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# Comparison of Misoprostol and Dinoprostone Gel for Induction in Prelabor Rupture of Membranes at Term

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## Abstract

**Background:** The aim of the study was to compare the safety and efficacy of vaginal misoprostol with dinoprostone gel for induction of labor in prelabor rupture of membranes at term pregnancy.

**Methods:** This is a prospective study conducted in the Department of Obstetrics and Gynaecology, at Sri Devraj Urs Medical College from December 2010 to September 2012. One hundred patients were induced with either misoprostol or dinoprostone gel using computer-generated randomized table. The study had two groups. Group I had 50 cases of primigravida, where 25 cases were induced with misoprostol and another 25 were induced with dinoprostone gel. Group II had 50 cases of multigravida, where 25 cases were induced with misoprostol and the rest 25 were induced with dinoprostone gel. Twenty-five microgram misoprostol was inserted vaginally every sixth hourly for maximum of six doses and 0.5 mg dinoprostone gel was used intracervically every sixth hourly for maximum of three doses. The primary outcome measured was induction to delivery interval and the secondary outcomes included mode of delivery, and maternal and neonatal outcome.

**Results:** Among the patients induced, both the groups were comparable with respect to age, parity, booking status, gestational age, and pre-induction Bishop's score. There was no significant difference in induction to delivery interval between both the groups. The induction to delivery interval in misoprostol group was 6.65 hours and that in dinoprostone group was 6.89 hours. In primigravida, the induction to delivery interval in misoprostol group was 7.74 hours and 7.08 hours in dinoprostone group and in multigravida, the induction to delivery interval in misoprostol group was 5.55 hours and in dinoprostone group was 6.71 hours. In primigravida, dinoprostone has shorter induction to delivery interval compared to misoprostol. In multigravida, misoprostol has shorter induction to delivery interval compared to dinoprostone. There was no difference in mode of delivery in both the groups. There was no significant difference in maternal outcome and neonatal outcome among both the groups.

**Conclusion:** Vaginal misoprostol is equally efficacious in labor induction and demonstrates a similar fetal and maternal safety profile when compared with dinoprostone gel.

**Keywords:** Prelabor rupture of membranes; Induction of labor; Misoprostol; Dinoprostone gel; Induction delivery interval; Failed induction; Chorioamnionitis; Oxytocin

## Introduction

Prelabor rupture of membranes (PROM) is defined as spontaneous rupture of fetal membranes after 37 completed weeks and before labor onset. PROM is a common occurrence with an incidence of 5-10% [1] and at least 60% of cases of PROM occur at term [2]. Spontaneous labor follows term PROM at 24, 48 and 96 h in 70%, 85% and 95% of women respectively.

Approximately two-thirds of the patients with PROM are delivered within the next 4 days and the rest within 1 week. The time between the rupture of membranes and onset of labor may extent from hours to days.

Studies in the period 1960 - 1980 showed an increased risk of maternal and perinatal morbidity and mortality when the time interval from rupture of the membranes until delivery was prolonged. This fact was the main reason why a policy of immediate induction of labor after PROM at term was adopted [3].

With increasing time elapsed since PROM to delivery, significant increase in incidences of induced labor, operative delivery, fetal distress, poorer fetal condition at birth, neonatal infections and maternal infection are noticed.

The management of a case of PROM has remained as one of the most difficult and controversial problems in obstetrics over the past several decades.

Our study is done to compare the safety and efficacy of vaginal misoprostol with that of dinoprostone gel for induction of labor in PROM at term pregnancy.

## Materials and Methods

This is a prospective study conducted in the Department of Ob-

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**Table 1.** Demographic and Clinical Characteristics in Group I

| Characteristic | Misoprostol (n = 25) | Dinoprostone (n = 25) | P value |
|---|---|---|---|
| Age (years) | 22.2 | 21.4 | 0.899 |
| Gestational age (weeks) | 39 | 40 | 0.500 |
| Bishop's score < 6 | 13 | 18 | 0.145 |

**Table 2.** Demographic and Clinical Characteristics in Group II

| Characteristic | Misoprostol (n = 25) | Dinoprostone (n = 25) | P value |
|---|---|---|---|
| Age | 25.6 | 26.1 | 0.566 |
| Gestational age (weeks) | 39 | 39 | 1 |
| Bishop's score < 6 | 17 | 21 | 0.162 |

stetrics and Gynaecology, Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar, between December 2010 and September 2012. The study had two groups. Group I had 50 cases of primigravida, where 25 cases were induced with misoprostol and another 25 were induced with dinoprostone gel. Group II had 50 cases of multigravida, where 25 cases were induced with misoprostol and the rest 25 were induced with dinoprostone gel. Patients were divided into groups based on computer-generated randomized table.

