery of baby[7,8]. There is very little knowledge about the pathophysiological mechanism of pre-eclampsia but its association with hematological parameters like platelet count, complete blood count (CBC), white blood cells (WBCs), hemoglobin and hematocrit has been explained in many past studies[9]. A clinical trial by T Ceyhan at el; in which they have observed blood pressure, platelet count, CBC and mean platelet volume of mild pre-eclamptic, severe pre-eclamptic and normotensive pregnant women. They wanted to find that lowered platelet count has any indication of hypertension in pregnant women. But they had not found any significant difference in platelet count in normotensive and pre-eclamptic women[10].

There is no local study to find out that low platelet count and other CBC parameters are indication of

hypertension in pregnant women. So, this clinical trial was organized to find low platelet count in pregnant women.

MATERIALS AND METHODS

This case control study was organized in Department of Gynecology and Obstetrics, Nishtar Hospital Multan from October 2017 to January 2018. The ethical approval was granted by department and informed consent was taken from all patients before start of the study. The sample size of this study was 125 patients. They were divided in three groups as 60 patients in pre-eclamptic group, 20 patients in severely pre-eclamptic and 45 pregnant women in control group. Pregnant women who were suffering from blood pressure over baseline > 140/90 mmHg with or without proteinuria after 20 weeks of gestation period were in inclusion criteria. Those pregnant women who had previous history of Diabetes, hypertension, ITP, renal diseases, pheochromocytoma, and hepatic diseases during non-pregnant state were in exclusion criteria.

Complete medical history of all patients was recorded and it was normal. Blood pressure was recorded in sitting position. Blood pressure of all pregnant women was regularly measured after every 2 weeks throughout pregnancy. All the definitions and measurements used in this study were all according to International Society for the Study of Hypertension in Pregnancy[11]. The pregnancy was defined as normal in which a normotensive woman having no proteinuria delivered a normal weight healthy neonate after 36 weeks of complete gestation period. It was mentioned as pre-eclampsia in which patient had hypertension (blood pressure of 145/95 mmHg or more for 5 hours) and continuous proteinuria (350 mg/ day). Severe pre-eclampsia was defined as: 1) Blood pressure > 160mmHg systolic or >11o mmHg diastolic on different occasion a persistent for 6 hours. 2) Significant proteinuria (>5 + on dipstick random sample)

3) Oliguria having urinary output > 450 mg/day. In addition to this, any patient was suffering from Cyanosis, pulmonary edema, visual and cerebral disturbance, thrombocytopenia; liver dysfunction was included in severe pre-eclampsia. Automated blood counter Cell-Dyn 4000 was used to measure and calculate all parameters of CBC.

All the data was recorded and analyzed by using computer software SPSS version 20. One way ANOVA was used to calculate mean and standard deviation of given data. In all the statistical calculation, the p value of < 0.05 was considered to be significant.

RESULTS

A total number of 125 patients were included in this study. All the pregnant women were divided into three groups. 48%(n=60) pregnant women were in pre-eclamptic group, 16% (n= 20) women in severe pre-eclamptic group and 36% (n=45) pregnant women were in control group. In pre-eclamptic group, the mean cell value, mean cell Haemoglobin, mean cell Haemoglobin concentration, RBC distribution width, mean platelet value and MPV / platelet count was82.62±4.99, 27.52±2.68, 34.12±1.85,14.22±2.30, 225.96±36.50, 8.9±1.03 and 0.0415±0.018 respectively. In severe pre-eclamptic group, the mean cell value, mean cell Haemoglobin, mean cell Haemoglobin concentration, RBC distribution width, mean platelet value and MPV / platelet count was 83.67±9.43,29.63±2.81,34.20±0.83, 15.02±2.89, 9.15±1.23 and 0.0481±0.010 respectively. When pre-eclamptic and severely pre-eclamptic patients were compared with control group, the difference was statistically insignificant according to CBC, platelet count, and MPV. That had been shown in (Table No. 1).

