COMPARATIVE STUDY OF THE INDUCTION OF LABOUR WITH INTRAVAGINAL MISOPROSTOL AND INTRACERVICAL DINOPROSTONE GEL

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ABSTRACT

OBJECTIVES

To compare the efficacy of labour with Dinoprostone gel and Misoprostol with respect to induction delivery interval, type of delivery and cost effectiveness.

METHODS

100 patients admitted to labour ward of OBG Department of Katuri Medical College and Hospital with indications for induction of labour and unfavourable cervices randomly assigned to receive either intravaginal Misoprostol or intracervical Dinoprostone gel between August 2012 and August 2013; 50 patients received 25 µg of intravaginal Misoprostol every 4 hours, maximum of 6 doses; 50 patients received 0.5 mg Dinoprostone gel intracervically every 6 hours, maximum of 3 doses as needed.

RESULTS

In Dinoprostone group, the mean induction delivery interval was 15.25±3.14 hrs. In the Misoprostol group, the mean induction delivery interval was 11.43±2.17 hrs; 72% required Oxytocin augmentation in the Dinoprostone group compared to 38% in Misoprostol group which is statistically significant (P<0.05); 78% of patients had vaginal delivery in Dinoprostone group and 90% of patients had vaginal delivery in Misoprostol group which is statistically significant (P<0.05). There was 10% incidence of NICU admission in both groups.

CONCLUSION

Misoprostol and Dinoprostone are safe and effective drugs for cervical ripening and labour induction. Misoprostol is more cost effective when compared to Dinoprostone. Misoprostol is stable at room temperature and does not need refrigeration, whereas Dinoprostone required refrigeration. Induction delivery interval, requirement of Oxytocin augmentation is less in Misoprostol group when compared to Dinoprostone group. Vaginal delivery rate is high in Misoprostol group when compared to Dinoprostone. These findings suggest that Misoprostol is safe, effective and inexpensive agents for cervical ripening and labour induction.

KEYWORDS

Labour Induction, Misoprostol, Dinoprostone.

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INTRODUCTION

Induction of labour is the non-spontaneous initiation of uterine contractions that result in progressive cervical effacement and dilatation with descent of the presenting part to achieve vaginal delivery when continuation of pregnancy presents a threat to the life or well-being of the mother or her unborn foetus. Labour induction near term is 10 to 20 percent of women. Medications that ripen cervix in a short period of time play an important role in modern obstetrics.

The method of administration that has been explored thoroughly is endocervical Dinoprostone or prostaglandin E_2. Though this is widely used, it is expensive and required refrigeration for storage with warming before use.

It was only a matter of time before a comparably cheap, safe and effective vaginally administered Prostaglandin with limited side effects would be available and Misoprostol or PGE_1 tablet fitted those criteria admirably.

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Of late, a number of recently published clinical trials abroad and in India have shown that intravaginal Misoprostol is an effective agent for induction of labour and cervical ripening at term when compared to other methods of labour induction. In this study, the method of cervical ripening with endocervical prostaglandin E_2 gel and the new one intravaginal prostaglandin E_1 tablet are compared with regard to efficacy and safety.

AIMS AND OBJECTIVES

- To compare the efficacy of induction of labour with Dinoprostone gel and Misoprostol with respect to induction delivery interval, type of delivery cost effectiveness.

MATERIAL AND METHODS

Source of Data

- 100 patients admitted to labour ward of OBG Dept. of Katuri Medical College and Hospital with an indication for induction of labour from Aug 2012 to Aug 2013.

Inclusion Criteria

- Singleton foetus with cephalic presentation.
- Over 37 weeks of gestation.
- Reactive foetal heart pattern.
- Unfavourable cervix Bishop Score <4.
- No contraindication to vaginal delivery.

Exclusion Criteria

- Previous LSCS or any uterine surgery.
- Mal presentation.
- Grand multiparity.
- Abnormal foetal heart rate pattern.
- Allergy to prostaglandins.

