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To Study the Risk Factors Associated With Early Onset Preeclampsia and Its Fetomaternal Outcome

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Abstract: The objectives of the study were: a) To identify the different risk factors in Early onset Preeclampsia. b) To study the Fetomaternal outcomes in that group. This was a one year cross-sectional study conducted in the Department of Obstetrics and Gynaecology at Gauhati Medical College and Hospital.100 mothers with Early onset Preeclampsia (EO-PE) (<34 weeks of gestation) were taken. Data about maternal risk factors, maternal complications, foetal and neonatal outcome were analysed and statistical significance determined. Primiparity, increasing BMI, family history of preeclampsia and male sex of the foetus were found to be important risk factors in development of EO-PE. All the maternal complications like eclampsia, sepsis, systemic disorders, ICU admissions and maternal deaths were higher in EO-PE. Greater number of patients with EO-PE progressed to develop severe preeclampsia. The rate of neonatal complications like abnormal umbilical artery Doppler, low birth weight, reduced APGAR score was higher in EO-PE. Incidence of NICU admissions and neonatal/perinatal deaths was also noted to be higher in EO-PE. Classification of preeclampsia into early and late onset has both etiological and prognostic value. Early detection, close monitoring, timely intervention by the obstetrician and good neonatal care by the paediatrician is the key for successful outcome in Early onset preeclampsia.

Keywords: Early onset preeclampsia, Maternal, neonatal outcome, risk factors and outcome.

INTRODUCTION

Hypertensive disorders of pregnancy are an important cause of maternal morbidity and mortality. It is reported to be the second most common cause of maternal death worldwide. Globally, incidence of hypertensive disorders in pregnancy is about 5-10%. Data collected from the National Eclampsia Registry (NER) of India shows the incidence of hypertensive disorders in pregnancy as 10.08% [1]. The prevalence of Preeclampsia in Assam was found out to be 57.4% [2].

Preeclampsia is characterized by elevated blood pressure and proteinuria after 20 weeks of gestation and upto 6 weeks postpartum, and/or associated organ involvement [3, 4]. It is unique to human pregnancy, and is characterized by abnormal vascular response to placentation associated with increased systemic vascular resistance, enhanced platelet aggregration, activation of coagulation system and endothelial dysfunction [5]. Although, the exact pathogenesis of preeclampsia still remains to be unrevealed and is most likely multifactorial, it is increasingly clear that pathological processes at the interface of the fetal and maternal circulation leading to generalized endothelial cell dysfunction contribute to the spectrum of the disease [6].

Recently, investigators have begun to classify preeclampsia based on the period of gestation at which first onset of the disease occurred. Early onset preeclampsia (EO-PE) is that which develops before 34 weeks of gestation and Late onset preeclampsia (LO-PE) is that which develops at or after 34 weeks of gestation. The two subtypes have similar clinical presentation but studies indicate that they are associated with different predisposing factors, heritability, biochemical markers and different maternal, foetal and neonatal outcome [7, 1].

Early onset preeclampsia (EO-PE) has been identified to be a placental disease and Late onset preeclampsia (LO-PE) as a maternal disease. EO-PE has familial predisposition suggestive of genetic factors and high recurrence risk. It is typically associated with placental dysfunction, reduction in placental volume, intrauterine growth restriction, abnormal uterine and umbilical artery Doppler studies, low birth weight, multiorgan dysfunction, perinatal death and adverse maternal and neonatal outcomes. For preeclampsia, the

complications often quoted are eclampsia, abruption placentae, renal failure and DIC [8, 9]. Foetal complications are foetal hypoxia leading to intrauterine growth restriction and death. Neonatal morbidity includes prematurity, low birth weight and asphyxia injury necessitating increased need of NICU admissions [10, 11].

Early onset preeclampsia in particular confers a higher risk of maternal and foetal complications. Early delivery of the foetus is the only definitive treatment for this condition, but this early termination is fraught with the risk of poor neonatal outcome [12, 13]. To counter this, expectant management is a strategy employed by Obstetricians to improve perinatal outcome, however this may lead to increased maternal complications [10, 11].

OBJECTIVES

- To identify the different risk factors in early onset preeclampsia.
- To study the fetomaternal outcomes in that group.

MATERIALS AND METHODS

Setting

It was a Cross-sectional study conducted in the Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati for a period of 1 year from July 2017 to June 2018. 100 antenatal patients with Early onset preeclampsia were included in the study.

Inclusion criteria

All pregnant women ≥20 weeks of gestation but <34 weeks of gestation with blood pressure ≥ 140/90 mm of Hg alongwith proteinuria.

