ORIGINAL RESEARCH

Maternal and Fetal Outcomes Following Vaginal Misoprostol Induction: A Comprehensive Analysis

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ABSTRACT
Background: The objective of this study is to assess the effectiveness and safety of using a low dose of vaginal misoprostol, specifically 25 µg, for the induction of labor. Labor induction is a critical medical intervention, often necessary for the well-being of both the mother and the fetus. The choice of medication and its dosage is crucial to ensure a smooth and successful induction process while minimizing potential risks. This research seeks to provide valuable insights into whether this lower dosage of misoprostol is a safe and effective option for labor induction, aiming to improve obstetric practices and maternal and fetal outcomes. **Methods**: In this study, 100 primigravida women were included and randomly divided into two groups. The first group received a low dose of 25 µg of misoprostol for cervical ripening and labor induction, while the second group served as the control, with no induction, allowing for the spontaneous progression of labor. The BISHOP prelabor scoring system was employed to evaluate the favorability of the cervix for labor induction, which considers various cervical parameters. **Results**: In this study, the majority of cases fell within the age group of 20-24 years, and most women in the case group had an unfavorable cervix with a Bishop Score of 6 or less. A significant difference was observed in the time it took for labor to begin actively between the two groups, with the induction group showing a notable advantage ($p < 0.05$). This finding suggests that low-dose misoprostol induction significantly reduced the time required for labor to progress into the active stage compared to allowing labor to initiate spontaneously. The study's results shed light on the potential benefits of using low-dose vaginal misoprostol for labor induction in primigravida women. **Conclusion**: Misoprostol has proven to be an effective agent for cervical priming and labor induction. However, it's important to note that its use may lead to a higher incidence of meconium-stained amniotic fluid, particularly in cases where the cervix is unfavorable. This increased incidence of meconium staining can have significant consequences, including a higher rate of cesarean deliveries due to concerns related to meconium-stained amniotic fluid

Keywords: Induction of labour, Bishop Score, Misoprostol, Cervical ripening

INTRODUCTION

Induction of labor is a medical procedure designed to initiate the process of childbirth artificially. It is typically achieved by administering oxytocin or prostaglandins to the expectant mother or by manually breaking the amniotic sac. In recent years, there has been a notable increase in the use of labor induction to reduce the duration of pregnancy[1].

In developed nations, it is not uncommon for as many as one in four pregnancies to result in term deliveries following labor induction[2,3]. This approach is often employed for various reasons, such as medical complications or the well-being of both the mother and the baby. The decision to induce labor is made based on a careful evaluation of these factors to ensure the best possible outcome for both[4].

Professional medical organizations have developed guidelines recommending the use of labor induction in specific situations where the potential risks associated with waiting for natural labor to begin outweigh the risks linked to inducing labor[5,6]. These situations typically involve pregnancies that have reached 41 completed weeks or more, prelabor rupture of the amniotic membranes, hypertensive disorders, maternal health complications, fetal death, fetal growth restriction, chorioamnionitis, multiple pregnancies, vaginal bleeding, and other complications. These guidelines serve as a valuable reference for healthcare providers in making informed

decisions about when and how to induce labor for the well-being of both the mother and the baby[7,8].Despite the absence of formal guidelines recommending it, there's a growing trend in the use of labor induction upon the request of pregnant women[9]. This practice is driven by the desire to expedite the pregnancy's duration or to align the baby's birth with the mother's or healthcare workers' convenience. It's important to note that these elective inductions should be carefully considered, taking into account potential risks and benefits, and should be discussed thoroughly between healthcare providers and expectant mothers to make informed decisions that prioritize maternal and fetal health.

