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ISSN: 2617-0817 E-ISSN: 2789-5912

Original Article

Induction-Delivery Intervals between Misoprostol Alone and Combined Oxytocin-Misoprostol across Different Gestational Ages in Pre-Eclampsia & Eclampsia

DOI: dx.doi.org

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Received: 28 Jan 2024
Accepted: 4 Feb 2024
Published: 14 Nov 2024

Published by:
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ABSTRACT

Introduction: *Induction of labor in women with pre-eclampsia and eclampsia is a critical aspect of managing high-risk pregnancies, where timely delivery is often essential to prevent maternal and fetal complications. This study aims to compare the induction-delivery intervals between the use of misoprostol alone and in combination with oxytocin across different gestational ages in women with pre-eclampsia and eclampsia.* ***Methods & Materials:*** *This observational cross-sectional study was carried out in the Department of Gynaecology & Obstetrics at Dhaka Medical College Hospital, Dhaka, from July 2015 to December 2015. The study included 100 pre-eclampsia and eclampsia patients from the Eclampsia Ward at Dhaka Medical College, selected via purposive sampling. Data analysis was conducted using SPSS-19.* ***Result:*** *In the misoprostol-only group, the mean time from induction to delivery was 17.80 ± 4.17 hours for women with a gestational age of ≤36 weeks and 17.00 ± 4.15 hours for those >36 weeks, with no statistically significant difference between the two groups (p = 0.342). When oxytocin was added to misoprostol, the induction-delivery interval decreased to 8.30 ± 2.54 hours for ≤36 weeks and 7.68 ± 2.49 hours for >36 weeks, but again, the difference was not statistically significant (p = 0.224).* ***Conclusion:*** *Combining oxytocin with misoprostol shortens induction-delivery time compared to misoprostol alone, with no differences between gestational age groups. Further research is needed on maternal and neonatal outcomes.*

Keywords: *Induction-Delivery Intervals, Misoprostol, Gestational Ages, Pre-Eclampsia, Eclampsia*

(The Planet 2023; 7(2): 172-175)

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INTRODUCTION

Preeclampsia is a disorder of widespread vascular endothelial malfunction and vasospasm that occurs after 20 weeks gestation and can present as late as 4-6 weeks postpartum. There is consensus that severe hypertension is confirmed with a diastolic blood pressure ≥ 110 mm Hg or systolic blood pressure ≥ 170 mm Hg on two occasions and that, together with significant proteinuria (at least 1 g/liter), this constitutes severe pre-eclampsia [1]. On the other hand, when pregnant women with preeclampsia develop seizures or coma then it is known as eclampsia. The global incidence of preeclampsia has been estimated at 5-14% of all pregnancies [2]. The incidence of eclampsia is extraordinarily high in Bangladesh - 7.9% [3]. According to RCOG guidelines when severe preeclampsia/eclampsia is diagnosed after 34 weeks gestation, delivery is most appropriate [4]. Labor induction is an intervention that artificially initiates uterine contractions leading to progressive dilatation and effacement of the cervix and birth of the baby. The main problems experienced during induction are ineffective labor and excessive uterine activity, which may cause fetal and maternal distress [5]. Prostaglandin analogs (misoprostol, dinoprostone, carboprost) are used in labor induction and augmentation. Among them misoprostol is preferred since it is inexpensive, easily stored at room temperature, and has few systemic side effects. WHO guidelines address induction of labor with misoprostol in severe pre-eclampsia or eclampsia when the cervix is unfavorable [5]. Misoprostol, a pharmacological analog of prostaglandin E1 (PGE1), has uterotonic and cervical ripening actions in contrast to oxytocin which provides only myometrial contractions [6]. It is rapidly absorbed regardless of the route of administration. Administering misoprostol before the oxytocin infusion has been shown to reduce the need for oxytocin, suggesting a synergistic action of misoprostol with oxytocin. A study was conducted in a hospital in Turkey to compare the efficacy and complications of intravaginal misoprostol application before starting oxytocin infusion with oxytocin infusion alone for labor induction. They found Intravaginal application of 50 mg misoprostol before starting oxytocin infusion is a more effective method of labor induction than oxytocin infusion alone [6]. Another trial compared the efficacy and complications of intravaginal misoprostol application with an oxytocin infusion for induction of labor in toxemia of pregnancy. The results of this study demonstrated that the rate of patients who were in labor after 12 hours was 94% and 80% in the misoprostol group and the oxytocin group, respectively (P < .05); Researchers concluded that intravaginal misoprostol is an efficacious, inexpensive, and safe method of induction of labor in severe preeclampsia and

ISSN: 2617-0817 E-ISSN: 2789-5912

eclampsia [7]. Nahar et al., conducted a prospective observational in 135 severe pre-eclampsia and eclampsia patients who required termination of pregnancy [8]. Induction to delivery time was a median of 8 h, with interquartile ranges of 4.2-8.2 h in the severe pre-eclampsia group, and a median of 9 h, interquartile ranges of 6.8-12.5 h in the eclampsia group, and average hospital stay were 3.4 +/- 1.8 and 3.7 +/- 1.7 days, respectively. This study aimed to analyze induction-delivery intervals between misoprostol alone and combined oxytocin-misoprostol across different gestational ages in pre-eclampsia & eclampsia.