Table No. 1: CBC Parameters of Pre-eclamptic, Severely Pre-eclamptic and control cases

Parameters	Pre-eclamptic (n=60)	Severely Pre-eclamptic (n=20)	Control (n=45)	P-value
Age (years)	31.31±6.69	24.84±4.36	27.75±3.32	0.000
White blood cell	10.09±2.0	14.77±4.19	10.59±2.93	0.091
Red blood cell	4.49±0.20	3.89±0.49	4.27±0.39	0.167
Haemoglobin	11.07±2.08	11.10±1.19	11.91±0.977	0.090
Haematocrit	34.33±3.83	32.80±2.57	35.78±3.01	0.101
Mean cell value	82.62±4.99	83.67±9.43	83.96±3.40	0.483
Mean cell Haemoglobin	27.52±2.68	29.63±2.81	28.64±2.03	0.324
Mean cell Haemoglobin concentration	34.12±1.85	34.20±0.83	34.07±0.83	0.936
Red cell distribution width	14.22±2.30	15.02±2.89	14.26±2.22	0.347
Platelet	225.96±36.50	207.95±68.03	225.10±50.16	0.269
MPV	8.9±1.03	9.15±1.23	9.88±1.34	0.389
MPV/PLT	0.0415±0.018	0.0481±0.010	0.0602±0.00319	0.196

DISCUSSION

Pregnancy induced hypertension (PIH) is one of the main causes of maternal death all around the world. It is highly related with intrauterine fetal death (IUD) and intrauterine growth retardation (IUGR).There are still no hematological parameters to predict PIH that leading to IUD and IUGR[12].

A study by Makuyana et al; that showed no significant differences of CBC parameters and platelet count between normotensive and pre-eclamptic pregnant women[13]. Platelet count, Haemoglobin level, WBC and mean cell volume of 72 normotensive and 38 pre-eclamptic women were same. The results of above mention study are completely similar to our results.

Neiger at el[14]; they had stated that they observed the significant different between CBC parameter and platelet count of pre-eclamptic women and control group. In their study normal non pregnant healthy women were in their control group. But they also reported that there was no difference of platelet count, WBC and Haemoglobin in mild and severe pre-eclamptic women. So, in our study we have concerned about platelet count only. That is same in mild and severe pre-eclamptic women.

Jaremo et al, had reported that elevate mean plasma value (MPV) and lowered platelet count was observed in pre-eclamptic women[15]. But in our study such lowered platelet count was not significant.

Boriboonhirunsarn et al; had declared that elevated MPV value is very important to differentiate between normotensive and pre-eclamptic pregnancy[16]. But we did not find any significant difference in MPV in our study. Von Dadelszen et al; they explained that MPV and platelet count ratio is very useful indicator of maternal health in pre-eclamptic women[17]. But, Calvert et al; have reported that MPV and platelet count are not useful indicator in clinical progress of 336 women[18]. Similarly, in our study, no significant difference was observed in MPV and platelet count between mild and severe pre-eclamptic women. There is another very important study by Temel Ceyhan et al; this study explains that there is no significant difference of CBC parameters and platelet count between mild, severe pre-eclamptic and normotensive pregnant women[10].

A study by Edelstam G et al, in which they had specified the platelet count and other CBC parameters in all non-pregnant and pregnant women[19]. They had compared the CBC values and platelet count of pregnant women with men and non-pregnant women. There was great difference in many CBC parameters between pregnant women blood sample and non-pregnant women. During pregnancy the WBC (white blood cell count) was increased, platelet count was reduced during third trimester and hemoglobin level was decreased. The results of their study are according to our results. Due to this reason, we have pregnant women in our control group instead of normal non pregnant women.

A study conducted in India by DIPTI Mohapatra et al, to find association of hematological parameters with pregnancy induced hypertension. This study reported that increased thrombocytopenia had been observed during moderate and severe pre-eclampsia than normotensive pregnant women[7].

Dominique Mannaerts et al, reported in their study that mean platelet value (MPV) raised in pregnant women suffering from moderate ad severe pre-eclampsia[20]. All the above studies explain that CBC parameters and platelet count do not show any significant difference in normotensive and pre-eclamptic pregnant women. So, platelet count, mean platelet volume (MPV) and CBC parameters do not help to indicate about hypertension in pregnant women.

CONCLUSION

From this study, we have concluded that hematological parameters like CBC, platelet count and mean platelet volume (MPV) values are not predictor of pregnancy induced hypertension.

Author's Contribution:

Concept & Design of Study:	Afshan Rasheed
Drafting:	Muhammad Ali Mahota
Data Analysis:	M Asif
Revisiting Critically:	Afshan Rasheed, Muhammad Ali Mahota
Final Approval of version:	Afshan Rasheed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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