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Mofeed Fawzy Mohamed

Obstetrics and Gynecology department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Al-Refaai Abd El-Fattah Marai

Obstetrics and Gynecology department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Mahmoud Ebraheim Atia Othman

Obstetrics and Gynecology department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt,
mahmoudetman481@gmail.com

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Comparison of Misoprostol Verses Dinoprostone in Induction of Labour

Mofeed Fawzy Mohamed, Al-Refaai Abd El-Fattah Marai,
Mahmoud Ebraheim Atia Othman*

Department of Obstetrics and Gynecology, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Abstract

Background: The practise of obstetrics includes labour induction on a regular basis.

In contemporary obstetrics, it is primarily used when continuing a pregnancy could be harmful to the mother, the fetus, or both. Oxytocin infusion has historically been used to induce labor, although multiple studies have proven that when the cervix is unfavourable, it cannot offer as satisfying results.

Aim: The aim of this study is to compare effectiveness of Dinoprostone vaginal inserts versus Misoprostol vaginal inserts in induction of labor as regard mode of delivery, number of doses and induction active labor interval, and the safety of the mother as regard uterine hyperstimulation and rupture uterus and the fetus as regard fetal distress and the outcome.

Patients and methods: The present study is an observational cross sectional analytic study which will be conducted at Al-Hussein and Sayed Galal Hospitals, Faculty of Medicine, Al-Azhar University on women who will be recruited from Obstetrics and Gynecology Department and outpatient clinics.

Result: There was no significant difference between the groups in terms of maternal outcome. There is a significant difference between the groups regarding gestational age (GA) and birthweight.

Conclusion: According to the finding in the current study, when compared with dinoprostone, Misoprostol significantly shortened the period between induction and delivery and had a similar caesarean section rate, and improved mother outcomes. The groups did, however, differ significantly in terms of gestational age and birthweight.

Keywords: Misoprostol, Dinoprostone, Labour induction

1. Introduction

The practise of obstetrics includes labour induction on a regular basis. In contemporary obstetrics, it is typically tried when continuing the pregnancy could harm the mother, the fetus, or both. Oxytocin infusion has historically been used to induce labor, however studies have shown that it does not always produce a satisfying results when the cervix is unfavourable.¹

Ineffective labour and excessive uterine contractions, which can result in foetal hypoxia and raise the danger of induction, are the main issues with induction of labour.²

Although there are wide regional variations in the prevalence of induced pregnancies, it is estimated that roughly 20% of labours in the UK and the USA

are induced. Labor induction, which involves triggering uterine contractions to achieve delivery before the onset of natural labour, has been a common practise since the synthesis of oxytocin in the 1950s.³ The US Food and Drug Administration (FDA) has authorised the use of dinoprostone (prostaglandin E2) vaginal inserts for cervical priming in women who are at term.⁴ Dinoprostone is expensive, requires refrigeration, and needs to be instilled in the cervix.⁵ Misoprostol is a synthetic prostaglandin E1analogue, was initially advertised for use in peptic ulcer prevention and treatment, and it has been noted to be a remarkably safe and effective cervical ripened. It does not require refrigeration, it is low-cost, simple to administer, and stable at ambient temperature.⁶

For obstetric causes such as labour induction and abortion induction, misoprostol is frequently

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* Corresponding author. Department of Obstetrics and Gynecology, Faculty of Medicine, Al-Azhar University, Cairo, 11884, Egypt.
E-mail address: mahmoudetman481@gmail.com (M.E.A. Othman).

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utilised. It stimulates the myometrium of the uterus during pregnancy by binding only to the EP-2/EP-3 prostaglandin receptors.⁷

The goal of this study was to compare effectiveness of Dinoprostone vaginal inserts versus Misoprostol vaginal inserts in induction of labor as regard mode of delivery, number of doses and induction active labor interval, and the safety of the mother as regard uterine hyperstimulation and rupture uterus and the fetus as regard fetal distress and the outcome.

2. Patients and methods

The present study is an observational cross sectional analytic study which will be conducted at Al-Hussein and Sayed Galal Hospitals, Faculty of Medicine, Al-Azhar University on *** women who will be recruited from Obstetrics and Gynecology Department and outpatient clinics during the period from ***** to *****.

