A Comparative Study of Sublingual and Vaginal Low Dose Misoprostol for Induction of Labor

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ABSTRACT

Introduction: Labour induction is a clinical intervention that has the potential to confer major benefits to the mother and new-born. Study aimed to compare the safety and efficacy of sublingual versus vaginal misoprostol and to evaluate maternal and foetal outcomes after sublingual and vaginal routes of administration.

Material and methods: We conducted a study on induction of labor with misoprostol on antenatal patients with medical or obstetric indication who presented in the Department of Obstetrics and Gynaecology, RMCH.

Result: There was no significant difference in the demographic characteristics between the two groups. The main indication for induction in both groups was pregnancy induced HT. Incidence of caesarean section was not significantly different in the two groups. There was no significant difference in maternal complications between the two groups.

Conclusion: Sublingual misoprostol is as effective and safe as vaginal misoprostol for induction of labor at term.

Keywords: Induction of Labor, Misoprostol, Vaginal, Sublingual

INTRODUCTION

Labour induction is defined as an intervention designed to artificially initiate uterine contractions on a pregnant uterus that has crossed the period of viability leading to progressive dilatation and effacement of the cervix and vaginal birth of healthy baby.[1] Induction of labor is a common obstetric procedure as around 20% of all deliveries are preceded by labor induction.[2]

The prostaglandins (PG) are a group of physiologically active lipid compounds having diverse hormone-like effects in animals. One of them is Misoprostol which is inexpensive, stored easily, and not affected by ambient temperature, and needs no refrigeration, in comparison with the other prostaglandins. It has minimal side effects on cardiovascular system and bronchial tree smooth muscles; so it can be safely used in hypertensive and asthamatic patients.[3-5]

Induction of labor with prostaglandins (PGs) offers the advantage of promoting cervical ripening while stimulating myometrial contractility. The American College of Obstetricians and Gynaecologist has reaffirmed the use of misoprostol as a drug for induction of labor because of its proven safety and efficacy.[6-10]

Present study has been undertaken to compare the safety and efficacy of vaginal and sublingual misoprostol for induction of labor in women requiring induction in the department of Obstetrics and Gynaecology in Rohilkhand Medical College and hospital, Bareilly (UP).

MATERIAL AND METHODS

Present study was a randomized prospective study carried out in the Department of Obstetrics and Gynaecology, Rohilkhand Medical College and Hospital, Bareilly (UP) from 2014 to 2015. The permission for the same was obtained from hospital ethical committee. Rohilkhand Medical College and Hospital Bareilly (UP). Consent in written was obtained from all the patients who participated in the study.

Inclusion criteria

- Live singleton pregnancy of gestation age 37-40 weeks with medical and obstetrics indication for induction of labour
- Both primigravida and multigravida
- Cephalic presentation
- Reassuring fetal heart tracing
- Bishop score < 6

Exclusion criteria

- Previous caesarean delivery
- Malpresentation
- Multiple pregnancy
- Known contraindication to use of prostaglandins (asthma)
- CPD

The patients were divided into 2 groups: Group A and Group B. Patients who received 25 µg misoprostol sublingually were considered in group A, and those who received 25 µg misoprostol vaginally were considered in group B.

Demographic details such as age, parity, gestational age, indication for induction were noted. In all these patients, the cervical status was assessed by using Bishop's score prior to induction. Repeat Bishop's was assessed before every repeat dose.

Labour was managed according to labour room protocol (partographically) for decision regarding oxytocin augmentation, ARM, and administration of labour analgesia.

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How to cite this article: Sana Amrin, Shobha Mukherjee, Jyoti Singh, Shivika Gupta. A comparative study of sublingual and vaginal low dose misoprostol for induction of labor. International Journal of Contemporary Medical Research 2020;7(2):B6-B8.

DOI: http://dx.doi.org/10.21276/ijcmr.2020.7.2.27

Primary outcome was measured by vaginal deliveries achieved and induction to delivery interval. Secondary outcome was measured by including incidence of caesarean section for fetal distress, incidence of failed induction, occurrence of side effects such as hyper stimulation, tachysystole, fever, nausea and vomiting etc. Neonatal outcomes was assessed by Apgar score and NICU admission. Failed induction was diagnosed when women did not go into labour or cervix was not favourable enough for ARM at the end of induction protocol; Birth asphyxia was defined by APGAR score less than or equal to 3 or requirement of ventilation.

RESULTS

Both groups age characteristics were similar. On comparing the indications for induction, there were 18(18%) cases of PIH in sublingual group and 23(23%) in vaginal group. No case of eclampsia in sublingual group and 21(21%) in vaginal group 0.2(2%) cases of GDM in sublingual group and 8(8%) in vaginal group. 25(25%) cases of post-dated in sublingual group and 24(24%) in vaginal group. No case of polyhydramnios in sublingual group and only 1 (1%) in vaginal group. 45(45%) cases of PROM in sublingual group and no case in vaginal group.

There was no significant difference in Bishop's score in sublingual and vaginal group.

There was no significant difference in relation to augmentation of labour in sublingual and vaginal group. Also, there was no significant difference in cases in relation to mode of delivery in sublingual and vaginal group (table-1).

There was no significant difference between sublingual and vaginal misoprostol with an average induction delivery interval in relation to primigravida (p=0.0838). Average induction delivery interval in multigravida was in 8.61 ± 3.16 hours in sublingual group and 11.55 ± 5.35 hours in vaginal group. This was highly significant (table-2).

In group A in which misoprostol was used sublingually for induction of labour, 2% had maternal complications. In group B in which misoprostol was used vaginally for induction of labour, 2% had maternal complications (vomiting, precipitate labour) (table-3).

There was no significant difference in cases in weight of the babies in sublingual and vaginal group. 100% of babies were alive in both group A and B (table-4).