MATERIALS AND METHODS

In a study conducted over one year, a total of 100 primigravida women were included and randomly assigned to one of two groups. The first group received induction of labor with 25 µg of misoprostol for cervical ripening, while the second group served as the control and did not undergo induction, allowing for the natural progression of labor[10]. The Bishop'sprelabor scoring system was utilized to evaluate the favorability of the cervix for labor induction. This system assesses various cervical factors to determine whether the cervix is conducive to labor induction. The study aimed to compare the outcomes of induced labor with those of spontaneous labor and assess the effectiveness of misoprostol in cervical ripening for labor induction in primigravida women.The progress of labor in both groups was closely monitored through vaginal examinations conducted at 4-hour intervals. These examinations were performed to assess the advancement of labor in terms of cervical dilatation, cervical effacement, and the descent of the presenting part of the baby[11]. In the group that received misoprostol induction, the dose was repeated every 4 hours once the cervical dilatation reached approximately 3-4 cm, provided that the amniotic membranes had not ruptured. If the membranes were still intact, artificial rupture of membranes (ARM) was performed, and the color of the amniotic fluid was carefully noted as part of the evaluation process. This approach allowed for the continuous monitoring of labor progress and ensured that any necessary interventions, including repeat dosing of misoprostol and ARM, were carried out according to the specific criteria and clinical findings.Based on the Modified Bishop Scoring (MSL) criteria, women were assessed for their readiness to progress to the next stage of labor. However, if any signs of fetal distress, tachysystole (excessive uterine contractions), or hyperstimulation (excessive contractions resulting in inadequate recovery time between contractions) were observed, the administration of the next dose of misoprostol was postponed or deferred[12]. This cautious approach ensured that the safety and well-being of both the mother and the fetus were a top priority, and interventions were adjusted accordingly to minimize any potential risks or complications.

In this study on the induction of labor, specific inclusion and exclusion criteria were established to determine which pregnant women would participate. The inclusion criteria encompassed various conditions, such as postdated pregnancies beyond the expected due date, premature rupture of membranes (PROM) occurring after 37 weeks of gestation, pregnancy-induced hypertension (PIH), intrauterine growth restriction (IUGR), and oligohydramnios, which involves insufficient amniotic fluid. It was also essential that color Doppler studies demonstrated normal blood flow in these cases. On the other hand, the exclusion criteria aimed to exclude individuals with particular risk factors. These criteria included a history of previous uterine scarring, such as prior uterine surgeries or cesarean sections, as well as unexplained maternal pyrexia or fever. Difficult previous deliveries, uterine rupture, abnormal fetal presentation, placental issues like placenta previa or vasa previa, cord presentation, and unexplained uterine bleeding were also grounds for exclusion[13]. These criteria played a crucial role in identifying suitable participants for the study while ensuring the safety and validity of the research.

