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Original Research Article

Efficacy of 50µg oral misoprostol versus 25µg vaginal misoprostol in induction of labor

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ABSTRACT

Background: Misoprostol is the latest drug for induction of labour which is cheap and stable at room temperature. Our study was conducted to test the efficacy of misoprostol for labor induction through oral and vaginal route.
Methods: 250 women who required induction of labor at Govt. Medical College, Kottayam was included in this study. Both oral misoprostol 50µg and vaginal misoprostol 25µg 4 hourly upto maximum of four doses were used for induction of labor as per consultant's preference. Out of these 125 patients were selected for study in both groups. Singleton term pregnancies with cephalic presentation were selected. The mean induction pain interval, induction delivery interval, mode of delivery, maternal complications like uterine contraction abnormalities, neonatal complications were observed.
Results: Induction to pain interval was shorter in oral misoprostol group compared to vaginal misoprostol group (2.48+1.3 hours vs. 3.91+2.17 hours P ≤0.001). But the mean induction to delivery interval was comparable in both groups (12.98±3.04hrs vs. 12.59±3.28 hrs.) Vaginal delivery and cesarean section rate in both groups were comparable. The oral group required more number of misoprostol (>2 misoprostol 38.4% in oral 25.6% in vaginal p=0.030). There was insignificant increased incidence of uterine hyperstimulation in vaginal group. The neonatal outcome was comparable.
Conclusions: Misoprostol administered either by oral or vaginal route was equally effective in induction of labor and found to be safe.

Keywords: MeSH-labor induction, Oral misoprostol, Pregnancy, Vaginal misoprostol

INTRODUCTION

A successful induction of labor leads to vaginal delivery of healthy baby, in an acceptable time frame with minimum maternal discomfort or side effects.[1] The drugs commonly available for the purpose the induction is oxytocin, dinoprostone gel and misoprostol. Induction of labor with oxytocin is unlikely to lead to vaginal delivery in an unripe cervix. The dinoprostone gel (PGE_2) requires intracervical application, needs refrigeration and is expensive.[2] Misoprostol was originally made for healing of gastric ulcers induced by NSAIDS.[3] It is cheap, stable at room temperature and can be easily administered through various routes. The objectives of the study are

- To compare the efficacy of oral misoprostol 50µg and vaginal misoprostol 25µg for induction of labor.
- To compare maternal and neonatal complications.

METHODS

This was a comparative observational study. Women admitted to labor room Govt. Medical College, Kottayam, Kerala, India from September 2011 to October 2012 were included in the study. Term singleton

pregnancy with cephalic presentation and parity less than five were selected. Patients with previous uterine scar and known cephalopelvic disproportion were excluded. Misoprostol was used by oral route (50µg) and vaginal route (25µg) for induction of labor according to consultant's preference in our hospital. Out of these 125 age and gravidity matched patients were selected in each group. We took the mean induction delivery interval with the established dinoprostone protocol to be around 24 hours with standard deviation of 12 hours.

Assuming that the oral misoprostol group would be equally effective as the established protocol, we took shortening of six hours in the vaginal misoprostol group as clinically significant. With these assumptions, we calculated that 100 women would be needed in each group to give the study a cover of 80% (CI:95, Power 80%).

Ethical committee clearance was obtained (IEC no. 90/2011) and consent was taken from the patients. In all patients who needed induction of labor cervical status was assessed by Bishop Score. Oral misoprostol 50µg or vaginal misoprostol 25µg was given 4th hourly upto 4 doses or upto the onset of adequate uterine contractions. Once in labor, women were cared according to current obstetric practices. No augmentation with oxytocin was done if uterine contractions reached a frequency of three in ten minutes lasting for 30-45 seconds. In labour patients were monitored for vital signs, progress of labor, foetal heart sounds as per hospital protocol. Mean induction to pain interval, mean induction to delivery interval, mode of delivery, uterine contraction abnormalities were studied. Neonatal complications such as 1'APGAR score, incidence of meconium and NICU admission were noted.

If labor did not ensue even after four hours of last dose of misoprostol, it was considered as failed induction. Tachysystole was defined as more than five uterine contractions per ten minutes for two consecutive ten minutes period. Hypertonus was defined as uterine contraction lasting for at least two minutes. Hyperstimulation was defined as tachysystole or hypertonus associated with foetal tachycardia, late deceleration or loss of beat to beat variability.

Statistical analysis

Results were represented as mean and standard deviation and Fisher's exact test. p value <0.05 was considered significant variables.

RESULTS

Two hundred and fifty cases of induction of labor was included in the present study using oral misoprostol 50µg and vaginal misoprostol 25 µg, with 125 patients in each group. The mean age, gravidity status, were similar in both groups (Table 1 and 2).

Table 1: Age distribution.

Age (Years)	Oral 50 µg (N=125)	Vaginal 25 µg (N=125)
<20	12 (9.6%)	14 (11.2%)
20-30	97 (77.6%)	97 (77.6%)
>30	16 (12.8%)	14 (11.2%)

X^2=2.87, P=0.866

Table 2: Distribution according to gravidity.

