Original Research Article

Effect of gestational age at admission on perinatal outcome in early onset pre-eclampsia cases

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Abstract

Background: Preeclampsia is the leading cause of maternal and perinatal morbidity and mortality worldwide. Early-onset PE poses a management dilemma. Delivery may benefit the mother, but may harm a premature fetus. Expectant management in women with early-onset PE before 34 weeks' gestation may reduce neonatal complications. **Aim:** To investigate the effect of gestational age at admission on perinatal outcome in early onset pre-eclampsia cases. **Material and Methods:** This cross – sectional study done to assess the perinatal outcome in 133 patients of pre-eclampsia in gestational age of 24-34 weeks with expectant management in a tertiary care hospital in a city in Maharashtra. The perinatal outcomes in those with gestational age <30 weeks and gestational age >30 weeks were compared. **Results:** The mean gestational age of women in study was 31.46±2.4 weeks. There was significant difference in the occurrence of intrauterine death, respiratory distress syndrome and birth asphyxia between the two groups ($p<0.01$). However, need for NICU admission, take home baby rate and incidence of maternal complications in the two groups were similar. **Conclusion:** With expectant management, pre-eclampsia not correlated with maternal mortality, but substantial neonatal mortality. If pre-eclampsia is picked up earlier in periphery and referred earlier to tertiary care centre, perinatal outcome is good.

Key Words: Gestational Age, perinatal Outcome, early onset pre-eclampsia, management.

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INTRODUCTION

Severe pre-eclampsia is one of the most serious problems faced by obstetricians, with a substantial increase in associated mortality and morbidity, both of mother and baby. The only definitive treatment is termination of pregnancy with delivery of the fetus and the placenta. Delivery benefits the mother but is often not in the interest of the fetus, if remote from term, because the primary prognostic factor for perinatal morbidity and mortality is gestational age at birth.[1] The concept of early onset pre-eclampsia depending on gestational age at onset is widely accepted. Early-onset PE poses a management dilemma. Delivery may benefit the mother, but may harm a premature fetus. Expectant management in women with early-onset PE before 34 weeks' gestation may reduce neonatal complications and stay in a Neonatal Intensive Care Unit (NICU).[2,3] This study was planned to investigate the effect of gestational age at admission on perinatal outcome in early onset pre-eclampsia cases.

MATERIAL AND METHODS

This cross-sectional study was conducted at Department of Obstetrics and Gynecology in a tertiary referral hospital in Maharashtra over a period of two years. Written approval from ethical committee, at the institute level was obtained.

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Sample size calculation: In a study by Agrawal *et al*,[4] the prevalence of pre-eclampsia symptoms in Maharashtra state was reported to 31% (p) among pregnant women. Using formula,

Sample size = $4pq/d^2$, where p = prevalence, q = 100-p, d = precision (10)

Sample size = $4 \times 31 \times 69 / 10^2 = 85.56 = 86$

Thus, as per sample size calculation we need at least 86 patients to study outcomes in patients of pre-eclampsia. It was decided to include all the patients that were possible during the period of data collection. Thus, at the end of this period, 133 patients were enrolled in the study.

Inclusion Criteria

1. Women with gestational age 24 to 34 weeks of gestation
2. Symptoms of early onset pre-eclampsia
3. Blood pressure of patients > 140\90 mm Hg
4. Patients eligible for expectant management of pre-eclampsia
5. Patients giving informed consent

Exclusion Criteria

1. Presence of eclampsia/ acute convulsions at the time of admission
2. Established Disseminated Intravascular Coagulation
3. Abruptio-placentae requiring termination of pregnancy
4. HELLP syndrome requiring termination of pregnancy
5. History of hypertension before pregnancy/ before 24 weeks of pregnancy

All the patients in the study were monitored in the ward using intensive non-invasive methods. Blood pressure, urine albumin, fetal movement count were recorded daily till the period of delivery. Weekly monitoring of abdominal circumference, symphysio-fundal height, complete blood count, liver function tests and renal function tests, fundoscopy and ultrasonography were performed as a routine for all patients.

Variables assessed

1. Maternal outcome in terms of mode of delivery, need for type of MgSO4 regimen, presence of complications like PPH, abruption, partial HELLP, HELLP, ARF, need for trauma ICU admission and need for number of blood transfusions.
2. Fetal outcome in terms of birth weight, APGAR scores at 0 and 5 minutes, survival of the fetus, presence of complications like IUGR, RDS, asphyxia, need for NICU admission and take home baby rate among babies admitted to NICU.

Statistical Analysis: The data was analyzed using SPSS version 21 software. Descriptive statistics were expressed in Mean±SD and percentages. Categorical variables were expressed as cross tables and analyzed using Chi square test. Data between two groups, which was not normally distributed, was compared using Mann-Whitney test. The level of significance in the study was 0.05 ($p<0.05$).

