

# Concurrent Oxytocin in Women Needing Second Dinoprostone

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## ABSTRACT

**Objective:** To reduce average induction delivery interval in patients with poor Bishop score without compromising fetomaternal outcome (in terms of birth weight, NICU admission, maternal complications and mode of delivery).

**Study Design:** A descriptive study.

**Place and Duration of Study:** Department of Obstetrics and Gynaecology, Pakistan Atomic Energy Commission (PAEC) General Hospital, Islamabad, from February to December 2009.

**Methodology:** All patients needing 2nd dinoprostone pessary for induction of labour were included in the study. Patients with gestation below 37 weeks, those with intra-uterine growth restriction, bad obstetric history, previous uterine scar and patients in whom Bishop score improved for amniotomy after 1st dinoprostone pessary, were excluded. Data was collected on a special proforma where all variables were defined.

**Results:** Out of 90 patients, 44 (48.8%) had spontaneous vertex deliveries and 12 (13.3%) had instrumental deliveries so a total vaginal deliveries occurred in 56 (62.2%) patients. Thirty four patients (37.8%) had emergency caesarean sections. Main indication for caesarean was failure to progress in 1st stage of labour followed by fetal distress. There were 3 failed inductions. Only 2 patients had hyperstimulation. NICU admission were 8 and all babies were discharged healthy from nursery with no case of early neonatal death.

**Conclusion:** Concurrent oxytocin with 2nd dinoprostone in patients with poor Bishop scores (initial scores 2 and 3) resulted in more vaginal birth and comparatively shorter induction delivery time with almost negligible fetomaternal complications.

**Key Words:** *Bishop score. Induction delivery interval. Hyperstimulation.*

## INTRODUCTION

Induction of labour is the stimulation of regular uterine contractions before the onset of labour, using mechanical and pharmacological methods in order to generate progressive cervical dilatation and subsequent delivery. Induction of labour is required in about 9.5% - 33.7% of all term pregnancies.<sup>1</sup>

The most appropriate timing for labour induction is the point at which the maternal or perinatal benefits are greater if the pregnancy is interrupted than if the pregnancy is continued.<sup>2</sup> Occasionally, a woman is best delivered before the spontaneous onset of labour like post date pregnancies and pregnancy induced hypertension which account for 80% of inductions.<sup>3</sup> Elective induction of labour in pregnancy induced hypertension and post date pregnancies result in better fetomaternal outcome when compared with expectant management of these conditions.<sup>4-7</sup>

Efficacy and safety of inducing agent is very important. Amniotomy and mechanical devices were used initially to provide the release of endogenous prostaglandins for the last 30 years.

In 1950, synthetic oxytocin became available for oral and intravenous routes for induction of labour. In 1968 Turnbull and Anderson used amniotomy followed by immediate intravenous titration of oxytocin for augmentation for labour.<sup>8</sup>

Currently prostaglandin E2 (PGE2, dinoprostone) is widely used as cervical ripening and labour inducing agent.<sup>9</sup> This agent has been approved by FDA for cervical ripening in women at or near term with mean induction delivery interval of  $15.6 \pm 0.7$  hours.<sup>10</sup> Many routes of administration are being used with the vaginal route being the most commonly used. The current recommendations of Royal College of Obstetricians and gynaecologists on the induction of labour are vaginal tablets in preference to gel formulations.

The usual method of induction is sequential i.e prostaglandins are used for cervical ripening and when bishop score improves then oxytocin infusion is given for further augmentation of labour. This method is considered safest, however, studies have been done on simultaneous use of oxytocin and prostaglandin preparations to shorten the induction to delivery time with no increase risk of adverse events.<sup>8,11,12</sup>

Success of induction depends upon state of cervix. Women with unfavourable cervix who have not experienced a cervical ripening phase prior to labour result in prolong labour and increase rate of caesarean section.

The purpose of this study was to determine the reduction in Induction Delivery Interval (IDI) and the frequency of

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operative delivery in patients with poor Bishop (2 - 3) scores without compromising feto-maternal outcome by using concurrent method of induction with prostaglandin E2 and oxytocin.

### METHODOLOGY

This was an experimental study which was conducted at Pakistan Atomic Energy Commission (PAEC), General Hospital, Islamabad, from February to December 2009. All patients having poor Bishop scores requiring 2nd dinoprostone pessary for induction of labour were included in the study. Patients in whom the Bishop scores were improved for amniotomy after first dinoprostone were excluded from the study. Other exclusion criteria for induction of labour were intra uterine growth restriction, bad obstetric history, gestation below 37 weeks and previous uterine scar.

