

## USE OF PROSTGLANDIN E2 FOR CERVICAL RIPENING AND INDUCTION OF LABOUR

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### SUMMARY

Induction of labour in a patient with an unripe cervix has always posed a formidable challenge to the clinician. The introduction of PGE<sub>2</sub> has significantly reduced this challenge. Oral routes of administration were found to be associated with an unacceptable high rates of gastro-intestinal side effects. On the other hand intracervical gels and vaginal suppositories were reported to be safe and effective for cervical ripening with reduced side effects. Hence we at Nowrosjee Wadia Maternity Hospital undertook a prospective study to evaluate the safety and efficacy of PGE<sub>2</sub> intracervical gels for ripening of cervix in patients with Bishop's score 3 or less, and induction and augmentation of labour with vaginal suppositories in patients with Bishop's score 5 or more. Accordingly 40 patients were inducted into this trial who required to terminate their pregnancy for various medical and obstetric reasons, chief being post-datism, pregnancy induced hypertension and PROM. It was observed that the average duration of first and second stage of labour were markedly reduced (1st stage 7.30 hrs and 2nd stage 26.7 mins). We had 62.5% normal vaginal delivery, 30% instrumental delivery and 7.5% Caesarean section, a reduction from 12% in Caesarean rate for our institute. We had no significant maternal and neonatal side effects except one case of hypertonus. Hence we conclude that PGE<sub>2</sub> is a useful alternative to oxytocin for cervical ripening, induction and augmentation of labour.

### INTRODUCTION

Induction of labour for medical or obstetric indications leads to a successful

vaginal delivery in a high percentage of patients with ripe or easily inducible cervixes. But on the other hand, induction of labour in a patient with an unripe cervix has always posed a formidable challenge to the clinician. Patients with firm, closed and

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unripe cervixes at the time of induction have a high incidence of failed induction (20% to 50%) Bishop 1964, Friedman 1966. Further when vaginal delivery is achieved, these patients undergo prolonged labour, higher incidence of instrumental delivery and increased maternal and fetal morbidity, Turnbull 1968. Various methods are described in literature to promote cervical ripening before labour induction but with contradicting reports. Oral and parenteral routes of administration of PGE<sub>2</sub> were investigated and were found to be associated with an unacceptably high rate of gastro-intestinal side effects ranging from 25% to 55%, Hauth 1977. Hence we at Nowrosjee Wadia maternity Hospital decided to use PGE<sub>2</sub> endocervical gels for cervical ripening and PGE<sub>2</sub> vaginal tablets for induction and augmentation of labour since they were associated with reduced side effects, Calder 1977.

#### MATERIALS AND METHODS

This study was performed at The Nowrosjee Wadia Maternity Hospital, Bombay from August 92 to January 93. 80 patients with singleton pregnancies and cephalic presentations were included in this study. All patients had reactive nonstress test, were afebrile and had Bishop's score of 3 or less and had obstetric or medical indications for induction of labour. Exclusion criteria were previous uterine scars, placenta praevia, abruptio placentae, H/O asthma, evidence of fetal distress. After each of the patients were admitted a thorough General examination was done, Bishop's score was determined and the patient assigned to either PGE<sub>2</sub> or Oxytocin group.

The intracervical gel was introduced under strict aseptic precautions with a special applicator taking care to see that the nozzle did not go beyond the internal Os. Patient was given 1/2 block headlow for 30 minutes after which the patient was allowed to be ambula-

tory if preferred. The patients were monitored for maternal and fetal side effects if any. If the patient went into labour after intracervical gel, the patient was reassessed and managed like any other patient including amniotomy at 4 cms or more, intrapartum amniotomy fetal monitoring and augmentation of labour with PGE<sub>2</sub> vaginal tablets if needed.

If the patient did not go into spontaneous labour, patient was reassessed for Bishop's score after 12 hours. If the Bishop's score was less than 5, another dose of intra-cervical PGE<sub>2</sub> gel was re-inserted. If after another 12 hours the Bishop's score did not improve to 5 or more, it was considered as failure of cervical ripening.

If on the other hand, after 4 hours of initial instillation of PGE<sub>2</sub> gel Bishop's score increased to 5 or more but patient did not go into spontaneous labour, PGE<sub>2</sub> vaginal tablets were introduced under aseptic precautions into the posterior vaginal fornix. These tablets were re-introduced after an interval of 2 hours if required during the first stage of labour to achieve contractions per 10 minutes each lasting for 30-40 seconds. A failed induction was defined as no change in cervical effacement or dilatation after 8 hours of adequate uterine activity.

If the patient was assigned to the Oxytocin group, a I.V. drip of 5% glucose saline containing 2 I.U. of pitocin was started to ripen the cervix. Once the patient went into active labour, the oxytocin drip was regulated so that the patient attained contractions per 10 minutes, each lasting for 30 to 40 seconds. A failed induction was defined as no change in cervical effacement or dilatation after 8 hours of adequate uterine activity or no uterine activity after 1 hour Oxytocin at 24 mu/min.

All patients in both groups who had failed induction received a prima-

caesarean section for that indication.

**RESULTS**

Table I shows the breakup of the patients who underwent cervical ripening with induction and augmentation of labour, the chief indications being postdatism and PROM with relaxed uterus in the PGE2 group and PROM with relaxed uterus and meconium stained liquor (mild to moderate) in the Oxytocin group. The average period of gestation was 38.3 weeks in the PGE 2 group

and 37.4 weeks in the Oxytocin group.

