A COMPARISON OF VAGINAL MISOPROSTOL WITH INTRAVENOUS OXYTOCIN FOR CERVICAL RIPENING AND LABOR INDUCTION

N. Eftekhari, B. Motamedi and H. Said

Department of Obstetrics and Gynecology, School of Medicine, Kerman University of Medical Sciences and Health Services, Kerman, Iran

Abstract- ***Labor induction despite an unriped cervix is one of the most common indications of the use of prostoglandines. This clinical trial was performed to compare the effectiveness of oxytocin with misoprostol for induction of labor in Bahonar Hospital, Kerman/lran from 1999 to 2000. Sixty pregnant women with indication for labor induction were randomly assigned to receive misoprostol or oxytocin. Misoprostol in tablet form, 25 µg, was placed in the posterior fornix and was repeated every four hours in the first group (to a maximum of 100 µg). The second group received intravenous oxytocin (21 µm/min). The results showed that 83.3% of women in the misoprostol group were delivered vaginally within 3.5-21 hours of the initiation of induction versus 76.7% within 4.5-17.5 hours in oxytocin group and there was no significant difference between them. The total cesarean rate was approximately similar in the two groups. Women receiving oxytocin had higher rate of cesarean for distocia (5 versus 1). The mean and median interval from induction to delivery were not significantly different between the two groups, (685± 223 and 710 minutes in the first group compared with 685±198 and 690 minutes in the second group, respectively). There were no significant differences in Apgar score and meconium staining between the two groups. Hyperstifflulation was seen in a patient in the first group with neither low Apgar score nor adverse neonatal outcomes. This study showed that the outcome of induction was not significantly different in the two groups. Therefore regarding the advantages of misoprostol, it is recommended as an alternative to oxytocin.***

Acta Medica Iranica, 40(4); 219-222: 2002

Key Words: ***Misoprostol, oxytocin, labor induction, ripening***

Correspondence:
N. Eftekhari, Department of Obstetrics and Gynecology, Kerman University of Medical Sciences and Health Services, Kerman, Iran
Tel: +98 341 47354
Fax: +98 341 3221671
E-mail: n_eftekhari2002@yahoo.com

INTRODUCTION

Labor induction (stimulation of uterine contractions before spontaneous onset of labor) is one of the common practices in the field of obstetrics (1). Different methods are used for induction including infusion of oxytocin and use of prostaglandins, particularly PGE2. Experimental findings using PGE2 either intravaginal or intracervical in more than 5000 pregnancy cases with 70 prospective clinical trials indicate that prostaglandine E2 is more effective than the others in dilation and effacement of cervix (2). It is well established that the outcome of labor induction depends on the characteristics of cervix including dilatation, effacement, position and consistency. Recently there has been considerable interest in the use of misoprostol, synthetic analogue of prostaglandin El, for both cervical ripening and labor induction. In comparison with dinoprostone it is less expensive, more stable at room temperature and its vaginal administration is easier. There are many studies in the literature reporting that it is as effective as PGE2 gel or even more (1,3). In 1995 Platz reported a randomized trial in a group of nuliparous women given gemoprost or vaginal misoprostol an hour before vacuum curettage. This study showed misoprostol to be more effective and less harmful for practicing legal abortion in the first trimester (4). Comparing with oxytocin, misoprostol is more effective for labor induction. It has a successful rate of 80% for vaginal delivery within 24 hours of initiation of induction and it is many times less expensive than oxytocin (5,6). Due to great advantages of misoprostol in labor induction and the ripening of the cervix, we compared it with oxytocin to suggest more accurate comments.

MATERIALS AND METHODS

This randomized clinical trial was performed to compare vaginal misoprostol with oxytocin for ripening of cervix and labor induction at Bahonar Hospital, Kerman, Iran. Sixty pregnant women with indication for labour induction were randomly selected and divided into two groups (30 subjects each

group). In the first group misoprostol in tablet form, 25 µg, was placed in the posterior fornix and repeated doses were given to a maximum of 100 µg every four hours in case of no response. In the second group oxytocin administration was begun at 2 µg/min and repeated doses were given every 15 minutes to arrive at stable contractions (up to 40 µg/min). The patients were matched regarding their age, parity, the indication for induction, Bishop score and gestational age and there were no significant differences between them. Inclusion criteria were: indication for labor induction, gestational age of ≥ 37 weeks, maternal age of 18-35 weeks, singleton gestation, Bishop score of ≤ 4-5, cephalic presentation and parity of ≤ 3. Exclusive criteria included: multiple pregnancy, any history of uterine surgery, any history of asthma and glaucoma, spontaneous contractions with more than 5 minutes interval, any contraindications such as placenta previa or herpes simplex. Using the experience of Sanchez-Ramos study (8) with a mean time to vaginal delivery of 585 minutes in misoprostol group and 885 minutes in oxytocin group and standard deviation of 300 minutes and considering clinical importance dilfference= 200, α= 5%, β= 1% sample size was calculated as 30 for each group. Data were collected using questionnaires and clinical examination. Results were analyzed using descriptive statistics, distributional indices, standard deviation, two ways ANOVA and the comparison of pairs.

