ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 05 | May - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

STUDY OF COAGULATION PROFILE IN PREECLAMPSIA.

Pathology

Dr Pratiksha Jakate* Junior resident, Department of Pathology, Govt. Medical College, Aurangabad*Corresponding Author

Dr. Anil Joshi Professor & head, Department of Pathology, Govt. Medical College

Dr Ankita Deore Junior resident Aurangabad, Department of Pathology, Govt. Medical College, Aurangabad.

ABSTRACT

Background: Preeclampsia is multisystem disorder unique to pregnant women after 20 weeks of gestation. It is one of the most common causes of increased mortality, morbidity both in mother and in the fetus. We have undertaken this study to assess coagulation profile of preeclampsia for early detection of complications and to reduce maternal and fetal mortality and morbidity. **Methodology:** This was a facility based prospective observational study conducted at pathology department of tertiary care hospital. A total of 90 pre-eclampsia patients were recruited in the study. All clinically confirmed patients with pre-eclampsia were evaluated by history, clinical examination and platelet count, bleeding time, clotting time, PT, aPTT and D Dimer investigations. **Results:** Mean age, gestational age and gravida did not differ significantly according to severity ($p>0.05$) while systolic & diastolic blood pressure was significantly more among cases with mild and severe preeclampsia. There was significant thrombocytopenia, bleeding time, clotting time, PT, aPTT were prolonged and D Dimer was raised in severe preeclampsia group ($p<0.05$). **Conclusion:** From this study we conclude that with routine screening of platelet count, bleeding time, clotting time, PT, aPTT and D Dimer, coagulation disorders of preeclampsia and eclampsia can be detected.

KEYWORDS

Platelet count, bleeding time, clotting time, PT, aPTT, D Dimer, coagulation disorders, preeclampsia and eclampsia.

Introduction:
Preeclampsia is multisystem disorder[1] unique to pregnant women after 20 weeks of gestation.[2] It is one of the most common cause of increased mortality, morbidity both in mother and in the fetus.[3] Preeclampsia is an elevated blood pressure (140/90mmHg) with proteinuria and edema that appears first time after 20 weeks of gestation.[4,5] Pathological process of preeclampsia begins with inadequate trophoblast invasion early in pregnancy which produces an increase in oxidative stress contributing to the development of systemic endothelial dysfunction in later phases of the disease.[6] Thrombocytopenia was defined as a platelet count <150,000/cubic millimeter.[7] In pre-eclampsia, usually the thrombocytopenia is mild to moderate but patients with eclampsia can develop severe thrombocytopenia.[8] Coagulation profile studied in preeclampsia are platelets counts, bleeding time, clotting time, prothrombin time and activated partial thromboplastin time, D dimer etc. These parameters are helpful in assessing the severity of coagulation abnormalities in preeclampsia in earlier stage prior to the occurrence of complications like HELLP syndrome, TTP, DIC, DVT, PPH.[9] Preeclampsia is highly thrombotic and pro-coagulant state with platelet activation and thrombin and fibrin formation.[10] Platelet count is a very important investigation for antenatal mother having PIH as it is directly related to maternal and perinatal outcome.[11] Hence, we have undertaken this study to assess coagulation profile of preeclampsia for early detection of complications and to reduce maternal and fetal mortality and morbidity.

Objective:
To determine the changes in platelet count, bleeding time, clotting time, prothrombin time and activated partial thromboplastin time and D dimer in pre-eclampsia.

Materials and Methods:
Current study was a facility based prospective observational study, which is in compliant with all the ethical standards and protocol was approved by the Institutional Ethical committee of the medical college. Written informed consent have been taken from all study subjects.

All pregnant women with pre-eclampsia coming to tertiary care center fulfilling inclusion and exclusion criteria during the study period was included by simple random sampling method. Inclusion criteria were pregnant women after 20 weeks of gestation and with warning signs and symptoms pre-eclampsia. Non-co-operative patients, patients who do not give consent, non-pregnant women, history of hypertension before completion of 20 weeks of gestation and patients with any complications were excluded.