Method of Induction

- 50 patients with an indication for labour induction received with 25 µg of intravaginal Misoprostol and repeated for a maximum of 6 doses every 4 hours as needed.
- 50 patients with an indication for labour induction received with 0.5 mg of intracervical Dinoprostone gel and repeated for a maximum of 3 doses every 6 hours as needed.
- After informed consent had been obtained, the patients selected for the study were evaluated initially by modified Bishop's Score and admission test for foetal wellbeing. Patients with a modified Bishop's score ≤4 and a positive admission test were induced.
- After drug insertion, patients were monitored for signs of labour maternal vital signs, foetal heart rate and progress of labour. The foetal heart rate was monitored by either intermittent auscultation or continuous foetal heart rate monitoring. A partogram was strictly maintained in all patients induced Oxytocin was started depending on the modified Bishop's score and in the absence of adequate uterine contractions after 6 hrs. of the last dose or for augmentation of labour in case of an arrest of dilatation. Oxytocin was started at the dose of 2 mu/min with increments of 2 mu/min every 30 minutes.
- Membranes were ruptured when the cervix was completely effaced with a cervical dilatation of more than 3 cms or at onset of active stage of labour.
- The data collection included indication for booked/unbooked case, maternal age, parity, gestational age on entry into the study, modified Bishop's score at the time of induction, induction-delivery interval, oxytocin augmentation, type of delivery, Apgar score of the baby, maternal and neonatal complications.
- The results observed were subjected to statistical analysis by student's 't' test, odds ratio, Chi-square test and a 'p' value of <0.05 was considered as significant. (Ethics clearance was taken by the Institution Ethics Committee of KMCH, Guntur).

OBSERVATIONS AND RESULTS

Total number of patients studied was 100.50 patients were induced with 25 µg intravaginal Misoprostol tablets and the other 50 patients were induced with 0.5 mg intracervical Dinoprostone gel. The results observed were subjected to statistical analysis by student's 't' test, Odd's ratio and Chi-square test.

The Following Observations were made

Drug	Mean Induction Delivery Interval (In hours)
Dinoprostone	15.25 +/-3.14
Misoprostol	11.15 +/-2.17
Mean Induction Delivery Interval	

P<0.05 Significant

The mean induction delivery interval in Dinoprostone is 15.25+/-3.14. The mean induction delivery interval in Misoprostol is 11.15+/-2.17. Mean induction delivery interval subjected to student's 't' test. This had statistical significance. In the Dinoprostone group, 78% patients delivered vaginally and 22% patients underwent caesarean delivery. In the Misoprostol group, 90% patients delivered vaginally and 10% patients underwent caesarean delivery. All caesarean deliveries were considered as 'failed inductions.' In the Dinoprostone group, the total number of failed inductions were 11 out of 50 patients giving an incidence of 22%. The majority of failed inductions were due to secondary arrest of dilatation- 7 cases; 2 patients had foetal distress and 2 patients had transverse arrest. In the Misoprostol group, the total numbers of failed inductions were 5 out of 50 patients giving an incidence of 10%. The majority of failed inductions were due to foetal distress- 4 cases. It was seen that foetal distress was associated with uterine hyperstimulation in 3 out of 4 cases; 1 patient had secondary arrest of dilatation.

There was a 38% incidence of side effects in the Dinoprostone group and 24% incidence of side effects in the Misoprostol group. In the Dinoprostone group, in the present study there was an 8% incidence of vomiting compared to 4% in the Misoprostol group. There was an 18% incidence of postpartum haemorrhage, out of which 12% were due to traumatic postpartum haemorrhage and 6% atonic haemorrhage. In the Misoprostol group, the present study says there is an increased incidence of tachysystole 4% and hyperstimulation 6%. Hyperstimulation was associated with foetal distress in three patients for which caesarean delivery was done; 6% patients had postpartum haemorrhage of traumatic type. In the Dinoprostone group, 4 babies were kept in NICU for less than 6 days and 1 baby was admitted for more than 6 days. In the Misoprostol group, out of 5 babies 2 babies were admitted for less than 6 days and 3 babies were admitted for more than 6 days.

DISCUSSION

It was that majority of patients in Dinoprostone group were booked cases at our institution and in Misoprostol group were unbooked cases, who had no regular antenatal checkups at our institution or elsewhere.

