Scholars International Journal of Obstetrics and Gynecology

Abbreviated key title: Sch. Int. J. Obstet. Gynec.
A Publication by "Scholars Middle East Publishers"
Dubai, United Arab Emirates

ISSN: 2616-8235 (Print)
ISSN: 2617-3492 (Online)

A Comparative Study of Dinoprostone Gel and Dinoprostone Pessary in Induction of Labour

Dr. Nabanita Deka Mazumdar[1], Dr. Chandana Ray Das[2], Dr. Rupa Das[3*]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankaradeva University of Health Sciences, Guwahati, Assam, India
[2]Assistant Professor, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankaradeva University of Health Sciences, Guwahati, Assam, India
[3]Post Graduate Trainee, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankaradeva University of Health Sciences, Guwahati, Assam, India

Case Report

***Corresponding author**
Dr. Rupa Das

Article History
Received: 26.11.2018
Accepted: 05.12.2018
Published: 30.12.2018

Abstract: Induced labour is one in which pregnancy is terminated artificially, any time after foetal viability is attained, by a method that aims to secure vaginal delivery. At term, upto 15 – 30% of pregnancies in obstetrics practice are induced for labour due to various foetal and maternal indications. Dinoprostone (Prostaglandin E2 or PGE2) has been shown to be the most effective agent achieving for cervical ripening. The present study is conducted with an aim of comparison between the two preparations i.e. dinoprostone vaginal gel vs dinoprostone vaginal pessary administration in a pregnant women with singleton pregnancy with vertex presentation for efficacy and safety in induction of labour. This tertiary level hospital base prospective observational study is done on 100 pregnant women out of which 50 pregnant women were given dinoprostone vaginal gel and 50 pregnant women were given dinoprostone vaginal pessary after obtaining informed consent. Data were collected on number of doses of drug required for delivery (58% required single dose in gel group vs 80% required single dose in pessary group), need of oxytocin augmentation for delivery (56% in gel group vs 30% in pessary group), induction to delivery interval (Mean 20.86 Hrs in gel group vs 16.88 Hrs in pessary group), mode of delivery (Vaginal delivery 46% in gel group vs 80% in pessary group), maternal complication (84% in gel group vs 90% in pessary group with no complication) for maternal outcome and for foetal outcome liquor characteristic (72% in gel group vs 88% in pessary group with clear liquor) and NICU admission (12% in gel group vs 6% in pessary group). Dinoprostone vaginal pessary is more effective for cervical ripening in induction of labour then dinoprostone vaginal gel.

Keywords: Dinoprostone (PGE2), Pessary, Gel, Cervical ripening.

INTRODUCTION

Induction of labour is defined as the stimulation of uterine contraction before the spontaneous onset of labour, with or without ruptured membranes [1]. It is generally indicated when the risk to either the mother or the foetus outweighs the possible benefit of continuing to manage the pregnancy [1]. Labour induction is a clinical intervention that has the potential to confer major benefits to the mother and newborn when continuation of pregnancy poses a risk or danger to the outcome of pregnancy. Induced labour is one in which pregnancy is terminated artificially, any time after foetal viability is attained, by a method that aims to secure vaginal delivery [2]. The state of the cervix is almost always related to the success of labour induction, duration and likelihood of vaginal delivery [3]. The ideal inducing method should be safe for the mother and the foetus, inexpensive, easy, simple to use and reversible. The induction of labour has two components cervical ripening and stimulation of uterine contraction [2]. The success of induction of labour primarily depends on the status of cervix at the time of induction. A prepared or ripe cervix has better chance of successful induction of labour than an unripe cervix. [1, 4, 5]. Prostaglandins were initially used in obstetric practice for the induction of labour in the 1970s when prostaglandins E2 (PGE2) and F2 (PGF2) became commercially available as dinoprostone and dinoprost, respectively. At high concentrations, they are strong stimulators of myometrial activity and, consequently, in the presence of an already ripe cervix, prostaglandins can be used to induce labour. However, to achieve the plasma concentration necessary to produce sufficient uterine contractility for labour induction, prostaglandins were initially administered intravenously or orally and were associated with various systemic side effects. This

leads to the rationale of localised application of prostaglandins at a lower dose and the development of formulations that could be administered directly to the cervix or vagina for cervical ripening. Vaginal PGE2 is currently the preferred agent for labour induction recommended by RCOG guidelines, unless there are specific clinical reasons against its use such as the risk of uterine hyper-stimulation. Dinoprostone has been shown to be the most effective agent achieving for cervical ripening [6, 7].