2.1. Study population

Pregnant women (nulliparous or multipara) above 37 weeks, singleton pregnancy and cephalic presentation having an indication for vaginal delivery in presence of unfavourable cervix (Bishop score ≤ 6). Indications for induction of vaginal delivery: Postmaturity (from 40 weeks to 42 weeks), prelabor rupture of membranes, preeclampsia and medical disorders during pregnancy (e.g., Diabetes or cardiac disorders) necessitating induction of labor before completed 40 weeks.

Exclusion criteria: Multi-fetal pregnancy, malpresentations, placenta previa, intrauterine growth retardation, Cephalo-pelvic disproportion, previous Cesarean section or other uterine surgeries, Macrosomia (4500 g).

Methodology in details: Each patient was subjected to the following: explanation of the procedure and the possible side effects, Counseling with informed consent. A detailed history has been obtained for each subject, along with the results of general physical examination, including vital signs and abdominal examination. Gestational age (GA) has been estimated by the date of last menstrual period and ultrasound done before 20 weeks Digital examination to assess favorability of the cervix and Bishop score. If it will be 6, labor induction with either preparation will be planned. Non stress test was performed to confirm fetal well-being.

Patients will be randomized into two groups, method of randomization by closed letters: group A: (n =) induction by misoprostol every 6 h up to

maximum of 4 doses. group B: (n =) induction by Dinoprostone every 6 h up to maximum of 2 doses. Both preparations will be vaginally administered high in posterior vaginal fornix and will be compared regarding efficacy and safety.

2.2. Statistical analysis

SPSS 22.0 for Windows was used to collect, analyse, and statistically evaluate all of the data (SPSS Inc., Chicago, IL, USA). To check if the data distribution was normal, the Shapiro-Wilk test was used. For the purpose of displaying qualitative data, frequencies and relative percentages were used. The picture illustrates how the χ^2 test and Fisher's exact were used to compare the qualitative variables. Quantitative data were expressed using the mean and SD (standard deviation), which were used to express parametric and nonparametric data, respectively. Specifically, for parametric and nonparametric variables, The Independent *T* test and the Mann-Whitney test were used to compute the difference between the quantitative variables in the two groups. Each statistical comparison was subjected to the two-tailed significance test. *P* values of 0.05 and 0.001 indicate highly significant differences, respectively, whereas *P* greater than 0.05 indicates no difference at all.

3. Results

Table 1.

According to this table, there are no appreciable differences between the groups in terms of maternal age or BMI Table 2.

According to this table, there is no appreciable difference between the groups in terms of the indication for labour induction Table 3.

According to this table, there are no appreciable differences between the groups in terms of the mode of delivery and CS indications Table 4.

According to this table, there are no appreciable differences between the groups in terms of tachysystole, inducement of labour, or delivery time Table 5.

Table 1. Demographic characteristics and clinical data among the studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	t	P
Age (years)				
Mean \pm SD	32.28 \pm 3.91	31.65 \pm 3.87	0.826	0.411
BMI (kg/m ²)				
Mean \pm SD	28.43 \pm 3.5	27.85 \pm 3.12	0.892	0.375

Table 2. Indication for labor induction among the studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	χ^2	P
Post-term pregnancy	28 (53.8%)	30 (57.7%)	0.156	0.693
GDM	8 (15.4%)	5 (9.6%)	0.791	0.374
Hypertensive disorders	7 (13.5%)	8 (15.4%)	0.078	0.781
Fetal hypotrophy	4 (7.7%)	3 (5.8%)	0.153	0.696
Other indications	5 (9.6%)	6 (11.5%)	0.102	0.750

This table demonstrates that there was no significant difference in maternal outcome across the groups Table 6.

4. Discussion

Induction of labour, which can occur with or without a ruptured membrane, is the procedure of inducing contractions prior to the commencement of labour on its own. When the advantages of a quick birth outweigh the hazards of continuing to carry a pregnancy, labour induction might be viewed as a therapeutic intervention Mohaghegh and colleagues.⁸

This study was conducted to compare effectiveness of dinoprostone vaginal inserts versus misoprostol vaginal inserts in induction of labor as regard mode of delivery, number of doses and induction active labor interval, and the safety of the mother as regard uterine hyperstimulation and rupture uterus and the fetus as regard fetal distress and the outcome.