Inclusion criteria were women who had ruptured membranes at > 37 weeks gestation, with singleton fetus in cephalic presentation and were not in labor. Women were excluded from the study if they were in labor, or if there was any contraindication for induction of labor or previous cesarean section, any case of antepartum hemorrhage, congenital anomalies/intrauterine death, and medical conditions like heart disease/uncontrolled diabetes mellitus/severe pre-eclampsia.

Diagnosis was based on the clinical history of the passage of liquor, pooling of fluid in posterior fornix on speculum examination. A prophylactic antibiotic was given (cephalosporin group) on admission to every patient.

Maternal morbidities like nausea, vomiting, uterine hyperstimulaiton, tachysystole, hypersystole, chorioamnionitis, foul smelling lochia, and wound gapping were noted. Neonatal morbidities variables included NICU admission, Apgar score < 7, sepsis, asphyxia, and respiratory distress.

Statistical analysis was performed on Epi-info software. Differences in the outcome and frequencies between both the groups were analyzed using mean and P values of less than 0.05 were accepted as indicating statistical significance.

**Table 3.** Demographic and Clinical Characteristics

| Characteristic | Misoprostol (n = 50) | Dinoprostone (n = 50) | P value |
|---|---|---|---|
| Age (years) | 23.02 | 23.09 | 0.867 |
| Gestational age | 38.40 | 38.26 | 0.899 |
| Bishop's score < 6 | 30 | 39 | 0.05 |

## Results

During the study period, there were 4,416 deliveries, with incidence of PROM being 7.06%. Group I contained 50 cases of primigravida, where 25 cases were induced with misoprostol tablets vaginally and another 25 cases were induced with dinoprostone gel intracervically. Group II consisted of 50 cases of multigravida requiring induction, of which 25 were induced with misoprostol and another 25 cases were induced with dinoprostone gel.

Table 1-3 show demographic and clinical characteristics in primigravida and multigravida respectively. There is no difference in age, gestational age, and Bishop's score in both the groups.

In primigravida, mean age in misoprostol group is 22.2 years and in dinoprostone group is 21.4 years. Hence, the ma-

**Table 4.** Total Number of Doses Required for Induction in Group I

| Number | Misoprostol group (n = 25) | | Dinoprostone group (n = 25) | | P value |
|---|---|---|---|---|---|
| | Number | Percentage | Number | Percentage | |
| 1 | 19 | 76 | 23 | 92 | 0.122 |
| 2 | 4 | 16 | 2 | 8 | 0.384 |
| 3 | 2 | 8 | 0 | 0 | 0.148 |
| Oxytocin during labor | 5 | 20 | 6 | 24 | 0.732 |

**Table 5.** Total Number of Doses Required for Induction in Group II

| Number | Misoprostol group (n = 25) | | Dinoprostone group (n = 25) | | P value |
|---|---|---|---|---|---|
| | Number | Percentage | Number | Percentage | |
| 1 | 22 | 88 | 21 | 84 | 0.683 |
| 2 | 3 | 12 | 4 | 16 | 0.683 |
| 3 | 0 | 0 | 0 | 0 | |
| Oxytocin during labor | 3 | 12 | 2 | 8 | 0.637 |

**Table 6.** Induction to Delivery Interval in Group I

| | Total number of patients | Induction delivery interval (in h) | P value |
|---|---|---|---|
| Misoprostol group | 25 | 7.748 ± 5.18 | 0.590 |
| Dinoprostone group | 25 | 7.07 ± 3.46 | |

