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Role of coagulation profile in predicting the severity of preeclampsia

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Abstract

Introduction: Preeclampsia (PE) is a pregnancy-specific syndrome with multisystem involvement that affects 3–5% of pregnancies[1]. In India, the incidence of preeclampsia is reported to be 8-10% among the pregnant women.[2]

Objective: To evaluate the coagulation profile and its role in predicting the severity in PIH (Pregnancy Induced Hypertension) women.

Patients and methods: This hospital-based, cross-sectional study was done on 150 patients. 100 patients were cases, who developed pregnancy induced hypertension in the second and third trimester of pregnancy and 50 patients were controls. All patients were having more than 20 weeks of gestation. Cases were compared with controls. After taking proper informed consent, under aseptic precaution her venous blood was collected in two different vacutainers. BT (Bleeding time), CT (Clotting time), Platelet count, PT (Prothrombin time), BP (Blood Pressure), RFT and LFT (Renal and Liver function tests) etc., were assessed.

Results: Most of the cases and controls belonged to the age group of 20 to 30 years. Most of the cases and controls were multiparous and there is no statistically significant difference in parity among cases and controls. Statistically there is significant difference in coagulation profile of cases and controls with low Platelet count, prolonged PT, INR, Low fibrinogen level and Hogh BT, CT in cases as compared to controls.

Keywords: Coagulation profile, Severity of preeclampsia, Blood pressure, Hypertensive disorders of pregnancy, Transfusion support.

Introduction

Preeclampsia (PE) is a pregnancy-specific syndrome with multisystem involvement that affects 3–5% of pregnancies. It is traditionally diagnosed when a pregnant woman presents with increased blood pressure and proteinuria or maternal organ dysfunction, such as renal insufficiency, liver involvement, neurological or hematological complications, uteroplacental dysfunction, or Fetal growth restriction.[1]

In India, the incidence of preeclampsia is reported to be 8- 10% among the pregnant women.[2]

ACOG (American College of Obstetrics and Gynecology) Task Force on Hypertension defines PE as new-onset hypertension and new onset proteinuria occurring after 20 weeks of pregnancy, near-term, or

superimposed on other hypertensive disorders of pregnancy.

PE is diagnosed with persistent systolic BP of 140 mm of Hg or higher, or a diastolic BP of 90 mm of Hg or higher after 20 weeks of gestation in a women with previously normal blood pressure and 24-hour urinary excretion of protein equals or exceeds 300 mg in 24 hours or the ratio of protein to creatinine in a single voided urine measures or exceeds 3 (each measured in mg/dl), this ratio has been demonstrated to match or exceed a 24-hour urine protein collection of 300mg or thrombocytopenia [with PLT of

renal insufficiency, pulmonary oedema or new onset of cerebral or visual disturbances.[3]

The exaggerated physiological response of hemostatic system in PE leads to various systematic disorders of metabolism and multiple organ dysfunctions and may even threaten maternal and fetal lives. Nearly 20% of women with PE present with deranged coagulation profile.4 The incidence of DIC reported in severe preeclampsia is 12.6%.5 Therefore, coagulation and fibrinolytic status is a good predictor for the onset and clinical degree of PE.6 The studies pertaining to evaluate the coagulation and fibrinolytic system in PE in South Indian population are rare hence we made an attempt to evaluate the coagulation profile in PE and normal pregnancy.

Objective

- To evaluate the role of blood coagulation parameters as potential predictors for the severity of PIH and to compare those with normotensive pregnant subjects.

Patients and Methods

Place of Study: Jawaharlal Nehru Medical College, Ajmer, Rajasthan

Type: Hospital-based, prospective, cross-sectional study. The study was conducted on two groups of pregnant women

Group I: Comprised 100 healthy pregnant women who developed pregnancy induced hypertension in the second and third trimester of pregnancy.

Group II: Comprised 50 normal healthy women in the second and third trimester of pregnancy.

