Original Article

Assessment of Coagulation Profile of Patients with Pregnancy Induced Hypertension Visiting Tertiary Care Hospital

Coagulation Profile with Pregnancy Induced Hypertension

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ABSTRACT

Objective: To assess abnormalities in platelet count, PT (prothrombin time) and APTT (activated partial thromboplastin time) in patients with PIH.

Study Design: Cross sectional analytical study

Place and Duration of Study: This study was conducted at the department of Pathology in collaboration with Gynecology and Obstetrics Department of Bahawal Victoria Hospital from January, 2021 to June 2021 for a period of six months.

Materials and Methods: After approval from Institutional ethics review committee. All the women more than 28 weeks gestation having uncomplicated pregnancy with pregnancy induced hypertension visiting the hospital were included in the study. Pregnancy induced hypertension was defined as blood pressure at or above 140/90 mm of Hg on at least two occasions, six or more hours apart together with or without proteinuria, edema, convulsions and coma. Investigation done were platelet count, PT and APTT. Data entry was done in SPSS version 22.0. An independent sample t-test was used to check for differences in mean platelet count, PT & APTT between women with pregnancy induced hypertension (PIH) and without PIH and p-value <0.05 was set for statistical significance.

Results: Out of total 372 women 186 were cases of pregnancy induced hypertension while remaining 186 had no PIH. Maximum number of women in both groups were between 25 to 30 years of age. The mean age of women with PIH was 27.43±6.82 and women without PIH is 29.72±7.43 years. PIH was more common in primigravida women. The differences of prothrombin time ($p<0.001$) and Activated partial thromboplastin time ($p<0.001$) between two groups was statistically significant.

Conclusion: Patients with pregnancy-induced hypertension showed reduction in platelet count with increase PT and APTT in women with pregnancy induced hypertension.

Key Words: Platelet count, preeclampsia, Prothrombin Time, Platelet count

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INTRODUCTION

Pregnancy is a physiological process that can pose a number of health concerns to both the mother and the fetus. Pregnancy-induced hypertension (PIH) is one of the most frequent illnesses linked with high blood pressure that starts after 20 weeks of pregnancy and disappears after birth.[1,2]

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Pregnancy-induced hypertension (PIH) is a common medical disorder during pregnancy that causes multi-organ failure and contributes significantly to maternal morbidity and death.[1] It is more common in primigravida than in multiparous women.[3] Preeclampsia is a hypertensive disorder that affect 2-8% pregnancies globally and associated with maternal morbidity and mortality. It is characterized by high blood pressure and significant amount of protein in the protein. Many body systems are involved including the presence of decreased blood platelet count (Thrombocytopenia), deranged liver functions, renal functions impairment, fluid retention in the lungs (Pulmonary edema), visual disturbances and if left untreated can develop eclampsia, a life threatening condition during pregnancy[3].

Eclampsia is a severe form of pregnancy-induced hypertension that is accompanied by seizures.[4] The majority of these illnesses can be prevented and treated with good antenatal care, but due to a lack of health

facilities in developing countries, this is not always possible.[5,6] During normal pregnancy, profound alterations in the coagulation and fibrinolytic systems occur, resulting in a hypercoagulable state. In PIH, there are a range of hematological abnormalities, with thrombocytopenia being the most common aberration due to increased consumption during low-grade intravascular coagulation.[7,8] The underlying coagulation problem raises the risk of bleeding issues, particularly during birth and the insertion of an epidural catheter for regional anesthesia. Preventing these coagulation abnormalities in pre-eclampsia patients can save lives and reduce maternal morbidity and mortality.[9-11] The coagulation system plays vital role in maintaining the integrity and patency of the vascular compartment. Extensive physiological changes during pregnancy are induced in coagulation system. In women preeclampsia and eclampsia there is evidence of intravascular coagulation shown by decrease in platelet counts and increase in prothrombin and activated partial thromboplastin time.