**Table 7.** Induction to Delivery Interval in Group II

| | Total number of patients | Induction delivery interval (in h) | P value |
|---|---|---|---|
| Misoprostol group | 25 | 5.55 ± 3.9 | 0.301 |
| Dinoprostone group | 25 | 6.71 ± 3.8 | |

**Table 8.** Induction to Delivery Interval in 100 Induced Patients

| | Total number of patients | Induction delivery interval (in h) | P value |
|---|---|---|---|
| Misoprostol group | 50 | 6.652 ± 4.6 | 0.777 |
| Dinoprostone group | 50 | 6.89 ± 3.6 | |

**Table 9.** Mode of Delivery in Induced Patients in Group I

| Mode of delivery | Misoprostol group (n = 25) | Dinoprostone group (n = 25) | P value |
|---|---|---|---|
| Cesarean section | 1 | 1 | 1.00 |
| Vaginal delivery | 24 | 24 | 1.00 |

ternal ages of two groups were comparable.

In multigravida, mean age in misoprostol group is 25.6 years and in dinoprostone group is 26.1 years. Hence, the maternal ages of two groups were comparable.

In primigravida, mean gestational age in misoprostol group is 39 weeks and in dinoprostone group is 40 weeks.

In multigravida, mean gestational age in both the groups is 39 weeks.

In primigravida, Bishop's score of less than 6 was seen in 52% in misoprostol group while 72% in dinoprostone group. There was no significant difference in two groups.

In multigravida, Bishop's score of less than 6 was seen in 68% in misoprostol group while 84% in dinoprostone group. There was no significant difference in Bishop's score in both the groups.

There is statistically significant difference in Bishop's score < 6 among dinoprostone group in 100 induced patients.

Table 4 shows in primigravida, 76% delivered with one dose in misoprostol group while 92% delivered in dinoprostone group with one dose. Sixteen percent in misoprostol group needed two doses to deliver while 8% in dinoprostone group needed two doses. Eight percent in misoprostol group needed three doses for delivery while none required third dose in dinoprostone group.

**Table 10.** Mode of Delivery in Induced Patients in Group II

| Mode of delivery | Misoprostol group (n = 25) | Dinoprostone group (n = 25) |
|---|---|---|
| Cesarean section | 0 | 0 |
| Vaginal delivery | 25 | 25 |

Table 5 shows in multigravida, 88% in misoprostol group and 84% in dinoprostone group required one dose for delivery. Twelve percent in misoprostol group and 16% in dinoprostone group needed two doses for delivery. None in both the groups required a third dose.

Table 6 shows in primigravida, induction to delivery interval was shorter in dinoprostone group (7.07 h) compared to misoprostol group (7.748 h), but is not statistically significant.

Table 7 shows in multigravida, induction to delivery interval was shorter in misoprostol group (5.55 h) compared to dinoprostone group (6.71 h), but is not statistically significant.

Table 8 shows induction to delivery interval in dinoprostone group (6.89 h) is more in our study compared to misoprostol group (6.65 h), but it is not statistically significant.

Table 9 shows the mode of delivery in induced patients in group I where there was one cesarean section each in both the groups. In misoprostol group, the indication for cesarean section was failed induction and that in dinoprostone group was fetal distress.

Table 10 shows the mode of delivery in induced patients in

**Table 11.** Maternal Adverse Effects

| Adverse effects | Misoprostol group | Dinoprostone group | P value |
|---|---|---|---|
| Nausea and vomiting | 1 | 2 | 0.557 |
| Diarrhoea | 4 | 0 | 0.041 |
| Hyperthermia | 1 | 2 | 0.557 |
| Uterine tachysystole | 2 | 1 | 0.557 |
| Chorioamnionitis | 1 | 1 | 1 |
| Postpartum fever | 1 | 1 | 1 |
| Foul smelling lochia | 1 | 1 | 1 |
| Wound infection | 1 | 1 | 1 |

group II where there was no case in misoprostol or dinoprostone group in multigravida which needed cesarean section.

Table 11 shows maternal adverse effects where diarrhea is significant among misoprostol group.

Table 12-14 show the neonatal mortalities and morbidities in both the groups which are not significant.