Study Period and Ethical considerations

The present study was carried out at RMC, Ajmer associated with Jawaharlal Nehru Medical College, Ajmer from Feb 2020 to Feb 2021 on pregnant women admitted in Obstetrics Department. Cases were selected after taking approval of ethical committee of this institute and obtaining consent from patients. **Inclusion criteria**

Normal healthy pregnant women who developed hypertension for the first-time during pregnancy after 20 weeks of gestation were included in this PIH category.

Exclusion criteria: Pregnant women with

- Hemorrhagic diathesis,
- Placental abruption or previa,
- Diabetes,
- Respiratory,
- Circulatory,
- Renal and hepatic disorders,
- Known cases of hypertension and
- Subjects taking drugs affecting coagulation profile.

Methodology

All participants were very well explained about this study and whole procedure. After taking proper informed consent, under aseptic precaution her venous blood was collected in two different vacutainer containing Sodium citrate and EDTA (Ethylenediamine tetra acetic acid) as anticoagulants. All the samples were centrifuged for 15 minutes at 3000 rpm and the plasma was separated. The

separated plasma was transferred in a clean and dry labeled test tube and was tested within 2-3 hours of blood collection. Total platelet counts were done in fully automated 3-part hematology cell counter from EDTA blood while PT (Prothrombin Time) and aPTT (Activated plasma thromboplastin time) was done on semiautomated coagulation analyzer from citrated blood.

Statistical analysis

The results were analyzed statistically to draw a comparison between the groups. The statistical data was processed using Microsoft Excel to draw the values of significance. Tests of significance applied was Chi-square and 'Z' test for statistical analysis to suggest the relationship between the observed abnormal values of chosen laboratory tests in the study with hypertensive disorders of pregnancy and its importance in antenatal care.

Results

Demography

In cases, majority of females in age group 20-30 years (74%) followed by 16% in age group less than 20 years. Similarly in controls majority of females in age group 20-30 years (78%) followed by 16.7% in age group less than 20 years. There is statistically no significant difference in number of females in cases and controls. Among cases, 87% are Hindu females and 13% Muslim females. Similarly, in controls 88% are Hindu females and 12% Muslim females. There is statistically no significant difference in religion of cases and controls.

In cases 55% females from urban area and 45% females from rural area. Similarly, in controls 52% females from urban area and 48% females from rural area. There is statistically no significant difference in residence of cases and controls.

Obstetric history: In cases, 49% females are primiparous and 51% are multiparous. Similarly, in controls, 34% females are primiparous and 66% are multiparous. Statistically no significant difference in parity among cases and controls (P-value 0.21).

Gestational age: The mean gestational age of cases is 38.79 weeks and that of controls is 37.13. weeks. There is statistically no significant difference in mean gestational age of cases and controls.

Blood pressure: The mean SBP and DBP of cases is 160.14 mm of Hg and 99.64 mm of Hg and that in controls mean SBP and DBP is 131.88 mm of Hg and 84.16 mm of Hg. There is statistically significant difference in mean SBP and DBP (P-value 0.02 S) in cases and controls.