RESULTS

The mean age of patients was 23.7±3.6 and 24.3±4.2, the mean of gestational age was 41±1 and 40±1 and Bishop score at the initiation of induction was 1.6±1.6 and 16±1.5 in the groups receiving misoprostol or oxytocin respectively and there were no significant differences between the two groups. The comparison between gravidity, parity, Bishop score at the initiation of induction and the indication for induction is shown in table 1.

Table 1. Distribution frequency of demographic features in the two groups

	Oxytocin Number	n= 30 Percent	Misoprostol Number	n= 30 Percent	p
Gravidity					
1	22	73.3	21	70	NS
2	3	10	5	16.7	
3	5	16.7	4	13.3	
parity					
0	22	73.3	21	70	NS
1	3	10	6	20	
2	5	16.7	3	10	
Bishop Score					
≤ 3	26	86.7	25	83.3	NS
4	4	13.3	5	16.7	
The reason for induction					
Post term	21	70	23	76.7	NS
Ofigohydranious	8	26.7	7	23.3	
WGI	1	3.3	0	0	

Table 2. The comparison of labor induction outcomes between the two groups

	Misoprostol Number	n=3 Percent	Oxytocin Number	n=3 Percent	p
Uterin hyperstimulation					
+	1	3.3	0	0	NS
-	29	96.7	30	100	
Meconium staining					
+	5	16.7	5	16.7	NS
-	25	83.3	24	83.3	
Type of delivery					
Vaginal	24	so	23	76.7	NS
Cesarean	5	16.7	7	23.3	
Vacuum	1	13.3	0	0	
Apgar score at 1 minute					
≤ 7	2	6.7	1	3.3	NS
≤ 8	28	93.3	29	96.7	
Apgar score at 5 mimte					
7	1	3.3	0	0	NS
≥ 8	29	96.7	30	100	
The number of induction applying					
Once	28	93.3	26	86.7	NS
Twice	2	6.7	4	13.3	NS

Table 3. Distribution frequency and the percentage of the optimal received misoprostol considering the type of delivery

Type of delivery	Vaginal		Cesarean		Vacuum		Total	
ose (ligr)	Number	Percent	Number	Percent	Number	Percent	Number	Percent
25	12	40	3	10	0	0	15	50
50	12	40	2	6.7	0	0	12	46.7
75	0	0	0	0	1	3.3	1	3.3
Total	24	80	5	16.7	1	3.3	30	100

$X^2 = 28.05$ df= 4 P <0.000002

The mean interval from labor induction to beginning of active phase was similar between the two groups: 163±753 min and 479±160 min in misoprostol-treated group and oxytocin-treated group respectively and there was no significant difference between the two groups. The comparison of uterine hyperstimulation, meconium stain, type of delivery, Apgar score at 1 and 5 minute, the number of induction trial in two groups is presented in table 2. The mean of Apgar score at 1, 5 minute was 8.7±0.8, 8.9± 0.4 in misoprostol group compared with 9.8± 0.6, 9.9± 0.4 in oxytocin group. The mean of birth weight was 3042±392 g in misoprostol group and 3132± 229 g in oxytocin group and they were not significantly different. Table 3 contains frequency distribution and the percentage of the maximum of received misoprostol.

