Original Article

ISSN (0): 2347-3398; ISSN (P): 2277-7253

Comparative Study of Sublingual versus Vaginal Misoprostol for Induction of Labour

Naiya Devgan[1]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, SGT University, Budhera, Gurugram.

Abstract

Background: For majority of women labor starts spontaneously at or near term and result in vaginal delivery, however because of medical or obstetrics complications of pregnancy, labor induction is often required. **Subjects and Methods:** 72 pregnant women at term in department of Obstetrics and Gynecology, the subjects were randomly assigned into two groups sublingual versus vaginal misoprostol (50 mcg) given every 6 hrs. **Results:** The mean age of patients was 24.48±8.67 years in sublingual group and 25.02±8.97 years in the vaginal group. The mean period of gestation was 38.26±11.23 weeks in sublingual and 38.86±1.33 weeks in the vaginal group. The mean Bishop was 3.42±1.07 in sublingual group and 3.72±1.72 in the vaginal group. **Conclusion:** Induction of labor, vaginal misoprostol is preferable to sublingual misoprostol when used in equivalent dosage of 50 mcg.

Keywords: Induction of labour, Misoprostol, Sublingual and Vaginal.

Corresponding Author: Dr. Naiya Devgan, Assistant Professor, Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, SGT University, Budhera, Gurugram

Received: August 2019
Accepted: August 2019

Introduction

Induction of labour is the artificial initiation of labour before its spontaneous onset to deliver the feto-placental unit. The World Health Organization (WHO) Global Survey on Maternal and Perinatal Health, between 2004 and 2008, conducted in 24 countries which included nearly 3,00,000 observations, showed that 9.6% of them were delivered by induced labor.[1] One of the most common indications is prolonged pregnancy.[2] Recent studies have suggested that pregnancy beyond 41 weeks leads to a statistically significantly higher rate of perinatal morbidity and mortality, as well as an increased risk to the mother.[3,4] Thus, there is a growing body of evidence suggesting the elective induction of labor at 41 weeks of gestation instead of expectant management.[4,5] In the presence of an unfavorable cervix, cervical ripening is recommended to increase the likelihood of successful induction and decrease the risk of a Cesarean delivery.[6] The search for the ideal agent, timing, and dosage interval to convert an unfavorable cervix to one receptive to delivery is an ongoing process. Attention has been focused on prostaglandins as effective pharmacological adjuncts to induction. Misoprostol, a synthetic analogue of prostaglandin E1, has been widely studied in a variety of dosages and routes of administration as an alternative to oxytocin. Misoprostol offers the advantage of promoting both cervical ripening and myometrial contractility.[7] Vaginal misoprostol appears to be more effective than the equivalent dosage administered orally but is associated with a higher risk of uterine hyperstimulation, both without and with fetal heart rate (FHR) changes.[8-10] The likely explanation for the high efficacy of vaginal administration could be determined by avoidance of the first-pass effects of the gastrointestinal and hepatic enzymes and its direct effect on the cervix and uterus.[11,12] Oral and sublingual misoprostol have a rapid onset of action. Sublingual and vaginal routes have prolonged activity and possess the greatest bioavailability.[13] Benefits of the sublingual route might include less frequent need for vaginal examinations, greater freedom of position in the labor bed, and ease of administration.[14] Aim of this present study was to compare the effectiveness of sublingual versus vaginal misoprostol (50 mcg) given every 6 h for a maximum of 24 h for labor induction.

Subjects and Methods

This present study was carried out in the Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, SGT University, Budhera, Gurugram. A total of 72 pregnant women at term in department of Obstetrics and Gynecology, Faculty of Medicine and Health Sciences, during the period of nine months i.e., from October 2018 to June 2019. The study was done after obtaining clearance from the institutional ethical committee of Faculty of Medicine and Health Sciences. After getting full informed consent, the subjects were randomly assigned into two groups according to inclusion and exclusion criteria:

Group A: 36 pregnant women received Sublingual 50mcg misoprostol and

Group B: 36 pregnant women received vaginal misoprostol 50mcg. All the participant who received sublingual misoprostol were asked to keep the tablet under the tongue and not to swallow the tablet at least for 20 minutes. The patients who received vaginal misoprostol were asked not to stand up or move around after the insertion of vaginal tablet. The administration was repeated every 4 hours until 3 or more uterine contractions of 40 seconds duration occur over 10 minutes, or when a maximum of 6 doses i.e. 150 microgram was reached. In cases of absence of either of these two criteria mentioned above, failed induction was reported and caesarean section was undertaken. Routine biochemical investigations include RBS, ABO/ Rh, Hb, BT, CT, Urine examination and obstetrical USG was done. All laboring women were monitored for fetal heart rate, uterine contractions and progress of labor. Maternal adverse effects included abnormal uterine contractions, GIT symptoms, hyperpyrexia and perinatal outcome was done by analyzing FHR changes during labor, intrapartum passage of meconium, Apgar scores at 1 and 5 minutes and newborn admission in NICU.