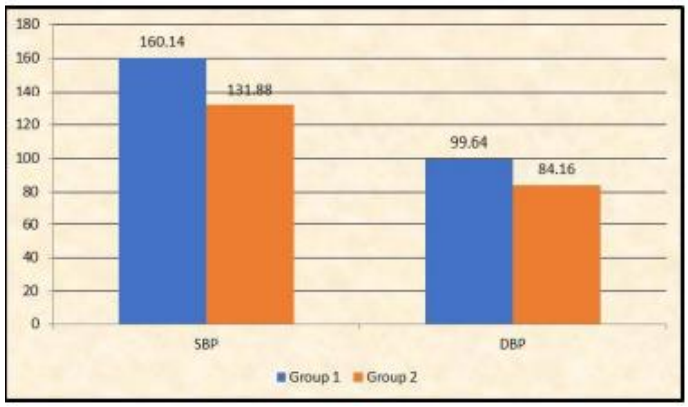

Figure 1: SBP and DBP comparison among two groups

RFT

In cases mean urea is 28.9 mg%, mean creatinine 0.78 mg% and uric acid is 6.45 mg%. Similarly, in controls mean urea is 30.04 mg%, mean creatinine 0.83 mg% and uric acid is 4.65 mg%. There is statistically significant difference in mean creatinine (P-value 0.007) and uric acid (P-value 0.001) and statistically no significant difference in urea (P-value 0.53) of cases and controls.

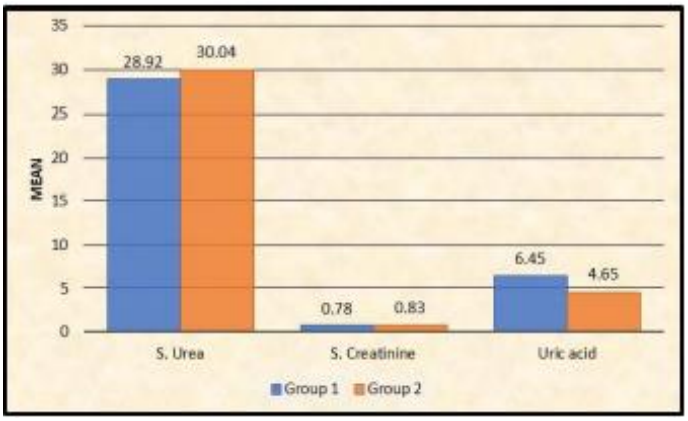

Figure 2: Renal function test comparison between two groups.

LFT: In cases, the mean LDH is 490.48 u/L, mean SGOT 42.66 u/L and SGPT is 34.80 U/L. Similarly, in controls mean LDH is 350.6 u/L, mean SGOT 42.65 u/L and SGPT is 48.13 u/L. There is statistically significant difference in mean LDH (P-value 0.001) and SGPT (P value 0.001) and statistically no significant difference in SGOT (P-value 0.99) of cases and controls.

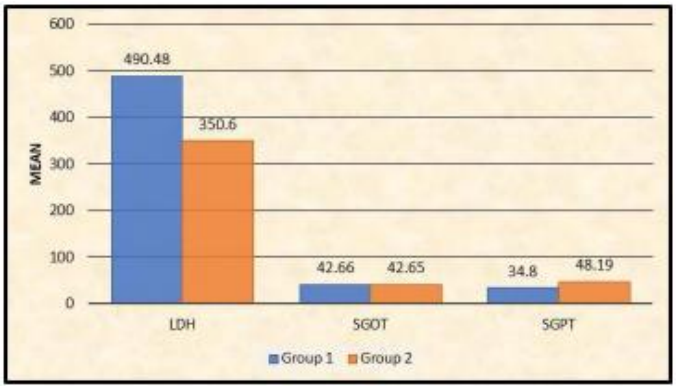

Figure 3: LFT parameters comparison between two groups

Coagulation profile: In cases, the mean platelets count is 145.95 *103/µL, mean PT is 14.84 sec, mean INR 1.08, mean aPTT 34.16 sec, mean fibrinogen is 438.48 mg/dL, mean BT 2.86 minutes and mean CT is 4.4 minutes. Similarly in controls mean platelets count is 313.0 *103/µL, mean PT is 12.47 sec, mean INR 0.94, mean aPTT 29.36 sec, mean fibrinogen is 303.2 mg/dL, mean BT 4.81 minutes and mean CT is 11.2 minutes.