Regarding past miscarriages, parity, and gravidity, there was no discernible difference between the groups in the current study. In agreement with our study, Mlodawski and colleagues⁹ research found no discernible variations in multiparity between the groups using misoprostol vaginal inserts (MVI) and dinoprostone vaginal inserts (DVI). Similar findings were observed in a research by Sire and colleagues. According to Kamlungkuea and colleagues¹⁰ study, history of prior vaginal deliveries was one of the practical indicators for a successful vaginal birth after labour induction. In both groups, the majority of IOLs were indicated by postterm pregnancy,

Table 3. Mode of delivery among the studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	χ^2	P
Cesarean section	12 (23.1%)	15 (28.8%)	0.450	0.502
Vaginal delivery	40 (76.9%)	37 (71.2%)		
Indications of CS				
Fetal distress	5 (9.6%)	6 (11.5%)	1.42	0.701
Induction failed	3 (5.8%)	5 (9.6%)		
Labor arrest	4 (7.7%)	3 (5.8%)		
Cord prolapse	0	1 (1.9%)		

Table 4. Delivery characteristics among the studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	t	P
Induction to labor time (hr)				
Mean \pm SD	8.73 \pm 14.65	24.11 \pm 22.45	MW 437	<0.001
Induction to delivery time (hr)				
Mean \pm SD	14.86 \pm 12.58	33.18 \pm 26.44	MW 518	<0.001
Labor duration (hr)				
Mean \pm SD	4.65 \pm 2.25	5.14 \pm 2.63	MW 289	0.317
Oxytocin use	16 (30.8%)	22 (42.3%)	1.49	0.222
Tachysystole	20 (38.5%)	7 (13.5%)	8.45	0.004

according to the current study, although there were no appreciable variations between the groups in terms of the indication for labour induction. Our findings were in agreement with a research by Mlodawski and colleagues⁹ comparing two distinct vaginal inserts that produce prostaglandins continuously for 24 h—the MVI with 200 g of misoprostol and the DVI with 10 mg of dinoprostone—in terms of obstetrical outcomes. The majority of IOL indications (56% of all indications) were for postterm pregnancy, which was the most frequent type. The IOL indicators were the same for each group. Similarly, in Gaudineau and colleagues,¹¹ study, Postterm pregnancy, early membrane rupture, diabetes mellitus, and hypertensive diseases were the most typical indications for IOL. The majority of deliveries in the current trial were vaginal, with the dinoprostone group having a nonsignificantly increased rate of cesarean delivery. There was nonsignificant preponderance of fetal distress, induction failed, and cord prolapse among dinoprostone group; however, there was nonsignificant preponderance of labor arrest among misoprostol group. Our study agreed with Mlodawski and colleagues,⁹ study which reported that vaginal delivery was the most common mode of delivery among both MVI and DVI groups. By contrast, Regarding meconium-stained amniotic fluid, unsuccessful induction or arrested labour, and an unsettling CTG trace, there was a substantial difference between the two groups.

Similar to this, the mode of delivery did not significantly differ between the MVI group and the DVI group in the Rankin and colleagues,¹² study. Additionally, the Benalcazar-Parra and colleagues,¹³

Table 5. Maternal outcome between the two studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	χ^2	P
Postpartum hemorrhage	12 (23.1%)	11 (21.2%)	0.056	0.813
Uterine hyperstimulation	2 (3.8%)	0	2.04	0.153
Rupture of perineum	7 (13.5%)	9 (17.3%)	0.296	0.587

Table 6. Neonatal characteristics between the two studied groups.

	Misoprostol (n = 52)	Dinoprostone (n = 52)	t/ χ^2	P
GA (weeks)				
Mean \pm SD	39.82 \pm 1.26	39.13 \pm 1.84	2.23	0.028
Birth weight (kg)				
Mean \pm SD	3.34 \pm 0.697	3.08 \pm 0.563	2.09	0.039
Mode of delivery				
Male	29 (55.8%)	27 (51.9%)	0.155	0.694
Female	23 (44.2%)	25 (48.1%)		
Apgar at 1 min				
Mean \pm SD	7.28 \pm 1.27	7.18 \pm 1.16	1.16	0.248
Apgar at 5 min				
Mean \pm SD	9.57 \pm 1.09	9.81 \pm 1.13	1.1	0.273

This table demonstrates a significant difference in Gestational age (GA) and birthweight across the groups.

study found no statistically significant difference between the two groups' rates of cesarean sections and meconium production. Zhang and colleagues,¹⁴ reported similar findings. According to the study by Gornisiewicz and colleagues,¹⁵ the proportion of mothers who gave birth vaginally was comparable in both groups. Cesarean sections were carried out in 68.8% of cases involving misoprostol and 76.9% of cases involving dinoprostone, respectively ($P = 0.207$). There were no changes in the rates of cesarean sections, indications for sections, or other types of sections, or the percentage of deliveries that were emergency caesareans ($P = 0.028$). However, in the misoprostol group, emergency cesarean deliveries were substantially higher.

