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Original Research Article.

Comparison Between Intravaginal Misoprostol (PGE_1) and Dinoprostone (PGE_2) in Induction of Labour

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ABSTRACT

Introduction: Induction of labour is needed in many patients to improve outcomes of pregnancy. It is important to identify the most suitable agent to assist the progression of natural labour.

Aims & Objectives: To conduct a comparative study on the efficacy and safety of two prostaglandin analogues misoprostol (PGE_1) and dinoprostone (PGE_2) in inducing a normal vaginal delivery.

Material & Methods: One hundred patients were randomly divided into misoprostol (n=50) and dinoprostone (n=50) groups. These groups were comparable in terms of period of gestation, gravidity and indication for induction of labour.

Results: We found that misoprostol was able to significantly (p-0.009) lower the mean duration of induction (320.6min) when compared to dinoprostone (417.2 min). In our study, misoprostol induction was successful in 90% of all cases, whereas dinoprostone induction was successful in 82%. The side effects profiles of both groups were similar and only minor side effects were noted with both misoprostol (n-12) and dinoprostone (n-6).

Conclusion: Misoprostol lowers the mean duration of labour and has a slightly higher success rate than dinoprostone in inducing labour. Hence it may be used an alternative to dinoprostone successfully & safely.

Keywords: Prostaglandin Analogues, Misoprostol (PGE_1), Dinoprostone (PGE_2), Induction of Labour.

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INTRODUCTION

Labour is a natural process comprising of maturation of cervix, followed by contraction of uterine musculature in order to eject the fetus out of the uterus. In normal course of events, labour occurs at the end-term of pregnancy. However, in many pregnant patients, labour does not progress as expected. In these cases, it has to be induced by artificial means.

Induction of labour i.e. artificially or prematurely stimulating childbirth may be done by the use of oxytocin to stimulate uterine contractions or via prostaglandins, when both cervical maturation & stimulation of contractions are needed.[1] Prostaglandins in general, are able to stimulate labour in a near-natural manner.[2] The ultimate goal of induction is to achieve a successful and safe vaginal delivery.

Prostaglandins function to promote cervical maturation by activating proteolytic enzymes in the cervix. These enzymes break down the collagen fibres causing changes in the cervical glycosaminoglycans.[3,4] There are two forms of commercially used prostaglandins, Misoprostol (PGE_1) and Dinoprostone (PGE_2). Misoprostol is available as 200, 100 and 25µg tablets. It is applied in the posterior uterine fornix every four hours till contractions are achieved. The commercially available form of dinoprostone for inducing labour is Cerviprime gel. It is a synthetic preparation of naturally occurring prostaglandin E2 and is available in gel form as 2.5ml preparation which has 0.5mg of Dinoprostone for intra-cervical route application. It is applied every 12 hours till labour is induced.

AIMS AND OBJECTIVES

1. To assess the efficacy of intravaginal misoprostol vs. dinoprostone gel for induction of labour
2. To evaluate safety of the two types of commercially available prostaglandins in inducing labour
3. To evaluate patient care, relative cost and associated morbidity in the two prostaglandins

MATERIALS AND METHODS

One hundred cases were selected for this case control study visiting outpatient department of our hospital.

Inclusion Criteria

- Single foetus with cephalic presentation
- Period of gestation from 28 to 42 weeks

Exclusion criteria

- Previous caesarean scar
- Contraindications for vaginal delivery
- Contraindications for medical induction

In the first group of 50 patients, labour was induced by misoprostol tablets placed in the posterior vaginal fornix and dose was repeated every four hrs until adequate uterine contractions were achieved. Dinoprostone was used intracervically in the second group of 50 patients taking care not to cross the internal os. Induction was considered successful when cervical dilatation was at least 4cm and repeated at 12hrs if necessary. Adequate contractions were said to have been achieved when at least 3 contractions, each of 40seconds duration were noted in a 10minute period. Induction was discontinued if labour pains did not start in 24 hours.

Both study groups were comparable with respect to age, parity and period of gestation of the included patients. Both the groups were monitored for maternal condition, pulse, BP, dehydration, uterine contractions and foetal well-being.

