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Early Onset and Late Onset Preeclampsia: Observational Study of Haematological Findings and Feto -Maternal Outcome

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ABSTRACT

Pre-Eclampsia is a dynamic process. The criterion for diagnosis EO-PE (Early Onset Pre-Eclampsia) and LO-PE (Late Onset Pre-Eclampsia) is almost same, only difference is in the gestational age; because this division is much simplified and has better understanding of the prognostic implications than mild vs severe terminology. It has been done to observe the differences in hematological findings between early late onset pre eclampsia & to observe the differences in Fetal and Maternal outcome. 60 cases of severe pre-eclampsia were selected from the cases diagnosed & admitted in the labour room of Obstetrics & Gynaecology Dept, VSSIMSAR, Burla. 34 weeks was used as a cut-off to classify patients into Early Onset Pre-eclampsia (EO-PE) and Late Onset Pre-eclampsia (LOPE). Mean GA during admission were between 29-36 weeks . EO-PE group had higher SBP/DBP values, higher Mean Serum Urea, Serum Creatinine, Mean Serum Uric Acid values with increased proteinuria measured by dipstick than LO-PE group. There was more thrombocytopenia in EO-PE. Obstetrical Complications seen more in EO-PE (IUGR, Oligohydramnios, Abruptio, AKI, Eclampsia, HELLP, AEDF, REDF etc). Most of the women underwent termination by LSCS in EO-PE (66.67%) compared to LO-PE (36.67%). (10%) mothers were admitted in ICU in EO-PE, but none were admitted in LO-PE. Mean Baby weight were between 1.47-2.48kgs. 80% neonates in EO-PE were admitted in NICU compared to LO-PE (30%). Early onset pre-eclampsia had more maternal and foetal complications than late onset pre-eclampsia.

Keywords: early onset and late onset preeclampsia, complication, NICU admission

INTRODUCTION

Pre-Eclampsia is a hypertensive disorder specific to pregnancy. It is one of the most common causes of maternal as well as fetal mortality and morbidity and is diagnosed in about 2–10% of pregnacy[1].According to new terminology (ACOG 2018) Task Force on Hypertension Pregnancy, "any new-onset increased Blood Pressure during regular ante-natal check up with either proteinuria or end-organ dysfunction after 20 weeks of gestation in previously normotensive women is labelled as pre-eclampsia". It is defined as Blood Pressure reading of ≥140/90 mmHg on two occasions atleast 4hours apart and >0.3 g protein in 24 hour urine specimen after 20 weeks of gestation in a previously normotensive woman. The terminology such as"mild Pre-Eclampsia" should be discouraged because Pre-Eclampsia by nature is progressive, Pre-Eclampsia without evidence of end-organ damage is termed "Pre-Eclampsia without severe features". If Blood Pressure reading of ≥160/110 mm Hg and >5 g protein in 24 hour urine specimen or symptoms of end organ damage like dearrranged Liver Function Tests, Thrombocytopenia, Oliguria, Visual disturbances, Pulmonary oedema are present, it is termed as "Severe Pre-Eclampsia".

Diagnostic parameters for severe Pre-Eclampsia comprises of a wide spectrum i.e. the occurrence of severe uncontrolled hypertension(>160/110 mmHg) and any severe neurological, cardiorespiratory,hematological, renal, hepatic, or feto-placental complications" [2].Some of the fetal and neonatal adverse outcomes are directly because of Pre-Eclampsia, but in majority, the fetus has to bear the brunt of prematurity as premature delivery is the only definitive option available for aggravated clinical course of the disease.Maternal outcome may be compromised by severe hypertension and its sequelae, HELLP syndrome, Eclampsia, pulmonary oedema,thrombocytopenia, various organ damage and increased risk of operative delivery and ICU admission. However long term sequelae such as cardiovascular risk is still a grey area of research [2].

