AN EVALUATION OF ROLE OF ORAL PROSTAGLANDINS IN INDUCTION OF LABOUR

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SUMMARY

Oral Prostaglandin E_2 (PGE_2) tablets were administered by mouth to induce labour in 80 patients. A similar number of matched controls were induced by intravenous oxytocin. The induction-delivery interval was shorter in PGE_2 group than oxytocin group. PGE_2 was successful in 76 patients and oxytocin in 72 patients. There was no significant difference in the Apgar Scores of the babies at one and five minutes after delivery in the two groups. Incidence of inco-ordinate uterine action was seen in oxytocin group and not in PGE_2 group which resulted in increased incidence of caesarean section in oxytocin group. PGE_2 administration also had better effect on cervical ripening.

INTRODUCTION

A new milestone in the world of Obstetrics was reached when a posterior pitiutary polypeptide known as "Oxytocin" discovered by Sir Henry Dale was first used intravenously for induction of labour by Theobald (1956, 1959) and known as `Pit-drip'.

Prostaglandins being more natural and less invasive in inducing labour revolutionised the available methods of induction of labour (Karim 1971, Bygdeman 1984). Our present study compares the safety and efficacy of oral PGE_2 with intravenous oxytocin in induction of labour.

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MATERIAL AND METHODS

Total of 160 patients were selected for induction of labour; 80 for oral PGE_2 (Dinoprostone 0.5 mg) and 80 for intravenous oxytocin. Patients in the two groups corresponded to each other in

respect of age, parity, gestational age, indications for induction of labour and inducibility rating as judged by Bishop score.

Various criteria for case selection were - Gestational age between 34 to 42 weeks with cephalic presentation, Age group between 18 to 35 years, Parity between 0 and 4, Absence of – cephalopelvic disproportion, abnormal vaginal bleeding, heart disease, bronchial asthma and glaucoma.

Various indications for induction were – post-dated pregnancy, pre-eclampsia, premature rupture of membranes, intrauterine death of foetus, anencephaly with hydramnios, Rh isoimmunisation. One patient with previous history of caesarean section was also induced by PGE_2 after ruling out cephalopelvic disproportion. Another patient with twin pregnancy was also induced in the present study. Some patients had more than one indication co-existent.

DRUG SCHEDULE

Oral PGE_2 tablets available by the name of 'Primiprost' containing Dinoprostone 0.5 mg (manufactured by ASTRA-IDL) were used.

After admission, a soap water enema was given. Prior to induction of labour, vaginal examination was performed aseptically and inducibility rating calculated. Two hours later, the patients were given two tablets i.e. 1mg of PGE_2 orally with minimal amount of tap water and continued thereafter at hourly interval depending upon the strength, frequency and duration of uterine contractions. These contractions were regarded as adequate if they occurred at intervals of 2.5 to 3 minutes, were of 40 to 45 seconds duration and of severe intensity. Dose was tapered to 0.5 mg/hr when effective uterine contractions started. Caesarean section was undertaken for any obstetrical indication.

Intravenous oxytocin : 1 unit of oxytocin was started in 500 ml of 5% Dextrose at the rate of 15 drops/min. The rate and dose were adjusted according to the uterine activity.

The patients were closely monitored during labour till 4 hours post-partum. Close watch was kept on pulse, blood pressure, FHS, uterine contractions, induction-onset interval, induction-delivery interval, mode of delivery, birth weight and Apgar Score. Induction of labour was deemed as successful if progress of labour was satisfactory and resulted in vaginal delivery.

RESULTS

Patients in both PGE_2 and oxytocin group were well matched in age, parity and gestational age as shown in Table I.

Post-dated pregnancy was the major indication in PGE_2 (45.2%) and oxytocin (36%) group followed by Pre-eclampsia (24% in PGE_2 and 22.6% in oxytocin group).

As shown in Table-II, labour was successfully induced in 76 out of 80 patients (95%) given PGE_2 as compared to 72 out of 80 patients (90%) given oxytocin. In PGE_2 group, success rate in nullipara was 90.33% and in multipara it was 97.95%. Four caesarean sections were performed in PGE_2 group (3 nullipara and 1 multipara), indication

Table I

Comparison of patients given PGE_2 and oxytocin

Gestational age (in weeks)	PGE_2	%	Oxytocin	%
34 - 37	08	10.0	10	12.5
38 - 40	32	40.0	34	42.5
More than 40	40	50.0	36	45.0
Total	80	100.0	80	100.0
Parity				
0	31	38.75	32	40.00
1 - 3	43	53.75	42	51.25
4 - 5	06	07.50	07	08.75
Total	80	100.0	80	100.0

Inducibility rating	N	M	Total	N	M	Total
0 - 3	09	16	25 (31.25%)	07	07	14 (17.5%)
4 - 6	21	31	52 (65.0%)	23	37	60 (75.0%)
7 or more	01	02	03 (03.75%)	02	04	06 (07.5%)
Total	31 38.75%	49 61.25%	80	32 40.0%	48 60.0%	80
Age groups (in years)						
15 - 20	05	01	06 (7.5%)	06	02	08 (10%)
21 - 25	24	20	44 (55%)	26	17	43 (53.75%)
26 - 30	02	14	16 (20%)	00	17	17 (21.25%)
31 - 35	00	14	14 (17.5%)	00	12	12 (15%)
Total	31	49	80	32	48	80

N = Nullipara, M = Multipara

being non-progress of labour in 3 patients and foetal distress in one. Peroperatively, the cause for non-progress of labour was dermoid cyst of right ovary (6" x 8" diameter in 1), cord round the trunk of foetus in 1 and cord entangled around the neck of foetus in 2. Eight caesarean sections were performed in oxytocin group (5 nullipara and 3 multipara), indications being foetal distress in 5 and non-progress of labour in 3 cases.