A total of 90 pre-eclampsia patients were recruited in the study. All clinically confirmed patients with pre-eclampsia were evaluated by history, clinical examination and appropriate laboratory investigations. All data pertaining to patients' demographics, detailed history, past treatment history/any comorbid illnesses were recorded in a pre-structured proforma. A complete physical examination, vital signs followed by relevant investigations. These included a Hb, platelet count, PT, INR, D DIMER and APTT. Blood sample was collected by venipuncture from antecubital vein and collected in citrate and EDTA bulbs (2ml in each). Samples were immediately transported to prevent deterioration of the labile clotting factors. Equipment used was fully automated three-part cell counter H-360 ERBA. Haemoglobin estimation was by cyanide free colorimetric method, Platelets by electrical impedance, bleeding time by IVY'S method, clotting time by Wright's capillary tube method etc. Data was entered in Microsoft Excel and analyzed using SPSS Software. Means were compared by using student t test while qualitative variables compared by using Chi square & Fischer exact test of significance.

Results:
In the present study, total 90 pregnant females according to Cunningham FG et al. was divided into 3 groups: Mild- 30 cases of mild pre-eclampsia, Severe- 30 cases of severe preeclampsia, Controls: 30 cases (no preeclampsia). Basic characteristics i.e. mean age, gestational age and gravida did not differ significantly according to severity ($p>0.05$) while systolic & diastolic blood pressure was significantly more among cases with mild and severe preeclampsia ($p<0.05$). (Table 1)

Table 1. Distribution of patients according to basic characteristics and severity of pre-eclampsia.

Basic characteristics		severity of pre-eclampsia			p
		Mild (n=30)	Severe (n=30)	Control (n=30)	
Age (Years)	(Mean + SD)	24.6 + 4.1	23.8 + 3.6	23.3 + 2.8	0.36
Gavida no. (%)	Primi	12	11	15	0.55
	Multi	18	19	15	
Gestational Age	Weeks	36.4 + 2.9	35.4 + 2.7	36.3 + 1.3	0.21
Systolic blood pressure	mmHg	144.1+ 6.4	161.1 + 11.6	120 + 37.6	<0.001
Diastolic blood pressure	mmHg	93.3 + 6.3	111.8 + 7.9	77.8 + 5.3	<0.001

We have found that most, 27 (90%) cases with mild preeclampsia presented with grade 1+ edema followed by 3 (10%) had grade 2+

oedema while most, 15 (50%) cases with severe preeclampsia presented with grade 2+ edema followed by 1+ oedema among 13 (43.33%) cases, 2 (6.67%) were having 3+ oedema. As compared to cases, most of the subjects (70%) in control group did not have oedema while 09 (30%) subjects had grade 1+ oedema. (Table 2)

Table 2. Oedema grade in control group and preeclampsia patients.

Oedema	Mild	Severe	Control
1+	27 (90)	13 (43.33)	09 (30)
2+	3 (10)	15 (50)	0 (00)
3+	0 (00)	2 (6.67)	0 (00)
Absent	0 (00)	0 (00)	21 (70)
Total	30 (100)	30 (100)	30 (100)

In this study, most, 23 (76.67%) cases with mild preeclampsia presented with grade 1+ proteinuria followed by 6 (20%) had grade 2+ proteinuria & 1 (3.33%) case had grade 3+ proteinuria while most, 14 (46.67%) cases with severe preeclampsia presented with grade 2+ proteinuria followed by 9 (30%) cases with grade 3+ proteinuria, 7 (23.33%) were having 4+ proteinuria. As compared to cases, all the subjects (100%) in control group did not have proteinuria. (Table 3)

Table 3. Urine protein grade in control group and preeclampsia patients.

Urine protein	Mild	Severe	Control
1+	23 (76.67)	0 (00)	0 (00)
2+	6 (20)	14 (46.67)	0 (00)
3+	1 (3.33)	9 (30)	0 (00)
4+	0 (00)	7 (23.33)	0 (00)
Nil	0 (00)	0 (00)	30 (100)
Total	30 (100)	30 (100)	30 (100)

On laboratory investigations, in mild group mean Hb was 10.8, platelet was 2.1. While in severe group mean Hb was 10.8, platelet was 1.5 and in control group mean Hb was 10.3, platelet was 2.6. BT was 2.5, CT was 3.5, PT was 13.9, INR was 1, aPTT was 28.9 and D Dimer 0.58 in mild group. BT was 3.3, CT was 4.4, PT was 14.9, INR was 1.4, aPTT was 31.3 and D Dimer 1.4 in severe group and BT was 2.3, CT was 4.2, PT was 13.8, INR was 1, aPTT was 27.7 and D Dimer 0.3 in control group. Statistical difference was seen for platelet count, bleeding time, clotting time, PT, aPTT and D Dimer. There was significant thrombocytopenia, bleeding time, clotting time, PT, aPTT were prolonged and D Dimer was raised in severe preeclampsia group ($p<0.05$). (Table 4)

Table 4. Coagulation profile in mild, severe eclampsia and normal pregnancy.