Henceforth, detection of the disease and its risk factors in the early course and its management are important aspects in decreasing its burden worldwide. Early and late onset Pre-Eclampsia has different etiologies and should be considered as different disease[3] .Early onset Pre-Eclampsia is the most severe clinical variant of disease occurring in 5- 20% of all cases of Pre-Eclampsia and is associated with higher neonatal morbidity and mortality. Late onset Pre-Eclampsia occurring in about 75-80% of all cases of pre-eclampsia; which are associated with maternal morbidity (metabolic syndrome, impaired glucose tolerance, obesity, dyslipidemia,chronic hypertension) [4]. The differences in the risk factors, clinical features, laboratory parameters and its prognostic values may reflect the different mechanisms of the disease development and progression of the two groups [5].

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The purpose of this study is to analyze the differences between the Early Onset Pre-Eclampsia (EO-PE) and Late Onset Pre-Eclampsia (LO-PE) in terms of hematological findings and feto-maternal outcome in VSSIMSAR, BURLA, which caters western part of Odisha state. This will improve the understanding of this two different entity in our locality and will be of great help in redesigning our Antenatal Care.

Primary Objective:
To analyze the difference between Early Onset Pre-Eclampsia (EO-PE) and Late Onset Pre-Eclampsia (LO-PE).

Secondary Objective:
- To observe the differences in Haematological findings between Early Onset Pre-eclampsia (EO-PE) and Late Onset Pre-Eclampsia (LO-PE)
- To observe the differences in Fetal and Maternal outcome between Early Onset Pre-eclampsia (EO-PE) and Late Onset Pre-Eclampsia(LO-PE).

MATERIALS & METHOD:
This is an Observational Comparative Study conducted in the Department of Obstetrics & Gynaecology of VSSIMSAR, BURLA from January 2021 to December 2022. 60 cases of severe pre-eclampsia selected from the cases diagnosed & admitted in labour room.

Selection criteria:
Inclusion Criteria: Gravid women with singleton pregnancies with pre-eclampsia admitted to Obstetrics & Gynaecology Dept, VSSIMSAR, BURLA.

Exclusion Criteria: Multiple pregnancies which occurred at similar frequencies in those two groups,
• Hydatidiform mole,
• Case presenting before 20 wks,
• k/c/o essential hypertension, CKD & any vascular disease

Pre-eclampsia was be diagnosed based on the criteria given.
Diagnostic criteria for pre-eclampsia[6].

 Blood pressure: Systolic blood pressure ≥140mmHg and/or diastolic blood pressure ≥90mmHg that are noted twice atleast 4 hours after 20 weeks of gestation in women with normal blood pressure before conception or in women with previous chronic hypertensive disorders. And coexistence of one or more of the following new-onset conditions:
 Proteinuria: Spot urine protein/creatinine >30 mg/mmol (0.3mg/dl) or >300 mg/day or at least 1 g/L ("1+") on dipstick testing.

Other maternal organ dysfunctions:
 Renal insufficiency (creatinine >90 μmol/L; 1.02 mg/dL).
 Liver involvement (doubling of serum transaminases and/or severe right upper quadrant pain).
 Neurological complications (eclampsia, altered mental status, blindness, stroke, or more commonly hyper-reflexia when accompanied by clonus and severe headaches when accompanied by hyper-reflexia and persistent visual scotomata).

 Haematological complications (platelet count <150,000/dL, DIC, and hemolysis)
 Utero-placental dysfunction: Fetal growth restriction.
Gestational age was determined based on the last menstrual period and/or the measurement of crown-rump-length in the first trimester of pregnancy.34 weeks is taken as cut-off to diagnose early or late onset pre-eclampsia. 30 cases were taken from early onset pre-eclampsia group, 30 cases were taken from late-onset pre-eclampsia group. Blood sample was collected to assess blood count, platelet count and serum levels of creatinine, blood urea nitrogen and analyzed for proteinuria. We compared and observed the differences of laboratory findings, obstetrical complications, perinatal morbidity, and neonatal outcomes between the two groups. Reports collected were analyzed and statistical tests were done. All data were analyzed using SSPS software, appropriate statistical tests were applied and after comparison final interpretation was done.