Statistical Analysis:

The statistical analysis collected was subjected to analysis using Statistical Package for Social Sciences, version 15.0 and then compared with Chi Square test and Student't' test for comparison of qualitative data. After check of normality, Mann Whitney and Kruskal- Wallis test were used, if normality not fitted, Independent t-test and ANOVA test used if normality fitted to data. p-value less than 0.05 was considered statistically significant.

Results & Discussion

This present study was conducted in the Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences. A total of 72 pregnant women were included in the study. They were categorized into two groups (A & B): Group A received 50 mg of misoprostol sublingually and group B received 50 mg of misoprostol vaginally. [Table-1] shows the demographics with regard to age, period of gestation, Bishop Score, indication for induction of labor and parity were similar in all the three groups.

Table 1: Demographic charateristics of subjects

Parameters	Sublingual (n=36)	Vaginal (n=36)	P value
Maternal age in year	24.48±8.67	25.02±8.97	0.64
Period of gestation in weeks	38.26±11.23	38.86±1.33	0.75
Preinduction Bishop score	3.42±1.07	3.72±1.72	0.34

The mean age of patients was 24.48±8.67 years in sublingual group and 25.02±8.97 years in the vaginal group (p value 0.64). The mean period of gestation was 38.26±11.23 weeks in sublingual and 38.86±1.33 weeks in the vaginal group (p value 0.075). The mean Bishop was 3.42±1.07 in sublingual group and 3.72±1.72 in the vaginal group (p value 0.34).

Table 2: Shows the Parity of subjects

Parity	Sublingual (n=36)		Vaginal (n=36)	
	No.	%	No.	%
Primi	23	63.9	24	66.7
Multi	13	36.1	12	33.3
Total	36	100	36	100

[Table 2] Shows the statistically not significant association between parity and route of administration of drug P=0.46 (P value > 0.05).

Table 3: Number of doses required for successful outcome, mode of delivery, induction–delivery interval.

Parameters	Sublingual (n=36)	Vaginal (n=36)	P value
Mean no of doses	1.52±0.46	1.2±0.32	<0.05
Induction- delivery (Hours)	15.96±7.1	12.4±6.21	<0.01
Spontaneous vaginal delivery	26 (72.2%)	29 (80.5%)	-
Instrumental vaginal delivery	01 (2.8%)	03 (8.3%)	-
Cesarean Section	09 (25.0%)	04 (11.1%)	
Induction to delivery interval	13.2±4.03	7.05±2.3	<0.05
Oxytocin augmentation (no of cases)	25 (69.4%)	22 (61.1%)	-

The mean number of doses required for successful induction was 1.52 in sublingual and 1.2 in the vaginal group. [Table-3] Shows the mean dose required for successful induction was significantly less in the vaginal group than sublingual groups. The induction to delivery interval was significantly less in sublingual group than vaginal 13.2±4.03 and 7.05±2.3 (p<0.05). [Table-4] shows the Side effects of drugs and neonatal outcomes.

Table 4: Side effects of drugs and neonatal outcomes

Variable	Sublingual	Vaginal
Nausea	1(2.7%)	0(0.0%)
Vomiting	2(5.5%)	1(2.7%)
Dizziness	0(0.0%)	0(0.0%)
Fever	0(0.0%)	1(2.7%)
Hypertonus	0(0.0%)	0(0.0%)
Uterine Hyperstimulation	0(0.0%)	0(0.0%)
Tachysystole	1(2.7%)	0(0.0%)
Meconium stained liqor	2(5.5%)	1(2.7%)
Fetal heart rate abnormalities	5(13.8%)	2(5.5%)
Cesarean Section	8(22.2%)	3(8.3%)
1 min Apgar score <7	2(5.5%)	3(8.3%)
5 min Apgar score <7	0(0.0%)	0(0.0%)
NICU admission	0(0.0%)	1(2.7%)

