Profiling Coagulation for Preeclampsia and Eclampsia

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ABSTRACT

Study of Coagulation profile in preeclampsia and eclampsia comprised of 258 cases which were categorized as preeclampsia, eclampsia and control group with 86 cases in each group. A total number of 258 patients were studied which were categorized as the control group, preeclampsia group and eclampsia group with 86 cases in each. Preeclampsia was further classified as mild preeclampsia (48/86) and severe preeclampsia (38/86). Among all patients, thrombocytopenia was found in 61% of patients. All patients in the control group had platelet counts within the normal range. The method used in the present study is an analytical case-control study, carried out in the Department of Pathology in our institute. Our study includes cases of preeclampsia and eclampsia coming to the Department of Obstetrics and Gynaecology during the period of two years from May 2015 to April 2017. Newly diagnosed Preeclampsia and eclampsia patients in the third trimester of age 18 to 30 years. From this study, it can be concluded that coagulation profile can help to assess the severity of preeclampsia and eclampsia and thus can help to reduce complications if treated early. Thus as inconclusive of this study of coagulation profile has significant value and impact on management and outcome of cases of preeclampsia and eclampsia.

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INTRODUCTION

'Snowball running downhill', that is what Sir Jams compared preeclampsia. The earlier one intervenes, the earlier it is to stop it. It is well known that hypertensive disorders complicate 5 to 10 per cent of pregnancies and form one member of the deadly triad, along with haemorrhage and infection, that contribute greatly to maternal morbidity and mortality rates. The prevalence of preeclampsia in India and Maharashtra are 5.56% and 39.5%, respectively (Agrawal and Walia, 2014). While in India, the prevalence of eclampsia is 1-5% and it is the cause for about 8 - 14% of maternal mortality, i.e. 200 mothers per day (National Eclampsia Registry) (Cunningham *et al.*, 2014).

It probably accounts for 50,000 maternal deaths a year worldwide. Major complications of preeclampsia and eclampsia include central nervous system injuries such as seizures, IHD, type II diabetes mellitus, venous thromboembolism, haemorrhagic and ischemic strokes, hepatic damage, HELLP syndrome, renal dysfunction, aspiration pneumonia, pulmonary edema, cardiopulmonary arrest, fetal growth retardation, placental abruption, fetal death, preterm delivery, increased frequency of cesarean delivery, in comparison with women without a history of the hypertensive disorders of pregnancy. (Chesley, 1978; Mattar and Sibai, 2000; Mustafa *et al.*, 2012)

Aim

To study coagulation profile in patients of preeclampsia and eclampsia.

Objectives

To study the changes in coagulation profile (platelet count, bleeding time, clotting time, prothrombin time and activated partial thromboplastin time) in patients of preeclampsia and eclampsia in the third trimester of pregnancy. To correlate the coagulation parameters with the severity of preeclampsia and eclampsia. To study coagulation parameters in a normotensive gestational age-matched pregnant woman in the third trimester of pregnancy (as controls).To compare coagulation parameters between the control, preeclampsia and eclampsia patients.

Review of Literature

New theories followed the discovery of Rayer (1839) in France and that eclampsia associated with albuminuria (Chesley, 1978). In 1972 Ernest Page did a lot of work on the pathogenesis of preeclampsia and eclampsia. He defined PIH using Mean Arterial Pressure. (Page, 1972)

The glomerular capillary endotheliosis is the most characteristic lesion of preeclampsia, characterized by an enlargement of glomerular tuft due to an increase in endothelial cell cytoplasm by a remarkable degree of swelling and vacuolation. There is the moderate widening of mesangial areas due to expansion of their cytoplasmic processes. Endothelial cells are damaged by vascular spasm or some agents or toxins resulting in markedly increased water content together with a variable degree of fatty change. In the more advanced cases of preeclampsia, the mesangial cell processes begin to grow around the capillary loops in the subendothelial region. The glomerular basement membrane remains intact. The most significant feature is the relative normality of epithelial foot processes despite proteinuria, which may be of severe proportion. A variety of vascular changes like the presence of elastic beads in arterioles and fat in the walls of arterioles occur in the patients with eclampsia. The tubules are relatively unaffected by preeclampsia, showing only occasional non-specific features like hyaline droplets and fatty change. Fully developed ischemic necrosis of tubules is rare in eclampsia.