Conflict Of Interest: Nil

Ethical Approval: The study was started after approval from the research ethics committee VIREC, Burla. Prior to the study necessary permission were obtained from all relevant participants. Only voluntary participants were included in the

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study. Confidentiality and anonymity were maintained throughout the study. There was less than minimal risk to the study population.

RESULTS

Table 1: Comparison of Obstetric Formula between two groups

Obstetric Formula	EO-PE (n=30)		LO-PE (n=30)		$\lvert\chi^2_{cal}\rvert$	p-value	Results
	No.	%	No.	%			
G_1	23	76.67%	15	50%	8.253	**0.0411**	**Significant**
G_2	03	10%	10	33.33%			
G_3	03	10%	01	3.33%			
$\geq G_4$	01	3.33%	04	13.34%			

Primigravida affected more than multigravida

Table 2: Comparison of Period of Gestation between two groups

Period Of Gestation (weeks)	EO-PE (n=30)		LO-PE (n=30)		$\lvert\chi^2_{cal}\rvert$	p-value	Results
	No.	%	No.	%			
22 - 26 weeks	05	16.67%	0	0%	49.455	**<0.0001**	**Significant**
27 - 31 weeks	13	43.33%	0	0%			
32 - 36 weeks	12	40%	21	70%			
≥ 37 weeks	0	0%	09	30%			

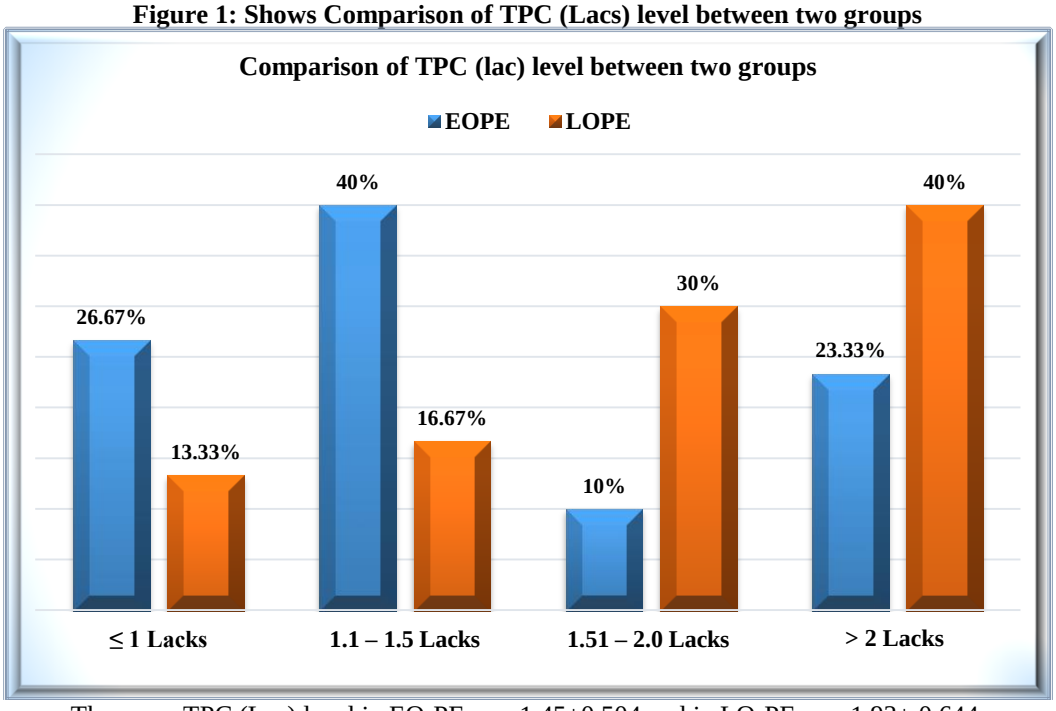
In EO-PE(43.33%) were belonging to 27-31 weeks, in LO-PE (70%) were belonging to 32-36 weeks.