This study was undertaken to assess the coagulation profile of women with PIH and coagulopathy related adverse effects by using hematological/coagulation parameters which are rapid, cheaper and easily available, that also guide us for management before the patient goes into a complication.

MATERIALS AND METHODS

It was cross sectional analytical study conducted from January to June 2021 in department of Pathology Quaid-e-Azam Medical college Bahawalpur in collaboration with Gynecology and Obstetrics Department of Bahawal Victoria Hospital, Bahawalpur after taking approval from Institutional ethics review committee. All the primigravida women more than 28 weeks gestation having uncomplicated pregnancy with pregnancy induced hypertension visiting the department of Obstetrics and gynecology were included in the study through non probability consecutive method. Pregnancy induced hypertension was defined as blood pressure at or above 140/90 mm of Hg on at least two occasions, six or more hours apart together with or without proteinuria, edema, convulsions and coma. Similar number of pregnant women in 3rd trimester with normal blood pressure, no proteinuria or edema were also included. Known cases of hemorrhagic disorder, Epilepsy, Hepatic or renal disorder, diabetes mellitus and hypertension were excluded from the study. Routine antenatal investigations like blood group, CBC, BT, CT, blood sugar, HIV, VDRL, HBs-Ag and anti HCV were done. Additional investigation done in both groups were manual platelet counts, prothrombin time (PT), activated partial thromboplastin time (APTT) and ultrasonography (USG). Sample of 5ml of blood was collected in an EDTA and sodium citrate vacutainer. Coagulation parameters were carried out by ERBA ECL 412 series coagulometer. Platelet count was estimated by hematology analyzer Sysmex XN-330 and manual method by peripheral blood smear. Data entry was done in SPSS version 22.0. Data cleaning and validation were done. An independent sample t-test was used to check for differences in mean parameter values like platelet count, PT, APTT between women with pregnancy induced hypertension (PIH) and without PIH. P-value <0.05 was set for statistical significance.

RESULTS

A total of 372 pregnant females visiting Obstetrics & Gynecology outpatient department of Bahawal Victoria Hospital Bahawalpur were enrolled in the study. Out of total 372 women 186 were cases of pregnancy induced hypertension while remaining 186 had no PIH. Age distribution showed that maximum number of cases in both the groups were between 25 to 30 years of age. The mean age of women with PIH was 27.43±6.82 and women without PIH is 29.72±7.43 years.

Table No.1: Age distribution of the patients with and without pregnancy induced hypertension (PIH)

Age in years	Patients with PIH (n=186)	Patients with no PIH (n=186)
18-24	58 (31.2%)	44 (23.6%)
25-30	97 (52.1%)	85 (45.7%)
31-35	31 (16.7%)	57 (30.7%)
Total	186 (100%)	186 (100%)

In the present study PIH was more in primigravida women as compared to multigravida. Out of total 186 women with pregnancy induced hypertension 125 (67.2%) were primigravida while 104 (55.9%) women without PIH were multigravida (Table II).

Table No.2: Distribution of the patients by gravidity

Gravidity	Patients with PIH (n=186)	Patients with no PIH (n=186)
Primigravida	125 (67.2%)	082 (44.1%)
Multigravida	061 (32.8%)	104 (55.9%)
Total	186 (100%)	186 (100%)

The mean and standard deviation of platelet count (lacs/cu mm) in women with no PIH was 2.73±0.54(lacs/cu mm) as compared to 1.54±0.46 (lacs/cu mm) in women with pregnancy induced hypertension and the difference between two groups is statistically significant (p<0.001). The mean and standard deviation of prothrombin time (in seconds) in women with no PIH was 12.54±1.32 (sec) as compared to the 17.62±0.54 (sec) in women which had pregnancy induced hypertension. The mean and standard deviation of Activated partial thromboplastin time (sec) in females with no PIH was 33.14±2.41 (sec) as compared to the 26.24±3.34 (sec) in women which were diagnosed cases of PIH. The differences of prothrombin time (p<0.001) and Activated partial thromboplastin

time (p<0.001) between two groups was statistically significant as shown in Table III.

