e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(10); 833-839

Original Research Article

Study of Comparison between Vaginal Misoprostol and Intracervical Dinoprostone Gel for Induction of Labour

Prafullita Maida[1], Meenakshi Samriya[2], Anil Samriya[3], Bhawana[4]

[1]Resident Doctor, Department of Gynaecology and Obstetrics Janana Hospital JLN Medical College Ajmer, Rajasthan, India

[2]Associate Professor, Department of Gynaecology and Obstetrics Janana Hospital JLN Medical College Ajmer, Rajasthan, India)

[3]Senior Professor, Department of Medicine JLN Medical College Ajmer, Rajasthan, India

[4]Resident Doctor, Department of Gynaecology and Obstetrics Janana Hospital JLN Medical College Ajmer, Rajasthan, India

Received: 16-08-2023 / Revised: 28-09-2023 / Accepted: 05-10-2023

Corresponding Author: Dr Bhawana

Conflict of interest: Nil

Abstract:

Introduction: Induction of labour is an intervention to artificially stimulate uterine contractions leading to progressive dilation and effacement of cervix. This results in delivery of foetus before the onset of spontaneous labour. Dinoprostone gel and Misoprostol are commonly used drugs for cervical ripening. We wanted to compare the efficacy and safety of Dinoprostone with Misoprostol for cervical ripening and induction of labour in women with unfavourable cervix.

Methods: This is a prospective study conducted among 100 antenatal women who required induction of labour for different indications. 50 patients with an indication for induction were given 25 mcg of intravaginal misoprostol and repeat dose up to a maximum of 3 doses every 4 hours as needed. The other 50 patients were given 0.5 mg of intracervical dinoprostone gel and repeated for a maximum of 3 doses every 6 hours as needed. Progress of labour was monitored. Bishop score was determined.

Result: Postdatism was the most common cause of induction (45% and 58%) in both the groups. The difference in values of mean induction delivery time in both primipara and multipara was not significant statistically for both the drugs. Study showed that the number of caesarean sections was significantly (p-value 0.028) reduced with the use of misoprostol for induction of labour. The most common indication for operative delivery was foetal distress (11% in the misoprostol group and 17% in the dinoprostone group). Maternal and foetal complication rate in both the groups was similar.

Conclusion: Caesarean rate was significantly less with intravaginal misoprostol group compared to dinoprostone group. Other factors had no statistical significance. Vaginal misoprostol is thus a better option for induction of labour.

Keywords: Induction of Labour, Misoprostol, Dinoprostone Gel, Bishop Score.

Introduction

Induction of labour at term to achieve a vaginal delivery is a commonly accepted obstetric intervention when continuation of pregnancy is deleterious for the mother or foetus or both. It is an intervention to artificially stimulate uterine contractions and thus leading to progressive dilation and effacement of cervix and delivery of foetus before the onset of spontaneous labour. [1] In some 5-25% of pregnancies, there comes a time when the foetus and/or mother would be better off if the delivery was conducted. Advent of prostaglandins has revolutionized induction of labour. [2] Many studies have shown the advantages of using vaginal prostaglandins in cervical priming and labour induction in terms of reduced induction-delivery interval and lower operative rate compared to oxytocin alone. Prostaglandins alter the extracellular ground substance of the cervix, ripen the cervix and also increase the activity of collagenase in the cervix. They also allow for an increase in intracellular calcium levels, causing contraction of myometrial muscle. [3,4] Labour induction with unfavourable cervix is often prolonged, tedious and may end up in induction failure. [5] Hence, for more successful outcome, cervical ripening is required before induction of labour.

The FDA revised its labelling of misoprostol in April 2002 from contraindicated in pregnancy to contraindicated in pregnancy for the treatment and prevention of NSAID induced ulcers. [4] Currently, two prostaglandin analogues, PGE1 (Misoprostol) and PGE2 (Dinoprostone gel) are available for cervical ripening. Dinoprostone is the drug of choice and is accepted for labour induction at term. Although safe and effective, it is expensive and requires refrigeration for storage. Misoprostol (15-deoxy-16-hydroxy-16 methyl-PGE1) was the first synthetic prostaglandin analogue to be made available for the treatment of peptic ulcer. It has been shown to be effective in cervical priming and labour induction. It is inexpensive, can be stored at room temperature and has few systemic side effects. [6,7] Misoprostol is proposed for induction in WHO model list of essential medicines for labour induction at term to be used in low dose (25-50 microgram).