Table 3: Comparison of Haemoglobin (gm %) level between two groups

Hemoglobin (gm %)	EO-PE (n=30)		LO-PE (n=30)		$\lvert\chi^2_{cal}\rvert$	p-value	Results
	No.	%	No.	%			
≤ 10 gm %	20	66.67%	15	50%	4.381	0.1119	Not Significant
10.1-12 gm %	04	13.33%	11	36.67%			
>12 gm %	06	20%	04	13.33%			

The Mean Haemoglobin (mg/dl) level in EO-PE group population was 9.51±2.25 gm% and in LO-PE group population was 10.25±1.37gm% respectively.

Figure 1: Shows Comparison of TPC (Lacs) level between two groups



The mean TPC (Lac) level in EO-PE was 1.45±0.504 and in LO-PE was 1.93± 0.644.

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Table 4: Comparison of Protein Dipstick between two groups

Protein Dipstick	EO-PE (n=30)		LO-PE (n=30)		$\|\chi^2_{cal}\|$	p-value	Results
	No.	%	No.	%			
1+	06	20%	21	70%	15.35	**0.0005**	**Significant**
2+	11	36.67%	05	16.67%			
3+	13	43.33%	04	13.33%			

EO-PE (43.33%) had (+3).while in LO-PE (70%) had protein dipstick value (+1).

Table 5: Comparison of Mean Serum Urea level between two groups

Serum Urea	EO-PE (n=30)	LO-PE (n=30)	$\|t\|_{cal}$	p-value	Results
Mean±S.D	31.53±2.70	24.57±4.39	7.397	**<0.0001**	**Significant**

Mean Serum Urea level in EO-PE was 31.53±2.70 and in LO-PE was 24.57±4.39.

Table 6: Comparison of Mean Serum Creatinine level between two group

S erum Creatinine	EO-PE (n=30)	LO-PE (n=30)	$\|t\|_{cal}$	p-value	Results
Mean±S.D	0.63±0.13	0.51±0.08	4.306	**<0.0001**	**Significant**

Mean Serum Creatinine level in EO-PE 0.63 ± 0.13 and in LO-PE 0.51 ± 0.08 .

Table 7: Comparison of Mean Serum Uric Acid level between two groups

Serum Uric Acid	EO-PE (n=30)	LO-PE (n=30)	$\|t\|_{cal}$	p-value	Results
Mean±S.D	7.29±1.10	6.58±0.54	3.174	**0.0024**	**Significant**

The Mean Serum Uric Acid level in EO-PE group population was 7.29 ± 1.10 and in LO-PE group population was 6.58 ± 0.54 respectively.

Table 8: Comparison of Mode of Delivery between two groups

Mode of Delivery	EO-PE (n=30)		LO-PE (n=30)		$\|\chi^2_{cal}\|$	p-value	Results
	No.	%	No.	%			
LSCS	20	66.67%	11	36.67%	5.316	**0.0211**	**Significant**
Vaginal Delivery	10	33.33%	19	63.33%			