METHODS & MATERIALS

This observational cross-sectional study was conduted in the Department of Gynaecology & 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 & 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. 50 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 Statistical Packages for Social Sciences (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 obained 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,
- Cephalic presentation

Exclusion criteria

- 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.
- Gestational age <34 weeks

RESULTS

Table – I: Distribution of patients according to age (*n*=100)

Age (years)	n	%
≤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 I 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 – II: Distribution of patients according to gravida (*n*=100)

Gravida	n	%
Primigravida	61	61.0
Multigravida	39	39
Total	100	100.0

Sixty-one percent of patients had primigravida and 39.0% had multigravida in this study.

Table – III: Distribution of patients according to gestational age (*n*=100)

Gestational age (weeks)	n	%
≤36	55	55.0
37 – 39	45	45.0
Total	100	100.0

Maximum 55.0% of patients had a gestational age less than or equal to 36 years and 45.0% of patients' gestational age from 37 to 39 weeks.

Table – IV: Induction delivery interval in Misoprostol and Oxytocin with Misoprostol in different gestational age (*n*=100)

Induction	Time interval (hours)		p values
	GA ≤36 weeks (Mean ± SD)	GA >36 weeks (Mean ± SD)	
Misoprostol	17.80 ± 4.17	17.00 ± 4.15	0.342
Oxytocin + Misoprostol	8.30 ± 2.54	7.68 ± 2.49	0.224

An unpaired t-test was done to measure the level of significance.

ISSN: 2617-0817 E-ISSN: 2789-5912

Table IV shows the Induction delivery interval in Misoprostol and Oxytocin with Misoprostol in different gestational ages. The mean time between 1st dose of misoprostol and delivery was 17.80 ± 4.17 hours in the ≤36 weeks gestational age group and 17.00 ± 4.15 hours in the>36 weeks gestational age group. There was no statistically significant difference between these two groups. The mean time between 1st dose of oxytocin with misoprostol and delivery was 8.30 ± 2.54 hours in the ≤36 weeks gestational age group and 7.68 ± 2.49 hours in the>36 weeks gestational age group. There was no statistically significant difference between these two groups.

DISCUSSION

Eclampsia and pre-eclampsia are recognized as major contributors to maternal and neonatal mortality worldwide. These conditions are associated with significant risks of maternal and fetal morbidity and mortality, particularly in cases of severe pre-eclampsia. While the only definitive treatment is delivery, the timing and mode of delivery remain challenging, especially when the cervix is unfavorable, which is often the case in these high-risk pregnancies. For women with severe pre-eclampsia, particularly after 34 weeks of gestation, the decision to induce labor versus opting for cesarean delivery remains controversial. The process of labor induction is complex due to the heightened risks of maternal and fetal complications, necessitating effective cervical ripening agents and close monitoring. 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 & 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]. Maximum 55.0% of patients had a gestational age less than or equal to 36 years and 45.0% of patients' gestational age from 37 to 39 weeks. There 58% delivery occurred at <35 weeks gestational age and 42% delivery occurred at ≥ 35 weeks gestation pre-eclampsia patients [13]. The mean number of misoprostol dosing was 2.08 ± 0.83 doses and the mean time between 1st dose and delivery was 17.44 ± 4.16 hours. The mean time between 1st dose of oxytocin and delivery was 8.03 ± 2.58. Frass et al. revealed that the mean time between 1st dose of misoprostol and delivery was 12.12±2.1 hours and the mean dosing was 2.77±1.3. Balci et al. found that the mean time from induction to delivery was 9.36+/-1.97 hours whereas Misoprostol and Oxytocin both were used for induction [14, 15]. The mean time between 1st dose of misoprostol and delivery was higher in our study comparing other studies.

Limitations of The Study

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

CONCLUSION

Combining oxytocin with misoprostol significantly shortens the induction-delivery interval compared to using misoprostol alone. However, no significant differences were observed between gestational age groups (≤36 weeks vs. >36 weeks) in either treatment. While the combination method is more efficient in reducing induction time, further research is needed to evaluate its impact on maternal and neonatal outcomes.

RECOMMENDATION

It is recommended that combined oxytocin and misoprostol be considered for labor induction in women with pre-eclampsia and eclampsia, as it significantly shortens the induction-delivery interval compared to misoprostol alone. This approach may be particularly beneficial for managing high-risk pregnancies where timely delivery is critical.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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