ORIGINAL RESEARCH

A Prospective Randomized Controlled Trial Comparing Safety and Efficacy of Intravaginal Misoprostol vs. Intracervical Cerviprime for Induction of Labor with an Unfavorable Cervix

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ABSTRACT
In this prospective randomized trial, the efficacy and safety of intravaginal Misoprostol and intracervical dinoprostone gel for the induction of labor in cases of an unfavorable cervix were compared. One hundred women with an unfavorable cervix requiring labor induction were randomly assigned to receive either 25 µg of vaginal Misoprostol every 4 hours or 0.5 mg of intracervical dinoprostone every 12 hours. The study measured the change in Bishop's score, the percentage of women who went into labor, induction-to-delivery interval, the need for oxytocin, mode of delivery, and complications.The parity, mean gestational period, and initial Bishop's score were similar in both groups. However, the Misoprostol group showed significantly better improvement in the Bishop's score at 12 hours. The induction-to-delivery interval was also significantly shorter in the Misoprostol group, with a mean duration of 16.49 ± 5.13 hours compared to 27.67 ± 12.71 hours in the dinoprostone group. The rate of complications was comparable between the two groups. Therefore, the study concluded that vaginal Misoprostol at a dosage of 25 µg every 4 hours is a safe and effective method for labor induction and is associated with a shorter induction-to-delivery interval.

Keywords: Induction of labour, Misoprostol, Cerviprime

INTRODUCTION

The primary goal of a successful labor induction is to reduce the likelihood of a cesarean delivery. Therefore, any new technique or method introduced to modify the labor induction process should be carefully evaluated for its impact on cesarean section rates (Brindley 1988)[1]. Oxytocin infusion is widely accepted as a safe and effective method, but its success is greatly influenced by the readiness of the cervix for labor. Since the condition of the cervix is the most crucial predictor of a successful induction, the use of prostaglandins, which have a dual action of ripening the cervix and initiating uterine contractions, appears to be a reasonable adjunct to the process[2].Misoprostol, a prostaglandin E1 analogue (PGE1), is a highly convenient and versatile drug due to its tablet formulation, stability, and cost-effectiveness. It offers several advantages over other prostaglandin forms, such as not requiring refrigeration during transport or storage. While the FDA has not approved the use of Misoprostol for labor induction, this off-label use has been endorsed by reputable organizations like the American College of Obstetricians and Gynecologists (ACOG) and the Cochrane Database Systematic Review (Hofmeyr and Gulmezoglu 2003).[3]

Numerous studies have documented the efficacy of Misoprostol in cervical ripening and labor induction, comparing favorably with placebos, oxytocin, and other prostaglandins (Aggarwal et al. 2003; Sanchez Ramos and Kaunitz 2000; Hofmeyr and Gulmezoglu 2003; Hofmeyr 2001). Despite the established efficacy of Misoprostol, the search for an ideal dosage regimen for clinical use continues.

MATERIALS AND METHODS

This prospective randomised study included total of 50 pregnant women with a singleton pregnancy at 34 weeks with Bishop's score 4 admitted for the induction of labour. Exclusion criteria were previous caesarean section, any active medical disorder, antepartum haemorrhage, abnormal fetal heart rate pattern, contracted pelvis, cephalopelvic disproportion, suspected chorioamnionitis, known uterine anomalies.On admission, a detailed history of the present preg- nancy and the past medical and obstetric history were recorded and the need for induction of labour was ascertained. A thorough general physical and systemic examination was carried out to rule out any maternal contraindication for induction. An abdominal examination to evaluate the fundal height, number of fetuses, lie and presentation of the fetus was done. A speculum examina- tion was done to rule out any cervicovaginal infection and a vaginal examination was done to assign the Bishop's score and to ascertain the adequacy of the pelvis.The study obtained informed written consent from the participants and then randomly allocated them into two groups using Tippet's table. In Group A, the women received 25 mg of Misoprostol, ensuring this dosage by utilizing exactly 1/4th of a double-scored 100 mg tablet. The medication was inserted into the posterior fornix with the assistance of a Sim's speculum, following vulva and vaginal cleaning. The 25 mg dose was repeated every 4 hours, with a maximum of six doses administered.

