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Original Research Article

A comparative analysis of fetal outcomes in pre-eclampsia and eclampsia: insights from vaginal, cesarean, and forceps deliveries

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ABSTRACT

Background: Pre-eclampsia and eclampsia are significant complications of pregnancy, characterized by hypertension and potential multi-organ dysfunction, which pose serious risks to both maternal and fetal health. This study aimed to analyze fetal outcomes in pre-eclampsia and eclampsia: insights from vaginal, cesarean, and forceps deliveries.
Methods: This observational cross-sectional study was carried out in the department of gynaecology and obstetrics at Dhaka medical college hospital, Dhaka, from July 2015 to December 2015. Patients of pre-eclampsia and/or eclampsia who attended the eclampsia ward in the department of gynaecology and obstetrics at Dhaka medical college and hospital, Dhaka were taken as the study population as per inclusion criteria. A total number of 100 patients presented with pre-eclampsia and/or eclampsia fulfilled the selection criteria and were taken as study subjects by purposive sampling method. Different statistical methods were adopted for data analysis. Statistical analysis was performed by using statistical packages for social sciences (SPSS-19).
Results: Regarding fetal outcomes, 81.0% of mothers had live births, with 49.0% normal, 19.0% asphyxiated, and 15.0% requiring NICU admission. Nine percent resulted in stillbirths; all linked to intrauterine devices (IUD). Delivery methods included 77.0% vaginal births, 22.0% cesarean sections, and one forceps delivery, indicating a predominant use of vaginal delivery among the patients.
Conclusions: The 81.0% of mothers experienced live births, and there were concerning rates of adverse outcomes, including asphyxia and NICU admissions. The high rate of vaginal deliveries (77.0%) raises questions about safety, especially given the stillbirths recorded.

Keywords: Fetal outcome, Vagina delivery, Cesarean section, Forceps delivery

INTRODUCTION

Preeclampsia is a condition characterized by widespread vascular endothelial dysfunction and vasospasm, typically occurring after 20 weeks of gestation and potentially presenting up to 4-6 weeks postpartum. Severe hypertension in preeclampsia is defined by a diastolic blood pressure of ≥110 mmHg or a systolic blood pressure of ≥170 mmHg on two separate occasions, along with significant proteinuria (at least 1 g/liter), which constitutes severe preeclampsia.[1] If a pregnant woman with preeclampsia experiences seizures or coma, the condition is classified as eclampsia. Globally, the incidence of preeclampsia is estimated to affect 5-14% of all pregnancies.[2] In Bangladesh, the incidence of eclampsia is notably high at 7.9%, not including cases of preeclampsia, based on a house-to-house survey.[3] According to the RCOG guidelines, when severe preeclampsia or eclampsia is diagnosed after 34 weeks of gestation, delivery is the most appropriate course of action.[4] The choice of delivery method depends on the severity of the disease and the likelihood of successful labor induction. Labor induction,

an intervention used to artificially initiate uterine contractions leading to cervical dilation and effacement, can result in birth. However, the main challenges during induction are ineffective labor and excessive uterine activity, which may lead to fetal and maternal distress.[5] Prostaglandin analogs, such as misoprostol, dinoprostone, and carboprost, are commonly used for labor induction and augmentation. Among these, misoprostol is preferred due to its affordability, ease of storage at room temperature, and minimal systemic side effects. WHO guidelines recommend the use of misoprostol for labor induction in cases of severe preeclampsia or eclampsia when the cervix is unfavorable.[5] Misoprostol, a synthetic analog of prostaglandin E1 (PGE1), promotes uterine contractions and cervical ripening, unlike oxytocin, which only induces myometrial contractions. Misoprostol is considered safe, cost-effective, and effective in causing cervical ripening.[6] It is rapidly absorbed regardless of the route of administration. Studies have shown that administering misoprostol before oxytocin infusion reduces the need for oxytocin, indicating a synergistic effect between the two. Frass et al carried out a prospective comparative study in Al-Thawara general hospital Sana'a, Yemen.[7] The neonatal outcomes of both groups were also similar. Misoprostol is significantly more effective for labor induction than oxytocin/PGE2 gel. The maternal intrapartum and neonatal outcomes were the same for both induction regimens. From a clinical and perinatal perspective, misoprostol is an acceptable choice for labor induction. Nahar et al conducted a prospective observational study in 135 severe pre-eclampsia and eclampsia patients.[8] Neonatal death occurred in five (11.3%) and eight cases (12.1%), respectively. Intravaginal misoprostol is well tolerated and very effective for the induction of labor in severe pre-eclampsia and eclampsia patients with unripe cervix. Frass et al carried out a prospective comparative study in Al-Thawara General Hospital Sana'a, Yemen.[7] The vaginal delivery was achieved in 69.6% in the study group versus 15.8% in the control group. The overall cesarean section was performed in 30.3% of the study group versus 84.2%. This study aimed to analyze fetal outcomes in pre-eclampsia and eclampsia: insights from vaginal, cesarean, and forceps deliveries.