Parameter	Mild		Severe		Control		P value
	Mean	SD	Mean	SD	Mean	SD	
Hb	10.8	1.4	10.8	1.1	10.3	1	0.1
Plt	2.1	0.7	1.5	0.6	2.6	0.4	<0.001
BT	2.5	0.5	3.3	0.5	2.3	0.4	<0.001
CT	3.5	0.6	4.4	0.7	4.2	0.4	<0.001
PT	13.9	1	14.9	1	13.8	0.8	<0.001
INR	1	0.08	1.4	1.7	1	0.06	0.19
aPTT	28.9	2.4	31.3	7	27.7	2.2	0.008
D Dimer	0.58	0.25	1.4	1.1	0.3	0.09	<0.001

DISCUSSION:

The present study on coagulation profile in preeclampsia was conducted over a period of one years with cases of different severity in comparison with normal healthy pregnant control group to assess the coagulation profile in these different health conditions. Total 90 pregnant females divided in three groups as: mild preeclampsia (30), severe preeclampsia (30) & control group (30) was studied. Basic characteristics i.e. mean age, gestational age and gravida did not differ significantly among three group ($p>0.05$) while systolic & diastolic blood pressure was differed significantly between mild and severe preeclampsia and control group ($p<0.05$). These findings are in line with study done by Chaware SA et al[12] and Elmina Lefko et al.[13]

This shows that as blood pressure increases the severity of disease also increases. A direct proportion was noted among blood pressure and preeclampsia.

In the current study, 90% cases with mild preeclampsia presented with grade 1+ edema while most, (50%) cases with severe preeclampsia presented with grade 2+ edema. As compared to cases, most of the subjects (70%) in control group did not have oedema. This finding is in line with Chaware SA et al.[12]

In this study, most (76.67%) cases with mild preeclampsia presented with grade 1+ proteinuria while most (76.67%) cases with severe preeclampsia presented with grade 2+ & grade 3+ proteinuria. As compared to cases, all subjects (100%) in control group did not have proteinuria. This finding is also in line with Chaware SA et al.[12]

On laboratory investigations, in mild group mean Hb was 10.8, platelet was 2.1. While in severe group mean Hb was 10.8, platelet was 1.5 and in control group mean Hb was 10.3, platelet was 2.6. BT was 2.5, CT was 3.5, PT was 13.9, INR was 1, aPTT was 28.9 and D Dimer 0.58 in mild group. BT was 3.3, CT was 4.4, PT was 14.9, INR was 1.4, aPTT was 31.3 and D Dimer 1.4 in severe group and BT was 2.3, CT was 4.2, PT was 13.8, INR was 1, aPTT was 27.7 and D Dimer 0.3 in control group. Statistical difference was seen for platelet count, bleeding time, clotting time, PT, aPTT and D Dimer. There was significant thrombocytopenia, bleeding time, clotting time, PT, aPTT were prolonged and D Dimer was raised in severe preeclampsia group ($p<0.05$). These findings are consistent with studies done by Talat Fatma et al [14] Chauhan et al [15] Anjali et al [16] Jahrom et al [17] Sameer et al [18] Elloradevi et al [19] S. Mohapatra et al[20] Who has shown that decreased platelet count, prolonged BT, CT, PT, aPTT and raise D dimer levels with the increased severity of preeclampsia.

CONCLUSION:

From this study we conclude that with routine screening of platelet count, bleeding time, clotting time, PT, aPTT and D Dimer, coagulation disorders of preeclampsia and eclampsia can be detected. The detection of derangement of coagulation will be helpful to obstetrician in treating the patients who probably may go in to D.I.C.

Declaration: There was no source of funding in our study and there was no any conflict of interest.