Mean induction-onset and induction-delivery intervals were shorter in PGE_2 group than oxytocin group (Table III).

Mean induction-onset dose of PGE_2 was 1.91 mg in nullipara and 1.25 mg in multipara while in oxytocin group, it was 1.2 units and 0.7 units respectively. Mean induction delivery dose of PGE_2 (in successful cases) was 7.38 mg and 5.0 mg in nullipara and multipara respectively as compared to 2.35 units and 1.85 units of oxytocin in nullipara and multipara respectively.

Table II

Mode of delivery

Mode of delivery	PGE_2		Oxytocin	
	Nullipara	Multipara	Nullipara	Multipara
Spontaneous Vaginal delivery	26 (83.83%)	48 (97.95%)	21 (65.62%)	43 (89.58%)
Forceps delivery	02 (06.45%)	00	06 (18.75%)	02 (04.16%)
Caesarean section	03 (09.67%)	01 (02.04%)	05 (15.62%)	03 (06.25%)
Total	31	49	32	48

Table III

Mean Induction-onset and Induction-delivery interval

	PGE_2 Mean time (Hr. min.)	Oxytocin Mean time (hr. min.)
Mean Induction-onset interval		
Nullipara	1 hr. 16 min.	1 hr. 27 min.
Multipara	1 hr. 08 min.	1 hr. 10 min.
Mean	1 hr. 12 min.	1 hr. 16 min.
Mean Induction-delivery interval		
Nullipara	8 hr. 13 min.	10 hr. 31 min.
Multipara	7 hr. 06 min.	8 hr. 26 min.
Mean	7 hr. 51 min.	9 hr. 08 min.

Relationship between parity, inducibility rating and mode of delivery is shown in Table IV. Out of 25 patients with pelvic score 0-3 in PGE_2 group, 22 patients (88%) delivered by vaginal route and 3 by caesarean section while in oxytocin group only 8 patients out of 14 patients (57.14%) delivered by vaginal route and 6 by caesarean section. It shows that PGE_2 has some effect on cervical ripening also. Mean Apgar Score at 1 minute and 5 minutes were approximately similar in both groups.

Incidence of hypertonic uterine contractions, inco-ordinate uterine contractions, thrombophlebitis and pain at drip site were seen in oxytocin group whereas only mild nausea and vomiting were seen in PGE_2 group. Foetal distress occurred more frequently in oxytocin group than PGE_2 group. Patients found PGE_2 more convenient as an inducing agent which also permitted ambulation.

DISCUSSION

In the present study the mean age of the patients (24-65 years in PGE_2 and 23.5 years in oxytocin group); mean

Table IV

Mode of delivery in relation to inducibility rating

Inducibility rating	Caesarean section	Forceps delivery	Spontaneous vaginal delivery	Total
PGE_2				
0 - 3				
Nullipara	2	-	7	9
Multipara	1	-	15	16
0 - 6				
Nullipara	1	2	18	21
Multipara	-	-	31	31
7 or more				
Nullipara	-	-	1	1
Multipara	-	-	2	2
Oxytocin				
0 - 3				
Nullipara	4	2	1	7
Multipara	2	1	4	7
4 - 6				
Nullipara	1	3	19	23
Multipara	1	1	35	37
7 or more				
Nullipara	-	1	1	2
Multipara	-	-	4	4

gestational age (39.48 weeks and 38.98 weeks in PGE_2 and oxytocin group) and the mean parity (1.07 in PGE_2 and 1.16 in oxytocin group) are less than that observed by Krishna et al (1990). Mean induction-delivery dose of PGE_2 in 6.19 mg and oxytocin is 2.1 units which is much less than that found by Krishna et al in 1990 (8.5 mg of PGE_2 and 3.1 units of oxytocin). This may be because they have taken only 30 patients while we have taken 160 cases.

Mean induction delivery interval is 7 hr. 51 min. in PGE_2 and 9 hr. 80 min. in oxytocin group which is slightly more as compared to study of Lichtenegger et al in 1981. The success rate was 95% in PGE_2 group and 90% in oxytocin group in our study as compared to 99.1% in PGE_2 and 93.34% in oxytocin group reported by Lichtenegger et al (1981). The difference is significant because of the smaller number of patients studied by us.

In conclusion oral PGE_2 administration is a convenient and acceptable method for induction of labour. Success rate was 95% with mean induction-delivery interval of 7 hr. 51 min. in PGE_2 group. In patients with poor inducibility rating (0-3), it was seen that 88% delivered vaginal in PGE_2 group while only 57.14% in oxytocin group confirming that PGE_2 is a better inducing agent in patients with poor inducibility rating.

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