COMPARISON OF MISOPROSTOL (PGE1) ANALOGUE WITH DINOPROSTONE (PGE2) FOR INDUCTION OF LABOUR

Naila Tahir*, Bushra Afzal*, Shazia Chohan**

*Army Medical College, National University of Sciences and Technology (NUST) Islamabad, **Combined Military Hospital Rawalpindi

ABSTRACT

Objective: To compare the results of induction of labour with misoprostol (PGE1 analogue) with dinoprostone (PGE2 analogue) in terms of induction delivery interval, mode of delivery, and the need for oxytocin augmentation.

Setting: Department of Obstetrics and Gynaecology, Combined Military Hospital, Rawalpindi.

Duration of Study: Six months

Study Design: Randomized controlled trial.

Subject and Method: Total 100 subjects were included in this study. These patients were divided in groups-A and B. Group-A was induced with prostin tablet i.e. dinoprostone PGE2 3 mg tablets maximum of 2 doses, 6 hours apart. Group-B induced with prosotec 50 µgm 4 hourly, 4 doses. The subjects were full term pregnant women who were either primigravida, 2nd or 3rd gravid and had bishop score less than 5.

Results: The patients included in the study were between the ages of 19 to 37 years. The mean age of group-A was 26.72 ± 4.62 years and of group-B was 28.4 ± 4.94 years (p value > 0.05). All the patients in both groups were between 37 to 42 weeks of gestation. The mean gestational age of group-A was 39.74 ± 2.09 weeks and in group-B it was 39.62 ± 1.55 weeks (p > 0.05). Oxytocin augmentation was required in late 1st stage and 2nd stage in group-A in 68% cases but it was required in only 30% cases in group-B cases. The maximum duration of labour was more than 11 hours in 24% cases in group-A but only 6% in group-B.

Conclusion: Misoprostol (PGE1 analogue) is a useful drug for labour induction. There is short induction delivery interval and reduced need for the use of oxytocin augmentation. There are also less failure rates of induction with misoprostol. Rate of instrumental delivery and caesarean section is also less.

Keywords: Induction of labour, misoprostol, dinoprostone, induction delivery interval, mode of delivery.

INTRODUCTION

Induction of labour is the artificial initiation of uterine contractions prior to their spontaneous onset, leading to progressive dilatation and effacement of cervix and delivery of the baby. Labour is induced in 13% of deliveries is USA for medical indications[1].

Cervical ripening is the most important part of the process of labour induction and the most important predictor of success. Ripening of the cervix greatly facilitates labour and increases the likelihood of vaginal delivery[2].

Ripening agents are used when the cervix is unfavorable, commonly prostaglandin E2. There are several methods of administration of prostaglandin E2 but little comparative work has been performed as to their acceptability by patients[3].

In the past 20 years prostaglandins have been used in a variety of formulations to ripen the cervix and to induce labour. Prostaglandins were first used intravenously in late 1960's but it was associated with significant side effects[3].

A change in the route of administration from systemic to local resulted in fewer side effects and smaller doses were required for desired effects on the cervix[4].

Prostaglandins may be given via oral, intravaginal, intracervical and intravenous routes, all of which are effective. Intravaginal administration of prostaglandin E2 i.e. dinoprostone is the most widely used

Correspondence: Brig Naila Tahir, Classified Gynaecologist, CMH Rawalpindi.
Email: dr-naila@hotmail.com
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pharmacological method to promote cervical ripening and labour induction[3].

Misoprostol (Cytotec-Searle, Arthrotec-Pfizer, Prosotec-Atco, ST Mom-Zafa) is a prostaglandin E1 analogue marketed for use in the prevention and treatment of peptic ulcer disease. It is inexpensive, easily stored at room temperature and has fewer systemic side effects. It is rapidly absorbed orally and vaginally. Although not registered for such use misoprostol is widely used for obstetric and gynaecological indications, such as induction of labour and termination of pregnancy. This is one of a series of reviews of methods of cervical ripening and labour induction using standardized methodology[5].

The drug does not require any special packaging or refrigeration. Its main advantages over dinoprostone is low cost and easy storage. Vaginal misoprostol resulted in successful and earlier induction of labour more often than dinoprostone[6].

The above features make it ideal for its use in third world countries. Though the drug in not licensed with FDA for use in pregnant women but worldwide it is being used for ripening of cervix and induction of labour as well[6].

The objectives of this study were to compare the duration of labour and mode of delivery in both the groups, the rate of caesarean section and need for oxytocin augmentation.

MATERIALS AND METHODS

The study was conducted at CMH Rawalpindi, Gynae/Obs department. Duration of the study was 6 months. Study design was randomised controlled trial. Full term primigravidas, low risk 2nd and 3rd gravidas having Bishop score less than 5 and patients having no contraindication to vaginal delivery were included in the study. Multigravida (G4 and more), high risk pregnancies and patients with history of previous LSCS were excluded from the study.