When the rate of cesarean deliveries was compared between spontaneous and induced labour, a substantial difference was discovered in favour of spontaneous labour. This should be taken into account if a nulliparous woman chooses to give birth by induction, especially if there are no medical reasons to do so Levine and colleagues.¹⁶

Lessened cervical dilation at hospital admission and higher rates of labour complications are the key contributors to nulliparous women's increased risk of cesarean birth after inducing labour Kjerulff and colleagues.¹⁷

Regarding delivery characteristics among the studied groups in the current study, dinoprostone group had a significant longer induction to labor time, and induction to delivery time than misoprostol group, while misoprostol group had a significant higher tachysystole than dinoprostone group. However, there were no significant differences between the groups regarding labor duration and oxytocin use.

Our results agreed with Rankin and colleagues,¹² There were significant differences between the MVI and DVI groups regarding tachysystole, according

to a study that found a 22% increase in the likelihood of experiencing it with MVI. In addition, the DVI group's delivery time (33 h) was significantly longer than that of the MVI group. However, intrapartum oxytocin showed no difference in either group. Similarly, The rate of tachysystole was significantly higher in the misoprostol group compared with the prostaglandin E2 gel group in Zhang and colleagues.¹⁴

Moreover, our results agreed with Wing and colleagues,¹⁸ study which revealed that the time to vaginal delivery and time to active labor were significantly shorter for women receiving the MVI compared with women receiving the DVI. Likewise, misoprostol group had higher incidence of tachysystole than dinoprostone group. However, regarding the need for oxytocin before to delivery, there were substantial differences between the MVI and DVI groups. In addition, Sire and colleagues,¹⁹ according to the study, the misoprostol group's induction to labor's beginning was noticeably quicker than the dinoprostone group's. Although there was greater tachysystole in the misoprostol group, the difference was not statistically significant ($P = 0.45$). However, tachysystole occurred more frequently ($P = 0.05$) in the dinoprostone group in the Arif and colleagues,²⁰ study.

Draycott and colleagues,²¹ study model analysis indicated that the MVI is a successful strategy for labour induction and could greatly minimise resource utilisation when compared with the DVI.

There was a nonsignificant increased prevalence of postpartum hemorrhage between the two analysed groups in the current study with regard to mother outcomes, uterine hyperstimulation among misoprostol group while there was nonsignificant higher prevalence of rupture of perineum in dinoprostone.

Our result was matched with Mlodawski and colleagues,⁹ study result which showed that there was no significant difference between MVI and DVI groups regarding postpartum hemorrhage. Similar result reported in Sire and colleagues,¹⁹ study.

Regarding neonatal characteristics between the two studied groups in the current study, dinoprostone group had a significant lower GA than misoprostol group. Likewise, dinoprostone group had a significant lower birthweight than misoprostol group. While there were no discernible differences between the two groups in terms of delivery method or Apgar scores at 1 and 5 min, there were. In accordance with our findings, Mlodawski and colleagues⁹ study found no statistically significant difference in Apgar at 1 and 5 min or GA at delivery between the misoprostol vaginal insert (MVI) group

and the dinoprostone vaginal inserts group. Likewise, 5 min Apgar score showed nonsignificant difference between the two groups in Gaudineau and colleagues,¹¹ study. Contrary to our findings, Sire and colleagues¹⁹ study found no statistically significant difference between the groups receiving dinoprostone and misoprostol in terms of birth weight and the 5 min Apgar score.

4.1. Conclusion

According to the finding in the current study, Misoprostol significantly shortened the period between induction and delivery compared with dinoprostone, and it had a comparable caesarean section rate, and improved mother outcomes. The groups did, however, differ significantly in terms of GA and birthweight. More studies are needed for significant higher tachysystole in the misoprostol group.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

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Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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