

A Comparative Study of Induction of Labor with Intravaginal Misoprostol and Oxytocin

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ABSTRACT

Introduction : The maternal complications associated with premature rupture of membranes in term pregnancies are risk of cord prolapsed, infection and an unfavourable cervix for induction. Objective of the study was to compare vaginally administered misoprostol with intravenous oxytocin for induction of labor in women with premature rupture of membranes.

Material and Methods: The present study of induction of labor was carried out on 200 cases of pregnant women with premature rupture of membranes at which included: Group I: Intravaginal misoprostol (25 mcg): 100 cases and Group II: Oxytocin infusion group: 100 cases

Results: Multiparous women responded to induction quickly than nulliparous women. The caesarean section rate was double in the oxytocin group. The incidence of incoordinate uterine action was more in the oxytocin group when compared to the misoprostol group. The mean birth weight did not differ significantly in the two groups. No significant difference was found in the maternal morbidity pattern between the two groups.

Conclusion: The present study shows that intravaginal misoprostol can be used safely and effectively in women with premature rupture of membranes at term. The patient can be ambulatory without intravenous drip.

Keywords: Oxytocin, misoprostol, induction of labor

INTRODUCTION

Premature rupture of membranes at term is defined as spontaneous rupture of membranes after 37 weeks of gestation and before the onset of regular painful contractions. It occurs in approximately 10% of pregnancies. The latent period is the time interval between the rupture of membranes to the onset of labor. It varies on a host of factors like the presence or absence of infection, multiple pregnancy, polyhydramnios and to some extent the gestational age.¹

The average incidence of premature rupture of membranes is 10% of all pregnancies, but it varies from 2-18%.¹ Approximately 60-80 and of these cases of premature rupture of membranes occur in term pregnancies.² Membranes from pregnancies associated with premature rupture of membranes are less elastic than normal chorioamniotic membranes.³ Membranes that rupture prematurely may have different mechanical properties, such as decreased thickness and elasticity, decreased collagen synthesis and increased collagen-

olysis, compared with membranes that do not rupture prematurely.^{4,5}

The maternal complications associated with premature rupture of membranes in term pregnancies are risk of cord prolapsed, infection and an unfavourable cervix for induction. The latter is associated with a high incidence of dysfunctional labor, chorioamnionitis, and increased rate of caesarean section, postpartum hemorrhage and endomyometritis. Bruschi⁶ found an increasing incidence of maternal morbidity with increasing length of the latent period. 1.7% upto 24 hours increasing to 8.6% over 48 hours on term premature rupture of membranes patients.

Sacks and Baker quoted the incidence of maternal morbidity to be 1.3% when the latent period was less than 24 hours and 4.8% when it was longer than 24 hours. Lehberz and associates used prophylactic antibiotics and found the post partum morbidity to be significantly reduced in patients with term premature rupture of membranes. In the entire literature reviewed there were only 69 maternal deaths associated with premature rupture of membranes. It is apparent from the literature that the primary cause of death in almost all cases was sepsis.¹

Perinatal mortality is mainly due to sepsis and respiratory distress. In a study of premature rupture of membranes, the neonatal mortality was reported as 6.7% of which 55% was due to infection.⁷

The risk of neonatal infection after premature rupture of membranes is increased with prematurity and the presence of chorioamnionitis, especially if there was a prolonged interval between the first vaginal examination and delivery. The duration of draining prior to the onset of labor has not been shown to be significant in the development of neonatal sepsis though there is a risk of chorioamnionitis. The volume of amniotic fluid remaining after premature rupture of membranes is of importance as it possesses antibacterial activity. Neona-

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tal infection may manifest as septicaemia (4.9%), meningitis (3.4%), pneumonia (4.8%), pyoderma (3.6%), umbilical sepsis (3%) and conjunctivitis (23.1%).⁷

MATERIAL AND METHODS

The present study of induction of labor was carried out on 200 cases of pregnant women with premature rupture of membranes at which included:

Group I: Intravaginal misoprostol (25 mcg): 100 cases

Group II: Oxytocin infusion group: 100 cases

Women with cephalo pelvic disproportion, parity more than 5, post caesarean pregnancy, any moderate or severe pre existing medical disease such as cardiovascular disease or chronic renal failure, malpresentation, evidence of chorioamnionitis as determined by temperature > 100.4 degree F and the presence of uterine tenderness or foul smelling amniotic fluid, active herpes simplex infection, placenta previa or unexplained vaginal bleeding, any contraindication for the use of prostaglandin such as glaucoma or sickle cell disease or bronchial asthma were excluded from the study.