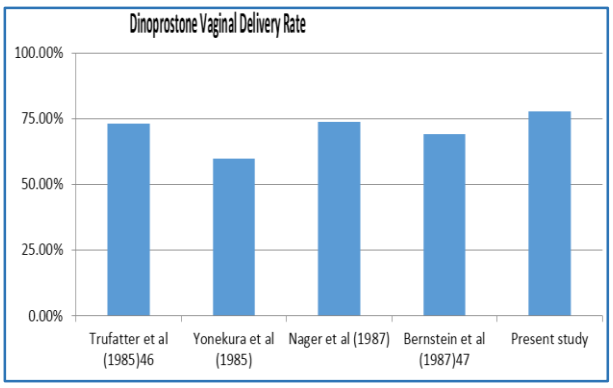
This indirectly reflects the socio-economic status. A single dose of Dinoprostone costs Rs. 230, thus was used most commonly in patients who were booked. A single dose of Misoprostol costs Rs. 8/- used in patients who were unbooked. Thus, concluding that Misoprostol is more cost effective than compared to Dinoprostone.

The other patient's characteristics like gravidity, gestational age and Bishop's score prior to induction had no major differences in both groups.

Response to Drug

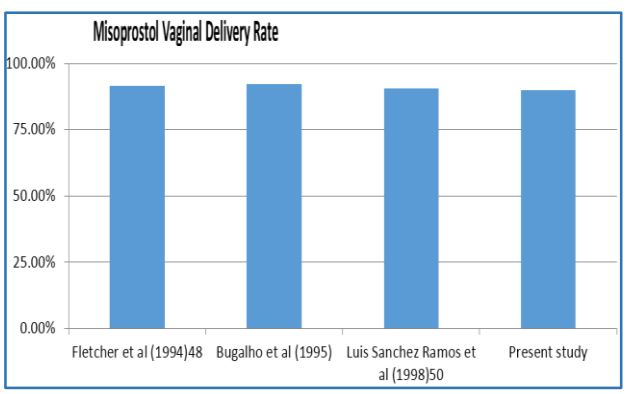
Vaginal Deliveries

The rate of vaginal deliveries was 78% in the Dinoprostone and 90% in the Misoprostol group.



Vaginal Delivery Rates with Dinoprostone According to other Authors

Misoprostol Vaginal Delivery Rate



Vaginal Delivery Rates with Misoprostol according to other Authors

In my study, the rate of vaginal delivery in the Dinoprostone group is consistent with the studies of Trufatter et al. (1985).[1] and Nager et al. (1987).

The vaginal delivery rate with Misoprostol in my study is consistent with the studies of Luis Sanchez Ramos (1998).[2] Fletcher et al. (1994).[3] and Bugalho et al. (1995).[4]

Induction to Vaginal Delivery Interval

In the present study, it was seen that the induction delivery interval was shorter in the Misoprostol group compared to Dinoprostone group 11±7.2 hrs and 13.7±6 one hour respectively. This was statistically significant (P<0.05).

Induction to Vaginal Delivery Interval

DINOPROSTONE	
Authors and Year	Induction Delivery Interval
Trufatter et al. (1985)	13.3±6.2
Yonekura et al. (1985)	13.1±8.1
Nager et al. (1987)	10.1±2.1
Bernstein et al. (1987).[5]	12.3±16.5
Present study	15.25±3.14

In the present study, the induction-delivery interval of Dinoprostone is comparable to the studies of Trufatter et al. (1985).[1] and Yonekar et al. (1985).

Induction to Vaginal Delivery Interval

MISOPROSTOL		
Authors and Year	**Dosage Max Dose**	**IDI (hrs)**
Sanchez Ramos et al. (1993)	50 µg 4 hrs (600 µg)	11±7.3
Fletcher et al. (1994)	100 µg (100 µg)	15.6±12.5
Wing et al. (1995a)	50 µg 3 hrs (300 µg)	15.1±8
Wing et al. (1995b)	25 µg 3 hrs (200 µg)	22.1±14.5
Bugalho et al. (1995)	50 µg 12 hrs (200 µg)	10.4
Present Study	25 µg 4 hrs (150 µg)	11.15±2.17

In the Misoprostol group it has shown that by various dosages of Misoprostol used, the induction-delivery interval also varies. Our present study uses 25 µg Misoprostol every 4th hourly with an induction delivery interval of 11.15±2.17 hrs, which is comparable to the studies of Bugalho et al. (1995).[4] who has used 50 µg Misoprostol 12th hourly to a maximum of 200 µg with an induction delivery interval of 10.4 hrs and Sanchez Ramos et al. (1993).[2] who used 50 µg Misoprostol 4th hourly to a maximum of 600 µg with an induction delivery interval of 11±7.3 hrs.