Exclusion criteria

- Pregnant women with essential hypertension or hypertension present before 20 weeks of gestation.
- Pregnant women with first onset of hypertension or first detection of hypertension at ≥34 weeks of gestation.
- Patients with pre-existing renal disease, diabetes mellitus, liver disease and other medical disorders.

Data of the patients who were admitted with preeclampsia were collected in a proforma from time to time and were followed upto delivery and discharge. All the patients were subjected to clinical and obstetrical examination, laboratory investigations and ultrasound examination alongwith Doppler study of the umbilical artery.

Statistical analysis

Analysis was done and percentage involved was found out for age distribution, BMI, risk factors, maternal outcomes, and condition at birth, differences in birthweight and other neonatal complications. Chi square test was done and p value was found out for parity, severity of the disease, distribution of Doppler findings and variations in sex distribution of the babies born. A p value <0.05 was considered significant.

RESULTS AND OBSERVATIONS

Table-1: Age Distribution

Age group	Number of patients	Percentage (%)
15-19	4	4%
20-24	13	13%
25-29	51	51%
30-35	32	32%

Patients with Early onset preeclampsia presented more in the 25-39 years age group (51%) and the lowest was in the 15-19 years age (4%) (Table-1).

Almost all (94%) of the patients with Early onset preeclampsia were primigravida, which was statistically significant (p<0.05) (Table-2).

Table-2: Parity Distribution

Parity	Number of patients	Percentage (%)
Primigravida	94	94%
Multigravida	6	6%
Total	100	100%

Table-3: BMI Distribution

BMI (kg/m^2)	Number of patients	Percentage (%)
< 18.5	7	7%
18.5 – 24.9	66	66%
25 – 29.9	14	14%
> 29.9	13	13%

The highest number of patients with early onset preeclampsia had normal BMI (66%) and 13% of the patients were obese (Table-3).

26% of the patients had family history of preeclampsia, 30% of the patients had preeclampsia superimposed on chronic hypertension, all the multigravida patients (6%) had suffered from preeclampsia in their previous pregnancies and 28% of the patients had other co-existing medical disorders (Table-4).

Table-4: Relation of other Risk factors

Risk factors	Number of patients	Percentage (%)
Family h/o preeclampsia	26	26%
Chronic hypertension	30	30%
H/o preeclampsia in previous pregnancies	6	6%
Other co-existing medical disorders	28	28%

Table-5: Severity of the disease

	Number of patients	Percentage (%)
Mild preeclampsia (<160/110 mm hg)	26	26%
Severe preeclampsia (≥160/110 mm hg)	74	74%

Higher number of patients (74%) had or progressed to severe preeclampsia as compared to mild preeclampsia (26%) which was statistically significant ($p<0.05$) (Table-5).

Table-6: Maternal outcomes

	Number of patients	Percentage (%)
Eclampsia	20	20%
Sepsis	14	14%
Systemic disorders	24	24%
Other complications	16	16%
ICU admissions	9	9%
Maternal death	3	3%
Uneventful	46	46%

The incidence of complications was in eclampsia (20%), sepsis (14%), systemic disorders (24%), other complications (16%), ICU admissions (9%) and maternal deaths (3%) in Early onset Preeclampsia (Table-6).

Table-7: Distribution of Doppler findings

Doppler findings	Number of patients	Percentage (%)
Normal	72	72%
Abnormal	28	28%

Most of the patients with early onset preeclampsia had normal umbilical artery Doppler findings (72%) which was statistically significant ($p<0.05$).

Table-8: Condition at birth

Condition at birth	Number of patients	Percentage (%)
Live	74	74%
Stillborn	18	18%
Macerated stillborn	8	8%

74% of the pregnancies with early onset preeclampsia resulted in live births, 18% of the fetuses were stillborn while 8% of the fetuses were macerated stillborn.

Table-9: Differences in birthweight

Birthweight (kg)	EO-PE	Percentage (%)
> 3.5	0	0
2.5 – 3.5	2	2%
1.5 - < 2.5	43	43%
1 - < 1.5	38	38%
< 1	17	17%

Almost all (98%) of the babies born had low birthweight (<2.5 kg) while only 2 babies had normal birthweight (2.5-3.5 kg) and none of the babies had weight above 3.5 kg.

Table-10: Variations in sex of the baby

Sex of the baby	Number of patients	Percentage (%)
Female	48	48%
Male	52	52%

The statistical difference between the number of male and female babies born to a mother with early onset preeclampsia was not significant (p>0.05) (table 10).

Almost half (57%) of the babies born were admitted to NICU, 23% had APGAR score <7 at 5 minutes and 10% of the babies had meconium staining of amniotic fluid. Overall there were 42% perinatal/neonatal deaths (table 10).