Before induction of labour patients were fully evaluated so that there should be a clear indication for induction of labour and no contraindication to vaginal delivery. Patients and her partner were explained and written consent was taken. Assessment with documentation prior to induction include confirmation of gestational age, pelvic adequacy, cervical dilatation and effacement, presentation, uterine activity, fetal heart rate, non stress test and indication for induction of labour. First dinoprostone pessary was inserted per vaginally at 0400 hours. Bishop score was repeated after 6 hours. Patients who required second dinoprostone received oxytocin infusion started at 1 mu/minute (3 ml/hour) and was doubled every 30 minutes to a maximum of 32 mu/minute to achieve effective uterine contractions (3 moderate in 10 minutes) without fetal heart rate abnormality. Strict vigilance of fetal heart rate and uterine contractions was observed after initiation of concurrent oxytocin with second dinoprostone. We allowed a maximum of two dinoprostone pessaries.

The data about age, parity, bishop score, duration of labour, mode of delivery, induction delivery interval, neonatal complications and maternal complications were collected on a special proforma where all variables were defined. All data collected were entered and analysed in statistical package for social sciences (SPSS) version 20. Frequencies and percentages were calculated for categorical variables whereas mean and standard deviation were calculated for continuous variables.

### RESULTS

Out of the 90 patients requiring second dinoprostone, 63 were multigravida, 25 were primigravida and two were grandmultipara.

Seventy two patients were between age 18 - 30 years, 14 patients between 31 - 35 years and 4 patients were between 35 - 42 years of age. Gestational age in 48

patients was between 37 - 40 weeks of pregnancy, between 40 - 41 in 41 patients and 41+ weeks in one patient.

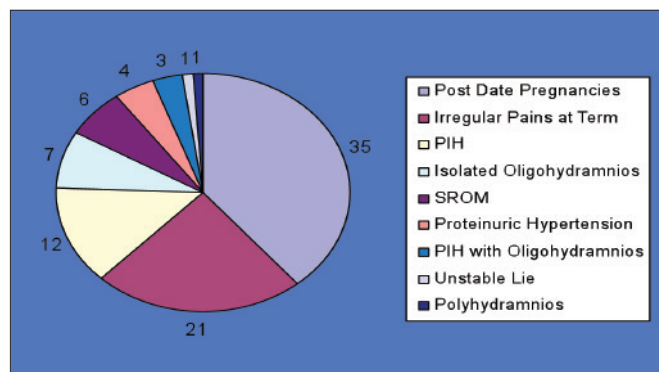
As shown in Figure 1 maximum number of patients were induced for post date pregnancies this was followed by irregular pains at term and pregnancy induced hypertension. Figure 2 shows bishop scores at 2nd dinoprostone insertion.

Maximum patients had bishop scores of 3, 4 and 5. Three patients had Bishop score of 2 and five patients had score of 6 at insertion of 2nd dinoprostone.

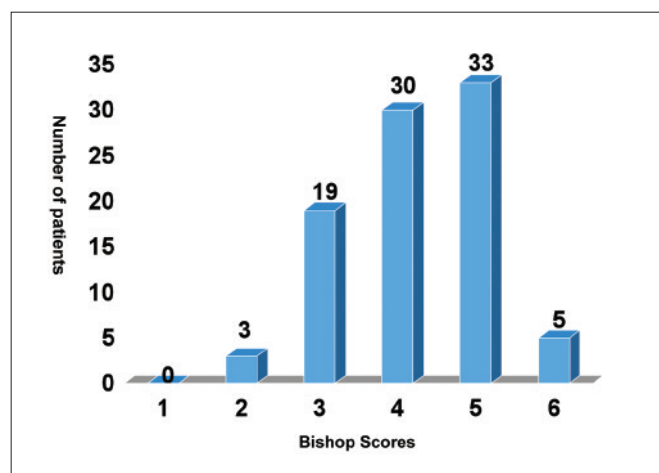
Out of 90 patients 44 patients (48.8%) had spontaneous vertex deliveries and 12 patients (13.3%) had instrumental deliveries (7 vacuum and 5 forcep) so total number of patients delivering vaginally were 56 (62.2%). Thirty four patients (37.8%) were delivered by emergency lower segment cesarean section. Indication

**Table I:** Induction delivery interval.

IDI in Hours	Frequency and percentages of the patients delivering vaginally (n=56)
7 - 8 hours	14 (25%)
9 - 11 hours	21 (37.5%)
12 - 15 hours	15 (26.7%)
15 - 18 hours	6 (10.7%)



**Figure 1:** Indications for induction of labour.



**Figure 2:** Bishop score at insertion of 2nd dinoprostone pessary.

for instrumental deliveries were fetal distress (4 patients), poor maternal effort (7 patients) and prolong second stage (1 patient). Indications for cesarean sections were failure to progress in 1st stage (19 patients), fetal distress (10 patients), failed induction (3 patients), hyperstimulation (1 patient) and failure to progress in second stage (1 patient). Induction delivery intervals are shown in Table I.

Mean induction delivery interval for 56 patients (delivered vaginally) was 10.68 hours (SD=2.90 hours). Maximum number of babies had good one minute and 5 minutes APGAR scores. Only 3 babies had low APGAR score and required intubation for resuscitation.

