A Comparison Between Sublingual Misoprostol and Intravenous Oxytocin for Inducing labor in Women with Term Pregnancy

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Abstract

Objective: In this study efficacy of sub lingual Misoprostol was examined in comparison to Oxytocin (I.V.) for inducing of labor in term pregnancy.

Materials and methods: Seventy patients were allocated by blocked randomization to Groups A (n=35, sub lingual Misoprostol 25 µg four hourly to maximum of 5 doses) and B (n=35, continuous Oxytocin infusion).

Results: Delivery active phase and total labor phase were shorter with sublingual Misoprostol in comparison to intravenous Oxytocin ($p< 0.001$) and the rate of cesarean section was lower in Misoprostol group ($p<0.04$) but delivery latent phase, meconium staining, uterine hypertonisity and apgar score (1&5 minute) were similar in two groups.

Conclusion: sublingual Misoprostol is better than intravenous Oxytocin for induction of labor at term.

Keywords: Sublingual Misoprostol, Oxytocin, Term-pregnancy, Labor induction

Introduction

Promotion of normal vaginal delivery (NVD) and reduction of cesarean section (CS) are of the targets of World Health Organization (WHO) because of probability of infection, need of hysterectomy, complications due to anesthesia and high probability of maternal death with CS (1,2).

Improving the process of NVD, like finding drugs which have the least complications but the most effectiveness for this issue, plays an important role to achieve this target. Unfortunately, it's prevalent that unfavorable cervix exists with induction of labor indications, so it seems reasonable to investigate for finding new methods for preparing cervix that are effective on uterine contractures and labor induction simultaneously (1).

Although one of the most prevalent used drugs for normal delivery induction is intravenous Oxytocin, it does not affect cervix, so in these situations, it's an improper agent for induction. Due to using intravenously, Oxytocin has another limitation, as a result, a skilled person is needed to check drug infusion all the time hence the costs are increased (1).

Misoprostol has approved for preparation of cervix, also, it's easy to use.

In two studies by Nigam and Kidanto designed to compare Misoprostol with Oxytocin in induction of term labor, among Misoprostol group, NVD was more and total labor time was less, significantly (3,4).

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Eftekhary et al investigated Iranian cases and didn`t find any difference between vaginal Misoprostol and Oxytosin groups in NVD prevalence (5). WHO (2011) recommended that low dose oral Misoprostol is safer than vaginal Misoprostol (6).

Overall, studies about effects and complications of Misoprostol, specially sublingual Misoprostol on mother and fetus is far limited.

This randomized controlled trial study has done to investigate sublingual Misoprostol effectiveness on induction of labor, its complications on mother and fetus and compare it with intravenous Oxytocin in term pregnant women with unfavorable cervix.

Materials and methods

This RCT designed study being done in Mirza khoochak khan hospital in Tehran in 2010-2011. Data gathering was based on a check list of required information. Sample size was calculated based on statistics and previous studies (35 in each group) (4). Alpha and beta error were considered 0.05, 0.2, respectively.

Convenience Sampling was done among pregnant women who referred to this hospital.

Seventy term-pregnant women were randomized to sublingual Misoprostol or intravenous Oxytocin groups by blockig method after getting informed written consent. Blinding for doctors and patients was not possible because of different way of drug use. Inclusion criteria were gestational age 37-42 weeks, Bishop Score =< 4, Indication for labor induction, cephalic presentation, reactive NST.

Exclusion criteria were Bishop score>4), gestational age less than 37 and more than 42, non-vertex presentation, intrauterine demise, previous uterine surgery, oligo or polyhydramnios, intrauterine growth retardation, multiple pregnancy, clinical evidence of cardiopulmonary collapse, electrolyte abnormalities, severe pre-eclampsia/eclampsi, hepatitis, asthma, glaucoma and adrenal insufficiency, Sublingual Misoprostol group (n=35) (Searle company) received 25 µg four hourly to maximum of 5 doses. Administration was continued until cervix was ready for amniotomy, spontaneous rupture of membranes, or starting active phase. Oxytocin intravenous infusion (Caspian company) 10 U/lit, was was initiated at 1 mU/min and if necessary, stepped up by 1 mU/min every 15 minutes then continued at the same till delivery completed. Permanent monitoring was done in both groups and Contractures were controlled every 15 min for assessing need to increase medicine administration. Only in situation of ineffective contractures and after doing NST, an additional dose of Misoprostol was administered. Amniotomy was performed when active phase had been started (cervix dilatation => 3cm) and membrane was intact.

Determination of latent phase duration and starting active phase was done by vaginal examination. Vital signs were recorded from starting contractures until one hour of placenta voiding. Promethazine (25 mg IM) for nausea and Pethidine (50 mg, IM) for pain were used if necessary.