In EO-PE ,(66.67%) patients had undergone LSCS and (36.67%) in LO-PE group

Figure 2: Shows comparison of Maternal Complications between two groups

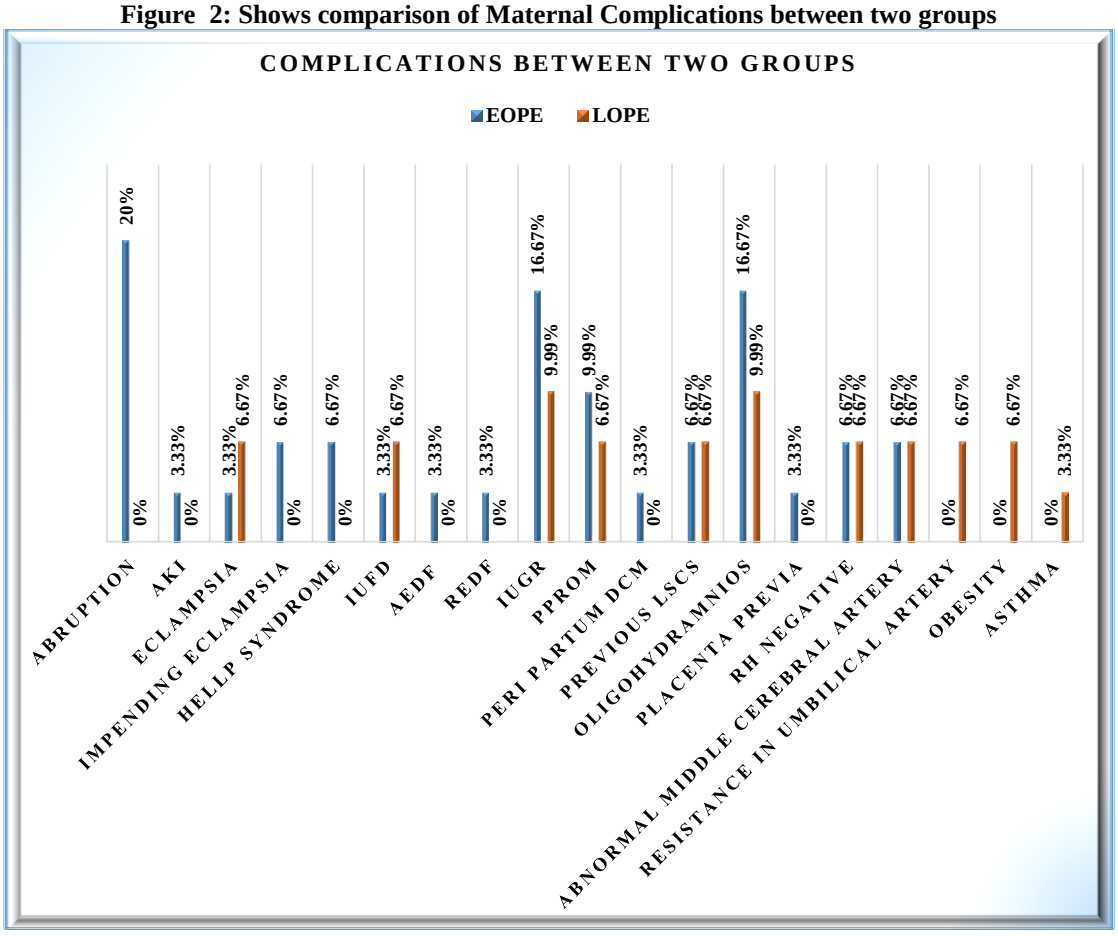

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Table 9: Comparison of APGAR Scores at 1 min between two groups

APGAR Scores at 1 min	EO-PE (n=29)		LO-PE (n=28)		$\|\chi^2_{cal}\|$	p-value	Results
	No.	%	No.	%			
< 6	07	24.14%	0	0%	7.570	**0.0059**	**Significant**
6 – 8	22	75.86%	28	100%			
9 - 10	0	0%	0	0%			

Table 10: Comparison of APGAR Scores at 5 min between two groups

APGAR Scores at 5 min	EO-PE (n=29)		LO-PE (n=28)		$\|\chi^2_{cal}\|$	p-value	Results
	No.	%	No.	%			
< 6	0	0%	0	0%	9.104	**0.0026**	**Significant**
6–8	21	72.41%	9	32.14%			
9-10	08	27.59%	19	67.86%			

EO-PE(72.41%) neonates had APGAR score (6-8) in 5 min, In LO-PE (32.14%) neonates had APGAR score (6-8) in 5 min

Table 11: Comparison of NICU admission between two groups

NICU admission (in days)	EO-PE (n=30)		LO-PE (n=30)		$\|t_{cal}\|$	p-value	Results
	No.	%	No.	%			
1 – 7 days	11	36.67%	05	16.67%	15.348	**0.0005**	**Significant**
> 7 days	13	43.33%	04	13.33%			
No admission	06	20%	21	70%			

In EO-PE (36.67%) neonates had NICU admission in between 1-7 days In LO-PE (16.67%) neonates had NICU admission in between 1-7 days.