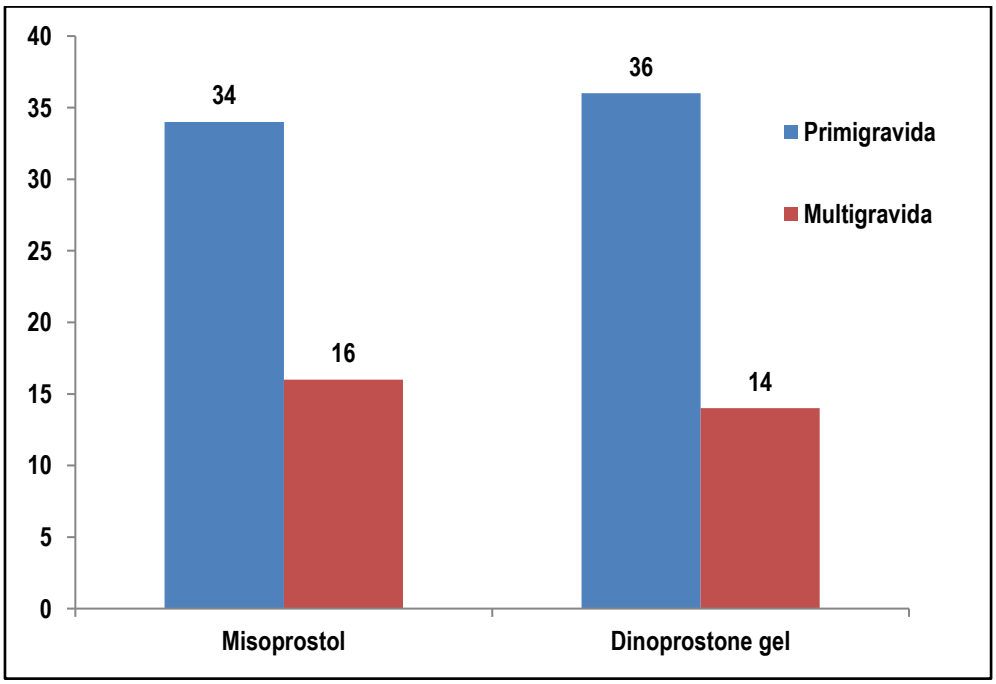

Figure 1: Distribution of cases according to inducing agent and gravidity

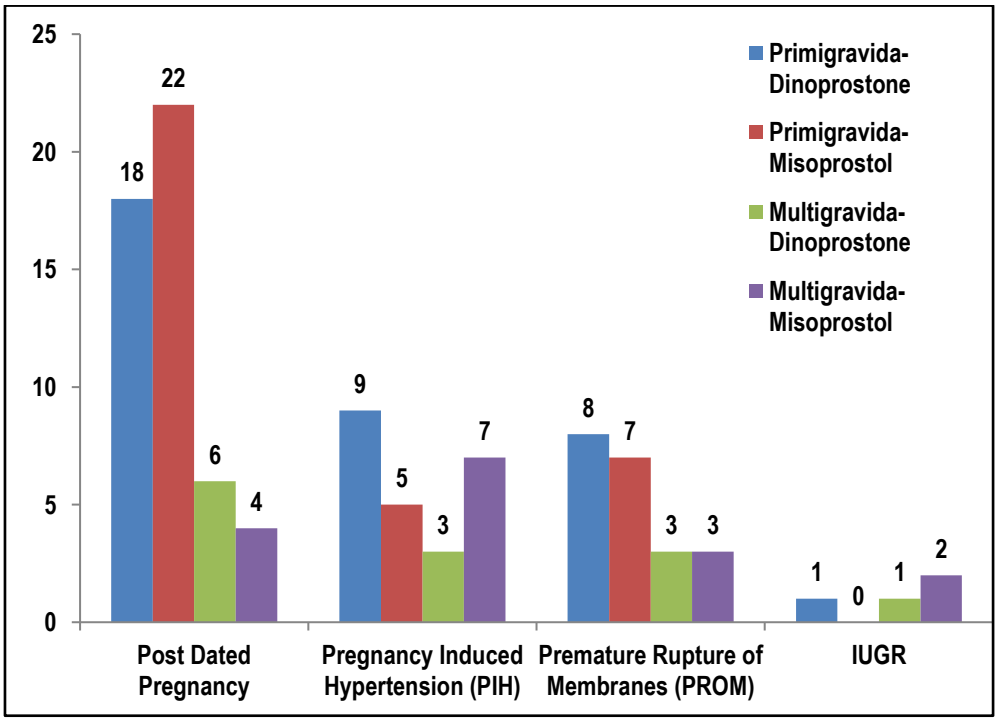

Figure 2: Distribution of groups based on indication and gravidity

Table 1: Indication for inducing labour in the two groups

Agent	Misoprostol	Dinoprostone
Indication		
Post-dated Pregnancy	26	24
PIH	12	12
PROM	10	11
IUGR	02	03

Table 2: Mode of delivery

	PRIMIGRAVIDA		MULTIGRAVIDA		
Inducing agent	**Vaginal delivery**	**LSCS**	**Vaginal delivery**	**LSCS**	**Overall incidence NVD/LSCS**
Misoprostol	30 (88.2%)	04 (11.8%)	15 (93.8%)	01 (6.2%)	90% /10%
Dinoprostone gel	29 (80.5%)	07 (19.5%)	12 (85.7%)	02 (14.3%)	82% /18%
Total	59 (84.2%)	11 (15.8%)	27 (90%)	03 (10%)	

Table 3: Success rate with different indications

Agent	Misoprostol	Dinoprost gel
Indication	**Success Rate**	**Success Rate**
Post-dated Pregnancy	24/26 (92%)	20/24 (83%)
PIH	11/12(92%)	10/12 (83%)
PROM	7/10(70%)	8/11 (73%)
IUGR	2/2 (100%)	3/3 (100%)

RESULTS

Demographic Distribution (Fig 1): Fifty patients each were induced each by misoprostol and Dinoprostone. In the misoprostol group, thirty four patients were primigravida and sixteen were multigravida. In the dinoprostone group, thirty six patients were primigravida and fourteen were multigravida.