Table No.3: Comparison of Coagulation profile between patients with and without pregnancy induced hypertension (PIH)

Age in years	Patients with PIH (n=186) Mean±S.D	Patients with no PIH (n=186) Mean±S.D	p-value
Platelet count	1.54±0.46	2.73±0.54	<0.001
PT	17.62±1.79	12.54±1.32	<0.001
APTT	26.24±3.34	33.14±2.41	<0.001

DISCUSSION

Women with Pregnancy-Induced Hypertension may develop various haematological changes and thrombocytopenia is the most commonly observed change. In third trimester of pregnancy there is hemodilution and platelet consumption is increased. Endothelial changes during pre-eclampsia also results in altered level of fibrinogen, activated partial thromboplastin time and prothrombin time. This study was conducted to assess the changes in coagulation profile of women that were diagnosed as cases of pregnancy induced hypertension and these changes were also compared with the coagulation profile of women which has no pregnancy induced hypertension.

Out of total 186 cases of pregnancy-induced hypertension was more common in primigravida. Similar findings have been reported in the study conducted by Xiong et al.[12] in which the frequency of preeclampsia was significantly lower in multiparous women as compared to primigravida women.

Our study findings showed that mean platelet count was 2.73±0.54 lacs/mm^3 in women which had no pregnancy induced hypertension and in the group with pregnancy induced hypertension it was 1.52±0.46 lacs/mm^3 and difference in mean platelet count between the groups was statistically significant (p<0.001). Our findings are in accordance with the results of study conducted by Halder et al.[13] which revealed mean platelet 1.21 lac/mm^3 in women that were diagnosed cases of eclampsia. Sharma et al.[14] in their study also found the decrease in mean platelet count in cases of preeclampsia. In a study done by Sultan R et al.[15] on platelet count in women which had preeclampsia and found that preeclampsia is associated with low platelet count. Our findings are also consistent with the results of studies done by Leduc l, et al[16] and Shete AN et al.[17] which showed decrease in mean platelet count in women with pregnancy induced hypertension as compared to the control group.

The findings of our study showed increased prothrombin time (sec) in women with pregnancy induced hypertension as compared to prothrombin time in group of women which were normotensive. Similarly, an increase in Activated partial thromboplastin time (sec) in group of women with PIH was increased as group with no PIH. The difference in prothrombin time (p<0.001) and Activated partial thromboplastin time (p<0,001) between two groups was statistically significant. These findings were in line with the results of study done by Lakshmi et al. [18] which revealed increased prothrombin time (PT) and activated partial thromboplastin time (APTT) in women that have preeclampsia and eclampsia. Similar findings were also shown by the study conducted by Joshi SR et al.[8] which showed coagulation abnormalities particularly an increase in APTT.

Currently there is no screening test available that may help to identify the severity and complications associated with pregnancy-induced hypertension. It is necessary to evaluate the women with pregnancy induced hypertension early for prevention of complications, morbidity and mortality. This study assessed the coagulation profile of women with PIH by easily available, cheaper and rapid method so that management should be started before onset of complications. The present study reveals that platelet count is cost effective, rapid, reliable and easily available method that may be used as useful of screening for early detection of complications in women with PIH even in the rural areas. It was a cross sectional study and has certain limitations and is potentially subject to many biases and variations. Further analytical studies are necessary to clarify the role of early assessment of coagulation as screening tool for detection of complication in women with preeclampsia.

CONCLUSION

Patients with pregnancy-induced hypertension showed reduction in platelet count with increase PT and APTT in women with pregnancy induced hypertension.

Author's Contribution:

Concept & Design of Study:	Huda Abbas
Drafting:	Sadia Bashir, Hamad Masood
Data Analysis:	Wajahat Hussain, Arif Ahmed Zaidi, Sadaf Mushtaq
Revisiting Critically:	Huda Abbas, Sadia Bashir
Final Approval of version:	Huda Abbas

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

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