Table 12: Comparison of Neonatal Complication type between two groups

Neonatal Complication type	EO-PE (n=29)		LO-PE (n=28)		$\|\chi^2_{cal}\|$	p-value	Results
	No.	%	No.	%			
IUGR	19	65.52%	07	25%	9.263	**0.0023**	**Significant**
Seizures	01	3.45%	0	0%	0.966	0.3257	Not Significant
RDS	03	10.34%	03	10.71%	0.002	0.9640	Not Significant
Neonatal sepsis	01	3.45%	0	0%	0.966	0.3257	Not Significant
Died after live birth	03	10.34%	0	0%	3.002	0.0831	Not Significant
Jaundice	03	10.34%	02	7.14%	0.179	0.6721	Not Significant
No neonatal complications	05	17.24%	18	64.29%	12.872	**0.0003**	**Significant**

EO-PE, (82.76%) patients had neonatal complications.. In LO-PE groups 10 (35.71%) patients had neonatal complications.

Table 13: Comparison of Mother ICU admission between two groups

Mothers ICU stay (in days)	EO-PE (n=30)		LO-PE (n=30)		$\|t_{cal}\|$	p-value	Results
	No.	%	No.	%			
1 – 7 days	2	6.67%	0	0%	3.158	0.2062	Not Significant
> 7 days	1	3.33%	0	0%			
No admission	27	90%	30	100%			

EO-PE group, 2 (6.67%) patients had ICU admission for between (1-7 days), and 27 (90%) patients did not admit.

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Table 14: Comparison of fetal outcome between two groups

Neonatal Morbidity	EO-PE (n=30)		LO-PE (n=30)		$\lvert\chi^2_{cal}\rvert$	p-value	Results
	No.	%	No.	%			
IUFD	1	3.33%	1	3.33%	0.50	0.4795	Not significant
Still Birth	0	0%	1	3.33%			

EO-PE group, 1 (3.33%) patient had IUFD and 0 (0%) patient had Still Birth. In LO-PE group, 1 (3.33%) patient had IUFD and 1 (3.33%) patient had Still Birth.

DISCUSSION

Prevalence of Pre-Eclampsia in our tertiary care hospital in is about6.7% which is little lower than the prevalence of National Health Program 2016 in India 8-10% [1]. Most of the patients were Primigravida similar to many other studies. **Pillai SS *et al*[7].** Nulliparity risk factor for severe preeclampsia which was also supported by **Saxena *et al*** in India[8].There is a positive co-relation between Mean Platelet count which is less in EO-PE, (1.45 ± 0.504) as compared to in LO-PE. There is a positive co-relation between increased protein in urine measured by dipstick is more in EO-PO. Mean Serum Urea level was more in EO-PE than (LO-PE). Positive co-relation seen in the value of Mean Serum Uric Acid which was support by **Geetanjaly R *et al* (2020)**[9].Mean Serum Creatinine more in EO-PE. **Pooja Wadhwani, *et al*. (2020)** showed similar results [10]. More LSCS was done in (EO-PE) than LO-PE support by **Aksornphusitaphong *et al*** [11]. Neonatal Complications more in EO-PE similar result by **Shrestha J, *et al*. (2021** [12].

CONCLUSION

As both the types lead to significantly different outcomes, they should be treated as different entities from a prognostic perspective. In view of an increased risk of maternal and perinatal morbidity and mortality in EOPE than LOPE , our findings highlights need for a special consideration and intensive feto-maternal surveillance of those women with early-onset diseases.

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