Gravidity	Oral 50µg N=125	Vaginal 25µg N=125	Total 250
Primigravido	60 (48.0%)	67 (53.6%)	127 (50.8%)
Multigravida	65 (52%)	58 (46.4%)	123 (49.2%)

X^2= 0.784 P=0.376

Table 3: Number of doses of misoprostol.

No. of doses	oral 50µg N=125	Vaginal 25µg N= 125	Total 250
1	40 (32%)	61 (48.8%)	101 (40.4%)
2	37 (29.6%)	32 (25.6%)	69 (27.6%)
>2	48 (38.4%)	32. (25.6%)	80 (32%)

Table 4: Effect of misoprostol on uterine activity.

Parameter	Oral 50 µg N=125	Vaginal 25µg N=125		
Induction to pain interval in hrs.	2.48±1.63 hrs	3.9±2.17	t, 5.9	P<0.001(S)
Induction to vaginal delivery interval in hrs	12.98±304hrs	12.593.28	t, +0.971	P>0.05(NS)
OxytocinAugmentation	60(48%)	42(34%)	X^2 5.37	P=0.021(S)

The pre induction Bishop score was 4.088 in oral group and 4.56 in vaginal group which was comparable.

48 patients (38.4%) in the oral misoprostol group required more than 2 doses compared to 32 (25.6%) in vaginal group which was statistically significant (P=0.03) (Table 3). There was significantly shorter induction to pain interval in oral misoprostol group compared to vaginal group (2.48±1.63 hours vs. 3.91±2.17 hours). But the induction delivery interval was similar in both groups.

(oral 12.98±3.04 hours and vaginal 12.59±3.28 hours). More number of patients required oxytocin augmentation in oral group (48%) compared to vaginal group (34%) which was statistically significant (Table 4).

Vaginal delivery (oral 80.8%7 vaginal 80%) rates were similar in both groups (Table 5). But duration of labour was significantly shorter in vaginal group. 17 patients (13.6%) in oral group took in more than 24 hours to deliver compared to 8 patients (6.4%) in vaginal group (Table 6).

Table 5: Mode of delivery.

Mode of delivery	Oral 50µg N=125	Vaginal 25µg N=125	Total N=250
Vaginal	101 (80.8%)	100 (80%)	201 (80.4%)
LSCS	17 (13.6%)	20 (16%)	37 (14.8%)
Forceps	4 (3.2%)	3 (2.4%)	7 (2.8%)
Vacuum	3 (2.4%)	2 (1.6%)	5 (2%)

Table 6: Vaginal delivery characteristics.

Induction delivery interval	Oral 50Mg	Vaginal 25 Mg	X2	P Value
<12hrs.	23 (18.4%)	46 (36.8%)	13.0	0.001 (S)
12-24hrs	61 (48.8%)	46 (36.8%)		
>24hrs	17 (13.6%)	8 (6.4%)		
Total	101 (80.8%)	100 (80%)		

LSCS was done for failed induction in 7 patients (5.6%) in oral group compared to (1.6%) in vaginal group which was statistically not significant. The more number of failed inductions in the oral group was probably because of reduced bioavailability of drug by first pass effect and also because of limited number of doses used (4 doses). Increased rate of LSCS in vaginal group for foetal distress, though not significant, could be due to increased hyperstimulation in vaginal group (Table 7). There was non-significant increase in incidence of abnormal uterine activity in vaginal misoprostol group compared to oral group (8% vs 2.4%) (Table 8).

Table 7: Indications for LSCS.

Indications for C.S	Oral 50 µg	Vaginal 25µg	X2	P
Failed induction	7 (5.6%)	2 (1.6%)	0.285	0.593 (NS)
Foetal distress	7 (5.6%)	12 (9.6%)		
Non progress of labor	3 (2.4%)	6 (4.8%)		
Total	17 (13.6%)	20 (16%)		

Table 8: Uterine contraction abnormalities.

Contraction Abnormality	Oral 50µg	Vaginal 25µg	Fishers Exact Test
Hypertonus	0	0	
Tachysystole	1(0.8%)	2(1.6%)	P 0.623 (NS)
Hyperstimulation	2(1.6%)	8(6.4%)	P 0.106 (NS)
Total	3(2.4%)	10(8%)	P 0.084

The I min APGAR Scores, incidence of meconium, mean birth weight and requirement of NICU admissions were similar in both groups (Table 9, Table 10, Table 11).

Table 9: APGAR score at 1 minute.

APGAR	Oral 50µg N=125	Vaginal 25µg N=125	Fishers Exact test
<7	0	4 (3.2%)	P=0.122 (NS)
>7	125 (100%)	121 (96.8%)	

Table 10: Incidence of meconium stained liquor.