In Group B, women received 0.5 mg of Prostaglandin E2, administered through a sterile preloaded syringe into the endocervical canal. The dose was repeated after 12 hours, with a maximum of two doses allowed. The subsequent dose was withheld if there were adequate contractions, cervical dilation of 3 cm, a Bishop's score of 8, or evidence of tachysystole (at least six contractions in 10 minutes for two consecutive 10-minute intervals), hypertonus (a single contraction with a duration of 42 minutes), or hyperstimulation.The study aimed to evaluate the efficacy and safety of two different methods for labor induction in cases of an unfavorable cervix. Specifically, it compared the use of intravaginal Misoprostol, a prostaglandin E1 analog, with intracervical dinoprostone gel. Labor induction is a crucial intervention in cases where the cervix is not yet favorable for childbirth, and the choice of induction method can impact the safety and effectiveness of the process.

In this study, a total of 100 women with an unfavorable cervix, requiring induction of labor, were randomly assigned to receive either 25 mg of vaginal Misoprostol every 4 hours or 0.5 mg of intracervical dinoprostone every 12 hours. The study measured several key outcomes, including changes in Bishop's score (an assessment of cervical readiness for labor), the percentage of women who went into labor, the time from induction to delivery, the need for oxytocin augmentation, the mode of delivery, and any complications that arose during the process[4].

The results indicated that Misoprostol was more effective in improving the Bishop's score at the 12-hour mark and led to a shorter induction-to-delivery interval when compared to dinoprostone. Additionally, the rate of complications was comparable between the two groups. The findings support the use of vaginal Misoprostol for labor induction in cases of an unfavorable cervix, as it was not only effective but also safe, with a shorter time to delivery.These findings contribute to the ongoing exploration of optimal labor induction methods, particularly in cases where the cervix is not yet favorable, offering healthcare providers additional tools for managing and improving outcomes in such situations. Further research and clinical practice may benefit from these insights into the use of Misoprostol as an effective and safe agent for labor induction in specific patient populations.

RESULTS

The subject characteristics in this study were comparable between the two groups. It is important to note that eight patients required the induction of labor before 37 weeks of gestation due to gestational hypertension with intrauterine growth retardation[5].This information highlights that the study carefully considered and controlled for subject characteristics to ensure that the groups were comparable. Additionally, it emphasizes the specific medical reasons that led to the induction of labor in some cases, such as gestational hypertension and intrauterine growth retardation, providing context for the inclusion of these patients in the study.The study found that the mean Bishop's score at 12 hours after induction was significantly higher in the Misoprostol group (7.57 ± 2.1347) compared to the Cerviprime group (5.68 ± 2.4473), with a p-value of 0.0025 .It's important to note that a comparison at 24 hours after induction was not possible, as 40 patients in the Misoprostol group had already delivered by that time.This information underscores the effectiveness of Misoprostol in improving cervical ripening as indicated by the higher Bishop's score at 12 hours, and it also highlights the rapid progress of labor in some patients in the Misoprostol group, leading to early deliveries within 24 hours.[6]

This prospective randomized trial aimed to assess the efficacy and safety of two methods, intravaginal Misoprostol and intracervical dinoprostone gel, for labor induction in women with unfavorable cervix conditions. The study included 100 women with an unfavourable cervix who required labor induction. The participants were randomly assigned to receive either 25 mg of vaginal Misoprostol every 4 hours or 0.5 mg of intracervical dinoprostone every 12 hours[7]. The outcomes measured included changes in Bishop's score, the percentage of women who went into labor,

induction to delivery intervals, the need for oxytocin, mode of delivery, and complications. The results indicated that Misoprostol was more effective in improving Bishop's score at 12 hours, led to a higher percentage of women going into labor within 24 hours, and resulted in a shorter induction to delivery interval compared to dinoprostone. Furthermore, the rates of complications were similar between the two groups. These findings suggest that Misoprostol, when used intravaginally, is a safe and effective option for labor induction in cases of unfavorable cervix, offering advantages such as shorter induction to delivery intervals, which can have a positive impact on clinical practice and maternal care.

Table1: Subject characteristics.

	Misoprostol	**Cerviprime**
	*n*¼25	*n*¼25
Age(years)	25.24+3.01	26.24+3.40
Gravidity (prim%)	60	50
Period of gestation (weeks)	38.57+1.4330	37.98+2.27
Period of gestation 537 weeks	3	5
Bishop'sscore	2.82+1.02	2.74+1.08

The study found that there was no significant difference in the rates of side-effects and complications between the two groups. Both prostaglandins, Misoprostol and Cerviprime, showed comparable safety profiles. Specifically, two patients in the Cerviprime group and three in the Misoprostol group experienced hyperstimulation, which necessitated the use of terbutalin to manage the condition. All women in the study delivered with good perinatal outcomes. One woman delivered vaginally with a favorable perinatal outcome, while another experienced an elevated temperature after four doses of Misoprostol.[8] Additionally, meconium staining of amniotic fluid was observed in two women in the Misoprostol group and three in the Cerviprime group. Notably, there were no cases of chorioamnionitis or uterine rupture recorded in the study, highlighting the safety of both induction methods in this cohort. The findings suggest that when considering side-effects and complications, both Misoprostol and Cerviprime exhibit similar safety profiles in the context of labor induction.