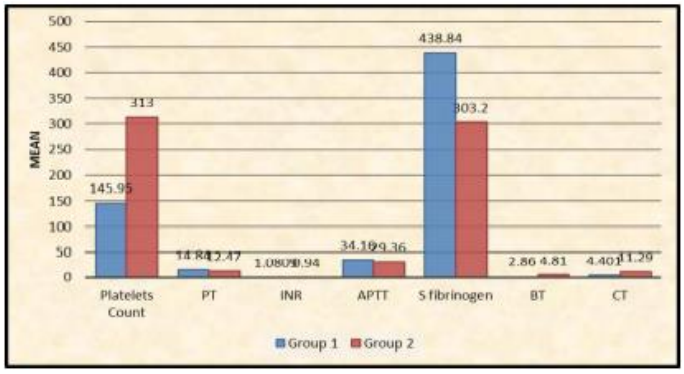

Figure 4: Coagulation profile among two groups.

Discussion

One of the most common medical complications of pregnancy is PIH; generally, more common in the developing countries than in the developed countries.7 In the current study, majority of females in age group 20- 30 years (74%) followed by 16% in age group less than 20 years and that of controls is 24.16 years with majority of females in age group 20-30 years (78%) followed by 16.7% in age group less than 20 years. There is statistically no significant difference in mean age of cases and controls.

Priyadarshini and Mohanty[8], Chauhan et.al[9], Jaleel and Baseer10, Nazli et al11 also found maximum cases between 21-30 years of age, similar to the present findings. Younger age of occurrence of pre-eclampsia testifies the early age of marriage and pregnancy in our country as compared to western countries.

In the current study, mean gestational age of cases is 38.79 weeks and that of controls is 37.13. weeks. There is statistically no significant difference in mean gestational age of cases and controls (p value=0.6). Thalor et al. (2019)12 found mean period of gestation at the time of the collection of samples in the preeclampsia group was 24 weeks, with the highest duration being 32 weeks and 48% of the patients belonging to the group 23–25 weeks.

In the current study, among cases mean platelets count is 145.95, mean PT is 14.84, mean INR 1.08, mean aPTT 34.16, mean fibrinogen is 438.48, mean BT 2.86 and mean CT is 4.4. Similarly in controls mean platelets count is 313.0, mean PT is 12.47, mean INR 0.94, mean aPTT 29.36, mean fibrinogen is 303.2, mean BT 4.81 and mean CT is 11.2. statistically there is significant difference in coagulation profile of cases and controls with low Platelet count, prolonged PT, INR, aPTT, low fibrinogen level and high BT, CT in cases as compared to controls (P-value<0.0001). Chaithra et al. (2021)13 study showed increased prothrombin time (sec) in the cases group is 16.70(sec) as compared to the 12.25 (sec) control group. Also, there was an increase in activated partial thromboplastin time (sec) in cases group is 32. 75 (sec) as compared to 25.59(sec) control group. The difference was statistically significant. The findings were in concordance with the study done by Lakshmi et al. (2016) shows increased PT and aPTT in severe preeclampsia and eclampsia.14 The study done by Joshi SR et al shows thrombocytopenia and coagulation abnormalities particularly showing an increase in aPTT15. So, the present study demonstrated that coagulation parameters were the prognostic markers in predicting the severity of preeclampsia. In Swetha et al (2018)16 a significant decline in total platelet count (TPC), increase in prothrombin time, activated partial thromboplastin time, bleeding time, and clotting time was seen in PIH as compared to normal pregnancy.

Conclusion

From the study of platelet indices, it may be concluded that decrease in platelet count starts from PIH and it is significantly reduced in preeclampsia and eclampsia patients when compared to normotensive patients with eclamptic patients having thrombocytopenia. Also, there is significant increase in mean platelet volume and platelet distribution width in preeclamptic and eclamptic patients.

Limitation: As the pathophysiology of PIH is complex and elusive so exact prediction of prognosis of disease remains a challenge, there is no single marker or lab investigation which can strongly predict the prognosis of disease. So future research in this field is necessary.

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References

1. Ben W J Mol, Claire T Roberts, Shakila Thangaratinam, Laura A Magee et al. Pre-eclampsia. Lancet. Published Online September 3, 2015 http :// dx. doi .org/ 10 .1016 / S0140-6736 (15) 00070 - 7.