Latent phase and active phase duration, induction until labor duration, type of delivery (NVD or CS), Apgar score at 1 & 5 min, uterous hypertonisity, decresed fetal heart rate and meconium staining were recorded.

All analyses were based on the intention to- treat principle, were done by SPSS software (version 11) with using T test , Chi square, Mann-Whitney U Test and Fisher's Exact Test. P value less than 0.05 was defined as significant.

Results

Seventy people were entered to this study (35 in each group). Indications of pregnancy termination were rapture of membrane, post date or hypertension (Graph 1).

Mean age, weight, height and gestational age, number of previous parities and Bishop Score were similar in two groups (p> 0.05) (Table 1).

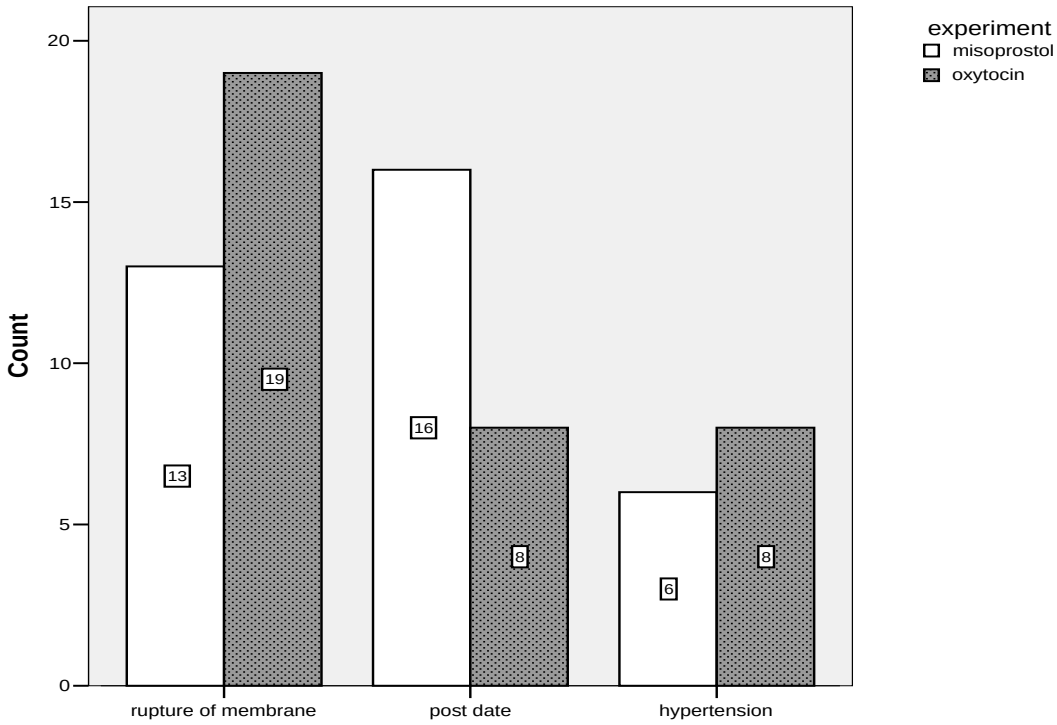
Mean of latent phase duration was similar (p< 0.069) in two groups but active phase and total labor phase duration were different significantly (p< 0.001) (Table 2).

Prevalence of meconium staining was similar (p > 0.05) but caesarian section was significantly different between two groups (p< 0.04) (Table 3).

No difference was seen between two groups in uterus hyper tonicity (%5.7 in Oxytocin and %0 in Misoprostol) and decreased fetal heart rate (none of groups)

Apgar score was similar between two groups (p< 0.6) (Table 4).

Among Misoprostol group, the most used dosage was 25 mcg (91%), only in 3 people 2 and 5 doses were needed (6% and 3.8% respectively).



Graph 1: frequency of indications for termination of pregnancy in each group

Table 1: Maternal characteristics in two groups

		Mean ± SD	P Value
Gestational age (weeks)	Oxytocin (n= 35)	39.42± 1.06	0.18*
	Misoprostol (n= 35)	39.77± 1.06	
Maternal Age	Oxytocin (n= 35)	25.49± 2.84	0.63*
	Misoprostol (n= 35)	25.83± 3.10	
Maternal weight (Kg)	Oxytocin (n= 35)	83.49± 5.15	0.62*
	Misoprostol (n= 35)	84.09± 4.91	
Maternal height (Cm)	Oxytocin (n= 35)	161.32 ± 5.38	0.88* test
	Misoprostol (n= 35)	161.14± 4.28	
Number of previous parities	Oxytocin (n= 35)	0	0.360**
	Misoprostol (n= 35)	0	
Bishop Score	Oxytocin (n= 35)	3	0.1**
	Misoprostol (n= 35)	3	