REFERENCES:

1. B. Namavar, Jahromi1*, S. H. Rafiee. Coagulation Factors in Severe Preeclampsia. IRCMJ. 2009; 11(3):321-324.
2. Imteyaz ganai(md)1. To study the biochemical and hematological parameters in pre-eclampsia. Jmscr. 2014 Jan ;2(1):315-321.
3. Dr Talat Fatma (M.D) ,Dr Shamim Khurrum Azmi (M.S)and Dr Ajit Kumar Chaudhary (M.D).coagulation profile as important markers in preeclampsia and eclampsia .Int. J. Adv. Res.2017 MAY; 5(5), 2211-2218.
4. C Vijaya Lakshmi.Comparative Study of Coagulation Profile in Mild Preeclampsia, Severe Pre-eclampsia, and Eclampsia. IJSS.2016 JULY;4(4):180-183
5. Han L, Liu X, Li H, Zou J. Blood Coagulation Parameters and Platelet Indices: Changes in Normal and Preeclamptic Pregnancies and Predictive Values for Preeclampsia. PLOS ONE 2014DEC2;9(12):1-14.
6. Francisco J. Valenzuela1, Alejandra Perez-Sepulveda1,Maria J. Torres1, Paula Correa1. Pathogenesis of Preeclampsia: The Genetic Component. J.pregnancy.2011OCT12;2012:1-88
7. Mary Pat fitzgerald (MD), Jamie Siegel (MD), Enrique Hernandez (MD) laboratory findings in hypertensive disorder of pregnancy. J.Natl.Med.Assoc.1996DEC;88(12):794-798.
8. Tejeswini K.K1*, Anitha G.S1, Nandagopal K.M2. Platelet count as a prognostic indicator in pregnancy induced hypertension. Int J Reprod Contracept Obstet Gynecol.2016 MARCH 01;5(4):1036-46.
9. Abhay A. Bhave.Coagulopathies in Pregnancy: What an Obstetrician Ought to Know! J Obstet Gynaecol India.2019 Nov 27;69(6):479-482.
10. Nirmala T1, Kumar Pradeep L2*, Vani B R3, Murthy Srinivasa V4. Study of coagulation profile in pregnancy induced hypertension (PIH).Indian J Pathol Oncol.2015 MARCH;2(1):1-6.
11. Aakriti Gupta*, Jyoti Hak, Isha Sunil, Amita Gupta. Platelet count estimation: a prognostic index in pregnancy induced hypertension. Int J Reprod Contracept Obstet Gynecol. 2018 Feb;7(2):476-482.
12. Chaware SA, Dhake R, Ingole A S, Bahattare V N. Study of coagulation profile in pre eclampsia and eclampsia. Med Int Med J; 2(3): 164-170.
13. Elmina Lefkou, Patrick Van Dreden, PhD, Aurélie Rousseau, PhD, Grigorios T. Gerotziafas. Differences in the coagulation profile in women with mild and severe preeclampsia. Blood coagulation and fibrinolytic factors. Blood. 2020 november 5;136(1):15-16.
14. Talat Fatma, Shamim Khurrum Azmi, and Ajit Kumar Chaudhary. Coagulation profile as important markers in preeclampsia and eclampsia Int. J. of Adv. Res. 2017 may 31;5(5):2211-2218.
15. Priyanka Chauhan, Usha Rawat, Vandana Bisht, R. C. Purohit. "Comparison of Coagulation Profile in PreEclamptic and Eclamptic Patients with Normotensive Pregnant Patients". J.Evol. Med. Dent. Sci. 2014 March 24; 3(12):3208-3215.
16. Shete Anjali N, K.D Gaikal, Prathiba R. Deshmukh. Physiological parameters in Pregnancy Induced Hypertension. . Int. J.Recent Trends sci.technol. 2013 May 20 ;7(1):24-25.
17. B Namavar Jahromi1, SH Rafiee2. Coagulation Factors in Severe Pre Eclampsia. Iran Red Crescent Med J. 2009 Oct;11(3):321-324.
18. M.ASameer, D.P.Meshram, Despande, Sadupand. Coagulation profile study in pregnancy induced hypertension. J. dent. med. sci.2014 Apr ;13(4):39-43.
19. Dr.Ellora Devi, Combination of Platelet and Uric acid estimation can predict severity of PIH better. Int. J. Pharma Bio Sci. 2012 Jul;3(3):1039-1045.
20. S.Mohapatra ,B.BPradhan, V.K.satpathy, Arti Mohanty Platelet estimation ;its prognostic value in pregnancy induced hypertension. Indian physiolpharmacol 2007 May ;51(2):160- 164.