LABOUR INDUCTION IN UNFAVOURABLE CERVIX (A PROSPECTIVE STUDY)

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SUMMARY

Evaluation of efficacy of PGE2 intracervical gel in dealing with unfavourable cervix was done. A comparative study of PGE2 intracervical gel and oxytocin infusion was carried out. 100 patients were enrolled in each group of PGE2 intracervical gel and oxytocin infusion. In PGE2 group, the induction was successful in 82% cases and the caesarean rate was 18% whereas in oxytocin group, induction was successful in 55% cases and the rate of caesarean section was 45%. The induction delivery interval in PGE2 group was significantly shorter than in the oxytocin group. Sixty six percent patients from PGE2 group delivered within 24 hrs compared to 29% in oxytocin group. Repeat induction was more frequently required in oxytocin group (47%) compared to the PGE2 group (27%). Besides, 15% cases in PGE2 group needed oxytocin augmentation. In PGE2 group, the incidence of maternal complications were uterine hypertonus in 2%, foetal distress in 5% and nausea and vomiting in 1% while there were no cases of PPH, cervical dystocia and retained placenta. In oxytocin group, the incidence of uterine hypertonus was 5%, cervical dystocia 25%, foetal distress 8%, retained placenta 3% and PPH 8%. There was a significant rise in the incidence of birth asphyxia (9%), and neonatal hyperbilirubinaemia (10%) in oxytocin group. There were not much differences in the occurence of neonatal infections and there was no neonatal death in any of the group. Hence, PGE2 intracervical application proves to be very valuable method for initiation of labour in unfavourable cervis, being simple, safe, convenient, less distressing and having low incidence of caesarean section.

However, it is not an absolute alternative to oxytocin infusion in all cases, as inspite of even second application of PGE2, about 15% of patients needed oxytocin augmentation to achieve effective uterine action for successful parturition.

INTRODUCTION

In recent years, modern obstetric techniques have greatly increased the safety and reliability of labour. Still induction of labour remains one of the major challenges in obstetrics. In this era of low risk practice, the spectrum of indications for induction has increased where the slightest risk to the foetus is often considered as sufficient reason for contemplating the induction of labour.

Different labour inducing agents have been developed over the years. Intravenous Oxytocin has been the main drug used for induction of labour which has stood the test of time. It is physiological in action and achieves high rates of success in patients with favourable cervix. However, its inability to achieve equally gratifying results in unfavourable cervix, always leaves a scope for further research in the field.

Recent development of PGE2 intracervical gel has revolutionised the methods of induction of labour (Bygdeman, 1984 and Karim, 1971). The use of PGE2 causes cervical ripening and enhances Bishop's score. It may also initiate labour in many cases. PGE2 intracervical gel is now freely available in India.

The principal objective of this study was to evaluate the efficacy of PGE2 gel in dealing with unfavourable cervix. The traditional oxytocin approach was compared with PGE2 gel application as the first step in initiation of labour.

MATERIAL AND METHODS

The present study was carried out at Military Hospital Patiala and Army Hospital, Delhi Cantt-10, from Jan 93 to Jun 95. A total of 100 patients with unfavourable cervix were studied for induction of labour with PGE2 (Dinoprostone gel). A similar number of well matched (in terms of age, parity, & indications for induction) controls were induced with intravenous oxytocin. All the patients had clear indications for termination of pregnancy where further continuation of pregnancy was thought to be more hazardous than the proposed intervention. The inclusion criteria specified that the patient should have singleton pregnancy with vertex presentation and an unfavourable cervix with poor Bishop's score (0-4) prior to induction. The cases for both the groups comprised of primigravidae aged 20-30 years or women of 1,2 or 3

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parity aged 22-35 years and at or near term or post-term. The main exclusion criteria were hypersensitivity to prostaglandins, previous caesarean section or major uterine surgery, cephalo-pelvic disproportion, patients having pre-existing foetal distress, grand multipairty, patients having history of difficult and traumatic delivery, ruptured membranes, and certain medical conditions such as heart disease, asthma and glaucoma. Patients enrolled for both the groups were routinely seen in the antenatal clinics. After admission all the patients were thoroughly examined and special investigations including sonogram with biophysical profile were carried out when indicated. The initial Bishop's score in both the groups was determined prior to induction of labour. Informed consent was taken in all cases.

