International Journal of Reproduction, Contraception, Obstetrics and Gynecology
*Mehta K et al. Int J Reprod Contracept Obstet Gynecol. 2017 Apr;6(4):1253-1257*
www.ijrcog.org

pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20170956

**Original Research Article**

# Incidence of cesarean delivery after induction of labour with dinoprostone gel at term in nulliparous women with unfavourable bishops score

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**Received:** 23 February 2017
**Accepted**: 27 February 2017

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## ABSTRACT

**Background:** The aim of induction of labour is to achieve vaginal delivery in advance of the normal timing of parturition and to avoid operative delivery. The objective was to study the incidence of instrumental delivery and cesarean section in nulliparous women with unfavourable bishops score at term.
**Methods:** This study was conducted on 200 patients in nulliparous women with unfavourable bishop score, cephalic presentation and no previous history of abortion.
**Results:** The most frequent cause of induction of labour was postdatism (47.5%) followed by PIH (25.5%) and PROM (13%). 143 (71.5%) women had normal vaginal delivery whereas in 54 women (27%) cesarean section was done. 2 women (1%) had forceps application for delivery and remaining 1 women (0.5%) had ventouse delivery. Out of 200 patients 9 had maternal complication of induction of labour.
**Conclusions:** In present study 71.5% women had normal vaginal delivery, 27% had cesarean section. Mean bishop score at induction was 3.31 which improved to 4.0 after 12 hours of gel instillation. The mean induction to delivery interval was 13.38 hrs in present study, 54.5% patients were delivered within 12 hours of gel instillation in this study. Most common indication of cesarean section was failed progress followed by fetal distress.

**Keywords:** Nulliparous, PIH, Postdatism, PROM

## INTRODUCTION

Induction of labour means, the adoption of measures designed to initiates labour earlier than it would take place as a natural event. The aim of induction of labour is to achieve vaginal delivery in advance of the normal timing of parturition and to avoid operative delivery. The rate of induction of labour has greatly increased in the past 10 years. Induction of labour is carried out in approximately 20% of pregnancies.[1] Generally labour induction is indicated when the benefit of delivery to the mother or fetus out weights the potential risk of continuing the pregnancy.[2,3] Birth by caesarean delivery is generally more hazardous than a normal vaginal delivery, and also poses more risks for subsequent pregnancies.[4,5] Therefore, it is hypothesized that prediction of the success rate of induction of labour might lead to a reduction in caesarean delivery and there by its complications. The relation between clinical state of cervix and spontaneous onset of labour has been known for many years.[6] In clinical practice quantifications methods and cervicouterine variable that influence the rate of progress of labour are used to decide which women are most likely to have successful induction. The traditional method of predicting whether an induced labour will result in successful vaginal delivery is based

on the pre-induction favourability of the cervix as assessed by the Bishop score described by bishop in 1964.[9] Bishop scoring system assigns points for cervical effacement, dilation, cervical consistency and position.

***Bishop score states that score of:***

- 7 Or less: do not attempt induction without ripening the cervix first.
- 9 Or more: favorable to attempt induction.
- 12 Or more: she is quite ready for labour or in early labour.[7]

***The indication for induction of labour (IOL)***

Postdated or prolonged pregnancy, Fetal growth restriction, pre-eclampsia and eclampsia, intrauterine fetal death, Rh isoimmunisation, premature rupture of membrane, chorio-amnionitis, oligohydromnios, congenital malformations of fetus, abruptio placenta, chronic hypertension, chronic nephritis, diabetes mellitus, cholestasis of pregnancy, indication for the convenience of the patient or the physician, distance from hospital.

***Contraindications of induction of labour***

Contracted pelvis and cephalopelvic disproportion, malpresentation-transverse lie or oblique lie, previous classical caesarean section or hystrotomy, placenta previa, cord presentation, prolapse, previous myomectomy entering the endometrial cavity, pelvic tumours occupying the pelvis, invasive carcinoma cervix, maternal infection like active herpes genitalis, HIV and Heart disease.

The association of prostaglandins release with labour was first discovered by Karim who noted a marked rise in PGE2 and PGF2α in amniotic fluid during spontaneous labour.[12] Prostaglandin are used in management of labour and are introduced as agent for induction of labour

PGE2 is used for induction of labour by oral, parenteral, vaginal, extra aminiotic and intra cervical route. The most convenient route is intracervical application of gel.[12] It offer an advantage of lower dose and lesser side effects.

***Aims and objectives***

The present study was conducted in the department of Gynaecology and Obstertics at Mathura Das Mathur Hospital, Jodhpur, Rajasthan, India with following aims and objectives:

- To explore the effects of induction by prostaglandin E2 gel on mode of delivery in nulliparous women with unfavourable bishops score.
- To identify factors affecting maternal and fetal morbidity after induction at term in women with unfavourable bishops score.
- To identify the incidence of instrumental delivery and cesarean section in nulliparous women with unfavourable bishops score at term.