Liquor	Oral 50 µg (N=125)	Vaginal 25µg N=125	Total N=250	X2	p Value
Clear	92(73.6%)	88(70.4%)	180(72.0%)	0.648	0.71 (NS)
Thin Meconium	13(10.4%)	12(9.6%)	25(10%)		
Thick Meconium	20(16.0%)	25(20%)	45(18%)		

DISCUSSION

Misoprostol is a cheap and effective drug for labor induction. Out of 250 patients included in our study 125 each were administered 50µg oral misoprostol and 25µg vaginal misoprostol 4 doses, 4 hourly. Successful induction was achieved in 80% of patients in both groups.

The mean induction to pain interval was 2.48±1.63 hrs in oral group compared to 3.91±2.17 hrs in vaginal group. This was similar to C. David Adnir et al.[4] This clinical observation is strengthened by the study of Zieman et al who found that maximum plasma concentration of misoprostol was reached 34 minutes after oral dosing and 80 minutes after vaginal administration.[5]

Table 11: Neonatal outcome.

Outcome	Oral 50µg	Vaginal 25µg
Birth weight in kg (mean+SD)	2.68±0.50	2.60±0.49
NICU admission	13(10.4%)	18(14.4%)

The mean induction delivery interval in oral group was 12.98±3.04 hrs compared to 12.59±3.2 hrs in vaginal group. This was much shorter than observed in a study conducted by Rehman H et al with similar dosage schedule where the induction delivery interval was 21.22 hours in oral and 20.15 hours in vaginal group.[6] Majority of cases with vaginal misoprostol delivered is the single dose of misoprostol (48.8%) compared to 32% in oral group. This may be due to the systemic bioavailability of vaginal misoprostol in 3 times that of oral route. In other studies where 50 µg of vaginal misoprostol was used induction delivery interval was significantly less as shown by Rasheed et al (20.6 hrs in oral and 13.5 hrs in vaginal).[7]

LSCS rates in both oral (13.6%) and vaginal (16%) misoprostol was comparable. This was similar to findings by Rehman H et al and Hall et al.[6,8] Higher incidence of foetal distress in vaginal group could be due to slight increase in hyperstimulation of uterus. Similar findings were observed by Shetty A et al.[9] Significantly increased number of patients in oral group (48%) required oxytocin augmentation compared to vaginal group (34%) similar to other studies by Rasheed R et aland Shetty A et al.[7,10] This indicates less bioavailability of oral misoprostol due to first pass effect in liver. The higher incidence of hyperstimulation and tachystole in vaginal group was observed in other studies too Rasheed R et al, Rehman H et al and A Shetty et al.[6,7,9] This can be explained by the fact that the systemic bioavalability of vaginally administered misoprostol is three times that of oral route and hence increased uterine activity.[5] The nonsignificant increase in meconium stained liquor in vaginal group could be due to hyperstimulation. Apart from these, no other maternal or neonatal complication was observed attributable to misoprostol in either group.

In present study a lower close of misoprostol was used vaginally (25µg) compared to oral route (50µg) which resulted in lower incidence of complications in vaginal route.

CONCLUSION

Misoprostol is safe and effective agent for induction of labor either by oral or vaginal route. Induction to delivery interval was comparable both oral and vaginal group. Vaginal misoprostol group required less oxytocin augmentation and fewer doses of administration. The higher incidence of tachysystole and hyperstimulation in vaginal group was not statistically significant. LSCS rate and neonated outcome in both groups were comparable.

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REFERENCES

1. Ramsey PS, Ogburn PL Jr, Harris DY, Heise RH, Ramin KD. Effect of vaginal PH on efficacy of misoprostol for cervical ripening and labor induction. Am J Obstet Gynecol. 2000;182(6):1616-9.
2. Sanchez Ramos, Luis MD, Kauntiz, Andrew M MD: Cervical ripening and labour induction. Clinic Obstet Gynaecol. 2000;43(3):475-88.
3. Hof Mayer GJ, Gul mezogln AM, Alfirevic Z. Misoprostol for induction of labour: A systematic review. Br J Obstect Gynaecol. 1999;106:798-803.
4. Adovir CD, Jonathan WW, Scott B, Michael E. Oral or vaginal misoprostol administration for induction of labor: a randonised double blind trial. Obstet Gynaecol. 1998;92(5):810-13.
5. Zieman M, Fong SK, Benowitz NL, Banskter D, Darney PD. Absorption Kinetics of misoprostol with oral or vaginal administration. Obstect Gynecol. 1997;90(1):88-92.
6. Rehman H, Pradhar A, Kharka L, Renjhen P, Kar S, Dutta S. Comparative evaluation of 50 µg oral misoprostol and 25µg intravaginal misoprostol for induction of labour at term: a randomised trial. J Obstet Gynaecol. 2013;35(5):408-16.
7. Rasheed R, Alam AA, Younus S, Raza F. Oral versus vaginal misoprostol for labor induction. J Pak Med Assoc. 2007;57(8):404-7.
8. Hall R Duarte-Gardea M, Harlass F. Oral versus vaginal misoprostol for labour induction. Obstet Gynecol. 2002;99(6):1044-8.
9. Shetty A, Danielian P, Templeton A. A comparison of oral and vaginal misoprostol tablets in induction of labor at term. BJOG. 2001;108(3):238-43.

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