RESULTS

Majority of the women in study belonged to the age group of 18-22 years (45.9%), followed by 33.8% in the age group of 22-26 years. Few patients (15%) were in the age group of 26-30 years, while least (5.3%) were more than 30 years in age. It was evident that as the age increases the number of pre-eclampsia women decreases. Hence, pre-eclampsia occurs more commonly in young women. The mean age of patients in the study was 23.81+3.59 years.

Table 1: Distribution of gestational age

Gestational age	Frequency	Percentage
24-26wks	4	3%
27-29wks	24	18%
30-34wks	105	78.9%
Total	**133**	**100%**

More than 1/3rd women (78.9%) women in study had a gestational age of 30-34 weeks, on admission, while few had gestational age of less than 30 weeks (21%). The mean gestational age of women in study was 31.46±2.4 weeks. Primigravida constituted majority of study population (45%), followed by multigravida (35.34%) and second gravida (19.55%). In the present study, 6 primigravida, 1 second gravida and 3 multi gravida were known cases of pregnancy induced hypertension, and were on antihypertensive treatment. Either oral nifedipine or methyldopa was initiated in these patients, and they had controlled blood pressure on admission. Newly diagnosed patients of pre-eclampsia were started on antihypertensive treatment. Patients presenting with a blood pressure of <160/110 mm Hg were started on tablet nifedipine. If the blood pressure on presentation was >160/110 mm Hg, tablet labetalol was started. If patients presented with a blood pressure of >160/110 mm Hg in addition to premonitoring symptoms or symptoms suggestive of imminent eclampsia, they were started on antihypertensives along with Inj. Magnesium sulphate.1 elderly primigravida, 3 second gravida and 5 multi gravida had previous history of pregnancy induced hypertension (with history of infertility and treatment taken for the same in outside hospital). They were also patients of chronic hypertension with superimposed pre-eclampsia. They were ontablet amlodipine 5 mg once daily since 1.5 years. 1 second gravida married for the second time and no history of pre-eclampsia in her first pregnancy from first marriage, presented with severe pre-eclampsia. This might have been because it has been

found that pre-eclapmsia incidence increases with change in paternity of the fetus. Most common premonitoring symptom observed in study was headache (42.86%) followed by nausea (36.09%) and vomiting (33.08%), followed by blurring of vision (26.31%) and lastly epigastric pain (4.51%). Very few patients had epigastric pain or all symptoms. After initiation of antihypertensive treatment and anticonvulsant (Inj. Magnesium sulphate), almost 70% reported a decrease in premonitoring symptoms by 12 hours, while 100% reported decrease by 24 hours after initiation of treatment. All patients were started on oral nifedipine, except anemic and patients with history of previous LSCS. These were treated with oral labetalol. If the blood pressure was not found to be controlled on single medication, second medication was added. Patients with known case of pregnancy induced hypertension and already on antihypertensives but with blood pressure controlled, were continued with same medication. Among the patients, Pritchard's regimen was commonly used in 48.9%, while low dose regimen was used in 36.8%.All patients were started on Inj. MgSO4. All patients were given Inj. Betamethasone 12 mg im. followed by 12 mg after 12 hours. About 3/4th patients (77.4%) were delivered vaginally, while LSCS was performed in 22.6% patients. All patients with previous vaginal deliveries were induced with prostaglandins and Foley's catheter. Patients with previous history of 1 LSCS and giving consent for VBAC were induced with Foley's catheter. Patients with previous history of 2 LSCS were taken for LSCS.

Table 2: Gestational age affecting fetal outcomes

Fetal outcome		Gestational age <30 weeks	Gestational age >30 weeks	P value	Interpretation
Need for NICU admission	Yes	14	63	0.39	There was no significant difference in the need for NICU admission between those with less than 30 weeks compared to more than 30 weeks gestational age.
	No	14	42		
Intrauterine death	Yes	13	14	<0.01	There was significant difference in the number of intrauterine deaths those with less than 30 weeks compared to more than 30 weeks gestational age.
	No	15	91		
Presence of RDS	Yes	20	33	<0.01	There was significant difference in the presence of RDS in neonates, those with less than 30 weeks compared to more than 30 weeks gestational age.
	No	8	72		
Presence of asphyxia	Yes	11	16	<0.01	There was significant difference in the presence of asphyxia in neonates, those with less than 30 weeks compared to more than 30 weeks gestational age
	No	17	89		
Take home baby rate	Yes	19	9	0.09	There was no significant difference in take home baby rates those with less than 30 weeks compared to more than 30 weeks gestational age
	No	50	55		

Using Chi square test, the fetal outcomes in those with gestational age <30 weeks and gestational age >30 weeks were compared. It was found that there was significant difference in the occurrence of intrauterine death, respiratory distress syndrome and birth asphyxia between the two groups ($p<0.01$). Need for NICU admission and take home baby rate was similar in those with < 30 weeks and >30 weeks gestational age.