Permission from the ethical committee of CMH Rawalpindi was taken for the study. Informed written consent for induction of labour was taken from all patients included in this study. Multi stage sampling was done. The initial study subject were selected by purpose sampling techniques. The group was divided into two groups A and B random sampling using random table. Patients were randomized into 2 groups, each consisting of 50 patients. Patients in group A were induced with dinoprostone i.e prostaglandin E2 vaginal pessary (3 mg), maximum 2 doses 6 hours apart. While patients in group B were induced with misoprostol i.e prostaglandin E1, given vaginally at a dose of 50 mcg 4 hourly, 4 doses maximum.

A patient was labeled as failed induction if no improvement in Bishop score was observed after 4 doses. Cardiotocograph was taken before and after insertion of each dose. Partogram was maintained in all cases as per the hospital protocol. Uterine contractions were monitored to detect hyper stimulation and tachysystole. Pelvic examination was mandatory before repeating the dose. Data was collected by means of questionnaire proforma. Data analysis was computer based. Data entry sheet was designed in SPSS version 10. There were 2 groups of patients. Data was presented in proportions (percentages) and means with SD. The 2 groups were compared using Chi Square test for quantitative variables (proportions) and t, test used to compare quantitative variables. The test of significance was taken at a p value <0.05.

RESULTS

All the patients in both groups were between 37 and 42 weeks of gestation. The mean gestational age of group A was 39.74 ± 2.09 weeks and in group B it was 39.62 ± 1.55 weeks. Greatest number of patients in group A and group B were at 41-42 weeks of gestation. There were 42% primigravida in group A and 34% in group B. Second gravida in both groups were 36%. Third gravida were 22% in group A and 30% in group B.

The maximum duration of labour in group A was more than 11 hours in 24% cases and in group B only 6% (table-1). Oxytocin augmentation was required in 68% of cases in group A and only in 30% cases in group B.

LSCS was done in 12% cases in group A but only 0.2% cases in group B (table–2).

Maximum number of patients were of ages 20-25 years in both groups i.e 48% in group A and 36% in group B. Only 2 patients in group A and 5 patients in group B were above 35 years.

DISCUSSION

Induction of labour remains the commonest obstetric intervention[7]. Labour is induced when the fetal survival is an anticipated outcome and prolongation of gestation is considered inadvisable for fetal or maternal well-being. The ripening of the cervix is the most important part of labour induction and predictor of success. Ripening agents are currently used for unfavourable cervix. Different prostaglandin analogues are prefered for this purpose of ripening of cervix and labour induction due to their effectiveness.

The prostaglandins used for induction of labour and termination of pregnancy were PGE2 dinoprostone and PGF2 i.e. dinoprost. Misoprostol a synthetic PGE1 analogue, has been marketed by the name of Cytotec by Searle, Arthrotec by Pfizer, and Prozotec by Atco, STmom by Zafa .

A number of randomized controlled trials have supported the efficacy of misoprostol administration at term for cervical ripening and labour induction .

Misoprostol, a potent uterotonic agent used primarily for induction of labour has been recently studied outside the United States, even in the management of third stage of labour . The advantages of misoprostol over other uterotonic agents i.e. prostaglandins are that it does not require refrigeration, it is inexpensive and may be stored at room temperature and does not degrade in tropical climates. It is heat stable.

Several clinical trials were carried out at Kingston General Hospital, Kingston, Ontario and elsewhere to compare the vaginal use of misoprostol for induction of labour with oral use of misoprostol.

Table-1: Comparison of duration of labour between group A and B.

Duration (hours)	PGE2 (Group A) n (%)	PGE1 (Group B) n (%)
<5	-	03 (06.0)
5-7	15 (30.0)	27 (54.0)
8-10	23 (46.0)	17 (34.0)
>11	12 (24.0)	03 (06.0)
Total	50 (100.0)	50 (100.0)
Mean	8.84 ± 2.43	7.12 ± 2.23
p value	0.000 (Significant)	

Table-2: Comparison of mode of delivery between group A and B.

Mode of delivery	PGE2 (Group A) n (%)	PGE1 (Group B) n (%)
SVD	32 (64.0)	40 (86.0)
Instrumental	12 (24.0)	06 (12.0)
C/section	06 (12)	04 (02.0)
Total	50 (100.0)	50 (100.0)

These studies suggested that vaginal use of misoprostol is more effective than oral administration, resulting in shorter induction-delivery interval and decrease need for oxytocin augmentation[8]. However the difference in instrumental delivery rate and caesarian section rate was non-significant. As far as apgar scores were concerned there was no clinically significant difference seen between the two groups[9].

The current study was carried out to compare the results of misoprostol with dinoprostone for induction of labour, in full term pregnancy.

Although misoprostol use started in CMH Rawalpindi a couple of years ago, it has been used for the indication of labour, for cervical dilatation in cases of missed abortions and mid trimester abortions. In our study all our patients with successful labour induction delivered within

12 hours of induction, 6% of patients induced with misoprostol were delivered within 4 hours of induction but none in group with prostin tablet.