AIM

The main aim of this study is to compare the safety and efficacy of equivalent doses of dinoprostone gel and dinoprostone pessary administration in induction of labour.

OBJECTIVES

- Bishop score
- Number of doses required for delivery
- Need of Oxytocin augmentation for delivery
- Liquor characteristic
- Induction to delivery interval
- Failed induction
- Maternal Outcome
  - Mode of Delivery
  - Maternal Complications
- Foetal Outcome
  - APGAR Score
  - NICU Admission

METHODOLOGY

- Cases for the present study were taken in the Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati, Assam. The study period is one year from 1st June 2017 to 31st May 2018.

Study design

Prospective observational study

Inclusion criteria

- Singleton pregnancy.
- More or equal to 37 gestational weeks.
- Cephalic presentation.
- Bishop score ≤ to 4 at admission.
- Pre labour premature rupture of membranes (PROM)
- Intra uterine growth retardation (IUGR)
- Intra uterine death (IUD)
- Medical disorders: hypertension and diabetes and Rhesus isoimmunisation.

Exclusion criteria

- Previous uterine scar.
- Ante partum haemorrhage
- Abnormal presentation.
- Foetal heart rate abnormalities.
- Cephalo pelvic disproportion
- Congenital malformations
- Ante partum haemorrhage
- Herpes genitalis infections

The cases were divided into two groups of 50 each to receive Dinoprostone intra cervical gel and Dinoprostone intra vaginal pessary. In all patients, the cervical status was assessed by using modified Bishop Score prior to induction. After induction, the patients were monitored for signs of labour, when labour ensured they were closely monitored for maternal vital signs, progress of labour and foetal heart rate which was monitored by intermittent auscultation in majority of cases.

Doses for the Labour Inducers were as follows

Dinoprostone pessary

A single dinoprostone vaginal pessary, left in place for up to 24 hours, is usually required to achieve adequate pre-induction cervical ripening. The reservoir of 10 mg dinoprostone releases prostaglandin E2 at a constant rate of approximately 0.3mg/hour over the 24 hour dosing period.

Dinoprostone gel

Dinoprostone intra cervical gel contains 0.5mg/3g. It is given at an initial dose of 0.5mg/3g, if there is no cervical or uterine response to the initial dose of cervical gel, repeat dosing may be given. The recommended repeat dose is 0.5mg with a dosing interval of 6 hours. The Maximum recommended cumulative dose for a 24hour period is 1.5mg.

RESULTS

The present study is the analysis of 100 cases of term pregnancy at ≥ 37-42 weeks of gestation admitted and treated in the Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati, Assam.

The foetal outcome of 100 cases was observed and analysed up to the first of neonatal life. The study period is one year from 1st June, 2017 to 31st May 2018. Qualitative data are expressed in the form of percentage and quantitative data as mean ± standard deviation, p-value.

Table-1: Showing Gestational age distribution

Group	Nos. of cases	Mean Gestational Age (Week)	Standard Deviation	Minimum (Week)	Maximum (Week)	't' Value	'p' Value
Pessary	50	39 wks 3 days	4.275	38 wks 2 days	40 wks 4 days	5.893	< 0.001
Gel	50	38 wks 6 days	3.491	38 wks 1 days	40 wks 1 day		

Table-2: Response to drug in terms of Bishop Score

		No.	Mean	SD	Minimum	Maximum	't' value	'p' value
Pre Induction Bishop Score	Pessary	50	1.66	0.303	1	3	25.091	<0.001
	Gel	50	1.66	0.370	2	3		
6 Hours Bishop Score	Pessary	50	6.86	0.303	5	8		
	Gel	50	4.84	1.404	1	8		