## METHODS

This study was conducted on 200 patients during the period of March 2015 to December 2015 at MDM Hospital, Jodhpur, Rajasthan, India in nulliparous women with a singleton pregnancy at 37-43 weeks with unfavourable bishop score and with cephalic presentation with no previous history of abortion. The patients included in study were between 18-35 years of age group with written consent of induction. All patients who were willing to participate in the study were included in the study. Baseline characters such as age, gestational age at induction and indication for induction were noted. After informed consent, careful history, general examination, systemic examination and per abdomen examination was done. A non-stress test was performed for the assurance of fetal wellbeing. Digital vaginal examination was done for pelvic assessment, to evaluate the cervix, and record the bishop score. Routine investigations like Hb, blood group, Rh typing, CBC, urine examination, RFT, LFT, viral markers were carried out, USG examination was done to confirm gestational age, Bishop score was used to estimate the prelabour inducibility and likelihood success of induction. The method of labour was decided after initial vaginal examination during evaluation of Bishops score.

If the Bishops score was ≤5 then induction was done with PGE2 gel (dinoprostone gel). Induction of labour was carried out according to the standard protocol of our hospital PGE2 was applied in the form of 0.5 mg. Dinoprostone per 3 gm. (2.5 ml) in prefilled syringe with catheter for endocervical application. The patient was instructed to recline for at least 3 minute. The patient was assessed after 6 hours and changes in Bishops score were noted depending on the cervical dilatation and presence of contractions a second dose of PGE2 was administered intracervically and maximum of three doses were used within 24 hours as per recommendation. Achievement of active phase of labour within 24 hours of induction was considered as successful induction. Failure of induction was considered as indication for caesarean delivery.

## RESULTS

The total 200 patients were studied, out of which 171 (85.5%) had attended antenatal clinic while 29 (14.5%) did not attend antenatal clinic during their present pregnancy.

Table 1 show their age wise distributions out of which maximum patient were below 25 years (87.5%). Patient's age ranged from 18 to 35 years with maximum number of patients in 21-25 years age group. The mean age was 22.2 years.

**Table 1: Age distribution of patients.**

| Age (in years) | No. of patients | Percentage |
|---|---|---|
| Below 20 | 28 | 14 |
| 21-25 | 147 | 73.5 |
| 26-30 | 23 | 11.5 |
| 31-35 | 02 | 1.0 |
| Total | 200 | 100 |

The most frequent cause of induction of labour was postdatism (47.5%) followed by PIH (25.5%) and PROM (13%). Less frequent causes were IUGR, DFM and IUFD (Table 2).

**Table 2: Indication of induction.**

| Indication of induction | No. of patients | Percentage |
|---|---|---|
| Postdatism | 95 | 47.5 |
| Pregnancy induced hypertension | 51 | 25.5 |
| Premature rupture of membranes at term | 26 | 13 |
| Oligohydramnios | 17 | 8.5 |
| Intra Uterine growth retardation | 4 | 2 |
| Postdatism and pregnancy induced hypertention | 3 | 1.5 |
| Decreased fetal movement | 3 | 1.5 |
| Intra uterine fetal death | 1 | 0.50 |
| Total | 200 | 100 |

In this study 143 (71.5%) women had normal vaginal delivery whereas in 54 women (27%) cesarean section was done. 2 women (1%) had forceps application for delivery and remaining 1 women (0.5%) had ventouse delivery (Table 3).

**Table 3: Distribution of patients according to mode of delivery.**

| Mode of delivery | No. of patients | Percentage |
|---|---|---|
| Vaginal delivery | 143 | 71.5 |
| LSCS | 54 | 27 |
| LMC forceps | 2 | 1 |
| Ventouse delivery | 1 | 0.5 |
| Total | 200 | 100 |

**Table 4: Distribution of patients according to induction delivery interval.**

| Patient delivered | No. of patients | Percentage |
|---|---|---|
| Within 12 hours of gel instillation | 109 | 54.5 |
| After 12 hours of gel instillation | 91 | 45.5 |
| Total | 200 | 100 |

Distribution of patients according to induction delivery interval shows that 54.5% patients delivered within 12 hours of gel instillation whereas 45.5% patients after 12 hours of gel instillation (Table 4).

**Table 5: Cause of cesarean section after induction of labour.**

| Causes | No. of patients | Percentage |
|---|---|---|
| Failed progress | 26 | 48.14 |
| Fetal distress | 17 | 31.48 |
| Failed induction | 05 | 9.25 |
| Obstructed labour | 05 | 9.25 |
| Cord prolapsed | 01 | 01.85 |
| Total | 54 | 100 |

The 54 patients who underwent cesarean section after induction of labour, the most common cause was failed progress (26 cases) followed by foetal distress (17 cases) and remaining 11 patients it was due to failed induction, obstructed labour and cord prolapsed (Table 5).