There is no difference in the age, gestational age among and Bishop's score among both the groups in primigravida.

There is no statistically significant difference among both the groups in multigravida.

There is statistically significant difference in Bishop's score < 6 among dinoprostone group.

There is no difference in the number of doses used for delivery among both the groups in primigravida.

There is no difference in the number of doses used for delivery among both the groups in multigravida.

There is no statistically difference in induction to delivery interval among both the groups. The induction to delivery interval in dinoprostone group is less than misoprostol group in primigravida.

There is no statistically difference in induction to delivery interval among both the groups. The induction to delivery interval in misoprostol group is less than dinoprostone group in multigravida.

There is no statistically difference in induction to delivery interval among both the groups.

There was one cesarean section each in both the groups. In misoprostol group, the indication for cesarean section was failed induction and that in dinoprostone group was fetal distress.

In this study, there was no case in misoprostol or dinoprostone group in multigravida which needed cesarean section.

Diarrhea is significant among misoprostol group.

There is no difference in neonatal outcome in both the groups in primigravida.

**Table 12.** Neonatal Outcome in Group I

| Variables | Misoprostol | Dinoprostone |
|---|---|---|
| Birth weight (kg) | 2.71 | 2.74 |
| Apgar score < 6 at 1 min | 2 | 2 |
| Apgar score < 8 at 1 min | 2 | 2 |

**Table 13.** Neonatal Outcome in Group II

| Variables | Misoprostol | Dinoprostone |
|---|---|---|
| Birth weight (kg) | 2.73 | 2.76 |
| Apgar score < 6 at 1 min | 0 | 1 |
| Apgar score < 8 at 1 min | 0 | 1 |

There is no difference in neonatal outcome in both the groups in multigravida.

There was no significant difference in the neonatal outcome between the two groups.

## Discussion

Intravaginal application of $PGE_2$ and misoprostol for cervical ripening and labor induction in the patients with PROM and near term have been studied and found of benefit [4, 5]. Our study shows vaginal misoprostol was not associated with significant differences in age, gestational age, and pre-induction Bishop's score between both the groups which is comparable with the study done by Ayad [6].

There was no significant difference in the induction to delivery interval between both the groups in our study. While study done by Ayad showed that the use of misoprostol was associated with achieving delivery more quickly and with less need for oxytocin. Study by Chaudhuri et al [7] showed that vaginal misoprostol may offer similar efficacy to $PGE_2$ gel for induction of labor after PROM at term.

There was no significant difference in the percentage of women in our study having successful vaginal delivery as there was only one case in each group delivered by cesarean section. This is in accordance to the study done by Ayad [6]. There was one case in misoprostol group who needed cesarean section for failed induction and one case in dinoprostone group who needed cesarean section for fetal distress.

When primigravida was evaluated separately, there was shorter induction to delivery interval in dinoprostone group when compared to misoprostol group. While study done by Ayad showed there was significant shorter time to delivery with misoprostol [6].

When multigravida was evaluated separately, there was shorter induction to delivery interval in misoprostol group when compared with dinoprostone gel group.

Maternal outcome in both the groups was not statistically significant except for diarrhea which was significant in misoprostol group. In comparison to study by Ayad, maternal side effects were uncommon [6]. There was difference in maternal

**Table 14.** Neonatal Morbidities

| NICU admission | Misoprostol group | Dinoprostone group | P value |
|---|---|---|---|
| Respiratory distress | 1 | 0 | 0.31 |
| Early onset sepsis | 1 | 1 | 1 |
| Birth asphyxia | 1 | 3 | 0.307 |

outcome in both the groups in the study done by Chaudhuri et al [7].

Neonatal outcome in our study was not statistically significant and is the same in comparison to study done by Ayad [6] and Chaudhuri et al [7].

**Conclusion**

Our study was unable to demonstrate any advantage for misoprostol over $PGE_2$ gel with regard to the induction to delivery interval following PROM and mode of delivery. Misoprostol and dinoprostone are both good inducing agents. The incidence of failed induction needing cesarean section is only 4% using these inducing agents. Misoprostol is a safe and effective drug for induction of labor. It is economical and easy to preserve and administer.

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