Table-3: Showing numbers of doses of drug required for delivery

Dose	Number of Dose			Total
Pessary	1	2	3	
	40	10	0	50
	80 %	20 %	0 %	100 %
Gel	1	2	3	
	29	18	3	50
	58 %	36 %	6 %	100 %
Chi-Square Value		Df	'p' value	
5.657		1	0.017	

Table-4: Showing requirement of augmentation with oxytocin

Dose	Augmentation with Oxytocin		Total
	Yes	No	
Pessary	15	35	50
	30 %	70 %	100 %
Gel	28	22	50
	56 %	44 %	100 %
Chi-Square Value		Df	'p' value
6.895		1	0.009

Table-5: Showing characteristic of liquor

Dose	Liquor			Total
	Clear	Thin MASF	Thick MASF	
Pessary	44	4	2	50
	88 %	8 %	4 %	100 %
Gel	36	9	5	50
	72 %	18 %	10 %	100 %
Chi-Square Value		DF	'p' value	
4.009		2	0.1347	

Table-6: Showing induction to delivery interval

	Nos. of cases	Mean Induction to delivery interval (Hrs.)	SD	Minimum (Hrs)	Maximum (Hrs)	't' value	'p' value
Pessary	50	16.88	3.606	10	23	-5.034	< 0.001
Gel	50	20.86	4.271	13	30		

Table-7: Showing failed induction

Dose	Failed Induction		Total
	Yes	No	
Pessary	1	49	50
	2 %	98 %	100 %
Gel	8	42	50
	16 %	84 %	100 %
Chi-Square Value		Df	'p' value
5.983		1	0.014

Table-8: Mode of delivery after Induction

Dose	Mode of Delivery				Total
	Vaginal Delivery	Caesarean Section	Forceps	Ventouse	
Pessary	40	9	1	0	50
	80 %	18 %	2 %	0 %	100 %
Gel	23	15	7	5	50
	46 %	30 %	14 %	10 %	100 %
Chi-Square Value		DF		'p' value	
15.395		2		< 0.001	

Table-9: Showing maternal complication

Maternal Complication					
Route	No Complication	Diarrhoea	Fever	Uterine Hyperstimulation	Total
Pessary	45	2	1	2	50
	90 %	4 %	2 %	4 %	100 %
Gel	42	6	1	1	50
	84 %	12 %	2 %	2 %	100 %
Chi-Square Value		df		'p' value	
2.437		3		0.486	

Table-10: Showing APGAR score at 1 and 5 minutes

		N	Mean	SD	Min.	Max.	't' value	'p' value
APGAR at 1 min	Pessary	50	7.18	1.004	4	9		
	Gel	50	5.28	1.070	3	7	0.912	< 0.001
APGAR at 5 min	Pessary	50	7.94	1.058	6	10		
	Gel	50	6.52	1.821	3	9	4.768	< 0.001

Table-11: Showing Neonatal complication

Dose	Neonatal Complication		Total
	NICU Admission	No Complication	
Pessary	3	47	50
	6 %	94 %	100 %
Gel	6	44	50
	12 %	88 %	100 %
Chi-Suqare Value		Df	'p' value
1.099		1	0.295

DISCUSSION

The present study entitled "A comparative study of dinoprostone gel and dinoprostone pessary in induction of labour" has been carried out in the Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati, Assam. The study period is one year from 1st June 2017 to 31st May 2018.

Before induction of labour, cervical scoring was done by Bishop's score for both the groups, next cervical scoring was done after 6 hours. Before administration of next dose of dinoprostone gel, PV examination was done. If the patient had already gone into active labour, further dose of dinoprostone gel administration was withheld.

Mean pre-induction Bishop Score for Pessary group was 1.66 ± 0.303. For Gel group, the mean pre-

induction Bishop scores 1.66 ± 0.370. After 6 hours mean Bishop Score for Pessary group was 6.86 ± 0.303 and mean Bishop Score for the Gel group was 4.84 ± 1.404, which was statistically significant ($p < 0.001$). It indicate that the improvement in the Bishop score was significantly more in Pessary group as compared to the Gel group after the first dose. The findings were consistent with the previous studies; Grignaffini A, *et al*. [8].

