

Mifepristone versus oxytocin for cervical ripening prior to induction of labour

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Abstract

Background: Induction of labour is one of the most important interventions done in modern obstetric practice and the success of induction techniques depends upon its role in cervical ripening and improvement in the Bishop's score.

Objectives: This study was done to compare the improvement in Bishop's score among the women receiving oral mifepristone and oxytocin infusion to ripen the cervix prior to induction of labour at term.

Methods: This was a hospital based, prospective randomized controlled trial conducted from August 2015 to February 2016. A total 68 patients were randomized into two groups: Mifepristone group and Oxytocin group. The improvement in Bishop's score prior to and after 48 hours of cervical ripening, induction to delivery interval in vaginal delivery, mode of delivery, any adverse maternal and foetal outcome were recorded in both the groups.

Results: The study demonstrated an overall significant improvement in Bishop's score in mifepristone group compared to oxytocin group (p -value=0.003). A significant number of patients in mifepristone group had improved mean Bishop's score (p -value=0.001) after 48 hours of cervical ripening. There were more vaginal deliveries in the mifepristone group, with shorter mean induction to delivery interval as compared to the oxytocin group. There were no maternal side effects and adverse perinatal outcomes in both the groups.

Conclusions: Mifepristone is a good alternative to oxytocin for cervical ripening for induction of labour.

Key words: Induction, Bishop's score, mifepristone, oxytocin

INTRODUCTION

Induction of labour is one of the most important interventions done in modern obstetric practice¹. In conditions where both maternal and foetal health are on jeopardy on further continuation of pregnancy, this intervention has a very advantageous role. The availability of newer induction techniques has modified the conservative attitude one held towards induction².

The success of induction techniques depend upon its role in cervical ripening. Cervical ripening refers to the softening of the cervix that typically begins prior to the onset of labor contractions. The most commonly used method to evaluate cervical ripening is the Bishop's score as it is simple and has the most predictive value. The Bishop's score of 6 or more is considered very much predictive of successful induction and vaginal delivery³.

A variety of methods have been developed to induce cervical ripening in the preparation of the cervix for labour and delivery⁴. Balloon catheter, stripping of the membrane, low dose oxytocin and prostaglandins are commonly used techniques. Oxytocin is the commonly used induction agent worldwide. It has been used alone, in combination with amniotomy or following cervical ripening with other pharmacological or non-pharmacological methods. Prior to the introduction of prostaglandins, oxytocin was used as a cervical ripening agent as well⁵. A continuous infusion of oxytocin in a low dosage (at the rate of 4 mIU per minute) is an effective method for cervical ripening and has relatively few adverse effects⁶. The induced patients will often progress to spontaneous labour in eight to twelve hours. The anti-progesterone; Mifepristone is currently of interest in its role for induction of labour. It is a 19-nor-steroid that binds strongly to progesterone receptor and inhibits the activity of progesterone at cellular levels and ripens the cervix, making it an option for labour induction with no apparent maternal and neonatal side effects². In late pregnancy, the uterus is sensitized to prostaglandins

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by mifepristone and promotes cervical dilatation and induces labour³.

The earliest study on the use of mifepristone for induction of labour was done by Frydman and colleagues in 1992 and concluded that mifepristone induction resulted in more vaginal deliveries and required lesser doses of oxytocin. Since then numerous studies have been done comparing mifepristone with dinoprostone¹, oxytocin⁷, placebo⁸⁻¹² and misoprostol¹³ with promising result in its effect on cervical ripening.

In this context, the aim of the present study is to compare the improvement in Bishop's score brought about by mifepristone as compared to oxytocin to ripen the cervix prior to induction of labour at term and also to compare the mode of delivery, induction to delivery interval in vaginal delivery, indications of cesarean section, any maternal side effects and adverse perinatal outcome.

METHODOLOGY

This was a hospital based, prospective randomized controlled trial conducted from August 2015 to February 2016 in the Department of Obstetrics and Gynaecology, Kathmandu Medical College (KMC). Ethical approval was taken from Institutional Review Committee of KMC. The inclusion criteria were singleton term pregnancy between 37-42 weeks confirmed by early USG scheduled for induction of labour, Bishop's score <6/13, with intact membranes and reactive fetal heart rate pattern. The exclusion criteria were parity >4, previously scarred uterus, major cephalopelvic disproportion, medical problems like renal, hepatic, cardiovascular diseases,