No of doses	Total dosage of misoprostol	Group A Sublingual	Group B Vaginal
1	25 µg	7(7%)	4(4%)
2	50 µg	49(49%)	19(19%)
3	75 µg	25(25%)	27(27%)
4	100 µg	11(11%)	30(30%)
5	125 µg	7(7%)	13(13%)
6	150 µg	1(1%)	7(7%)

Table-1: Distribution of cases according to total dosage of misoprostol

Indication	Group A – sublingual	Group B – vaginal
Fetal distress	11(11%)	11(11%)
Failed induction	1(1%)	0(0%)
DTA	2(2%)	1(1%)
Deflexed head	4(4%)	3(3%)
Non reassuring NST	1(1%)	2(2%)
NPOL with fetal distress	1(1%)	4(4%)

Table-2: Distribution of cases in relation to indication of caesarean section

Induction delivery interval (hours)	Group A sublingual	Group B Vaginal
< 12	62(62%)	30(30%)
12-24	16(16%)	49(49%)
>24	2(2%)	2(2%)

Table-3: Distribution of cases in relation to induction delivery interval

Bishop's score	Group A sublingual	Group B Vaginal	t-value	p-value
0-3	11.17±5.11	18.85±4.0	3.6750	0.0017
4-6	9.52±4.37	12.93±4.54	4.4726	0.0001

Table-4: Relationship between bishop's score and induction delivery interval

Time	Range	Group A sublingual	Group B Vaginal
1 min	8-10	55	37
	5-7	40	56
	0-4	5	7
5 min	8-10	93	85
	5-7	7	14
	0-4	0	1
Total		100	100

Table-5: APGAR score

Indication	Group A sublingual	Group B Vaginal
Observation	5	7
Birth asphyxia	2	3
Meconium aspiration	1	1

Table-6: Admission to neonataL ICU

DISCUSSION

Various new methods for the induction of labor has been adopted by obstetricians viz membrane sweeping, anatomy, extra-amniotic, Foley catheter insertion, extra-amniotic saline infusion, castor oil consumption, intravenous oxytocin, vaginal prostaglandin E2, vaginal prostaglandin F2α, misoprostol, and even acupuncture, all with different success rates and probable complications. Studies have been reported that the vaginal application of misoprostol has higher efficacy with a longer duration of elevated plasma levels and 3 times more bioavailability than does the oral route by the elimination of the hepatic or gastrointestinal effect.

In present study total number of cases of sublingual (group A) mean dose of misoprostol for delivery was 2.65± 1.07 and in cases of vaginal (group B) required mean dose for delivery

was 3.5±1.25. This result is consistent with the study done by F.E.L Feitosa[4] et al that mean dose in sublingual group was 2.8±1.2 and in vaginal group the mean dose was 2.6±1.2. Also, the study by Satya Prabha[5] et al showed similar result since mean number of doses required were more in vaginal as compared to sublingual group. This is mostly because pharmacokinetics is different in sublingual versus vaginal administration of misoprostol.

For sublingual administration, the onset of action is 11 minutes and duration of action is 3 hours. For vaginal administration, the onset of action is 20 minutes and duration of action is 4 hours. It is clear by the pharmacokinetics, that the time of onset is short in sublingual misoprostol. More number of cases in the vaginal group required oxytocin augmentation in present study, similar to other studies.

In present study 80% of antenatal women in sublingual group were delivered vaginally which was comparable to other studies.[6] The mean induction to vaginal delivery interval in present study in comparison to other studies shows that there is significant reduction in the induction to vaginal delivery interval with sublingual misoprostol. The difference is statistically highly significant (P=0.00001), indicating that sublingual route of administration leads to lesser induction to delivery intervals as compared to vaginal.

It was found that 7% of babies in the sublingual group and 15% in the vaginal group had 5 min APGAR score <7. The difference was not statistically significant (P=0.1577). In the present study 8% cases required admission to NICU in sublingual group (table-5,6). In previous studies like Lubna[7] et al and Satya prabha[5] et al NICU admissions were almost comparable.

The administration of high doses of misoprostol (i.e. 400 to 600 mcg) may induce side effects such as shivering, nausea, vomiting, hyperthermia, and diarrhoea. These side effects are, however, less common with doses of 25 to 50 mcg, used for the induction of a term pregnancy. Two percent of cases from sublingual group developed side effects like nausea, vomiting and fever, whereas vaginal group 2% cases developed vomiting and precipitate labour.

Limitations of the present study is its small sample size, which precludes exact conclusions. Also, we did not compare fever and hyperthermia, as a common complication of misoprostol, between the two groups. Last but not the least drawback is evaluation patient satisfaction due to the design of the study.

Misoprostol is a effective and potent drug and that it may have complications similar to those associated with other uterotonic medications. The administration of misoprostol in small dosages will alleviate the side effects. However, there are few studies with misoprostol for pregnancies with a live full-term fetus and randomized clinical trials are need for present day, especially in the case of a scarified uterus. The Federation of International Gynecologists and Obstetricians (FIGO) suggests a half dose of misoprostol for women with a previous Caesarean section. However, uncertainties still exists regarding the administration of misoprostol previous uterine scars.

CONCLUSION

Women who received sublingual misoprostol, experienced shorter induction to delivery intervals and required fewer doses of misoprostol there requirement of oxytocin augmentation was much less than those who received vaginal misoprostol. Sublingual misoprostol could be more acceptable to the patients and could be an attractive option for induction of labour at term. Sublingual misoprostol has an added advantage over vaginal misoprostol in cases of PROM. Sublingual misoprostol is as effective and safe as vaginal misoprostol for induction of labour at term.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 25-12-2019; **Accepted:** 27-01-2020; **Published:** 29-02-2020