In the present study, maximum of 40 cases (80 %) required 1 dose and 10 cases (20 %) required 2 doses for induction of labour in the Pessary group. In the Gel group, minimum number of dose required was 3 in 3 cases (6 %). Maximum number of dose required was 1 in 29 cases (58 %) and 18 cases (36 %) required 2 doses for induction of labour. The 'p' value is 0.017 which is statistically not significant. This result is consistent with the previous studies done by Perry MY, *et al*. [45] and Grignaffini A, *et al*. [8]

In the present study, it was found that 15 cases (30 %) in the Pessary group and 28 cases (56 %) in the Gel group required augmentation with oxytocin. The difference was statistically not significant ($p = 0.009$) indicating that dinoprostone gel application for induction of labour requires additional methods of labour augmentation, such as oxytocin drips. The findings of this study are consistent with the previous studies; Irion O, *et al*. [9] and Facchinetti F, *et al*. [10].

In Pessary group, the mean interval was 16.88 hours and for the Gel group it was 20.86 hours. The difference is statistically significant ($p <0.001$), indicating that intravaginal route of administration leads to lesser induction to delivery interval as compared with intracervical gel. Also, in the intravaginal group, the maximum induction to delivery interval was 23 hours and majority of cases (80%) delivered within 24 hours of induction of labour. In the intracervical group, maximum induction to delivery interval was 30 hours. The findings of this study are consistent with the previous studies; Strobelt N, *et al*. [11] and Perry MY, *et al*. [12].

In the present study, 1case (2%) in Pessary group failed to proceed to active labour, while in the Gel group 8 cases (16 %) failed to proceed to active labour. The difference in both the group was statistically not significant ($p = 0.014$). The findings of this study are consistent with the previous studies; Nuutila M *et al*. [13] and Facchinetti F *et al*. [10].

In Pessary group, 40 cases (80 %) proceeded for spontaneous vaginal delivery, 9 cases (18 %) required Caesarean Section for delivery and 1 case (2 %) required forceps application for delivery and none of the cases requires ventouse application for delivery. In Gel group, 23 cases (46 %) proceeded for spontaneous vaginal delivery, 15 cases (30 %) required Caesarean Section for delivery and 7 cases (14 %) required forceps application and 5 cases (10 %) required ventouse application for delivery. The 'p' value is < 0.001 which is statistically significant. The findings of this study are consistent with the previous studies; Triglia MT, *et al.* [14], Denoual-Ziad C, *et al*. [15] and Facchinetti F, *et al*. [10].

In Pessary group, 44 cases (88 %) exhibited clear liquor, 4 cases (8 %) exhibited thin meconium stained amniotic fluid (MSAF) and 2 cases (4%) exhibited thick meconium stained amniotic fluid (MSAF). In Gel group, 36 cases (72%) exhibited clear liquor, 9 cases (18 %) exhibited thin meconium stained amniotic fluid (MSAF) and 5 cases (10%) exhibited thick meconium stained amniotic fluid (MSAF). The 'p' value is 0.1347 which is statistically not significant.

In the present study, 2 cases (4 %) in the pessary group developed uterine hyper stimulation and 1 case (2 %) in the gel group develop uterine hyper stimulation. The 'p' value is 0.486 which is statistically not significant. This finding is consistent with the various previous studies; Hales KA, *et al*. [16], Nuutila M, *et al.* [13] and Wieland D, *et al*. [17].

APGAR score in pessary group, 4 neonates (8 % cases) had APGAR score ≤ 6 at 5 minutes and 11 neonate (24 % cases) had APGAR score ≤ 6 at 5 minutes in Gel group. The 'p' value is < 0.001 which is statistically significant. The findings were similar to the previous studies done by Irion O, *et al*. [9] and Perry MY, *et al*. [12]

In the present study, 3 numbers of cases (6 %) developed neonatal complications, of these 1 case (2 %) required NICU admission for respiratory distress, 1 case (2 %) for meconium aspiration syndrome and 1 case (2%) was kept for observation in Pessary group. In Gel group, 6 numbers of cases (12 %) developed neonatal complication and admitted in NICU, of these 2 cases (4 %) were admitted due to respiratory distress, 1 cases (2 %) because of low birth weight, 2 cases (4 %) for meconium aspiration syndrome, 1 case (2 %) was kept for observation. The 'p' value is 0.861 which is statistically not significant. The findings were similar to the previous study done by Irion O, *et al*. [9].