Regarding birth weights, 3 babies were < 2.5 kg weight; rest of the babies had weight between 2.5 - 4.5 kg. No baby had weight > 4.5 kg.

The maternal and fetal complications were uterine hyperstimulation and uterine atony in 2 patients each, meconium aspiration in one baby, NICU admission in 8 babies and shoulder dystocia in one patient which was easily overcome by Mcrebert position and suprapubic pressure. There was no early neonatal death and all babies were discharged healthy with mothers.

## DISCUSSION

Induction of labour is performed when it is considered that there are benefits to the baby and / or mother if baby is delivered, compared with alternative of the baby remaining in utero.<sup>13</sup> For example post date pregnancies, pregnancy induced hypertension, pre mature rupture of membranes.

Successful induction of labour is clearly related to the state of cervix which is determined by Bishop score. Cervical ripening is complex process that results in physical softening and distensibility of cervix. The process of softening, shortening and partial dilation of cervix usually takes place in the days or weeks prior to the onset of labour, the cervix relaxes and opens in response to uterine contractions which pull the cervix over the presenting fetal part. However, in some patients this natural process does not take place adequately. These patients present with poor Bishop score even at 40 week of gestation and usually end up in post date pregnancy which was the most common indication of induction of labour in this study. Secondly, those patients in whom induction of labour is done before 40 weeks do not get adequate time for natural preparation of cervix towards labour. Pregnancy induced hypertension, oligohydramnios, intrauterine growth restriction and preterm prelabour rupture of membranes are few examples. These patients will face prolong labour and increased risk of operative delivery.

Various pharmacological and non-pharmacological methods have been used to tackle this problem of poor

Bishop score. The safest and most efficacious among them is prostaglandin-E2 (dinoprostone). Maximum recommended dose is 2 pessaries administered 6 hours apart. Augmentation with oxytocin infusion is done after 6 hours of second dinoprostone to avoid the possibility of hyperstimulation. So the patient with poor Bishop score often have long induction delivery interval and prolong hospital stay.

Purpose of this study was to reduce induction delivery interval by administration of concurrent oxytocin with the second dose of dinoprostone in patients with very poor Bishop score without having significant effect on fetomaternal outcome. Results were very encouraging in terms of reducing induction delivery interval, decrease rate of cesarean section and negligible fetomaternal complication.

Out of 90 patients, 56 (62.2%) delivered vaginally, 34 (37.8%) patients had emergency cesarean sections and only three patients had failed induction. Currently, in UK one in 7 women experiences complications during labour that provide an indication of surgical delivery.<sup>14</sup> In approximately 40% of such cases cesarean section provides the safest route of delivery.<sup>14</sup> Cesarean section rate is increased manifold when induction of labour is done on poor Bishop scores both in nulliparous and multiparous women.<sup>15,16</sup> Whereas in this study it was 37% which is again very good in the context of poor Bishop score. Similarly, there were only 3 failed inductions which also supports the concurrent method when compared with literature.<sup>15,16</sup>

Mean induction delivery interval was also significantly reduced in those patients who delivered vaginally. It was 10.68 hours (SD = 2.90 hours) which is very good when compared with induction of labour with dinoprostone alone.<sup>10</sup> Similarly, oxytocin alone is less likely to be effective in induction of labour when cervix is unfavourable.<sup>2,3,17</sup>

Concurrent oxytocin with dinoprostone resulted in shorter induction delivery interval in other studies quoted in literature.<sup>8,11,12,18</sup>

Regarding fetomaternal complications all neonates were alive and discharged healthy with mothers though 8 babies remained in ICU for different reasons. Two patients had uterine atony which responded to medical treatment. Shoulder dystocia occurred in one patient. Weight of baby was 4 kg. This emergency was easily overcome by Mcrebert position and suprapubic pressure. Baby was delivered with good APGAR score and there was no fetal complication related to the procedure. Uterine hyperstimulation was the most anticipated complication in concurrent method of induction and infact fear of this complication is the main cause of reluctance for the use of this method for induction of labour. In this study only two patients (2.2%) had hyperstimulation. Out of these two, one patient was

delivered vaginally as she was multigravida and hyperstimulation occurred at 7 cm dilation. The oxytocin infusion was stopped. Hydration and left lateral position worked in her case and delivery occurred in next 20 minutes. Other patient had emergency lower segment cesarean section, she was primigravida in early labour. This frequency of hyperstimulation (2.2%) in this study corresponds with the reported incidence (1 - 5%) of hyperstimulation with inducing agents.<sup>19,20</sup>

### CONCLUSION

Careful administration of concurrent oxytocin with dinoprostone for induction of labour in patients with poor bishop scores is associated with shorter induction delivery interval and higher incidence of vaginal births without compromising fetomaternal outcome. Shorter induction delivery interval also allows shorter hospital stay which is an added advantage of this technique.

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