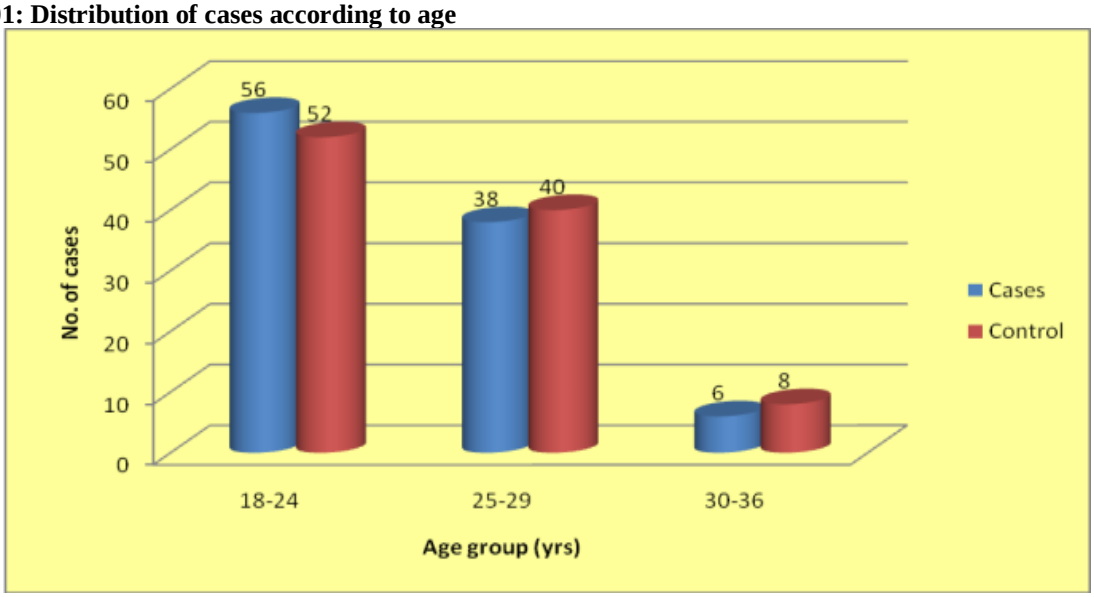
RESULTS

Distribution of cases within different age groups in both the case and control groups. In the case group, 26 cases (26%) fell into the 20-24 years age group, while in the control group, 24 cases (22%) were within the same age range. The 25-29 years age group consisted of 28 cases in the case group and 22 cases in the control group[14]. For the 30-36 years age group, there were 6 cases (6%) in the case group and 8 cases (8%) in the control group. It is noteworthy that the majority of cases, 44 in the case group and 42 in the control group, were concentrated within the 18-29 years age group.

Table 1: Distribution of cases according to booked/unbooked

Status	Cases		Control	
	No.	%	No.	%
Booked	25	25	10	10
Unbooked	35	75	40	90
Total	100	100	100	100

Fig 01: Distribution of cases according to age



Among the 50 cases, 7 cases (8%) in the case group and 8 cases (13%) in the control group were found to be illiterate. A larger proportion of participants in the case group, 23 cases (46%), had education up to the primary and middle school level compared to the control group, where 22 cases (42%) had similar educational backgrounds[15]. In the category of education up to high school and intermediate, there were 15 cases (30%) in the case group and 17 cases (32%) in the control group. Finally, in the group with education up to graduation, 5 cases (10%) were observed in the case group, while 3 cases (6%) were seen in the control group.

Table 2: Distribution of cases according to education

Education	Cases	Control
	No.	No.
Illiterate	7	8
Primary and middle	23	22
High school and intermediate	15	17
Graduate	5	3
Total	50	50

Table 4: Distribution of cases according to pre induction Bishop Score

Bishop Score on admission	Cases	Control
	No.	No.
1	22	23
2	14	17
3	11	6
4	2	3
5	1	1
Total	50	50

The data reveals that in the case group (induction group), most of the women had lower Bishop scores before induction. Out of the 50 cases, 22 had a Bishop score of 1, 14 had a score of 2, 13 had a score of 3, 2 had a score of 4, and 1 had a score of 5.In the control group (no induction), Bishop scores were distributed differently. Out of the 50 cases, 23 had a Bishop score of 1, 17 had a score of 2, 6 had a score of 3, 3 had a score of 4, and 1 had a score of 1. This distribution suggests that the women in the control group generally had higher Bishop scores compared to the induction group.

In the case group, 7% of cases experienced birth asphyxia, while in the control group, this figure was 3%. Meconium-stained liquor (MSL) was observed in 17% of cases in the case group and 12% in the control group. Respiratory distress syndrome (RDS) was found in 10% of cases in the case group, while the control group also had a 10% incidence. However, when it comes to meconium aspiration syndrome (MAS), it was identified in 4% of cases in the case group and none in the control group. These results indicate that a majority of complications were

observed in the case group compared to the control group[16].

DISCUSSION

The literature suggests that oral misoprostol has advantages over vaginal misoprostol, including fewer side effects such as hyperstimulation, hypertonicity, and tachysystole, while maintaining similar neonatal outcomes. In this study, a significant difference (p=0.025) in the incidence of hyperstimulation was observed, with the vaginal group experiencing a higher rate (18%) compared to the oral group (4%). This finding aligns with previous research that reported a 0% incidence of hyperstimulation in the oral group versus 11.3% in the vaginal group. Furthermore, uterine tachysystole was less common in the oral group (10%) compared to the vaginal group (24%), a pattern consistent with the results of other studies (10% versus 32%). These outcomes emphasize the potential benefits of oral misoprostol in reducing adverse effects during labor induction.

In our study, while the vaginal group had a higher number of women experiencing fetal distress and hyperstimulation compared to the oral group, there were no significant differences in neonatal outcomes[17]. This included similar APGAR scores at both 1 and 5 minutes after birth and comparable rates of neonatal intensive care unit (NICU) admissions. These findings align with results from other studies, emphasizing that despite the differences in maternal experiences during labor induction, the well-being of the newborns, as indicated by APGAR scores and NICU admissions, remained consistent between the two groups.