2. Preeclampsia [Internet]. Gov.in. [cited 2022 Mar 10]. Available from: https: //www. nhp. gov. in/ disease/ Gynaecology - and obstetrics / preeclampsia.

3. Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. Obstet Gynecol. 2013 Nov; 122 (5): 1122- 1131. doi: 10. 1097/ 01. AOG .0000437382. 03963. 88. PMID: 24150027.

4. Bhakti Ganatra, Karti key Shastri, Nalini I. Anand. THE ROLE OF BLOOD COMPONENT THERAPY IN OBSTETRICS (A study of 100 cases with deranged coagulation profile). Indian Journal of Obstetrics and Gynecology Research, April-June 2015; 2 (2): 59-61

5. Offer Erez, Lena Novack, Ruthy Beer-W et al. DIC Score in Pregnant Women – A Population Based Modification of the International Society on Thrombosis and Hemostasis Score. PLOS ONE, April 2014 ;9(4)

6. Lei Han, Xiaojie Liu, Hongmei Li et al. Blood Coagulation Parameters and Platelet Indices: Changes in

Normal and Preeclamptic Pregnancies and Predictive Values for Preeclampsia. PLoS ONE 9(12): e114488.

7. Parmar MT, Solanki HM, Gosalia VV. Study of risk factors of perinatal death in pregnancy induced hypertension (PIH). Natl J Community Med 2012; 3:703-7.

8. Study Girija Priyadarshini, Rama Raman Mohanty. Assessment of Coagulation Profile and Its Correlation with Severity of Preeclampsia in Women of Odisha a Comparative Cross- Sectional Study. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 3 Ver.15 March. (2018), PP 49-58.

9. Chauhan P, Rawat U, Bisht V, Purohi RC. Comparison of coagulation profile on pre-eclamptic and eclamptic patients with normotensive pregnant patients. J Evol Med Dent Sci 2014 ;12 (3) :3208-3215.

10. Jaleel A, Baseer A. Thrombocytopenia in preeclampsia: an earlier detector of HELLP syndrome. J Pak Med Assoc 1997 Sep; 47(9):230-2.

11. Nazli R, Khan MA, Akhtar T, Mohammad NS, Aslam H, Haider J, Frequency of throm bocytopenia in pregnancy related hypertensive disorders in patients presenting at tertiary care hospitals of Peshawar. Khyber Med Univ J 2012; 4 (3): 101-105.

12. Thalor N, Singh K, Pujani M, Chauhan V, Agarwal C, Ahuja R. A correlation between platelet indices and preeclampsia. Hematol Transfus Cell Ther. 2019 Apr Jun; 41 (2): 129 - 133. doi: 10.1016/j.htct.2018.08.008. Epub 2018 Dec 31. PMID: 31084762; PMCID: PMC6517612.

13. Nazli R, Khan MA, Akhtar T, Mohammad NS, Aslam H, Haider J, Frequency of thrombocytopenia in pregnancy related hypertensive disorders in patients presenting at tertiary care hospitals of Peshawar. Khyber Med Univ J 2012 ;4 (3): 101-105.

14. Lakshmi C Vijaya. "Comparative Study of Coagulation Profile in Mild Pre-eclampsia, Severe Pre-eclampsia, and Eclampsia". International journal of scientific study. 2016;4 (4) 180 -183.

15. Kumar P L, Nirmala T, Vani B R, et al. Study of coagulation profile in pregnancy induced hypertension (PIH). Indian J Pathol Oncol. 2015;2(1)1-6.

16. Swetha A G, Nagaraja Puranik, K F Kamar. "A comparative study on coagulation profile and neutrophil-lymphocyte ratio in pregnancy-induced hypertension". National Journal of Physiology, Pharmacy and Pharmacology. 2018 ;8 (3) 400-405