The artificial prostaglandin E2 i.e. Dinoprostone gel can be administered vaginally to induce labour but it is unstable at room temperature and is expensive. A minimum of six hours' time gap has to elapse after the dose for further management. [8] Misoprostol has shown to be an effective and safe agent for induction of labour in many trials. A major adverse effect of the obstetrical use of Misoprostol is hyperstimulation of the uterus and foetal distress, but it is usually seen in cases where Misoprostol is given in higher doses. [9]

The present study is aimed to compare the efficacy and safety of Dinoprostone with Misoprostol for cervical ripening and induction of labour in women with unfavourable cervix.

Methods

This is a prospective interventional study comparing the efficacy of intracervical dinoprostone gel with intravaginal misoprostol for cervical ripening for induction of labour. The study was undertaken for a period of 12 months from April 2022 to March 2023 in the Department of Obstetrics and Gynaecology of a tertiary care center Janana hospital JLN Medical college Ajmer Rajasthan India. All eligible cases admitted in the antenatal ward and labour room were included in the study. 100 Antenatal women who required induction of labour for different indications were selected randomly on the basis of experience. Patients who needed induction were screened first by detailed history, thorough general, systemic and obstetric examination including per vaginum examination. Selection was finally done according to the inclusion and exclusion criteria given below.

Inclusion criteria

1. Singleton foetus with cephalic presentation.
2. Over 34 weeks of gestation.
3. Reactive foetal heart pattern.
4. Unfavourable cervix bishop score <4.
5. No contraindication to vaginal delivery.

Exclusion criteria

1. Women who are not giving consent.
2. CPD (Cephalo Pelvic Disproportion).
3. Previous LSCS or any scar on uterus.
4. Malpresentation.
5. Prior myomectomy or uterine unification surgery.
6. Malpresentation.
7. Multiple gestation.
8. Allergy to prostaglandins.
9. Abnormal foetal heart rate pattern.
10. Severe maternal medical disorders.

Antenatal patients were assigned to one of the following two groups by simple randomisation technique-

Group A: 50 patients with an indication for induction were given 25 mcg of intravaginal misoprostol and repeat dose for maximum 3 doses every 4 hours as needed. Women were examined 4 hourly intervals to know the improvement in Modified bishop's score. observations were continued as per decided schedule. Oxytocin drip started as per requirement.

Group B: 50 patients with an indication for induction were given 0.5 mg of intracervical dinoprostone gel and repeated for a maximum 3 doses every 6 hours as needed. Cases were reviewed 6 hours after 1st instillation for the Modified bishop's score. If score is poor further instillation of dinoprostone gel was done and were reassessed every 6 hourly. Oxytocin drip was started as per requirement. Progress of labour was monitored with the help of Partogram in both the groups, when patients were in the Active stage of labour. Continuous electronic foetal heart rate and uterine contraction monitoring was made available for every case. Before induction of labour is carried out, Bishop score should be assessed and recorded, and a normal foetal heart rate pattern should be confirmed using electronic foetal monitoring. Bishop score should be reassessed 6 hours after vaginal PGE2 tablet or gel insertion, to monitor the progress of labour when contractions begin, or if she has had no contractions after 6 hours.

The following were recorded:

1. Mean time taken for onset of labour
2. Induction delivery intervals
3. Mean duration of labour
4. Oxytocin augmentation
5. Mode of delivery
6. Indication for cesarean section
7. Side effects of drugs
8. Neonatal outcome

Results

Table 1: Indications for induction

Indication	Misoprostol	Dinoprostone gel
Postdate pregnancy	36%	32%
IUGR (stage 1)	28%	22%
PIH/ Preeclampsia	34%	40%
Eclampsia	2%	6%

The indications of induction were similar in either group as mentioned in table No.1. Majority of patients were induced due to post-dated pregnancy. Other indications were Intrauterine Growth Restriction, Pregnancy-induced Hypertension, Pre-eclampsia and Eclampsia.