In the PGE2 group, the patients were placed in lithotomy position. With strict aseptic rituals and with the help of sterile speculum and good light the cervix was visualised. The canula of a prefilled syringe containing PGE2 gel was gently inserted upto the internal OS and the plunger was gently pushed and the syringe gradually withdrawn to ensure the deposition of the entire contents of PGE2 gel into the cervical cannal below the internal OS. The patient remained recumbent for 30 minutes and kept in the labour room for another 6 hours before transfer to the ward. After approximately 12 hours, patients were examined and changes in the cervical findings were noted. Once the cervix was dilated 3 cms or more, amniotomy was done. In cases where there were no changes in the cervical score, another application of PGE2 gel was repeated with same follow up. Oxytocin augmentation was done if the uterine contraction were not adequate. In oxytocin group, oxytocin infusion was started after sensitivity test. The dose was titrated against uterine contractions. With the establishment of effective uterine contractions and 3-4 cms cervical dilation amniotomy was performed and oxytocin infusion continued with titrating dosages. If good uterine contractions could not be achieved within 8 hours and there was no improvement in the cervical score, oxytocin infusion was stopped and restarted after 24-48 hours.

All the patients had careful clinical monitoring of uterine contractions, foetal heart rate pattern and maternal vital parameters. The progress of labour was assessed by noting the strength of uterine contractions, descent of the presenting part and dilatation of cervix which was plotted on a partogram. An appropriate intervention was carried out as and when any indication arose during labour from both the groups. The results in the two groups were analysed and compared as regard to successful induction rate, caesarean section rate, and maternal and perinatal complications.

RESULTS

Table I shows the distribution of age and parity in both the groups which are well matched as regards maternal age and parity.

Various indications for induction of labour in both the groups are shown in Table II. PIH (45%) and post datism (32%) were the commonest indications for induction in each group.

The induction-delivery interval is

TABLE I
AGE & PARITY DISTRIBUTION OF PATIENTS IN BOTH GROUPS

Age in Years	PGE2 Group Primi %	PGE2 Group Multipara %	Oxytocin Group Primi %	Oxytocin Group Multipara %
20 - 25	42	17	42	17
26 - 30	08	28	08	28
31 - 35	00	05	00	05
Total	50	50	50	50

TABLE II
INDICATIONS FOR INDUCTION OF LABOUR IN BOTH GROUPS

Indications	PGE2 Group Primi %	PGE2 Group Multipara %	Oxytocin Group Primi %	Oxytocin Group Multipara %
Post - date	13	19	13	19
PIH	30	15	30	15
Rh Negative	03	05	03	05
IUGR	04	05	04	05
IUD	02	04	02	04
Total	50	50	50	50

TABLE III
INDUCTION - DELIVERY INTERVAL IN OXYTOCIN GROUP

Induction - delivery Interval	Oxytocin Group Primi %	Multipara %	Total %
0-12	00	08	08
12 24	05	16	21
24 & above	07	09	16
Total	12	33	45

TABLE IV
INDUCTION - DELIVERY INTERVAL IN PGE2 GROUP

Induction-delivery interval	PGE2 Group Primi %	Multipara %	Total %
0-12	15	22	37
12-24	11	18	29
24 & above	10	06	16
Total	36	46	82

illustrated in Table III & Table IV. In oxytocin group only 8% cases (All multiparae) delivered within 12 hours, 21% cases (5% primiparae & multiparae) between 12-24 hours & rest 16% cases (7% primiparae & 9 multiparae) after 24 hours. On the other hand in PGE2 group higher percentage (37%) of cases (15% primiparae & 22% multiparae) delivered within 12 hours, 29% cases (11% primiparae & 18% multiparae) in 12-24 hours & only 16% cases (10% primiparae & 06 multiparae) after 24 hours (Table VI).

TABLE V
LABOUR OUTCOME IN PGE2 GROUP

Labour outcome	PGE2 Group Primi %	Multipara %	Total %
A. Successful Induction			
1. After first application	15	25	40
2. Needed second application	09	18	27
3. Needed oxytocin augmentation	12	03	15
B. Caesarean Section	14	04	18
Total	50	50	100

TABLE VI
LABOUR OUTCOME IN OXYTOCIN GROUP

Outcome	Oxytocin Group Primi %	Multipara %	Total %
A. Successful Induction			
1. After first Induction	00	08	08
2. Needed second Induction	18	29	47
B. Caesarean Section	32	13	45
Total	50	50	100

Table V demonstrates the outcome of labour in both groups. Nineteen percent Primi and 18% multi in PGE2 group required repeat application as compared to 18% Primi and 29% multi who needed repeat induction group for failed induction.

Interestingly 12% primiparae and 3% multiparae required oxytocin augmentation in the PGE2 group. Caesarean section rate was 14% for primiparae and 4% for multiparae in the PGE2 group as compared to 32% in primiparae and 13% in multiparae in oxytocin group which is statistically highly significant. It was further observed that repetition of PGE2 gel application/ oxytocin infusion and need for caesarean section were more in patients having unengaged head and occipito-posterior positions.