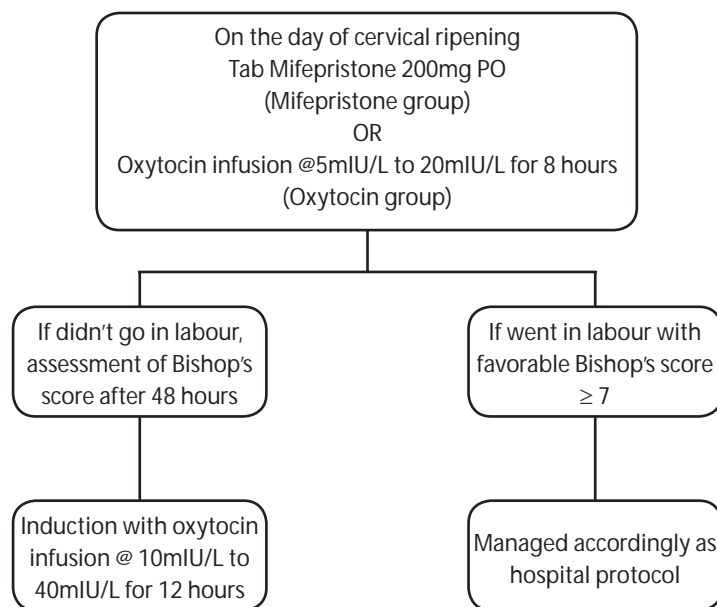
severe asthma and contraindications of mifepristone like adrenal insufficiency, hemorrhagic disorders, inherited porphyrias, women on anticoagulant or on long term corticosteroids.

After getting an informed consent, women who met the inclusion criteria were randomized into two groups by picking up the chits labeled Mifepristone group and Oxytocin group. A total of 68 women were enrolled in the study duration, 34 in mifepristone group and 34 in oxytocin group. A thorough history and examination were performed and Bishop's score was recorded prior to cervical ripening.

If the patient didn't go into labour/or active labour even after 12 hours of induction with oxytocin, the induction attempt was considered as failed.

The Bishop's score prior to cervical ripening and 48 hours thereafter in patients who required oxytocin induction was recorded. The induction to delivery interval in vaginal delivery, mode of delivery and indications of cesarean section were recorded. Maternal complications like tachysystole, uterine rupture, and any systemic side effects like diarrhoea, nausea, vomiting, and pain abdomen were recorded. Any adverse foetal outcome like birth asphyxia, apgar score <7 and NICU admission were recorded in both the groups.

The data were entered in Microsoft Excel 2010 and transferred to SPSS version 20. Data were analyzed using Pearson Chi Square test, Fisher's exact test and T test. A p-value of <0.05 was taken as significant.



RESULTS

Both the groups were matched for maternal age, parity, indications of induction and Bishop's score prior to cervical ripening as shown in (Table 1). Mean Bishop's score prior to cervical ripening and its improvement after 48 hours in mifepristone group and oxytocin group are shown in (Table 2). There was a significant improvement in mean Bishop's score after 48 hours of cervical ripening in mifepristone group ($p < 0.001$). The overall improvement of Bishop's score was seen in 76.47% of women in mifepristone group as compared to 41.17% in oxytocin group ($p = 0.003$) and a significant number of patients had improvement in Bishop's score after 48 hours of cervical ripening, that is, 50% in mifepristone group and 14.70% in oxytocin group ($p = 0.001$) as shown in (Table 3). Fifty percent of women in mifepristone group had vaginal delivery and 50% had Lower Segment Cesarean Section as compared

to 29.41% who had vaginal delivery and 70.58% had Lower Segment Cesarean Section in oxytocin group as shown in (Figure 1). Though not significant, the mean induction to delivery interval in vaginal delivery was shorter i.e. 6.5 ± 1.59 hours in mifepristone group as compared to 10 ± 4.95 hours in oxytocin group as shown in (Figure 2). Regarding indication of LSCS, failed induction was more in oxytocin group 17 compared to 8 in mifepristone group, however, other indications like CPD in active stage of labor, fetal heart rate irregularities and moderate to thick meconium stained liquor was comparable in both the groups as shown in (Table 4). There were no maternal complications like tachysystole, uterine rupture, or any systemic side effects like nausea, vomiting, diarrhea, pain abdomen. There was no adverse perinatal outcome like birth asphyxia, low Apgar score (below 7) or any NICU admission in both the groups

Table 1: Characteristics regarding age, parity, Bishop's score prior to cervical ripening and indications of induction

