"Induction of labour with oral PGE_2 and its comparison with intravenous oxytocin"

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Summary

Induction of labour is resorted in the conditions where continuation of pregnancy may be hazardous to mother or foetus. An ideal method of induction of labour should combine safety for mother and foetus both, a short induction to delivery interval, absence of side effects, and convenience for both patients and medical staff. Oxytocin has been used since a long time without satisfying all criteria. A lamp of success was lit with introduction of prostaglandins. In present study the role of PG in induction of labour has been found and its oxytocic property has been compared with IV oxytocin.
A total of 100 cases were studied; 50 cases in Group A were induced with PGE2 and similar number of cases in group B received IV infusion of oxytocin. The findings suggest that PGE2 is as effective as IV oxytocin with the added advantages of higher sucess rate, low incidence of foetal distress, caesarean section, and uterine hypertonus, convenience of administration, and better acceptability to patients. Allowance of ambulation during labour is attractive factor with beneficial effects on uterine activity. It also obviates the water retention property of oxytocin in patients with toxaemia of pregnancy and renal and heart diseases.

Introduction:

Induction of labour means the adoption of measures designed to initiate labour earlier than it would take place as a natural event in the conditions where the continuation of pregnancy may be hazardous to foetus or mother e.g. pregnancy induced hypertension, postdatism, PROM,etc.

Introduction of prostaglandins in the field of induction opened a new chapter. PGE2 stimulates uterine contractions and faciliates cervical ripening simultaneously. It has an additional advantage of reduced primary PPH due to uterine atony and antithrombotic property reducing thromboembolic complications of puerperium. As the endogenous production of PG is the essential feature of labour, their supplementation by different routes can augment the process. Thus PGs have found a place in management of labour & they are introduced as agents for induction of labour in scientific manner.

Use of oxytocin is associated with uterine hypertonous, fetal bradycardia and further more there is possibility of water retention in case of toxaemia of pregnancy, renal diseases, & heart diseases. Also the misery of intravenous (IV) drip in an otherwise normal woman & forced immobility which it involves, attracted the attention towards the use of oral PGE2 and its comparative study with IV oxytocin.

Material & methods:-

A total of 100 cases were taken for study in two groups, each having 50 cases. The criteria of selection include singleton pregnancy with cephalic presentation at term or postterm without having contraindication for vaginal delivery. The patients were disqualified from the study if they had previous uterine surgery, vaginal bleeding of uncertain origin or medical condition not allowing the labour. A special history of glaucoma or bronchial asthma was taken in patients with PGE2 group. Bishop's score was used to estimate the prelabour inducibility.

The 50 patients of Group A induced with PGE_2 and 50 in Group B induced with IV oxytocin were similar in age, parity, gestational age, and Bishop's score.

Patients in group A, received primiprost tablets of 0.5 mg. Dosage schedule was the same as described by Noah; as "low incremental". Beginning with 0.5 mg and repeated in one hour, dosage increased to 1 mg at two hour and 1.5 mg at three hours if necessary. Quality of labour was evaluated every hour; when good labour was established; dose decreased to 0.5mg / hour. Maximum dose allowed was 1.5 mg/ hour.

Oxytocin infusion was started in group "B"

patients, with 1 mu/min and increased every half hourly until a maximum of 16 mu / min depending on response and establishing adequate uterine contractions.

Induction was considered successful if contractions started within 8 hours of starting medication & delivery occurred within 18 hours.

Observations:-

In both the groups age of the patients were mostly between 20 to 25 years, with a range of 18 to 32 years. The indications for induction were similar. The common indications were PIH, postdatism & PROM. There were 54% primigravidae & 46% multigravidae in both groups.

The patients with Bishop's score 0 to3 were 32% and 68% patients had Bishop's score of 4 to 7, with a mean of 4.18 ± 1.38 in group A and 4.69 ± 1.47 in Group B.

The labour pattern was more or less similar in both groups. The time interval between medication to start of contraction was 1.05 ± 0.3 hours with PGE_2 a little longer as compared to oxytocin where it was 0.44 + 0.3 hours. The induction to delivery interval (ID interval) was shorter with PGE_2. It was 10.59 ± 1.5 (0-3 Bishops score) and 6.04 ± 1.3 hours (4 to 7 Bishop Score) as compared to 11.3 ± 1.4 & 6.35 ± 1.58 with oxytocin respectively (Table I). Primigravidae in Group A had I-D interval 8.04 ± 2.59 & in Group B, 9.16 ± 3.19 hours while multigravidae showed a shorter I-D interval of 6.38 ± 2.1 in Group A and 6.45 ± 2.3 in Group B (Table II).