Four primary causes were indications for inducing labour (Fig 2, Table 1). These were post-dated pregnancy, pregnancy-induced hypertension (PIH), premature rupture of membranes (PROM) and intrauterine growth retardation (IUGR). Fig 2 and Table 1 show the distribution of patients in the two groups based on the indications.

An overall success rate of 86% was achieved with prostaglandin induction (Table 2). Approximately 88% of primigravida patients and 94% of multigravida patients induced with misoprostol had a normal vaginal delivery. In comparison, with Dinoprostone induction, 80% of primigravida and 85% of multigravida patients were able to achieve a normal vaginal delivery.

The success of vaginal delivery was found to be good for all the four indications (Table 3). In the case of misoprostol, it ranged from 70 – 100% whereas for dinoprostone it ranged from 73 to 100%. Prostaglandin-based induction was seen to be most effective in cases of IUGR (100%- both PGE_1 & PGE_2) and the least effective in premature rupture of membranes (70% for PGE_1 & 73% for PGE_2).

In general, misoprostol was seen to be more or at least equally efficacious to dinoprostone. The only case where this was not seen was in cases of PROM where dinoprostone (73%) was found to be more successful than misoprostol (70%) in inducing a vaginal delivery. Additional antibiotic coverage was also needed when inducing labour for PROM in order to prevent ascending infection.