Demographic variables	Mifepristone group n=34	Oxytocin group n=34	p-value
Age (Mean±SD) (years)	25.65±3.15	26.12±3.68	0.796
Parity			
Primigravida	24	23	0.793
Multigravida	10	11	
Bishop's score prior to cervical ripening (Mean±SD)	3.53±.82	3.38±.77	0.686
Indications of induction			
Post dated	21	19	
Pre eclampsia	5	7	
Oligohydramnios	2	2	0.591
IUGR*	1	3	
↓ fetal movement	5	2	
Obstetric cholestasis	0	1	

*Intra uterine growth restriction

Table 2: Mean Bishop's score before and after 48 hours of cervical ripening

Bishop's score	Mifepristone group (Mean±SD)	Oxytocin group (Mean±SD)	p-value
Pre cervical ripening Bishop's score (n=34)	3.53±0.82	3.38±0.77	0.453
Bishop's score after 48 hours (n=25)	5.36±1.89	3.48±0.91	<0.001

Table 3: Improvement in Bishop's score

Bishop's score	Mifepristone group n=34	Oxytocin group n=34	p-value
Improvement in Bishop's score	26 (76.47%)	14 (41.17%)	0.003
Within 48 hours	9 (26.47%)	9 (26.47%)	1.000
After 48 hours	17 (50%)	5 (14.70%)	0.001

Table 4: Indications of Lower Segment Cesarean Section

Indications of LSCS	Mifepristone group n= 17	Oxytocin group n=24	p-value
Failed induction	8 (47.05%)	17 (70.83%)	0.185
CPD* in active stage of labor	4 (23.5%)	3 (12.5%)	
Fetal heart rate irregularities	4 (23.5%)	2 (8.3%)	
Moderate-Thick Meconium stained liquor	1 (5.8%)	2 (8.3%)	