Use of prostaglandin E1 analogue, Misoprostopl for induction of labor has been quite promising. It is inexpensive can be stored at room temperature, has minimal side effects at low doses, can be administered with ease by

various routes like oral, sublingual, vagina, buccal and rectal and more importantly acts to promote cervical ripening and uterine contractions. Doses ranging from 25 mcg to 200 mcg have been used but doses more than 50 mcg is associated with uterine contraction abnormalities, meconium passage and uterine rupture.[15] According to World Health Organization, Induction of labour needs to be considered when the risk–benefit analysis indicates that delivering the baby is a safer option for the baby and the mother, rather than continuing the pregnancy, and when there are no clear indications for caesarean section and no contraindications for vaginal delivery.[16] A number of methods are available for induction of labor. No side effect except for fever 2.7% in the vaginal group was found in my study. Vomiting was noted in 5.5% of pregnant women in the sublingual and 2.7% in the vaginal group. Statistically, the difference between two the groups was not significant. Misoprostol is reported to have fewer systemic side effects as compared to other labor inducting drugs (Abdel-Aleem, 2011).[17] El Kattan et al. (2013).[18] reported complications like tachysystole in 8% of sublingual group patients and hypertonus and hyperstimulation in 12% patients each in sublingual group and 16% patients each in vaginal group. The rate of side effects is higher with 50 µg dose for either of the two routes, as evidenced in the study of Malik et al. (2010),[19] who found vomiting rate of 10% in both oral and sublingual groups and tachysystole rate in 2% of oral and 10% of sublingual groups. No women in either group had hyperstimulation and hypertonus in this present study. The reason for this difference might be attributed to the smaller dose of drug used in the present study. In smaller doses, these side effects are quite low as evidenced in the study of Siwatch et al.[20] (2012) who reported hyperstimulation and tachysystole in only 1 case each of both subglingual as well as vaginal groups. Thus indicating that 25 µg dose of misoprostol administration through either of the two routes does not produce any substantial side effect. In present study, cesarean delivery rate was 22.2% in sublingual and 8.3% in vaginal groups. However, this difference was not significant statistically. Jahromi et al. (2016).[21] Also reported a lower cesarean delivery rate in the vaginal group (14%) as compared to the sublingual group (22%) and did not observe a significant difference between two groups which was comparable to my study. Sheela et al. (2015),[22] and Siwatch et al.[20] (2012) while using 25 µg misoprostol dose reported much lower cesarean delivery rate in both sublingual (14.1% and 8.7%) and vaginal (10% and 7.5%) group, and both of them did not find a significant difference in the route of delivery between the two groups. In present study we used 50 microgram misoprostol 6 hourly and majority of cases in both the groups required four to five doses of misoprostol. Statistically, there was no significant difference between the two groups with respect to the number of doses required for vaginal delivery. In contrast, Ayati et al. (2014).[23] Used 25 microgram misoprostol 6 hourly, reported need of only two doses in majority of the patients in sublingual group and only one dose in half the patients in vaginal group and showed no significant statistical difference between the two groups. The mean induction-delivery interval was 13.2 hours in the sublingual group and 7.05 hours in the vaginal group, showing that this interval was longer in the sublingual group as compared to the vaginal group which was not statistically significant. Ayati et al.[23] (2014) in their study reported mean induction-delivery interval to be 11.62±6.76 hours in the sublingual and 11.08±3.41 hours in the vaginal group and did not find a significant difference between two routes. El-Kattan et al. (2013),[18] reported the induction delivery interval to be 10.47±7.83 hrs in sublingual and 12.04±7.88 hrs in vaginal group and did not show a significant difference between two routes. No neonatal complication was found except for birth asphyxia in one baby each of both the groups. No case of neonatal death, neonatal hyperbilirubinemia, meconium aspiration or acute respiratory distress syndrome was reported in this present study. El-Kattan et al. (2013),[18] reported NICU admission for 1 case each in both the groups. All these findings reveal that neonatal complication rate is limited and does not get affected by route of misoprostol administration. Thus, present study shows that the fetal outcome results were also comparable in two groups. Maternal side effects were also same in the two groups and similar findings were seen in studies by Benette et al and Shetty et al.[13,24]

Conclusion

In conclusion, the present study showed that induction of labor, vaginal misoprostol is preferable to sublingual misoprostol when used in equivalent dosage of 50 mcg and without adding any additional burden of complication. Thus indicating that the decision regarding route is optional and must be dependent on patient's/obstetrician's choice, however, given the variable nature of evidence provided in different studies, the problem needs to be analyzed using a meta-analysis design. The decision regarding route of administration is optional and must be dependent on patient's / obstetrician's choice. Neonatal outcome and maternal side effects are comparable in both groups.