Misoprostol group

In the misoprostol group, 25 mcg of misoprostol was placed in the posterior fornix. Fetal heart rate were monitored every half an hour. The dose was repeated every 3 hours and was continued in the active phase of labor also till the patient delivered. The induction was stopped if the patient developed hyper stimulation or fetal distress.

The progress of labor was followed by a partogram. If there was no response even with 8 doses of misoprostol or on any evidence of fetal distress, it was considered as failed induction and LSCS was done.

The uterine contractions were monitored for any tachy systole, hypertonus and hyper stimulation syndrome.

Oxytocin induction group

Induction of labor was done with intravenous oxytocin drip after assessing the initial Bishop score and pelvic assessment.

Five units of syntocionon was added to 500 ml of 5% dextrose in primigravidae or 2.5 units of syntocionon in case of multigravidae was stated as IV drip. The drip rate was started with 6 mu/min inprimis and 4 mu/min in multis over a period of an hour until the patient developed three regular contractions in a period of 10 minutes and each contraction lasting for about 40-50 seconds with a period of relaxation in between, the maximum dosage of oxytocin given was upto 20 mu/min.

Clinical monitoring of patient was done as follows:

1. Hourly blood pressure and pulse rate
2. Two hourly temperature recording
3. Fetal heart rate every 15 minutes in the first stage and every five minutes in the second stage.
4. Uterine contractions, their intensity, frequency and du-

ration by external palpation.

If there was progress in labor, the induction with oxytocin was continued till delivery. If no response to induction was seen or any complications developed, the induction was stopped and an LSCS was done.

If the induction resulted in a vaginal delivery of a healthy child either naturally or helped out with forceps or vacuum extraction, it was a successful induction.

Failed induction was defined as no appreciable change in the cervix after eight hours of adequate uterine contractions or as no progressive increase in cervical dilatation after more than two hours in the active phase of labor.

The following observations were made and compared between the two groups.

1. Induction to delivery interval.
2. Mode of delivery
3. Maternal side effects
4. Neonatal side effects
5. Neonatal outcome
6. Success and failure rates
7. The patients in both the groups were kept in the hospital for one week after delivery for observation.

RESULTS

Table 1 shows induction delivery interval in nulliparous and multiparous women in both the groups. Nulliparous women: 56% of cases delivered within 9 hours and 88.8% of cases delivered within 12 hours in the misoprostol group. In the oxytocin group only 41% of cases delivered within 9 hours and 82% delivered within 12 hours. After 12 hours the effect was almost same in both the groups indicating response of uterus to prostaglandin is quicker than oxytocin.

Multiparous women: 83% of cases delivered within 9 hours in the misoprostol group and 67% delivered within 9 hours in the oxytocin group. After 9 hours, the effect was almost the same in both the groups. The mean induction delivery interval was 3.7 hours in the misoprostol group and 7.5 hours in the oxytocin group. Multiparous women responded to induction quickly than nulliparous women.

92% misoprostol treated women delivered vaginally ad 84%

Induction delivery interval	Misoprostol group		Oxytocin group (n = 58)	
	Nulliparous women (n = 54)	multiparous women (n = 46)	Nulliparous women (n = 58)	multiparous women (n = 42)
> 3 hours	2 (4%)	4 (9%)	2 (3%)	4 (10%)
3-6 hours	4 (7%)	28 (61%)	6 (10%)	8 (19%)
6-9 hours	24 (44%)	6 (13%)	16 (28%)	16 (38%)
9-12 hours	18 (33%)	6 (13%)	24 (41%)	10 (24%)
> 12 hours	6 (11%)	2 (4%)	10 (17%)	4 (9%)

Table-1: Induction delivery interval in nulliparous and multiparous women

oxytocin treated women delivered vaginally. 8% misoprostol treated women underwent caesarean section and 16% oxytocin treated women underwent caesarean section which shows that the caesarean section rate was double in the oxytocin group.