* Independent samples T test ** Mann-Whitney U Test

Table 2: Mean of latent phase, active phase and labor phase duration in Misoprostol and Oxytocin groups

		Mean ± SD	P Value
Duration of latent phase (minutes)	Oxytocin (n= 35)	406.42± 271.10	0.069*
	Misoprostol (n= 35)	296.14±227.08	
Duration of active phase (minutes)	Oxytocin (n= 35)	286.11± 152.28	0.001*
	Misoprostol (n= 35)	169.53± 89.89	
Duration of labor phase (minutes)	Oxytocin (n= 35)	718.88± 310.62	0.001*
	Misoprostol (n= 35)	487.18± 164.50	

* Independent samples T test

Table 3: Prevalence of meconium staining and caesarian section in Misoprostol and Oxytocin groups

		n (%)	P Value
Meconium staining	Oxytocin (n= 35)	3 (8.6)	1.00
	Misoprostol (n= 35)	2 (5.7)	
Duration of active phase (minutes)	Oxytocin (n= 35)	3 (8.6)	0.04
	Misoprostol (n= 35)	2 (5.7)	

Fisher's Exact Test

Table 4: Median of Apgar Score at 1 & 5 minutes in Misoprostol and Oxytocin groups

		Median	P Value
Apgar 1	Oxytocin (n= 35)	9	1.00
	Misoprostol (n= 35)	9	
Apgar 5	Oxytocin (n= 35)	10	0.04
	Misoprostol (n= 35)	10	

Mann-Whitney U Test

Discussion

This study was conducted on seventy full term pregnant women with unfavorable cervix and indication for induction of labor simultaneously. Mean of active and total labor phase were less significantly among misoprostol group in comparing with Oxytocin group. There was not more fetal or maternal complications with using Misoprostol (25 mcg) than Oxytocin.

Hofmeyr, Nigam and Kidanto found similar results and Misoprostol was more effective than Oxytocin to shorten active and total labor phase. This effect is probably due to positive impact of Misoprostol on favouring cervix (3, 4, 7).

There was no difference between two groups in induction to active phase duration in Eftekhry study, similar to present survey (5).

Crane, Hofmeyr and Kidanto, similar to this study, found that prevalence of caesarian section is lower with Misoprostol use rather than Oxytocin (4, 7-9) but this prevalence was equal in two groups in Nigam and Eftekhary's studies (3, 5).

Oral Misoprostol (50 mcg) had been used and incidence of Hypertonicity had not been measured which can be reason of increasing rate of caesarian section in Misoprostol group in Nigam study. In this study more patients needed to use second or third Misoprostol doses in comparing with this study (72% vs. 9%) which can be increasing factor for caesarian section probability.

Different results in Eftekhary study may be due to using vaginal Misoprostol in 18-35 weeks pregnant women (not term) and there were third gravid pregnant women in study too.

Similar to this study, Hofmeyr, Nigam and Eftekhary didn't find any meconium staining prevalence difference between two groups (3, 5, 7) but Wing showed that use of vaginal Misoprostol, accompanied with increasing meconium staining. Vaginal Misoprostol (50 mcg) was used in Wing's study, so this higher prevalence could be due to increased uterus hypertonicity (8).

Apgar score (1 & 5 minute) was similar in Misoprostol and Oxytocin groups in Hofmeyr, Nigam , Eftekhry and this study (3, 5, 7).

Incidence of uterus hypertonicity, in Eftekhary's like this study, was similar between two groups (5) but in one study (Hofmeyer's systematic review) vaginal Misoprostol (50 mcg) accompanied with uterus hypertonisity (7).

Prevalence of decreasing FHR was zero in two groups in present study, however in one study of Hofmeyer's systematic review, decreased FHR prevalence was higher which can be a result of accompanying with uterus hypertonicity (7).

One of the most important differences between this study with the others, which can be a justification for differences, is comparing sublingual Misoprostol with oxytocin when the others study oral or vaginal Misoprostol, specially when Shetty, Bartusevicius and niroomanesh have shown different effects between these two types of Misoprostol previously (10, 11, 12).

In present study, all women were first or second gravid which could be justifiable with higher prevalence of vaginal delivery complications in these gravids, but these results aren't representative for

women with gravid more than two, so there need for survey on this group.

Conclusion

Based on this study, according to effectiveness of Misoprostol on ripening of cervix, labor phase duration is shorten in using Misoprostol rather than Oxytocin and With 25 mcg sublingual Misoprostol, fetal and maternal complications were equal, so it is reasonable to use Misoprostol instead of Oxytocin for inducing labor in women at term with unfavorable cervix. Performing more surveys in order to finding more complications in using higher doses of Misoprostol seems logical.

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