DISCUSSION

Labor induction despite an unriped cervix may be necessary in some pregnancies. Oxytocin is the only drug that has been approved by FDA to be used in such cases. The outcome of the induction is determined by the condition of cervix (4). In subjects with Bishop score of <4 chance of cesarean section increases up to 60%. Recently a great interest has been raised in the use of vaginal misoprostol for cervical ripening and labor induction. In patients using misoprostol some side effects such as fever, uterine pain, vomiting and diarrhea occurred less. Misoprostol is cheep and easily administered (1,7). In this study 83.3% of the patients in misoprostol-treated group were delivered vaginally within 15-21 hours of initiation of induction and 76.7% of oxytocin-treated group were delivered vaginally within 43-17.5 hours of initiation of induction and no significant difference was observed between the two groups. In a study by Mundle, 220 women with the indication for labor induction were randomized to receive vaginal misoprostol, 50 µg, every four hours or the other drugs (dinoporostone, oxytocin). The results showed that the mean time to vaginal delivery was shorter in the first group and there was no significant difference in cesarean rate, maternal mortality and neonatal complications (6). In a randomized comparison between intravaginal misoprostol and dinoprostone. Nunes showed that the interval from the application of the initial dose to the beginning of active phase and delivery was shorter in the misoprostol-treated group (3). This study showed that misoprostol was more cost-effective compared to dinoprostone (3). Sanchez-Romans compared misoprostol with oxytocin for labor induction in 140 pregnant women with premature rupture of membranes and found that the mean interval from induction to delivery was significantly shorter in misoprostol group (8). In our own study there was only one case of uterine hyperstimulation (3.2%) in misoprostol group that led to cesarean section because of fetal distress. The Apgar scores were 6 and 9 in minute 1 and 5, respectively. Wing et al (1999) reported that oral adminis-tration of 50 µg doses of misoprostol appears less effective than vaginal administration of 25 µg doses of it for cervical ripening and labor induction (9). Uterine tachysystol and hyperstimulation occurred more frequently with misoprostol. It appears that the incidence of uterine tachysystol is dose related and is 17% with 25 µg dose (1,10-12). In the studies of Wing et al, of Sanches-Romas and Kramer the relatively high incidence of uterine trachysystol did not result in low apgar scores, neonatal acidosis and increase in the cesarean rate, or admission to NIM (5,8,11,12). In the present study 5 cases in the misoprostol group (16.7%) and 7 cases in the oxytocin group (23.3%) had cesarean deliveries of which 1 in misoprostol and 5 in oxytocin group were for distocia. Despite nonsignificant statistical difference it was noticeable in oxytocin group. The mean interval from initiation of induction to active phase was 1163± 753 with the median of 550 min and to delivery was 684± 223 with the median of 710 min in the oxytocin group. The mean interval from initiation of induction to active phase was 419± 160 with the median of 450 min and to delivery was 658±198 with the median of 690 min. The median induction to delivery interval was significantly shorter (585 versus 885 minutes, p <0.001) in the misoprostol group in Kramer study (5). In the study of Kramer and our own study, Apgar scores at 1 and 5 minutes and meconium staining in amniotic fluid were similar in the two groups. Misoprostol is the most effective choice for the treatment of post partum. hemorrhage (13). Because of the great advantages of misoprostol including drug form, easily administrated, less expensive, most effective for labor induction it is reported to be more applicable than oxytocin. As its side effects are dose-dependent and are ignorable in

25 µg dose, it is no less safe than oxytocin, and it is similar with oxytocin in labour induction. This study supports recent reports that misoprostol is a cost-effective alternative to oxytocin. Further studies with more access to monitoring devices and tocolytic drugs such as tebutalin and also some studies with the aim of neonate acidosis measurment is required to suggest more accurate comments and to establish the optimal dose of misoprostol.

REFERENCES

1. Cuningham G, Macdonald PC, Gant NI et al. Williams obstetrics, 20th ed., Norwalk: Appleton & Lange 1997; 426-430.

2. Raybum WF, Woods R, Eggert J, Ramadel C. Initiation of labor with a moderate favorable cervix: A comparison between prostaglandin E2 gel and oxytocin. Int J Gynecol Obstet 1998; 30: 225.

3.Nunes F, Rodrigues R, Meirinho M. Randomized comparison between intravaginal misoprostol and dinoprostone for cervical ripening and induction of labor. Am J Obstet Gynecol 1999; 181(3): 626-629.

4. Platz.christensen JJ, Nielsen S, Hamberger L. Is misoprostol the drug of choice for induced cervical ripening in early pregnancy termination? Acta Obstet Gynecol Scand 1995; 74(10): 809-12.

5. Kramer RL, Gilso GJ, Marrison DS et al. A randomized trial of misoprostol and oxytocin for induction of labor: safety and efficacy. Obstet Gynecol 1997; 89(3): 387-91.

6. Mundle WR, Young DC. Vaginal misoprostol for induction of labor: a randomized controlled trial. Obstet Gynecol 1996; 84(4 pt 1): 521-5

7. Stubble field PG. Family planning. In. Berek JS, Adashi EY, 1Ellard PA, eds: Novak's Gynecology, 12'h ed., Williams & Wilkins, 1996; 264-268

8. Sanchez-Ramos L, Chen AH, Kaunitz W et al. Labor induction with intravaginal misoprostol in term premature rupture of membranes: a randomized study. Obstet Gynecol 1997; 89(6): 909-912.

9. Wing DA, Ham D, Paul RH. A comparison of orally administered misoprostol with vaginally administered misoprostol for cervical ripening and labor induction. Am J Obstet Gynecol 1999; 180(5): 1155-1160.

10. Sanches-Ramos L, Kaunitz AM, Del Valle Met al. Labor induction with the prostaglandin E_1 methyl analogue misoprostol versus oxytocin. A randomized trial. Obstet Gynecol 1993; 81(3): 332-336.

11. Wing DA, Jones NWI, Rohall A et al. A comparison of misoprostol and prostaglandin E2 gel for preinduction cervical ripening and labor induction. Am J Obstet Gynecol 1995; 172(6): 1804-1810.

12. Wing DA, Rahall A, Jones MM et al. Misoprostol: an effective agent for cervical ripening and labor induction. Am J Obstet Gynecol 1995; 172(6): 1811-1816.

13. O' Brien P, EL Refaey a Gordon A. Recently administered misoprostol for the treatment of postpartum hemorrhage unresponsive to oxytocin and ergometrine: a descriptive study. Obstet Gynecol 1998; 92(2); 212-221.