Induction to Vaginal Delivery Interval

Authors and Year	DINOPROSTONE (Dosage)	MISOPROSTOL (Dosage)
Varaklis et al. (1995)	22.4±10.9 (0.5 mg 6 hrs.)	16.0±7.7 (25 µg 2 hrs.)
Wing Da et al.[6] (1995)	23.5±14.5 (0.5 mg 6 hrs.)	15.1±8.0 (50 µg 3 hrs.)
Herabutya et al.[7] (1997)	21.36±13.09 (1.5 mg)	19.14±10.6 (100 µg)
Ozgur et al. (1997)	8.2±5.9 (0.5 mg)	7.6±1.9 (100 µg)
Blanchette et al.[8] (1999)	31.3±13.0	19.8±10.4
Kolderup et al.[9] (1999)	28.52 (0.5 mg 6 hrs.)	19.5 (50 µg 4 hrs.)
Present study	15.25±3.14 (0.5 mg 8 hrs.)	11.15±2.17 (25 µg 4 hrs.)

Various authors in their studies have compared the efficacy of Misoprostol and Dinoprostone in relation to induction-delivery interval.

Failed Induction

Failed inductions were those cases, which did not fulfil the criteria for the definition of induction of labour. Thus all caesarean deliveries were considered 'failed induction,' irrespective of the cause of the same.

Caesarean delivery rates in the present study are 22% in the Dinoprostone group and 10% in the Misoprostol group. The various indications were foetal distress, failure to progress due to deep transverse arrest or secondary arrest of dilatation. In the Dinoprostone group secondary arrest of dilatation formed the major indication for caesarean delivery and in the Misoprostol group foetal distress formed the major

indication for caesarean delivery. In the Misoprostol group, it was found the presence of thick meconium stained liquor in all cases.

Maternal Side Effects

The maternal side effects observed were tachysystole, hyperstimulation, vomiting, diarrhoea, fever and PPH.

In the Dinoprostone group the major side effects were vomiting- 8% and PPH of which traumatic were 12% and 6% atonic. The major side effects observed in the Misoprostol group was tachysystole 6% and hyperstimulation 4%. A concern with Misoprostol induction has been excessive uterine activity namely tachysystole and hyperstimulation, 3 cases of hyperstimulation were seen with foetal distress for which caesarean delivery had to be done. Other side effects in the Misoprostol group were fever, vomiting and diarrhoea which were minimal. Misoprostol had 3 patients with traumatic PPH; all were cervical tears and did not require any blood transfusion.

Neonatal Outcome

The mean birth weight and mean Apgar scores in both groups did not show any major difference. The incidence of NICU admission was 10% in both groups. The indications for NICU admission were meconium aspiration syndrome, birth asphyxia and hyperbilirubinaemia. There was an increased incidence of meconium aspiration syndrome and birth asphyxia in the Misoprostol group and was associated with uterine hyperstimulation.

CONCLUSION

Misoprostol and Dinoprostone are safe and effective for cervical ripening and labour induction. Misoprostol is cost-effective when compared to Dinoprostone. Misoprostol is stable at room temperature and does not need refrigeration, whereas Dinoprostone requires refrigeration. Induction delivery interval, requirement of Oxytocin augmentation is less in Misoprostol group when compared to Dinoprostone. Vaginal delivery rate is high in Misoprostol group when compared to Dinoprostone.

One disadvantage with Misoprostol is uterine tachysystole and hyperstimulation with further foetal distress. Therefore, further work is needed to determine the ideal dosing to prevent such complications.

In conclusion we believe that Misoprostol is apparently safe, efficient and a cost-effective induction agent which may become the drug of choice for induction of labour in the coming years.

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