**Table 6: Maternal complication of induction of labour at term in nulliparous women.**

| Complication | No. of patients | Percentage |
|---|---|---|
| Postpartum haemorrhage | 3 | 1.5 |
| Cervical tear | 3 | 1.5 |
| Uterine hyperstimulation | 2 | 1.0 |
| Resuturing of wound | 1 | 0.5 |

Out of 200 patients, 9 had maternal complication of induction of labour. Postpartum haemorrhage was noted in 3 (1.5%) cases, all three cases underwent intra uterine packing and received blood transfusion. Three had cervical tear, 2 had uterine hyperstimulation and 1 patient required resuturing of wound (Table 6).

## DISCUSSION

The present study was conducted on 200 patients at MDM Hospital, Jodhpur to find out risk of ceserean delivery after induction at term in nulliparous women with an unfavourable Bishop score.

PGE2 gel (dinoprostone gel) was selected as inducing agent as it is effective, acceptable to patients and non-invasive administration. It also shortens the duration of oxytocin acceleration.

The patients were at term or post term (37-42 weeks of pregnancy) as done by others Mackenzie, Ulmsten and Kenedy.[8-10]

The expected date of delivery was confirmed by ultrasonographic examination, patients earliest pelvic examination and per abdominal examination.

In present study 85.5% patients were booked and 14.5% were unbooked because of increase number of institutional deliveries promoted by the government of India under JSSK scheme.

The mean age of patient was 22.2 years with maximum number of patient between 21 to 25 years.

The mean age in studies done by Wilson, Ulmstem and Neilson were 23.3 years, 25 years, and 24 years respectively.[9,11,12]

The mean age in present study was less than other studies because of early marriages in this part of India.

The most frequent cause of induction of labour in present study was post-dated pregnancy (47.5%) followed by PIH (25.5%) premature rupture of membrane at term (13%) and oligohydramnios (8.5%). There were other less common causes like IUGR, postdatism and PIH, decrease fetal movement and intra uterine fetal death.

The most common cause seen by Yeast JD et al was also postdatism.

The present study shows that mode of delivery was normal vaginal delivery in 71.5% followed by cesarean section in 27% low mid cavity forceps in 1% and ventouse delivery in 0.5%.

The cesarean rate ranged from 23.3% to 33.8% in study conduct by Prins RP et al, Neilson DR et at, Calder AA et al and Macer J et al.[12-15] Present ceserean rate in also in between this range.

The mean induction to delivery interval in present study was 13.38±7.91 hours.

The study conducted by Calder et al, Wilson PD et al and Prins RP et at also shows mean induction to delivery interval in this range.[11,14,16]

The main indication for ceserean section was failed progress (48.14%) followed by fetal distress (31.48%) similar indications were also reported by Calder et al, Wilson PD et al and Macer JA et al.[11,14,15] In present study maternal complication seen were postpartum haemorrhage (1.5%), Cervical tear (1.5%), uterine hyperstimulation (1.0%) and resuturing of wound (0.5%) Out of 200 patient, only nine had these complication (4.5%).

## CONCLUSION

The present study was undertaken with the aim to find out risk of cesarean delivery after induction at term in nulliparous women with an favourable bishop score and to evaluate the effect of induction of labour by PGE2 gel on the route of delivery on nulliparous women. Mean bishop score at induction was 3.31 which improved to 4.0 after 12 hours of gel instillation, further augmentation of labour with oxytocin was done according to changes in the cervical state. The mean induction to delivery interval was 13.38 hrs. in present study, 54.5% patients were delivered within 12 hours of gel instillation in this study. In present study 71.5% women had normal vaginal delivery, 27% had cesarean section, 1% women had to undergo application of low mid cavity forceps and 0.5% women had to undergo application of low mid cavity forceps and 0.5% women had ventouse delivery. Most common indication of cesarean section was failed progress followed by fetal distress. Dose of PGE2 gel used intracervically was so low that no systemic side effects like nausea, vomiting were noted. Postpartum haemorrhage was noted in 3 patients. All three cases underwent intrauterine packing during cesarean section and all 3 patients received blood transfusion. Resuturing of wound was done in one patient. Traumatic complication like cervical tear was noted in 3 patients. Thus, it is concluded that induction of labour in the presence of an unripe cervix is associated with failed induction, failure to progress of labour and risk of cesarean section. Bishop score is good predictor of successful induction of labour, in this study, successful induction of labour has a statically significant positive relationship with the bishop score.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Mehta K, Kumar D, Fathepuriya DS, Verma L. Incidence of cesarean delivery after induction of labour with dinoprostone gel at term in nulliparous women with unfavourable bishops score. Int J Reprod Contracept Obstet Gynecol 2017;6:1253-7.