References

1. WHO Recommendations for Induction of Labour. World Health Organization: Geneva; 2011.
2. Yawn BP, Wollan P, McKeon K, Field CS. Temporal changes in rates and reasons for medical induction of term labor, 1980–1996. Am J Obstet Gynecol 2001; 184:611–619.
3. Hilder L, Costeloe K, Thilaganathan B. Prolonged pregnancy: evaluating gestation-specific risks of fetal and infant mortality. Br J Obstet Gynaecol 1998; 105:169–173.
4. Cotzias CS, Paterson-Brown S, Fisk NM. Prospective risk of unexplained stillbirth in singleton pregnancies at term: population based analysis. Br Med J 1999; 319:287–288.
5. Rand L, Robinson JN, Economy KE, Norwitz ER. Post-term induction of labor revisited. Obstet Gynecol 2000; 96:779–783.
6. Hofmeyr GJ. Induction of labour with an unfavourable cervix. Best Pract Res Clin Obstet Gynaecol 2003; 17:777–794.
7. Sanchez-Ramos L, Kaunitz AM,Wears RL, Delke I, Gaudier FL. Misoprostol for cervical ripening and labor induction: a meta-analysis. Obstet Gynecol 1997; 89:633–642.
8. Alfirevic Z. Oral misoprostol for induction of labour. Cochrane Database Syst Rev (Online) 2001; 2:CD001338.

9. Hofmeyr GJ, Gu¨lmezoglu AM. Vaginal misoprostol for cervical ripening and induction of labour. Cochrane Database Syst Rev (Online) 2003; 1:CD000941.
10. Bartusevicius A, Barcaite E, Nadisauskiene R. Oral, vaginal and sublingual misoprostol for induction of labor. Int J Gynecol Obstet 2005; 91:2–9.
11. Zieman M, Fong SK, Benowitz NL, Banskter D, Darney PD. Absorption kinetics of misoprostol with oral or vaginal administration. Obstet Gynecol 1997; 90:88–92.
12. Danielsson KG, Marions L, Rodriguez A, Spur BW,Wong PYK, Bygdeman M. Comparison between oral and vaginal administration of misoprostol on uterine contractility. Obstet Gynecol 1999; 93:275–280.
13. Muzonzini G, Hofmeyr GJ. Buccal or sublingual misoprostol for cervical ripening and induction of labour. Cochrane Database Syst Rev (Online) 2004; 4:CD004221.
14. Wolf SB, Sanchez-Ramos L, Kaunitz AM. Sublingual misoprostol for labor induction: a randomized clinical trial. Obstet Gynecol 2005; 105:365–371.
15. Fletcher HM, Mitchell S, Simeon D, Freidrick J, Brown D: Misoprostol for labor induction at term. Br J Obstet Gynaecol. 1993;100:641-4.
16. Goonewardene M, Rameez MFM, Kaluarachchi A, Perera H. WHO recommendations for induction of labour: RHL commentary (last revised: 1 November 2011). The WHO Reproductive Health Library; Geneva: World Health Organization.
17. Abdel-Aleem H. Misoprostal for cervical ripening and induction of labour: RHL commentary (last revised: 1 May 2011). The WHO Reproductive Health Library; Geneva: World Health Organization.
18. El Kattan, Eman A, Abdel M, Ghada A, Abdel Razek, Abdel Rahman. Sublingual versus vaginal misoprostol for induction of labor in term primigravidas: a randomized study. Evidence Based Women's Health Journal 2013;3(3):111-4.
19. Malik HZ, Khawaja NP, Zahid B, Rehman R. Sublingual versus oral misoprostol for induction of labour in prelabour rupture of membranes at term. J Coll Physicians Surg Pak. 2010 Apr;20(4):242-5.
20. Siwatch S, Kalra J, Bagga R, Jain V. Sublingual vs Vaginal Misoprostol for Labor Induction. J. Postgrad. Med., Edu., Res. 2012;46(3):138-43.
21. Jahromi BN, Poorgholam F, Yousefi G, Salarian L. Sublingual versus Vaginal Misoprostol for the Induction of Labor at Term: A Randomized, Triple-Blind, Placebo-Controlled Clinical Trial. Iranian Journal of Medical Sciences. 2016;41(2):79-85.
22. Sheela CN, John C, Preethi R. Comparison of the efficacy and safety of sublingual misoprostol with that of vaginal misoprostol for labour induction at term, Journal of Obstetrics and Gynaecology, 2015;35(5):469.
23. Ayati S, Vahidroodsari F, Farshidi F, Shahabian M, Afzal Aghaee M. Vaginal Versus Sublingual Misoprostol for Labor Induction at Term and Post Term: a Randomized Prospective Study. Iranian Journal of Pharmaceutical Research : IJPR. 2014;13(1):299-304.
24. Benett KA, EL More L, Feischman S, Jones D, Lopel JA. Prostaglandin induction in women with prior cesarean delivery increases induction time and risk of uterine rupture. Am J Obstet Gynecol. 2000;182:S130.

How to cite this article: Devgan N. Comparative Study of Sublingual versus Vaginal Misoprostol for Induction of Labour. Asian J. Med. Res. 2019;8(3):OG15-OG18.
DOI: dx.doi.org/10.21276/ajmr.2019.8.3.OG5

Source of Support: Nil, **Conflict of Interest:** None declared.