Table 3 shows that in the misoprostol group the maternal side effects were minimal when compared with the oxytocin group. The incidence of chorioamnionitis, fetal heart rate variations and puerperal pyrexia were similar in both the groups. The incidence of incoordinate uterine action was more in the oxytocin group when compared to the misoprostol group.

Table 4 shows the neonatal outcome in both the groups. The mean birth weights, the Apgar scores < 7 at 1 and 5 minutes and the percentage of infants requiring admission to NICU were similar in the two groups.

The neonatal complications were similar in both the groups. Meconium aspiration was more in the misoprostol group and jaundice in the oxytocin group.

DISCUSSION

The use of vaginal misoprostol reduced the duration of labor in the nulliparous women. No patient in the misoprostol group required oxytocin for augmentation of labor. This is in contrast to Wing et al study.⁸

No case of hyper stimulation was seen in the misoprostol group. Tachysystole was observed in two cases of oxytocin group and one case in the misoprostol group, in contrast to the studies of Sanchez R et al.⁹ The present study showed that low dose vaginal misoprostol is associated with lower rate of tachysystole and hyper stimulation. This finding was in accordance with Wing et al study.⁸

Post partum hemorrhage was observed in 4% of the oxytocin group. In the misoprostol group two cases had small cervical lacerations, leading to PPH of about 750 ml, which were sutured. The overall blood loss was reduced in the misoprostol group. Very few investigations have studied the incidence of PPH following induction with oral prostaglandin.¹⁰ They found no case of PPH in PGE₁ induced group as compared to 6 (12%) cases in oxytocin group.

The maternal and perinatal outcome was similar in both the groups. This is similar to the study of Wing et al⁸ and Sanchez R et al.⁹

The rate of forceps delivery was more among oxytocin group in the present study, the main indication being fetal distress in the 2nd stage of labor.

The mean birth weight did not differ significantly in the two groups which is similar to the study by Wing et al.⁸

The vaginal misoprostol was well tolerated in all cases and no patient developed nausea, vomiting or diarrhea. In the oxytocin group there were complications like thrombophlebitis and drip reaction.

No significant difference was found in the maternal morbidity pattern between the two groups. This finding is similar to that of Hannah ME et al.¹¹

Mode of delivery	Misoprostol group (n = 100)	Oxytocin group (n = 100)
Spontaneous	84	70
Vacuum extraction	4	4
Low forceps	4	10
Caesarean section	8	16

Table-2: Mode of delivery in the misoprostol and oxytocin group

Complications	Misoprostol group (n = 100)	Oxytocin group (n = 100)
Gastrointestinal	0	0
Drip reaction	0	3
Hyper stimulation	0	2
Tachysystole	1	2
FHR variations	10	12
Chorioamnionitis	1	2
Puerperal pyrexia	2	2
Thrombophlebitis	0	4

Table-3: Comparison of complications in the two groups

Neonatal outcome	Misoprostol group (n = 100)	Oxytocin group (n = 100)
Apgar < 7		
1 min	8	14
5 min	2	04
Mean Birth weight (kg)	2.7	2.85
Neonatal infection	1	1
Admission to NICU	6	10

Table-4: Comparison of neonatal outcome in two groups

neonatal complications	Misoprostol group (n = 100)	Oxytocin group (n = 100)
Birth asphyxia	8	10
Meconium aspiration	10	8
Jaundice	2	4

Table-5: Comparison of neonatal complications in two groups

CONCLUSION

The present study shows that intravaginal misoprostol can be used safely and effectively in women with premature rupture of membranes at term. The patient can be ambulatory without intravenous drip.

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