*Cephalopelvic disproportion

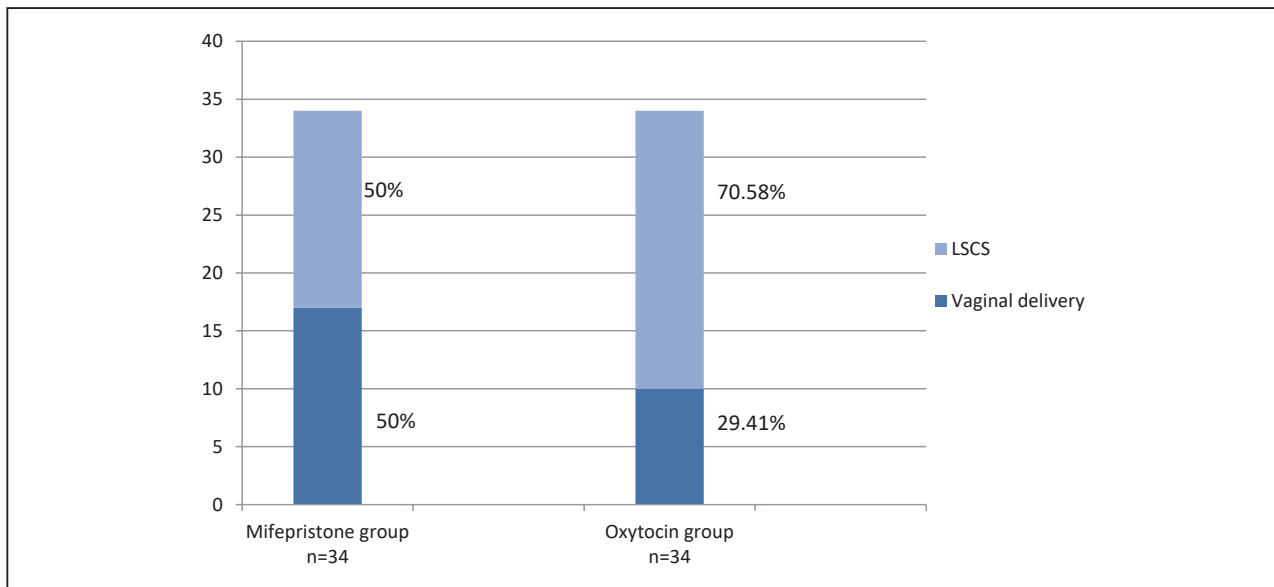


Figure 1: Mode of delivery *p-value 0.083

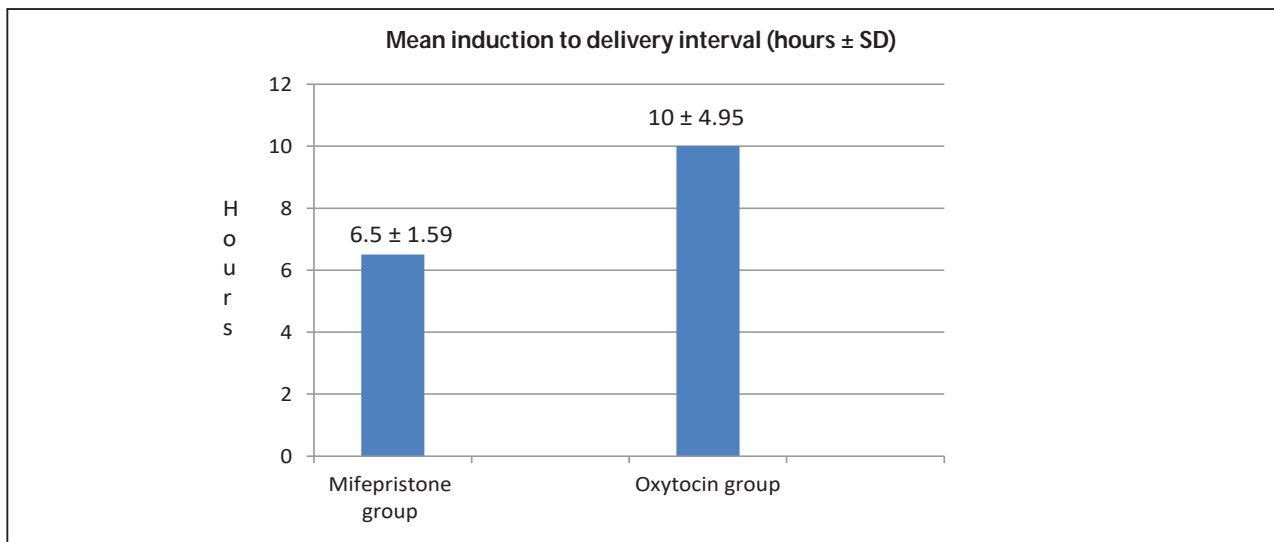


Figure 2: Induction to delivery interval in vaginal delivery after oxytocin induction

DISCUSSION

In the present study, the improvement of Bishop's score was seen in a significant number of women in mifepristone group as compared to oxytocin group. Gaikwad et al¹ compared mifepristone with dinoprostone for cervical ripening prior to induction and observed improved Bishop's score in 94% of women receiving mifepristone compared to 80% women who received dinoprostone¹. The higher rate of improved Bishop's score seen in their study is may be due to multiple assessment of Bishop's score at 12, 24, 48 hours, after 72 hours of cervical ripening and also when women went into active labour, whereas in our study, assessment was done only after 48 hours. So the improvement seen after 72 hours has also been reported in their study. Athawale et al observed an improvement of cervical score in 76% of women who received mifepristone for cervical ripening compared to 36% of women who received a placebo¹².

In our study, a significant number of women had improvement in Bishop's score at the end of 48 hours in mifepristone group as compared to oxytocin group. This result infers that the cervical ripening was better with mifepristone at the end of 48 hours as compared to oxytocin. Stenlund et al also have reported ripened cervix in 79.2% women at the end of 48 hours with mifepristone as compared to 16% of women who received placebo¹¹.

More vaginal deliveries were observed in mifepristone group as compared to oxytocin group, in the present study. In a similar comparative study, Gaikwad et al reported 84% of vaginal delivery in women who received mifepristone compared to 56% who received dinoprostone¹. Wing et al also observed more vaginal deliveries, 78.1% with mifepristone as compared to 51.5% who received oxytocin infusion⁷.

As seen in our study, the mean induction to delivery time was shorter in mifepristone group (6.5±1.5 hours) compared to oxytocin group (10±4.9 hours). Wing et al observed shorter induction to delivery interval with mifepristone (12.8±8.6 hours) compared to oxytocin (19.9±9.4 hours) in his study⁷. Stenlund et al also reported shorter induction to delivery interval with mifepristone (36h23m) compared to a placebo (53h17m)¹¹. The difference in hours seen in their study could be explained by the time taken as the beginning of induction: in our study it was taken as 48 hours after cervical ripening, while in theirs, it was from the time of cervical ripening.

CONCLUSION

Mifepristone, with or without augmentation, is a good alternative agent to oxytocin for cervical ripening for induction of labour.

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