CONCLUSION

The findings of the present study indicate that misoprostol is effective in enhancing the Bishop's score for cervical ripening, with the outcome depending on the pre-induction Bishop's score. It's worth noting that, despite more vaginal deliveries in the control group, the induction group exhibited a higher rate of cesarean sections. Induction of labor was associated with a significantly elevated risk of cesarean delivery, particularly in nulliparous (women giving birth for the first time) individuals.The study suggests that augmenting induction methods could help reduce the rate of primary cesarean deliveries among nulliparous women. It's crucial for healthcare providers to counsel patients before initiating labor induction, discussing factors like costs and the potential risks of additional procedures. Additionally, evidence-based protocols for cervical ripening and induction should be readily available at the regional level to ensure safe and effective practices in this regard.

REFERENCES

1. World Health Organization. International Statistical Classification of diseases and Related Health Problem, 10th revision, Genera (CH). World Health Organization. 2006.
2. American Academy of Pediatrics/American College of Obstetrics &Gynaecology. Appendix D: Standard Technology for reporting of reproductive health statistics in the United States. In: Guidelines for perinatal Care. 6th Ed. EIK Grove (IL): AAP/ACOG; 2007 p. 389-404.
3. Briscoe D, Ngaryen N, Mencer M, Gutam N, Kalb DB. Management of pregnancy beyond 40 weeks gestation. Am Fam Physician 2005;71(10):1935-41.
4. Biswas A, Arulkumaran S. Induction of labour. Obst. &Gynae. for Postgraduate Vol. 2, First Edition 197-210.
5. The Netherland Perinatal Registry 2008.
6. Martin JA et al. Births: Final data for 2008, Natl Vital Stat Rep 2010;1:71.
7. Gulmezoglu AM, Growther CA, Middleson P. Induction of labour for improving birth outcomes for women at or beyond term. Chchrane Database Syst Rev 2006 Oct;18(4):CD004945.
8. Koopmans CM, Bijlenga D, Aarnoudse JG, van Beek E, Bekedam DJ, van den Berg PP et al. Induction of labour versus expectant monitoring in women with pregnancy induced hypertension or mild preclampsia at term: the HYPITAT trial. BMC Pregnancy Childbirth. 2007;7:14.
9. Bishop E. Pelvic scoring for elective induction. ObstetGynecol1964;24:266-268.
10. Calder AA, Brennand JE. Labor and normal delivery: induction of labor. CurrOpinObstetGynecol1991;3:764.
11. Vrouenraets FP, Roumen FJ, Dehing CJ, vanden Akker ES, Aarts MJ, Scheve EJ. Bishop Score and risk of caesarean delivery after induction of labour in nulliparous women. ObstetGynaecol 2005;105(4):690
12. Caughey AB, Sundaram V, Kaimal AJ, Cheng YW, Gienger A, Little SE, et al. Maternal and neonatal outcomes of elective induction of labor. Evidence report/technology assessment. 2009(176):1.
13. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Kirmeyer S, et al. Births: final data for 2005. National vital statistics reports. 2007;56(6):1-103.
14. National Collaborating Centre for Ws, Children's H. National Institute for Health and Clinical Excellence: Guidance. Induction of Labour. London: RCOG Press National Collaborating Centre for Women's and Children's Health.; 2008.
15. Guerra G, Cecatti J, Souza J, Faundes A, Morais S, Gülmezoglu A, et al. Factors and outcomes associated with the induction of labour in Latin America. BJOG: An International Journal of Obstetrics &Gynaecology. 2009;116(13):1762-72.
16. Colón I, Clawson K, Hunter K, Druzin ML, Taslimi MM. Prospective randomized clinical trial of inpatient cervical ripening with stepwise oral misoprostol versus vaginal misoprostol. Am J Obstet Gynecol. 2005;192:747-52.
17. Cheng SY, Ming H, Lee JC. Titrated oral compared with vaginal misoprostol for labor induction: a randomized controlled trial. Obstet Gynecol. 2008;111:119-25.