Table-11: Other neonatal complications

Complications	Number of patients	Percentage (%)
Meconium staining of amniotic fluid	10	10%
Apgar score < 7 at 5 minutes	23	23%
Nicu admissions	57	57%
Perinatal/neonatal deaths	42	42%

DISCUSSION

In the present study, age of the patients ranged from 18 – 37 years. The highest numbers of patients were in the age group 25 – 29 years in EO – PE (51%), followed by 30 – 35 years (32%) and 20 – 24 years (13%) and then 15-19 years (4%). Though preeclampsia is described in extremes of age groups, there is no such trend seen in our study. Jeong E J *et al*., and Nagajan Bhadarka *et al.*, found no significant differences in maternal age between EO-PE and LO-PE [14, 15].

The incidence of Preeclampsia was found to be higher in Primigravida (n = 94) than in Multigravida (n = 6) in our study. It applied to both EO-PE and LO-PE**.** Raymond D *et al*., and Lisonkova *et al*., observed that primiparity increases the risk of EO-PE [9, 16].

Majority of the patients of EO-PE had normal BMI (66%). 13% of the patients were obese (BMI>30) in the EO-PE group. Rozanna Fang *et al.*, observed that pre – pregnancy and pregnancy obesity was associated with higher risk of Preeclampsia; though there was no such difference between EO-PE and LO-PE [17], which was similar to our findings.

26% of EO-PE patients had positive family history of Preeclampsia, which was similar to the findings of Jayashree *et al.*, who observed that family history of Preeclampsia was an important risk factor for development of EO-PE [18].

Only 6% of patients gave history of suffering from Preeclampsia in their previous pregnancies in EO-PE. This was similar to the conclusions of Jeong E J *et al.*, who found no significant differences in EO-PE with regards to presence of family history of Preeclampsia [19].

28% of patients with EO-PE had other co-existing medical disorders in our study. Adisorn *et al*., also concluded that presence of other systemic disorders was an important risk factor for EO-PE [19].

Most of the patients with EO-PE (74%) had or developed severe disease (≥ 160/110 mm Hg). This was similar to the observations made by Vinitha Wills *et al*., who found that Severe preeclampsia was more in patients of EO-PE than LO-PE [20].

In our study, the incidences of the maternal complications in EO-PE was found to be: Eclampsia (20%), Sepsis (14%), systemic disorders (24%) and other complications like PPH, abruptio placentae etc (16%). The number of ICU admissions (9%) and mortality (3%) was also high in EO-PE. Umran Kucukgoz Gulec *et al*., and Aziz A *et al*., concluded

that both maternal morbidity and mortality was higher in EO-PE [21, 22].

Overall in our study, the incidence of neonatal morbidity and mortality was higher in EO-PE. 28% of the foetuses had abnormal Doppler findings in the EO-PE group. The incidence of fresh stillbirth was 18% and IUFD (Macerated stillbirth) was 8%. Most of the babies born to early onset preeclamptic mothers had low birthweight (<2.5 kg) most probably due to the fact that foeto placental blood flow was compromised early in this group and pregnancy couldn't be continued for longer duration. Birth weight of most babies was between 1.5 – 2.5 kg in the EO-PE group (43%). Although the total number of male foetuses was higher (52%) than female foetuses (48%) in our study, we didn't find any such statistically significant differences between the two. Amongst the other neonatal complications, the incidence of meconium staining of amniotic fluid which was found to be 10%, 23% of foetuses had APGAR score < 7 at birth in EO-PE. Almost 60% of the babies born to mothers with EO-PE required NICU admissions. The perinatal/neonatal death rate was 42%. Jeong E J *et al.*, reported higher rates of intrauterine fetal death, low APGAR score and perinatal death in EO-PE and Lisonkova *et al.*, found that EO-PE is associated with high risk of fetal death and neonatal morbidity [19, 21].

CONCLUSION

Hypertensive disorders of pregnancy have become a challenging problem. Nowadays, in the society, people wish to have less number of children but with best possible quality in the future development of the growing children. The classification of Preeclampsia into Early onset and Late onset has both etiological and prognostic importance. Association of various risk factors with both EO-PE has been demonstrated in the study. Hence, both primordial and primary prevention has an important role to play in decreasing the incidence and prevalence of the disease. The need for regular antenatal checkups should be stressed upon so that gestational hypertension can be detected at an early stage before it progresses to preeclampsia and so that timely intervention can be made and thus avoiding an unfavourable outcome. Preeclampsia without severe disease can be tried with conservative management to improve the neonatal outcome. However as the severity of the disease increases, the rate of maternal and foetal complications worsens necessitating termination of pregnancy. Finally, we conclude that early detection, monitoring and timely intervention by the obstetrician and good neonatal care by the paediatrician is the key for successful outcome in Early onset preeclampsia.

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