Table II shows the change in the Bishop's score after one intracervical PGE2 gel instillation after 4 hours of instillation v/s oxytocin drip of 4 hours. It was seen that PGE2 intracervical gel definitely improved the Bishop's score by 2.37 points as compared to Oxytocin drip which increased it by 1.15 points.

Table III It was seen that there was a significant reduction in the first stage of labour with use of PGE2 as compared to Oxytocin drip. However the second and third stage of labour were not significantly different.

Table IV shows the mode of delivery. It was seen that there was a significant reduction in the number of Caesarean Section in the PGE2 as compared to Oxytocin group (7.5% v/s 20%). Indications for caesarean section in PGE2 were hypertonus (1), fetal distress (1), and failure to progress (1). In the oxytocin group there was no case of hypertonic uterus. The indications for caesarean section were failed induction (3), fetal distress (2), arrest of dilatation (2), and arrest of descent (1).

With respect to maternal complications there was no significant difference between PGE2 and Oxytocin group as regards nausea, vomiting, diarrhoea or temperature elevation (7% in PGE2 v/s 5% in Oxytocin). There was

**Table I**

**Distribution of Cases**

	PGE <sub>2</sub> (n = 40)	Oxytocin (n = 40)
Post datism	12	5
PROM	16	15
PH	6	8
Meconium Liquor	3	10
	(2 Thin + 1 Moderate)	(8 Thin + 2 Moderate)
UGR	3	2

**Table II**

**Effect on Bishop Score of Single Intra Cervical Gel after 4 hrs. or Oxytocin Drip for 4 hrs.**

	PGE <sub>2</sub>	Oxytocin
Initial Bishop score	2.65 ± 1.04	2.71 ± 0.96
Follow up Bishop Score	5.02 ± 1.58	3.86 ± 1.45
Mean Change in Bishop Score	2.37	1.15

**Table III**

**Mean Duration of the Stage of Labor**

	PGE <sub>2</sub>	Oxytocin
1st Stage (hrs)	7.3 (1.5 to 12hrs)	10.4 (2 hrs to 14 hrs)
2nd Stage (mins)	26.7 mins	25.5 mins
3rd Stage (mins)	7 mins	5 mins

Table IV

## Mode of Delivery

	PGE <sub>2</sub>	Oxytocin
Normal Vaginal Delivery	25 (62.5%)	14 (35%)
Instrumental Delivery	12 (30%)	18 (45%)
L.S.C.S.	3 (7.5%)	8 (20%)

no case of PPH nor puerperal sepsis in both groups.

As regards to neonatal outcome, the mean birth weight was similar in both groups (2550 ± 519) gms in PGE<sub>2</sub> group v/s 2650 ± 450 gms in Oxytocin group). We had two babies of Apgar less than 7 at 5 mins in PGE<sub>2</sub> group v/s 3 babies in the Oxytocin group. None of the babies required intubation for resuscitation.

## DISCUSSION

The cervix is not merely a passive structure that yields slowly and progressively to the repetitive forces of uterine contraction but is involved in the active process of ripening which results in the separation and rearrangements of firm collagen bundles into smaller more flexible fibrils, an increased accumulation of glycosaminoglycans and an overall loss of collagen, Danforth 1974. Prostaglandins stimulates production of these glycosaminoglycans from cultured fibroblasts and increase the stretch modules of human cervical tissue, Chang 1977.

Buchanan 1984 reported a study of 38 patients who had PGE<sub>2</sub> vaginal suppositories used for cervical ripening. Of these 68% went into labour within a mean time of 2.38 ± 2.56 hours. Only 5.3% in the study had failed induction. They concluded that 3mg

PGE<sub>2</sub> vaginal suppository is an effective method of both cervical ripening and labour induction and its use resulted in a significant reduction of failed inductions. This is corroborated in our study where 80% of those in whom intracervical gel was instilled for cervical ripening went into spontaneous labour itself. In the remaining patients 6(15%) the cervix was inducible and hence PGE<sub>2</sub> vaginal tablets were used to induce labour. In two patients (5%) the cervix was unripe and hence another PGE<sub>2</sub> gel was reinstilled. Of the 32 who went into spontaneous labour all but 4 patients require PGE<sub>2</sub> vaginal tablets for augmentation of labour.

Introduction of labour with PGE<sub>2</sub> rather than with Oxytocin offers the advantages of inducing cervical ripening as well as promoting myometrial contractility. Further Oxytocin has been implicated in causing excessive water retention, an increased incidence of neonatal jaundice. As far as comparison between PGE<sub>2</sub> and PGF<sub>2</sub> for cervical ripening and induction of labour was concerned, Mackenzia 1979 have observed that PGE<sub>2</sub> causes an improvement in the Bishop's score as well as reduction in the length of labour compared to PGF<sub>2</sub> which has action only on the myometrium and hence it is associated with high number of uterine hypertonus with non-inducible cervixes.

Hence to conclude PGE<sub>2</sub> intracervical gel is a good medium for cervical ripening as well as induction of labour. PGE<sub>2</sub> vaginal tablets are to be used in inducible cervixes for induction and augmentation of labour.

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