CONCLUSION

In the present study it is concluded that dinoprostone vaginal pessary had a high degree of efficacy and safety for both mother and fetus. Dinoprostone vaginal pessary require less induction to delivery interval, a single dose is sufficient to achieve cervical ripening in majority of patients, higher rate of spontaneous vaginal delivery is achieved in pessary

group, lower rate of caesarean section and operative vaginal delivery were seen in pessary group then gel group and the incidence of failed induction is also less in the pessary group. Thus, dinoprostone vaginal pessary showed a distinct superiority in terms of cervical ripening and spontaneous vaginal delivery within 24 hours.

REFERENCES

1. Cunningham, F.G., Laveno, K.J., Bloom, S.L., Hoth, J.C., Rouse, D.J., Sponge, C.Y.(2010). Williams Obstetrics. 24rd Ed. McgrawHill: 2010. Chapter 26, Labour Induction. p523-532
2. Mishra, R., Ian Donald's Practical Obstetrics Problems. 7th Ed. BI Publications. (2007).; Chapter 26, Induction of Labour. p496-511
3. Tenore, J.L.(2003). Method of Cervical Ripening and Induction of Labour. Journal of American Academy of Family Physicians. 2003 May {Am Fam Physician. 2003 May 15; 67(10): 2076,2078.2083-4.}
4. Dutta, D.C. (2015). Textbook of Obstetric. 8th Ed. Central. Chapter 35, Induction of Labour; p 598-608
5. Arias, F., Daftary, S.N., Bhide, A.G. (2008). Practical Guide to High Risk Pregnancy and Delivery. 3rd Ed. Elsevier; 2008. Chapter 15, Abnormal Labour and Delivery. p373-390
6. Kelly, A.J, Kavanagh, J., Thomas, J. (2003). Vaginal prostaglandin for induction of labour at term. Cochrane Database SystRev: CD003101.
7. Keirse, M.J.(2003). Natural prostaglandins for induction of labour and pre-induction cervical ripening: ClinObstet Gynecol.49:609-626.
8. Grignaffini, A (1)., Soncini, E, Anfuso, S., Ronzoni, E. (2004). Minerva Ginecol. Oct; 56(5): 413-8.
9. Irion, O(1)., Pedrazzoli, J., Mermillod, B.(1998). Obstet Gynecol. 1998 Jan; 91(1):65-71.
10. Facchinetti, F(1).(2005). Eur J Obstet Gynecol Reprod Biol. Apr 1;119(2):189-93.
11. Strobelt, N. (2006). Acta Obstet Gynecol Scan. 85(3):302-5.
12. Perry, M.Y.(2004). Obstet Gynecol. 103(1):13-7.
13. Nuutila, M(1)., Kajanoja, P.(1996). Acta Obstet Gynecol Scand. Feb;75(2):135-8.
14. Triglia, M.T.(2010). Acta Obstet Gynecol Scand. May;89(5):651-7.
15. Denoual-Ziad, C.(2005). J Gynecol Obstet Biol Reprod (Paris). Feb;34(1 Pt 1):62-8.
16. Hales, K.A.(1994). Am J Obstet Gynecol. 1994 Oct;171(4):1087-91.
17. Wieland. D(1).(1999). Friedman, F Jr. J Reprod Med; Aug;44(8):724-8.
18. Sanchez-Ramos, L., Kaunitz, A. M., Delke, I., & Gaudier, F. L. (1999). Cervical ripening and labor induction with a controlled-release dinoprostone vaginal insert: a meta-analysis. *Obstetrics & Gynecology*, *94*(5), 878-883.
19. Marconi, A. M., Bozzetti, P., Morabito, A., & Pardi, G. (2008). Comparing two dinoprostone agents for cervical ripening and induction of labor: a randomized trial. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *138*(2), 135-140.
20. Kelly, A.J, Kavanagh, J., Thomas, J.(2003). Vaginal prostaglandin for induction of labour at term. Cochrane Database SystRev:CD003101.
21. Keirse, M.J.(2006). Natural prostaglandins for induction of labour and pre-induction cervical ripening: Clin Obstet Gynecol; 49:609-626.