Misoprostol is found more effective in induction of labour through vaginal route and maximum patients delivered in 5-7 hours i.e. 54%.

The maximum patients in group-A i.e. 46% cases induced with prostin delivered in 8-10 hrs of induction.

This study also showed that induction delivery interval is short in cases of misoprostol. These results are comparable with the study of Schroder et al[10].

Misoprostol is a useful drug for ripening of cervix and induction of labour. The need for augmentation with oxytocin is reduced in cases of induction with misoprostol. Only 30% cases in group-B needed oxytocin augmentation while 68% cases in group-A required augmentation.

In cases of misoprostol i.e. group-B, maximum patients i.e. 86% delivered vaginally and only one LSCS for fetal distress and 6 instrumental deliveries carried out.

In group-A i.e. dinoprostone group 64% vaginal deliveries and 12% LSCS and 24% instrumental deliveries were carried out.

Our study gave us results comparable with other studies[11,12] and showed better results with misoprostol. The priming of cervix to induction and induction to delivery intervals were also considerably shortened in cases of misoprostol and also delivery rate by LSCS was lowered in the misoprostol group.

Apgar score at 5 minutes after birth was same in both groups.

A number of studies carried out to compare the safety and efficacy of misoprostol for cervical ripening at term with dinoprostone. Garry et al[12] reported that intravaginal misoprostol and dinoprostone are safe and effective medications for use in cervical ripening before labour induction. Misoprostol results in a shorter interval from induction to delivery. Moodley[13] concluded that in selected women, the efficacy of misoprostol for the induction of labour at term is similar to that of dinoprostone but misoprostol associated with a higher incidence of hyperstimulation[14].

There was no uterine hyperstimulation noted with any of the drug, used for induction.

Limitations of Study

We cannot use misoprostol for labour induction in grand multiparous and scarred uterus because of the hyperstimulation[14]. The effects of misoprostol on the fetus needs further investigation before it is used as routine agent for induction of labour.

CONCLUSION

Misoprostol PGE1 is a useful drug for labour induction. There is short induction delivery interval in case of PGE1 and also reduced need for the use of oxytocin augmentation. There are also less failure rates of induction with misoprostol and rates of instrumental delivery and lower segment caesarean section is also less.

The cases should be properly selected for induction, carefully monitored during labour, to have better results and to avoid complications . It is also important to have more clinical experience.

REFERENCES

1. Hayat KT. Induction of labour in unripe cervix an experience with 153 patients. J Coll Physicians Surg Pak 1997; 7: 205-8.
2. Bishop EH. Pelvic scoring for elective induction. Obstet Gynaecol 1964; 24: 266-8.
3. American college of Obstetricians and Gynaecologists. Induction of labour. ACOG technical bulletin no. 127 Washington DC: ACOG, 1995.
4. Wing DA, Jones MM, Ranal A, Goodwin TM. Paul RH. A comparison of misoprostol and prostaglandin E2 gel for preinduction cervical ripening and labour induction. Am J Obstet Gynaecol 1995; 172: 180-82.
5. Tomlinson J, Archer PA, Hobson A. Induction of labour: a comparison of two methods with particular concern to patient acceptability. J Obstet Gynaecol 2001; 21: 239-41.
6. Hussain N, Soomro N. use of misoprostol for cervical ripening and induction of labour. Med Channel 2000; 6: 36-8. Wagner 2006, which cites:
7. Induction of labour; Guideline No.16. Royal College of Obstetricians and Gynaecologists,1998.
8. Kolderup I, McLean I, Grullon K, Safford RN, Kilpatrick SJ. Misoprostol is more efficacious for labour induction than prostaglandin E2 but is it associated with more risks? Am J Obstet Gynecol 1999; 180: 1543-7.
9. Day L, Taylor A, Howard R. Misoprostol for induction of labour at term. Br J Obstetrics and Gynaecology 2000; 107: 756.

10. Schroder AK, Tauchert S, Diedrich K. Induction of labour at term with misoprostol; an effective and inexpensive alternative. Zentralb Gynakol 2004; 126: 154-8.
11. Mutlu-Meydanli M, Caliskan E, Haberal A. Prediction of adverse outcome associated with vaginal misoprostol for labour induction. Eur J Obstet Gynecol Reprod Biol 2003; 110: 143-8.
12. Garry D, Figueroa R, Kalish RB, Catalano CJ, Maulik D. Randomised controlled trial of vaginal misoprostol versus dinoprostone vaginal insert for labour induction. J Maternal Fetal Neonatal Med 2003; 13: 254-9.
13. Moodley J, Venkatachlam S, Songea P. Misoprostol for cervical ripening at and near term–a comparative study. MS Afr Med J 2003; 93: 371-4.
14. Sallyp, Weaver. Vaginal misoprostol for cervical ripening in term pregnancy. American Family Physican 2006; 73(3): 511-2.