Table 3: Maternal complications according to gestational age

Maternal outcome		Gestational age <30 weeks	Gestational age >30 weeks	P value	Interpretation
Need for TICU admission	Yes	3	5	0.36	There was no significant difference in the need for TICU admission between patients with less than 30 weeks compared to more than 30 weeks gestational age
	No	25	100		
Presence of PPH	Yes	1	10	0.46	There was no significant difference in the occurrence of PPH between patients with less than 30 weeks compared to more than 30 weeks gestational age
	No	27	95		
Presence of ARF	Yes	4	4	0.06	There was no significant difference in the occurrence of ARF between patients with less than 30 weeks compared to more than 30 weeks gestational age
	No	24	101		

On comparing the maternal complications between those with gestational age < 30 weeks and >30 weeks, it was observed that incidence of complications in the two groups were similar.

DISCUSSION

In the present study, maternal and perinatal outcome in women with pre-eclampsia in the gestational age of 24-34 weeks was assessed in a tertiary care hospital in a city in Maharashtra. Number of studies have been conducted globally to study the maternal and perinatal outcome in women with pre-eclampsia. The mean gestational age in the current study was found to be 31.46±2.4 weeks, with 78.9% in the gestational age of 30-34 weeks. Median gestational age in Haddad *et al* study was 30.4 weeks.[5] The gestational age at diagnosis in Liu *et al* study was 29.3±7.9 weeks.[6]The mean gestational age at admission in Swamy *et al* study was 32 weeks (24-32).[7] In the study by Smitha *et al*, gestational age was <30 weeks in 8%, 30-36 weeks in 58% and ≥ 37 weeks in 34%women.[8] Thus, pre-eclampsia is more common in the women with more than 30 weeks gestational age, as observed in the current and similar studies. Primigravida constituted 45.11% of study population, 19.55% were second gravida and 35.34% were multi gravida. These findings have been almost similar to other studies.[6-9]As observed from the current and other study findings, primigravida contribute to pre-eclamptic population of women in range of 42-51%. In the current study, vaginal mode of delivery was attempted in 77.4% women while caesarean section was performed in 22.6% women. In study by Al-Mulhim *et al*, spontaneous vaginal delivery was done in 69.2% women, instrumental delivery was done in 8.2%, induced labour in 22.8% and caesarean was performed in 14.9%.[9] In study by Haddad *et al*, caesarean section was performed in 95.8% patients.[5] Caesarean delivery was performed in 87.3% women in Liu *et al* study.[6] In study by Bombrys *et al*, mode of delivery was vaginal in 20% patients and caesarean in 80% patients.[10] In study by Khawaja *et al*, 66.66% women were delivered vaginally, while 39.1% were delivered by caesarean section.[11] In study by Smitha *et al*, vaginal delivery was done in 56% while caesarean section was performed in 44%.[8] In WHOMCS, spontaneous labour was noted in 48.4% women, induced in 18.5% while caesarean was performed in 33.1% women.[12] The current study in comparison to other studies reported highest number of deliveries by vaginal mode. While studies in India and Pakistan reported high vaginal deliveries, developed nations preferred caesarean section as the mode of delivery in pre-elamptic women. This shows the developed – developing divide approach in the mode of delivery.

Table 4: Comparison of present study with similar studies

Sr. No.	Study	Age (Mean)	Gestational age (Mean)	Maternal mortality	NICU admission	IUGR	Neonatal compli.	Neonatal death
1.	Al-Mulhim *et al*[9]	-	-	0.3%	-	12.1%	-	3.5%
2.	Haddad *et al*[5]	31	30.4	0%	-	24.27%	44.35%	2.93%
3.	Liu *et al*[6]	30.9	29.3	0.82%	-	-	-	8.82%
4.	Bombrys *et al*[10]	27	30	-	-	27%	44%	-
5.	Khawaja *et al*[11]	-	-	8.69%	-	8.69%	-	13.04%
6.	Swamy *et al*[7]	23	32	-	55.3%	40.4%	-	5.31%
7.	Smitha *et al*[8]	-	-	-	42.2%	-	-	14.4%
8.	Abalos *et al* (WHOMCS)[12]	-	-	0.43%	-	-	20.6%	-
9.	Present study	23.8	31.4	0%	72.6%	33.84%	35.8%	11.28%

In the present study, significant association was found between gestational age at admission compared individually to that with intrauterine death, presence of respiratory distress and birth asphyxia. Some associations with outcome of perinatal and maternal complications have been noted by WHOMCS and Gong *et al.*[12,13] Gong *et al* observed that factors affecting neonatal mortality in women with pre-eclampsia were gestational age at admission, at delivery and systolic blood pressure before delivery.[13] WHOMCS observed that fetal and neonatal death, preterm birth and neonatal ICU admission was increased in patients of pre-eclampsia.[12]

CONCLUSION

With expectant management, pre-eclampsia not correlated with maternal mortality, but substantial neonatal mortality. Though pre-eclampsia is high risk pregnancy and if it is picked up earlier in periphery and referred earlier to tertiary care centre, fetal and maternal outcome is good and helps to reduce maternal and fetal morbidity and mortality.

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