METHODS

This observational cross-sectional study was carried out in the department of gynaecology and obstetrics at Dhaka medical college hospital, Dhaka, from July 2015 to December 2015. Patients of pre-eclampsia and /or eclampsia who attended the eclampsia ward in the department of gynaecology and obstetrics at Dhaka medical college and hospital, Dhaka were taken as the study population as per inclusion criteria. A total number of 100 patients presented with pre-eclampsia and/or eclampsia fulfilled the selection criteria and were taken as study subjects by purposive sampling method. Fifty mcg of misoprostol was provided orally every 6 hours in these studies was 20 mcg. When the cervix became 4 cm dilated oxytocin was provided. Computer-based statistical analyses were carried out with appropriate techniques and systems. All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Different statistical methods were adopted for data analysis. Statistical analysis was performed by using window-based computer software devised with SPSS-19 (SPSS Inc, Chicago, IL, USA). A 95% confidence limit was taken. The summarized data was interpreted accordingly and was then presented in the form of tables. Informed written consent was taken from the patients. Ethical clearance was taken by the ethics committee of Dhaka medical college hospital.

Inclusion criteria

All eligible women with a pregnancy at >34 weeks of gestation, with severe pre-eclampsia and eclampsia, with an unfavorable cervix, Ingleton gestation and cephalic presentation were included.

Exclusion criteria

All women with previous uterine surgery, placenta previa or placental abruption, genital infection with herpes simplex virus, multiple gestations, abnormal heart rate patterns, abnormal end-diastolic velocity in the umbilical artery, expected cephalopelvic disproportion, premature rupture of the membranes, active labor and other maternal or fetal conditions that would preclude labor induction and gestational age <34 weeks were excluded.

RESULTS

Table 1 shows the distribution of patients according to age. Most of the patients (79.0%) were in the age group 21-30 years. Sixteen patients were below or equal to 20 years old and only 5 patients were more than 30 years old.

Table 1: Distribution of patients according to age, (n=100).

Age (in years)	N	Percentages (%)
≤20	16	16.0
21-25	49	49.0
26-30	30	30.0
>30	5	5.0
Total	100	100.0
Mean±SD	24.48±3.63	
Range (Min-Max)	18-35	

Table 2 shows the distribution of patients according to gravida. Sixty-one percent of patients had primigravida and 39.0% had multigravida.

Table 3 shows the distribution of patients according to ante-natal checkup. Twenty percent of patients never

visited for ante-natal checkups, 42.0% visited irregularly and 38.0% visited regularly for ante-natal checkups.

Table 2: Distribution of patients according to gravida, (n=100).

Gravida	N	Percentages (%)
Primigravida	61	61.0
Multigravida	39	39
Total	100	100.0

Table 3: Distribution of patients according to ante-natal checkup, (n=100).

Ante-natal checkup	N	Percentages (%)
No (0 visit)	20	20.0
Regular (4 visits)	38	38.0
Irregular (<4 visit)	42	42.0
Total	100	100.0

Table 4 shows the distribution of patients according to fetal outcome. Eighty-one percent of mothers gave live birth and nine percent gave stillbirth. Of 81 live births, 49.0% were normal, 19.0% were asphyxiated, 15.0% were admitted to NICU and 8.0% were asphyxiated and admitted into NICU. IUD was the reason for all stillbirths.

Table 4: Distribution of patients according to fetal outcome, (n=100).