Table 2: Mean time taken for onset of labour

	Misoprostol	Dinoprostone	mean difference	SD (mean)	standard errror (mean)	t	p
In all patient	43.22min	1 hr 40 min	56.78min	77.85	11.12	3.3907	0.00069
In primigravida	44.37min	1 hr 26 min	41.63 min	61.69	19.00	2.0822	0.21983
In multigravida	43.25 min	1 hr 35 min	52.42 min	82.12	13.96	2.7527	0.00527

The mean time taken for onset of labour was significantly less(P=.00069) in the misoprostol group(43.22 min v/s 1 hour 40 min) as shown in table No.2.Thus Misoprostol leads to early labour and thus early delivery as compared to the Dinoprostone.

Table 3: Induction delivery intervals

	Misoprostol	Dinoprostone	Mean difference	S D (mean)	standard error (mean)	t	p
Induction to active phase	1 hr 42 min	4 hr 10 min	2 hr 28 min	161.76	24.61	2.71	0.006
active phase to delivery	3 hr 06 min	4 hr 54 min	1 hr 48 min	147.10	22.33	2.599	0.01275
induction to delivery	5 hr 2 min	11 he 12 min	6 hr 10 min	377.60	54.97	3.8077	0.0004

In Misoprost group the time taken for induction to active phase (1 hr 42 min v/s 4 hrs 10 min) was less which is statistically significant as P=0.006. Similarly active phase to delivery interval (3 hrs 06 min v/s 4 hrs 54 min), was also less and was statistically significant with P=0.01. Overall there is less induction to delivery interval (5 hrs 2 min v/s11 hrs 12 min) and this was statistically significant.

Table 4: Mean duration of labour

	Misoprostol	Dinoprostone	Mean difference	S D (mean)	standard error(mean)	t	p
Duration of labour (mean)	4 hr 22 min	7 hr 36 min	3 hr 14 min	212.16	32.5	2.293	0.01519
Duration of labour in primi (mean)	3 hr 10 min	7 hr 15 min	4 hr 5 min	169.18	48.30	2.872	0.02252
Duration of labour in multi (mean)	4 hr 53 min	7 hr 5 min	2 hr 58 min	276.13	53.39	1.501	0.10432

Mean duration of labour was much less in the misoprostol group (4 hrs 22 min v/s 7 hrs 36 min) which is significantly less (P=0.015) as seen in Table No. 4. Even in Primigravida patients Misoprostol resulted in shorter duration of labour as compared to dinoprostone gel (3hrs 10 min v/s 7hrs 15min) which is statistically significant as P=0.02

Table 5: Oxytocin augmentation

	Misoprostol	Dinoprostone
	% of patients	% of patients
Oxytocin augmentation	-	6%

Oxytocin augmentation was not required in misoprostol group whereas in 6% cases of dinoprostone group required augmentation as seen in Table No. 5.

Table 6: Mode of delivery

Type of delivery	Misoprostol (% of patients)	Dinoprostone (% of patients)
Normal Vaginal	90%	72%
Instrument delivery	4%	6%
Cesarean section	6%	22%

90% of patients in misoprost group delivered normally as compared to 72 % in dinoprost group as seen in Table No.6. Thus less rate of Cesarean section seen in the study group.

Table 7: Indication for cesarean section

Indication for LSCS	Misoprostol	Dinoprostone
failure of induction	2%	12%
Meconium stained liquor	4%	6%
fetal distress	-	4%
Total	6%	22%

Less number of cesarean section done in misoprostol group compared to dianoprost gel group and most of cesarean section done for meconium stained liquor which is common in both group.

Table 8: side effects

Side effects	Misoprostol (% of patients)	Dinoprostone (% of patients)
Nausea Vomiting	8%	4%
fever with chills	16%	-
GI symptoms	6%	4%
Hyperstimulation	8%	-
Meconium stained liquor	12%	6%

Although maternal complications like fever with chills, Hyperstimulation (Hypersystole & tachysystole) & Meconium-stained liquor were more in misoprostol group than in dinoprostone group as shown in Table No. 8. Significant side effect were not encountered.

