A Comparative Study of Oral Prostaglandin (PGE_2) & Intravenous Oxytocin in Induction of Labour

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Summary: This study includes 120 cases each of induction of labour with PGE_2 and IV oxytocin. The efficacy, safety and outcome of labour with each drug was evaluated.

The mean age was 23.4 years with 61.33% primiparae. Maximum (35%) cases were of PIH. The mean induction and onset interval in primiparae was 1.09 ± 0.90 hours in oral PGE_2 and 3.36 ± 3.04 hours in IV oxytocin group and in multiparae 1.08 ± 0.80 hours in oral PGE_2 and 3.37 ± 3.15 hours in IV oxytocin group. The mean induction delivery interval in PGE_2 was 7.28 ± 3.55 hours as compared to IV oxytocin 10.28 ± 7.15 hours ($P < 0.01$). Maternal and fetal side effects were more in IV oxytocin than PGE_2.

Introduction

Induction of labour forms an integral part of the practice of obstetrics. Timely induction reduces the fetal mortality and morbidity. For induction of labour, oxytocin was the only drug until recently when prostaglandin became available. From 1973 onwards various local forms of PGE_2 (as gels, pessaries and films) have been used for application to vagina and cervix for induction of labour (Poulsen et al,. 1991).

The present study was carried out with the use of oral Prostaglandin tablet for induction of labour and the result was compared with intravenous oxytocin to find out the efficacy and safety of PGE_2 on mother and fetus.

Material and Methods.

The present study was carried out in MGIMS, Sevagram, Wardha from Nov. 1994 to Nov. 1996, one hundred and twenty cases requiring induction were studied by using oral PGE_2 for induction of labour and same number of cases was taken for control where oxytocin infusion of 0.5 units in 500 ml of 5% dextrose, in gradually escalating doses were started, and stopped upto the required dose in course of time. These cases were primi or multigravida requiring induction. Cases were monitored to observe the uterine activity, progress of cervical dilatation and any undesirable effects like hypertonic uterine contractions or fetal distress.

Procedure

After complete evaluation patients of Group A were given PGE_2 tablets 0.5 mg each at one hourly intervals till the contractions were established. In a day maximum of 4 to 7 tablets were given. If the uterus remained relaxed at the end of the day tablets were started on the next day in a similar fashion. If the patient did not respond to 8 tablets then the case was considered as failure of induction. The Group B cases were induced with intravenous oxytocin. Oxytocin was started with 0.5 units in 500ml of 5% dextrose drip and escalated upto 5 units and in IUD cases upto 10 units and if no response the drip was omitted at 10 pm and restarted the next day at 6 am. If uterine contractions were established the oxytocin was continued till the patient delivered. The mean induction and delivery interval in both the Groups were compared and statistical analysis of the data carried out by student's 't' test.

Results:

There were maximum number of cases (91-93) in the age Group of 20-25 years of age in both Groups. There were maximum number of primigravidae in both the Groups. The Group A and Group B were more or less similar with respect to gestational age.

Two or more indications were existing in one patient of each Group and pregnancy induced hypertension constituted the commonest indication for induction of labour in both the Groups (Table I).

The mean induction and onset of labour interval (IDI) was shorter in Group A as compared to Group B in both primis and multis and it is statistically significant (Table – II).

Table I
Distribution of cases according to indication for induction.

Indication	Group A	Group B
Postdate	30 (23%)	40 (23.53%)
IUGR	30 (23%)	34 (20%)
PROM	16 (12.31%)	14 (8.24%)
PIH	40 (30.77%)	65 (38.23%)
Eclampsia	-	04 (2.35%)
IUD	07 (5.38%)	04 (2.35%)
APH	-	01 (0.58%)
BOH	03 (2.30%)	04 (2.35%)
GDM	04 (3.07%)	04 (2.35%)

(More than one indications were present).

Table II
Mean induction and onset of labour interval

Primis	Group A			Group B		
Multis	No.	Hrs. Of MIOL	S.D.	No.	Hrs. of MIOL	S.D.
Primis	73	1.09	0.90	75	3.36	3.04
Multi	47	1.08	0.80	45	3.27	3.15

P<0.01
MIOL = Mean induction onset labour.

The active phase of labour was shorter in Group A as compared to Group B. The duration of active phase of labour was a minimum of less than 3 hours in 30 (30%) cases as compared to 13 (18.30%) cases in Group B in both primis and multis. In Group-A 24 (24%) cases had active phase with a maximum of 5-7 hours as compared to 13 (18.30%) cases in Group B in both primis and multis.

Table III shows the distribution of cases according to induction delivery interval. The mean IDI was shorter in Group A as compared to Group B in both primis and multis. The difference in IDI in both the Groups is statistically significant.

Table III
Mean induction delivery interval

Parity	Group A			Group B		
	No	X	S.D	No.	X	S.D
Primi	56	7.28	3.55	39	10.28	7.15
Multi	43	6.39	4.45	31	09.58	07.49

P < 0.01
No. – Number of cases
X – Mean induction delivery interval
S.D. – Standard deviation.

Analysis of mode of delivery showed that 112 cases in Group-A and 110 cases in Group B delivered following induction. The mode of delivery showed, LSCS was done in 6 (8.43%) cases of Group A and 10 (9.09%) cases of Group B.