Streak haemorrhages are frequently seen in the adrenal cortex. Very occasionally there are massive bilateral intra adrenal haemorrhages. Occasionally bilateral haemorrhagic pneumonia may be present. Haemorrhages are frequently seen within the splenic pulp. The lymphoid tissue around the branches of arterial vessels within the spleen is often necrotic. (Haines and Taylor, 2003)

Thrombocytopenia occurs in only a minority of eclampsia patients. However, since increased marrow platelet production could mask increased consumption, the incidence of actual thrombocytopenia may not reflect the true incident of platelet consumption in preeclampsia (Burrows et al., 1987). Approximately 20% of patients with preeclampsia develop consumptive thrombocytopenia that usually is mild, but can be severe (Ruggeri and Savage, 2006). Thrombocytopenia, usually an incidental but early finding in preeclampsia and sometimes precedes the renal abnormalities. Once formed, thrombin comes in systemic circulation and binds to antithrombin (endogenous serine protease inhibitor) and forms an inactive complex. This complex is called as Thrombin-Antithrombin Complex (TAT). Serum TAT levels, when measured, can be used to reflect the amount of thrombin in circulation. (Reinthaller et al., 1990; De Boer et al., 1989; Hayashi et al., 1998). It has been found that serum TAT levels gradually increase as pregnancy progress. (Weltermann et al., 1999).

Onisai et al. (2009) concluded that preeclampsia women presented with slight thrombocytopenia, but with a significantly higher MPV.

Mondal et al. (2015) group obtained significant higher values of MPV, PDW, P-LCR in preeclampsia (n=32) and eclampsia (n=32) women in comparison of normal pregnant women (n=32). Platelet count was significantly lower in the previous group.

MATERIALS AND METHODS

The present study is an analytical case-control study, carried out in the Department of Pathology in our institute. Our study includes cases of preeclampsia and eclampsia coming to the Department of Obstetrics and Gynaecology during the period of two years from May 2015 to April 2017. Newly diagnosed Preeclampsia and eclampsia patients in the third trimester of age 18 to 30 years.

OBSERVATION AND RESULTS

The present study is a case-control study, carried out over a period of two years in the Department of Pathology in our institute. In our study, 258 patients were studied in total who were admitted to the antenatal ward/ labour room of the Department of Obstetrics and Gynaecology.

As seen in Table 1, patients were categorized as Preeclampsia group and Eclampsia group and Control group with 86 patients in each. Preeclampsia

Table 1: Distribution of patients according to clinical diagnosis

Patient Group	Number of Patients
Preeclampsia Group	86
Mild Preeclampsia	48
Severe Preeclampsia	38
Eclampsia Group	86
Control Group	86

Table 2: Distribution of patients according to age and diagnosis

Age (in years)	Control (N=86)	Pre- Eclampsia (N=86)		Eclampsia (N=86)
		Mild (n=48)	Severe (n=38)	
18-20	19(22%)	8(17%)	14(37%)	26(30%)
21-25	37(43%)	22(46%)	17(45%)	45(52%)
26-30	30(35%)	18(37%)	7(18%)	15(18%)
Total	86(100%)	48(100%)	38(100%)	86(100%)

Table 3: Distribution of PIH patients and controlaccording to gravidity status

	Control (n=86)		Preeclampsia (n=86)		Eclampsia (n=86)	
	No. of patients	%	No. of patients	%	No. of patients	%
Primigravida	65	75.58	55	63.95	58	67.44
Multigravida	21	24.42	31	36.05	28	32.56
Total	86	100	86	100	86	100

Table 4: Clinical features in Preeclampsia and Eclampsia

Clinical Features	Pre- Eclampsia (N=86)		Eclampsia (N=86)
	Mild (n=48)	Severe (n=38)	
Nausea & Vomiting	19(26%)	16(41%)	31(38%)
Headache	21(10)%	17(44%)	32(37%)
Epigastric Pain	6(3%)	7(19)%	13(15%)
Bluring Vision	0(0)%	2(4)%	13(11%)
Oliguria	0(0%)	0(0%)	5(6%)

group was further classified into Mild preeclampsia and Severe preeclampsia.