DISCUSSION

This study aimed to evaluate the effectiveness and safety of two different prostaglandin medications, intravaginal Misoprostol and intracervical prostaglandin E2 gel (Cerviprime), for inducing labor in patients with unfavorable cervical conditions[9]. In the study, 25 mg of Misoprostol was used as the induction agent. It's worth noting that using a quarter of a tablet may present practical challenges, as the active substance's distribution may not be uniform within the tablet. A recent study addressed this issue, finding that 25 mg vaginal Misoprostol tablets were as effective and safe for cervical ripening and labor induction as the equivalent dose obtained from a fraction of 200-mg oral tablets. This research contributes to the ongoing efforts to optimize labor induction protocols, particularly in cases with unfavorable cervical conditions[10].

A notable finding in our study was a significant improvement in Bishop's score at the 12-hour mark in the Misoprostol group. Similar results were observed in other studies where a higher dose of 50 mg of Misoprostol was employed. For instance, Sanchez-Ramos and colleagues (1993) conducted a study comparing Misoprostol at a 50 mg dose, administered intravaginally every 4 hours, with oXytocin. In their research, they also noted an enhancement in the Bishop's score following the use of Misoprostol. These findings suggest that Misoprostol, particularly at higher doses, can effectively enhance cervical readiness for laborinduction .

In a study by Buser and colleagues (1997), they employed 50 mg of intravaginal Misoprostol and 0.5 mg of intracervical Cerviprime and similarly observed an improvement in the Bishop's score[11]. The mean change in the score was 3.5 ± 2.1 in the Misoprostol group, while it was 2.7 ± 1.8 in the Dinoprostone group. This change in the score was statistically significant ($p < 0.01$). Notably, 50% of the patients who received Misoprostol exhibited a score change of 4–9 units, whereas this percentage was lower at 26.5% for the patients who received Dinoprostone. These findings further support the efficacy of Misoprostol in enhancing cervical readiness for labor induction compared to Dinoprostone.It's noteworthy that the improvement in Bishop's score observed in our study using 25 mg of Misoprostol is comparable to the results seen in studies that employed a higher dose of 50 mg every 4 hours. This suggests that the lower dosage of Misoprostol can still be effective in achieving cervical ripening and preparing the cervix for labor induction, emphasizing its efficiency as a labor-inducing agent.

Previous research has raised concerns about uterine contraction abnormalities associated with the use of Misoprostol, particularly with higher doses (50 mg or more) administered vaginally or orally. Some studies have reported increased rates of meconium passage and cesarean deliveries due to fetal distress when higher doses of vaginal Misoprostol are used. However, in our study, we observed that the rate of cesarean sections, as well as the incidence of tachysystole and perinatal outcomes, were similar in both the 25 mg Misoprostol and Cerviprime groups.[12] Notably, a recent meta-analysis has suggested that intravaginal Misoprostol may be associated with a reduced cesarean section rate compared to control

groups, as reported by Sanchez-Ramos and Kaunitz (2000). This finding underscores the safety and effectiveness of using a lower dose of Misoprostol, such as 25 mg, for labor induction without increasing the risk of adverse perinatal outcomes or cesarean deliveries.

CONCLUSION

In this study, the effectiveness and safety of two methods for inducing labor in cases of an unfavorable cervix were compared. The study included 100 women with an unfavorable cervix who required laborinduction. They were divided into two groups: one group received 25 mg of vaginal Misoprostol every 4 hours, while the other group received 0.5 mg of intracervical dinoprostone gel every 12 hours. The study evaluated various outcomes, including changes in Bishop's score, the percentage of women who went into labor, the time from induction to delivery, the need for oxytocin augmentation, mode of delivery, and complications. The results revealed that Misoprostol was more effective in improving the Bishop's score after 12 hours and resulted in a significantly shorter induction-to-delivery interval compared to dinoprostone gel. Both methods had a comparable rate of complications, demonstrating that Misoprostol, at a dose of 25 mg every 4 hours, is a safe and effective option for labor induction, with the added benefit of a shorter time interval to delivery.

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