Dose of oral PGE_2
The analysis of dose required for successful induction had shown that the least dose required was one tablet (0.5 mg) and the maximum dose required was 8 tablets (4mg). The average dose required for induction in primis was 3.99 tablets and in multis was 2.74 tablets.

Dose for IV oxytocin:
The least dose required was 0.5 units and the maximum dose was 10 units. The average dose of oxytocin was 2.3 units in primis and 2.06 units in multis.

Fetal outcome:
The average apgar score in Group A was 8.64 in first minute and 9.48 in 5 minutes and in Group B 8.20 in 1 minute and 9.20 in 5 minutes.

Fetal side effects:
There were 36 cases and 17 cases of fetal distress in Group-B and Group A respectively. The neonatal morbidity was more in Group-B, of these 7 cases had jaundice, 2 had convulsions and 2 had meconium aspiration. There were equal number of cases of septicaemia, 2 in each Group (Table IV).

Table IV
Maternal and Fetal Complications in Group A & B

Complications	Group A	Group B	Total
Maternal –			
PPH	1 (0.83%)	6 (5%)	7
Retained placenta	-	1 (0.83%)	1
Infection at episiotomy site	2 (1.66%)	4 (3.33%)	6
Fetal (excluding IUD)			
Fetal distress	17 (14.16%)	36 (30%)	53
Jaundice	01 (0.83%)	07 (5.83%)	08
Convulsions	-	02 (1.66%)	02
Meconium Aspiration	01 (0.83%)	02 (1.66%)	03
Septicaemia	02 (1.66%)	02 (1.66%)	04

Discussion:

Analysis of age revealed maximum number of cases (77.5%) were in age Group of 20-25 years. Age Group of present study is comparable with study of Hingorani et al (1988) and Jina et al (1994).

Indication for induction (Table I) was high in PIH cases in both the Groups. In PGE_2 Group it was observed that there was no change in pulse and BP during induction of PIH with PGE_2. There was rise of BP by 10mm Hg even in normotensive patients in oxytocin Group probably due to its fluid overload.

The time from induction to onset of labour was earlier with oral PGE_2 as compared to IV oxytocin. The mean induction and onset of labour interval in primis was 1.09 ± 0.90 hours in oral PGE_2 Group and 3.36 ± 3.04 hours with IV oxytocin Group. The same for multis was 1.08 ± 0.80 hours in oral PGE_2 Group and 3.27 ± 3.15 hours in IV oxytocin Group. Our study is comparable with Jina et al (1994) in PGE_2 Group but in comparison with IV oxytocin, study showed longer duration which may be due to variation in doses of oxytocin used.

The mean active phase of labour in induction in the present study was 4.35 ± 2.10 hours and 7.14 ± 4.28 hours, in primis of oral PGE_2 and IV oxytocin, 3.48 ± 1.95 and 6.55 ± 4.12 hours in multis of each Group respectively. Our study showed that active phase was shorter in PGE_2 both in primis and multis as compared to IV oxytocin. Similar study was conducted by various workers (Friedman & Sachtleben, 1974; Visscher et al, 1977) who reported active phase in PGE_2 Group to be 2.27 and 1.38 ± 0.76 hours respectively. The difference might be due to early amniotomy and escalation of this drug done in their cases.

The mean IDI in primis was 7.28 ± 3.55 hours in oral PGE_2 and 10.28 ± 7.15 hours in IV oxytocin Group, in multis it was 6.39 ± 4.45 hours and 9.58 ± 7.49 hours in each Group respectively. Gabert et al (1976) reported the mean IDI in primis to be 10.15 hours and in multis of 6.5 hours with oral PGE_2. Our study was comparable with study of Jina et al (1994), who reported IDI in primis of 8.13 hours and 10.31 hours in oral PGE_2 and IV oxytocin Group respectively, in multis 7.06 hours and 9.08 hours in each Group respectively. The study of Bhatla et al (1998) had shown the mean IDI was 10.3 ± 7.8 hours and 11.8 ± 6.1 hours in PGE_2 and IV oxytocin in their study which is higher as compared to our study, however, they have not studied primis and multis separately.

There were 89.28% vaginal deliveries in oral PGE_2 Group & 64.53% with oxytocin Group. Instrumental delivery was 2.6% and 9.99% in Group A and B respectively and LSCS in 8.03% and 25.45% in oral PGE_2 and IV Oxytocin respectively. The study indicates high incidence of successful vaginal delivery in this Group. The present study was in agreement more or less with other workers (Agarwal et al, 1994; Dubey et al, 1994; Jina et al, 1994). Our study showed that there was high LSCS in IV oxytocin Group, as compared to oral PGE_2 (25% against 8%).

The indications of LSCS due to cervical dystocia was seen in 6 cases in IV oxytocin where as none in PGE_2 Group stressing the fact the improved dilatation due to drug Prostaglandin. Jina et al (1994) & Bhatla et al (1998) had opined improved vaginal delivery with oral PGE_2.

The successful induction with less maternal side effects and fetal compromisation was seen in PGE_2 Group as compared to IV oxytocin Group.

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