Table 9: Neonatal outcome

APGAR SCORE <7	Misoprostol	Dinoprostone
after 1 min	2%	6%
after 5 min	1%	4%
Need for NICU	1%	4%

Good fetal outcome seen in misoprostol group compared to dinoprostone gel group and less number of NICU admission.

Discussion

The introduction of Prostaglandins to clinical practice, particularly their local use for cervical ripening, has decreased major difficulties of labour induction. Duration between induction and delivery has been decreased dramatically by introduction of Prostaglandins. Similarly it also decreased associated complication of amnionitis and fetal infection. The baseline data of our study population including maternal age, gravidity and gestational age were comparable with similar studies [7,8,9]. In our study, indication for induction in Misoprostol group were post-date pregnancy in 36% and Pre- eclampsia in 34% whereas in Dinoprostone group 32% and 40% respectively induced for postdated pregnancy and Pre-eclampsia. Thus majority of indication was due to these two conditions. Post-dated pregnancy was the main indication for induction in other studies [7, 8, 9]. The mean time taken for onset of labour was less in misoprost group (43.22 min v/s 1 hr 40 min).There was no significant difference between the primigravida and the multigravida in both the groups regarding the time taken for onset of labour. [10- 14] In this study the mean induction to delivery interval was less in the misoprost group (5 hrs 02 min v/s 11 hrs 12 min), which is statistically significant(P =<.001). [15-18] Similar results were seen in study in 2003 by Agarwal et al [10] where it was 12.8+/- 6.4 hrs v/s 18.53+/-8.5 hours. In 2003 D. Garry et al [11] also concluded in his study that interval from start of induction to vaginal delivery was significantly shorter in the misoprostol group. [19,20] Also in another study

of Murthy Bhaskar Krishnamurthy in 2006, induction delivery interval was shorter in the misoprostol group. Other reported studies 12, 13 also had parallel observation. Thus misoprostol reduces the mean duration of labour which reduces the duration of suffering of a patient in labour and also provides fast delivery which is required in cases of Premature rupture of membranes, eclampsia and fetal distress. [21-25]

Conclusion

Our study results revealed that, Misoprostol is better inducing agent as compared to the Dinoprostone gel because it has short induction to delivery intervals and thus short duration of labour and advantage of rapid labour as required in cases of pre- eclampsia and eclampsia . The need of Oxytocin augmentation was less with the Misoprostol and it results in more vaginal deliveries compared to Dinoprostone. Thus Misoprostol reduces the Cesarean section rate and also has less chances of failure of induction. Although hyperstimulation and meconium stained liquor was more in Misoprost group in few patients and did not had any effect on the neonatal outcome. Misoprostol also does not need cold chain storage and is cheaper. Thus Misoprostol can be considered as safe, efficacious, cheap and mother and fetus friendly drug for the induction of labour.