Fetal outcome	N	Percentages (%)
Live birth	49	49.0
Live birth (asphyxiated)	19	19.0
Live birth (NICU admission)	15	15.0
Live birth (asphyxiated + NICU admission)	8	8.0
Still birth (IUD)	9	9.0

Table 5: Distribution of patients according to fetal outcome in different delivery systems, (n=100).

Fetal outcome	Type of delivery			Total
	Vaginal	CS	Forceps	
Live birth	68 (88.3)	22 (100.0)	1 (1.00)	81 (81.0)
Stillbirth	9 (11.7)	0 (0.0)	0 (0.0)	9 (9.0)
Total	77 (100.0)	22 (100.0)	1 (1.00)	100 (100.0)

Table 5 shows fetal outcomes in different delivery systems. Seventy-seven percent delivery was vaginal, 22.0% by cesarean section, and 1 by forceps.

DISCUSSION

Eclampsia and pre-eclampsia are well-recognized causes of maternal and neonatal mortality. Preeclampsia complicates 5-8% of pregnancies, and severe preeclampsia is responsible for an important proportion of fetal and maternal morbidity and mortality.[9,10] Delivery remains the only definite treatment. There is a general agreement to terminate the pregnancy when maternal or fetal conditions are deteriorated, or once 34 weeks gestation is reached.[10] However, the mode of delivery after 34 weeks in women with severe preeclampsia with unfavorable cervix remains a controversial issue in obstetrics.[11] The induction of labor is difficult and risky because these patients are often far from term and mostly have unfavorable cervix.[12] So, cervical ripening and labor induction are especially important in hypertensive pregnancy. This cross-sectional observational study was carried out on 100 pre-eclampsia and eclamptic patients. Most of them (79.0%) were in the age group 21-30 years. Sixteen patients (16.0%) were below or equal to 20 years old and only 5 patients (5.0%) were more than 30 years old. The mean age was 24.48±3.63 within the range of 18-35 years. Khan et al found the majority of the cases belonged to the 21-30 years age group in their respective study.[13] The ante-natal checkup data indicate that 20.0% of patients had no visits, while 42.0% attended irregularly. These findings raise concerns regarding access to prenatal care, which is crucial in managing high-risk pregnancies.[14] Regarding fetal outcome, 81.0% of mothers gave live birth and 9.0% gave stillbirth. Of 81 live births, 49.0% were normal, 19.0% were asphyxiated, 15.0% were admitted to NICU and 8.0% were asphyxiated and admitted into NICU. IUD was the reason for all stillbirths. Seventy-seven percent of deliveries were vaginal, 22.0% in cesarean section, and 1 by forceps. Nahar et al found vaginal delivery in 80.5% of cases, and cesarean section was performed in 20.6% of severe pre-eclampsia and eclampsia patients who were provided misoprostol and 35% of cases misoprostol along with oxytocin.[8]

The vaginal delivery was achieved in 69.6% in the study of Frass et al where only misoprostol was used for induction.[15] The caesarean delivery rate was 17.3% in the oxytocin group and 8.7% in the misoprostol group.[16] In examining stillbirths, it is noteworthy that all were associated with vaginal deliveries. This finding is in line with literature that indicates higher stillbirth rates in cases of severe maternal conditions.[17]

The data indicate that while a majority of the mothers experienced live births (81.0%), there remains a concerning rate of adverse outcomes, including asphyxiated births and NICU admissions, emphasizing the ongoing risks associated with pre-eclampsia and eclampsia. The high rate of vaginal deliveries (77.0%) and associated stillbirths raise critical questions about the safety of this mode of delivery in severe cases.

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The 81.0% of mothers experienced live births, and there were concerning rates of adverse outcomes, including asphyxia and NICU admissions. The high rate of vaginal deliveries (77.0%) raises questions about safety, especially given the stillbirths recorded.

Recommendations

To improve outcomes for mothers and infants affected by pre-eclampsia and eclampsia, it is essential to enhance access to and quality of prenatal care, ensuring regular monitoring and education on the importance of ante-natal visits. A multi-disciplinary approach should be adopted for comprehensive management, and robust postnatal follow-up care must be established to monitor long-term health outcomes.

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