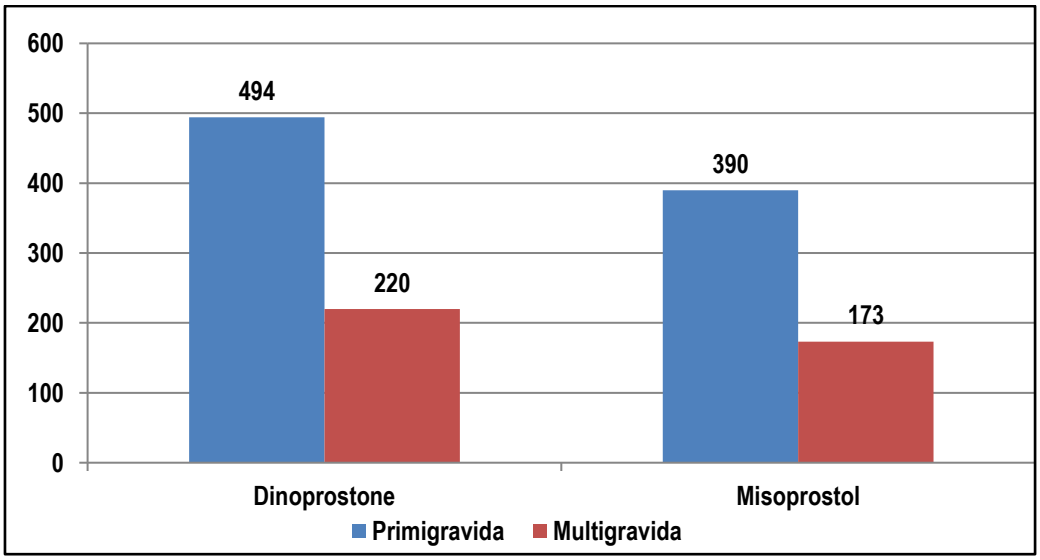

Fig 3: Mean induction and onset of labour interval according to gravidity in minutes

Table 4: Maternal Side Effects

Side effects	Misoprostol	Dinoprostone	Total
Nausea and Vomiting	4	1	5
Diarrhoea	3	0	3
Bronchospasm	0	1	1
Uterine hyperstimulation	2	2	4
Maternal pyrexia (transient) & shivering	2	1	3
Neonatal death	1	1	2

The mean induction time with misoprostol was 320.6 minutes and was 417.3 minutes with dinoprostone (Fig 3). This difference was significant in both the primigravida and multigravida (p = .0009) patients. An average of 195 minutes (5-6 hrs) of induction time was seen in multigravida patients with both agents.

The maternal side effects were minimal in both the groups with none of them being serious (Table 4). Side effects ranged from nausea and vomiting, diarrhoea, bronchospasm, uterine hyperstimulation and maternal pyrexia. Minor side effects of nausea, vomiting and diarrhoea were more common with misoprostol. Uterine hyperstimulation was noted in both groups resulting in short duration of labour. Neonatal deaths seen in both groups were due to maternal causes (Severe PIH in group 1 and IUGR in group 2).

DISCUSSION

Our findings were essentially similar to another study conducted on the Indian population by Murthy et al.[4] They found a similar result of shortening of the mean interval between induction & delivery. Moreover, similar to our patients, the dinoprostone group had a higher rate of delivery by caesarean section in their group. Their patients differed from our subjects only in the cause of LSCS which was maternal exhaustion. In our patients, premature rupture of membranes was the most common cause for LSCS.

Surbek et al and Kolderup et al.[5,6] found a similar degree of shortening of induction interval and success of vaginal delivery. However, in their study also, a higher rate of fetal distress (20% vs 5%) was noted. Our results showed a lower rate of fetal distress, likely because we used a lower dose of misoprostol with a more frequent dosing interval compared to these studies.

Garry et al.[7] also found that misoprostol led to a shortening of the induction to delivery interval. They also found a higher rate of success of induction with misoprostol similar to our study. However, they found that a higher rate of fetal distress in the form of non-reassuring fetal heart rate was seen in the misoprostol group as compared to the dinoprostone group. We did not find a similar result in our group.

CONCLUSION

In conclusion, Misoprostol used as 25µg tab was found to be extremely effective in induction of labour. The interval between induction and onset of labour was significantly shortened as compared to Dinoprostone gel. There were fewer minor maternal side effects on using either modality of induction and assistance was not needed in any of them. Meconium staining of liquor was noted with Misoprostol induction without evidence of serious neonatal hypoxia. Therefore, we conclude that Misoprostol is better than Dinoprostone to induce labour as it shortens the time for induction and has additional benefits of being cheaper, easier to store (does not need refrigeration) and simpler to use.

To summarize, low dose, frequent misoprostol is safer and more effective in inducing labour by vaginal route than dinoprostone gel and it can be used at least as efficaciously as cerviprime gel.

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