Reference

1. Houghton Mifflin Company, The American Heritage References of labour. Newborn, An Illustrated Textbook 1997,3:449.
2. Witter FR. Prostaglandin E2 preparations for preinduction cervical ripening. Clin Obstet Gynecol. 2000; 43:469– 74.
3. Arias F. Pharmacology of oxytocin and prostaglandins. Clin Obstet Gynecol. 2000; 43:455 68.
4. American College of Obstetricians and Gynecologists. New U.S. Food and Drug Administration labeling on Cytotec (Misoprostol) use and pregnancy. Committee Opinion Washington, DC: American College of Obstetricians and Gynecologists; 1999; 283.
5. F.Gary Cunningham, Kenneth J.Leveno, Steven L.Bloom, John C., Rouse,Spong,Williams Obstetrics,2010;23:502.
6. Sahu Latika, et al. Comparison of Prostaglandin E1(Misoprostol) with Prostaglandin E2 (Dinoprostone) for Labor Induction. J Obstet Gynecology India 2004; 54(2):139-142.
7. Patil K P et al. Oral Misoprostol v/s intracervical dinoprostone for cervical ripening and labour induction. J Obstet Gynec India 2005; 55(2):128-131.
8. Murthy BK et al. Misoprostol alone versus a combination of Dinoprostone and Oxytocin for induction of labour. J Obstet Gynec India 2006;56(5):413-416.
9. Agarwal N, Gupta, A, Kriplani, Bhatla NP. Six hourly vaginal misoprostol versus intracervical Dinoprostone for cervical ripening and labour induction. J Obstet and Gynecology Res 2003; 29(3):147-51.
10. Garry D, Figueroa R, Kalish RB. Randomized Controlled Trial of Vaginal Misoprostol Versus Dinoprostone Vaginal Insert for labour induction Journal of Maternal-Fetal and Neonatal Medicine 2003; 13(4):254-259.
11. Calder AA, Loughney AD, Weir CJ, Barber JW. Induction of labour in nulliparous and multiparous women: a UK, multicentre, open label study of intravaginal misoprostol in comparison with dinoprostone. BJOG. 2008;115 (10):1279- 88. [PubMed]
12. Sebiha Ozkan, Eray Caliskan, Emek Doger, Izzet Yucesoy, Semih Ozeren, Birol Vural. Comparative safety and efficacy of vaginal Misoprostol versus Dinoprostone Vaginal insert in labour induction at term: a Randomized Trial. Archives of Gynecology and Obstetrics 2009;280(1):19-24.
13. Neiger R. Greaves PC. Comparison between Vaginal Misoprostol and Cervical Dinoprostone for cervical ripening and labour induction. Tenn Med. 2001;94(1):25-7.
14. F. Gary Cunningham, Kenneth J. Leveno, Steven L. Bloom, John C., Rouse, Spong. Williams Obstetrics, 2010;23:50 3.
15. Cheng SY, Ming H, Lee JC. Titrated oral compared with vaginal misoprostol for labor induction: A randomized controlled trial. Obstet Gynecol. 2008; 111:119-125.
16. Muzonzini G, Hofmeyr GJ. Buccal or sublingual misoprostol for cervical ripening and induction of labour. Cochrane Database Syst Rev. 2004; 4:CD004221.
17. Colon I, Clawson K, Hunter K, Druzin ML, Taslimi MM. Prospective randomized clinical trial of inpatient cervical ripening with stepwise oral misoprostol vs vaginal misoprostol. Am J Obstet Gynecol. 2005; 192:747-752.
18. Houghton Mifflin Company. Induction of labour. In: American Heritage Dictionary eds. The American heritage dictionary. 4th edn. Boston, MA: Houghton Mifflin Harcourt. 2006; 1074.
19. Beischer NA. Maternal well-being during pregnancy. In: Beischer NA, Mackay EV, Colditz PB, eds. Obstetrics and the newborn. An illustrated textbook. 3rd edn. Plhiladelphia: Saunders 1997; 449.
20. Witter FR. Prostaglandin E2 preparations for preinduction cervical ripening. Clin Obstet Gynecol 2000; 43(3): 469-74.

21. Arias F. Pharmacology of oxytocin and prostaglandins. Clin Obstet Gynecol. 2000; 43(3): 455-68.
22. Brindley BA, Sokol RJ. Induction and augmentation of labour: basis and methods for current practice. Obstet Gynecol Surv. 1988; 43(12):730-43.
23. Ozkan S, Caliskan E. Comparative safety and efficacy of vaginal misoprostol versus Cervi prime vaginal insert in labour induction at term: a randomized trial. Arch Gynecol Obstet. 2009;280(1):19-24.
24. Nanda S, Singhal SR, Papneja A. Induction of labour with intravaginal misoprostol and prostaglandin E2 gel: a comparative study. Trop Doct. 2007;37(1):21-4.
25. Hofmeyr GJ, Gulmezoglu AM. Vaginal misoprostol for cervical ripening and induction of labour. Cochrane Database Syst Rev. 2003;(1): CD000941.
26. Van Gemund N, Scherjon S, Le Cessie S, et al. A randomised trial comparing low dose vaginal misoprostol and dinoprostone for labour induction. BJOG: An International Journal of Obstetrics and Gynaecology. 2004;111(1):42-9.
27. Kulshreshtha S, Sharma P, Mohan G, et al. Comparative study of misoprostol vs dinoprostone for induction of labour. Indian J Physiol Pharmacol. 2007;51(1):55-61.