As seen in Table 2, a maximum number of patients were from the age group of 21 to 25 years in preeclampsia (45%) and in Eclampsia (52%), while in the control group a maximum number of patients belonged to 26- 30 years (43%).

Gestational Age

Gestational age of the patients in the control group was between 28-39 weeks, while in the case of preeclampsia, it was between 28-40 weeks and eclampsia it was between 28-40 weeks. Mean with SD of gestational age for the control group, preeclampsia and eclampsia were 34.57 $\pm$ 2.66, 36.64 $\pm$ 1.64, 36.62 $\pm$ 1.78 weeks respectively.

As seen in Table 3, the majority of patients were found to be Primigravida. In the preeclampsia group, 55 patients (63.95%) and in eclampsia 58 patients (67.44%) were primigravida. Similarly, the control group had 65 patients (75.58%) of Primigravida.

As seen in Table 4, in eclampsia group, the headache was the most common symptom which was present in 32 patients (37%) followed by nausea and vomiting in 31 patients (38%), epigastric pain in 13 patients (15%), blurring of vision in 13 patients (11%) and reduced urine output in 5 patients (6%). In severe preeclampsia eclampsia group, the headache was present in 17 patients (44%) followed

by nausea and vomiting in 16 patients (41%), epigastric pain in 7 patients (19 %), blurring of vision in 2 patients (4%) and while none had reduced urine output. In Mild preeclampsia group, Nausea and vomiting were the most common symptom, 19 patients (26%) followed by headache in 21 patients (10%) and epigastric pain in 6 patients (3%). At the same time, none had blurring of vision or reduced urine output.

DISCUSSION

Women with preeclampsia and eclampsia, develop a variety of coagulation abnormalities. These coagulation abnormalities have an impact on the outcome of delivery of these patients so that aggressive therapy is required to prevent maternal and neonatal morbidity and mortality. The obstetricians rely upon laboratory tests for further management. The present study was aimed at analyzing the coagulation changes in patients of preeclampsia and eclampsia attending our tertiary care hospital.

In our study, 258 patients were studied in total who were admitted to the antenatal ward/ labour room of the Department of Obstetrics and Gynaecology. These patients were categorized as Preeclampsia group and Eclampsia group and Control group with 86 patients in each. Preeclampsia group was further classified in Mild preeclampsia and severe Preeclampsia. In Total 172 patients of Pre-eclampsia and eclampsia were included for analysis of coagulation profile with Eighty-Six age and gestational age-matched controls.

CONCLUSION

The present study was conducted to study coagulation profile in cases of preeclampsia and eclampsia at our institute. From this study, it can be concluded that coagulation profile can help to assess the severity of preeclampsia and eclampsia and thus can help to reduce complications if treated early. Platelet count, which is cost-effective and routinely performed and bleeding time and Clotting Time which can be performed at bedside correlated well with the severity of preeclampsia and eclampsia. Thrombocytopenia frequently complicated severe preeclampsia and eclampsia more than mild preeclampsia. Abnormal PT, PTT values were found in patients with platelet counts of less than 1 lakh/ mm3 so in cases of severe preeclampsia physician can follow serial estimations of platelet count. Laboratory tests like PT, INR, APTT and D dimer assay proved to be very sensitive and specific in early detection of derangement in coagulation. Results of these tests correlated well with the sever-

ity of clinical features and complications. Raised a PTT and D dimer can be taken as good indicators of severe preeclampsia and these patient need aggressive treatment. Prothrombin Time, Activated Partial thromboplastin Time can be used to predict Preeclampsia, Eclampsia complicated with HELLP syndrome landing into Disseminated Intravascular coagulation (DIC). The documentation of HELLP syndrome is essential as aggressive therapy needs to be initiated to prevent neonatal morbidity and mortality. Thus the study of coagulation profile has significant value and impact on management and outcome of cases of preeclampsia and eclampsia.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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