Nausea and occasional vomiting was seen only in 1% cases, uterine hypertonus in 2% cases, foetal distress in 3% cases, and there was no incidence of

TABLE VII
MATERNAL COMPLICATIONS IN BOTH GROUPS

Maternal Complications :	PGE2 Group %	Oxytocin Group %
Nausea & Occasional vomiting	01	00
Uterine Hypertonus	02	08
Cervical Dystocia	00	25
Foetal Distress	03	18
Retained Placenta	00	03
Post-partum Haemorrhage (PPH)	00	09

TABLE VIII
NEONATAL COMPLICATIONS IN BOTH GROUPS

Complications	PGE2 Group %	Oxytocin Group %
Birth Asphyxia	2.0	9.0
Neonatal Jaundice	0.0	10.0
Neonatal Infection	0.0	2.0
Neonatal Mortality	0.0	0.0

PPH, cervical dystocia and retained placenta in the PGE2 group whereas in the oxytocin group uterine hypertonus was seen in 8% cases, cervical dystocia in 25% cases, foetal distress in 18% cases and PPH in 9% cases (Table V II).

Analysis of neonatal complications in both the groups revealed that the incidence of birth asphyxia was only 2% in the PGE2 group whereas 9% in oxytocin group, Neonatal jaundice was seen in 10% in the oxytocin group and there was none in the PGE2 group. There were no significant differences in the incidence of infections and there was no neonatal death in any of the groups (Table V III).

DISCUSSION

Our study has clearly brought out the differences in success rates of PGE2 gel and oxytocin infusion in induction of labour in unfavourable cervix. The success rate of delivery was 82% in the PGE2 group whereas this was only 55% in the oxytocin group This is similar to the results obtained by Norchi et al (1992). The incidence of foetal distress was significantly high (9%) in Oxytocin group as compared to only 2% in PGI·2 gel group. This can be explained on the basis of rising tension on uterine wall with unnatural uterine contractions in the face of an unyielding cervix, which compromises uteroplacental circulation.

Uterine hypertonus reported to be a complication of PGE2 intracervical gel (Rayburn, 1988 and Handa et al 1994) was not seen in our study. This complication appears to be related to inaccurate application of PGE2 gel. One must take care to deposit the gel in the cervical canal and not beyond. PGE2 being a good stimulant of uterus can certainly initiate uterine contractions before the cervix has had time to ripen. This may lead to uterine hypertonus as with oxytocin

We have observed in our study that a high incidence of caesarean section was partly because of undiagnosed border line disproportion/CPD particularly among the nulliparae who presented with unengaged foetal head/OP position at the time of induction. Our present study has demonstrated that there was an increased incidence of dysfunctional labour (uterine hypertonus & cervical dystocia), foetal distress and PPH in the oxytocin group. A similar observation is also made by many authors earlier. Uterine hyperstimulation or inco-ordinate uterine activities were virtually absent in our study.

In this study it was seen that the rate of caesarean section was considerably less in PGE2 group (18%) as compared to the oxytocin group (45%) which is in agreement with the results obtained by Calder et al (1973) & Baveja et al (1988).

It is observed that the incidence of primary PPH is higher in oxytocin group. This may perhaps be due to uterine exhaustion in response to administration of oxytocin in high concentration over a long period. So, It is further observed that even on steping up the oxytocin dose in the third stage, the uterus becomes relaxed/atonic resulting in PPH. It is interesting to note from our study that in such a situation administration of injection Prostodin (carboprost Tromethamine) acts better to arrest the PPH immediately.

We are also convinced that there is increased incidence of retained placenta

in oxytocin induced patients whereas it was virtually absent in the PGE2 group. PGE2 promotes the fundal dominance and simultaneously relaxes the lower uterine segment whereas oxytocin promotes uterine dominance as well as contraction of lower uterine segment resulting in the entrapment of placenta/retained placenta in few cases.

The present study has confirmed that neonatal outcome was better with PGE2 group. Although it has been reported by some authors that there is an increased rate of neonatal infection with the oxytocin infusion, in our study this was very low (2%) which may be due to stringent supervision and strict aseptic precautions followed in army settings. Moreover, 10% of neonates developed jaundice after oxytocin infusion while no case of neonatal jaundice was reported in PGE2 group. The present study is in agreement with Clegg et al (1974), that a strong dose dependant relationship of oxytocin to the incidence of neonatal hyperbilirubinaemia exists.

CUNCLUSION

From this study, it is concluded that PGE2 intracervical gel is a useful instrument for induction of labour in unfavourable cervix. However, it is not an absolute alternative to oxytocin as oxytocin augmentation may be required in some cases. The roles of PGE2 gel and oxytocin in unfavourable cervix are complimentary and not competitive.

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