Table I
Relationship between Bishop Score and Labour Pattern in Successful Cases

Labour	PGE_2		Oxytocin	
Time in Hours	0-3	4-7	0-3	4-7
Medication to Contraction	1.05 ± .3	0.49 ± .2	.44 ± 03	.35 ± .17
Medication to Established Labour	3.05 ± .25	1.15 ± .2	2.4 ± .3	1.47 ± .17
Latent Phase	4.2 ± 1.1	2.2 ± .6	4.23 ± 1	2.17 ± .6
Active Phase	3 ± 1.2	2.04 ± .3	3.6 ± .4	2.24 ±
IInd Stage	34.58 ± 16.6	24 ± 12.7	30 ± 14	28.5 ±.11.33
Induction to Delivery Interval	10.59 ± 1.5	6.04 ± 1.3	11.3 ± .4	6.35 ± .58

Table No. II
Relationship Between Parity and Labour Pattern in Successful Cases.

Labour Pattern Time (Hours)	PGE_2		Oxytocin	
	Nullipara	Multipara	Nullipara	Multipara
Medication to Contraction	1.02 ± .29	0.53 ± .27	0.51 ± .3	.44 ± .27
Medication to Established Labour	2.02 ± .1	1.52 ± 1	1.35 ± .18	1.44 ± .25
Latent Phase	3.27 ± 1.4	2.1 ± 1.2	4.29 ± 2.1	2.3 ± 1.1
Active Phase	2 ± 1.12	2.19 ± .34	2.33 ± 1.1	2.18 ± .32
Duration of IInd Stage of Labour (Min.)	35 ± 13	18 ± 9	35.5 ± 12	18 ± 13
Induction to Delivery Interval	8.04 ± 2.59	6.38 ± 2.1	9.16 ± 3.19	6.45 ± 2.3

The total dose of primiprost required was high in primigravidae & patients with low Bishop's score. However mean dose required was 4.31 ± 1.38 mg & average number of dosage was 5.1 ± 1.3 (Table No. 3).

Table III
Relationship of Dosage of PGE_2 with Bishop Score and Parity

Bishop's Score	PGE_2 Total Dose		Number of Dosage	
	Nullipara	Multipara	Nullipara	Multipara
0-3	5.6 ± 1.1	4.3 ± 0.4	6.6 ± 1.5	6.0 ± 0.7
4-7	3.1 ± 1.1	2.5 ± 0.7	4.8 ± 1.6	4.3 ± 1.01
Mean SD	4.5 ± 1.3	2.9 ± 1.0	5.4 ± 1.7	4.6 ± 1.10
Mean ± SD	4.31 ± 138	5.1 ± 1.3		

In Group B, 68% of successful cases required less than 4 units of oxytocin while only 14% required more than 4 units of oxytocin for induction of labour. The success rate was 81.4% in primigravidae & 100% in multigravidae in Group A as compared to 77% & 86.9% in Group B respectively. The overall success rate was 90% in Group A & 82% in Group B. 80% had vaginal delivery, 8% forceps & 2% LSCS in Group A as compared to 68%, 4% & 10% in Group B respectively (Table IV).

Table IV
Overall Outcome of PGE_2 & Oxytocin Induction

Outcome of Labour	PGE_2 N=50		IV Oxytocin N=50	
	No.	%	No.	%
Success Total	45	90%	41	82%
Normal vaginal Delivery	40	80	34	68%
Forceps Delivery	4	8%	2	4%
LSCS	1	2%	5	10%

Incidence of vomiting was more with PGE_2 (8%) while incidence of foetal distress (8%) and incordinate uterine activity (4%) was more with oxytocin. Hypertonic uterine contractions were noted in 6% with oxytocin as compared to only 2% with PGE_2; 2% had rigors with oxytocin drip (Table V).

Table V
Maternal & Fetal Side Effect

Side effects	PGE_2		IV Oxytocin	
No.	%	No.	%	
Vomiting	4	8%	1	2%
Incoordinate Uterine activity	-	-	2	4%
Foetal distress	1	2%	4	8%
Rigors	-	-	1	2%
Uterine hyper-contractility	1	2%	3	6%

No significant neonatal complication was seen, only 4% had apgar score between 4 to 6 at 1 min with PGE_2 as compared to 10% in oxytocin group.

Discussion

The advent of PGs has given medical induction an entirely new connotation, elevating the procedure from virtual oblivion into a new eminence.

In the present study it was observed that although the patients started responding earlier to oxytocin, the induction to delivery interval was much shorter with oral PGE_2. The observation is supported by the study of Kelly et al 1973.

When correlating the induction to delivery interval with inducibility score, a longer duration was observed with low Bishop score (0-3) being 11.39 ± 1.1 in primigravidae & 9.49 ± 2.15 in multigravidae with PGE_2, whereas still longer duration of 12.41 ± 1.28 in primi & 10.02 ± 1.16 in multi was observed with oxytocin. Similar observation of longer duration with low Bishop score was reported by Karim et al (1971), Craft (1972) and Gabert et al (1976). While a much shorter I-D interval was noted in multi with high inducibility score in both groups having marginal difference between two. Nelson & Bryan 1978 reported the same. Medication to established labour time interval was longer with PGE_2 while the latent phase duration was observed to be longer with oxytocin. Active phase of labour and II^{nd} stage of labour were more or less similar in both groups. Study of Friedman et al (1974, 1975) support these findings.

While using the low incremental dosage schedule in present study mean dose of PGE_2 required was 4.5 + 1.3 mg in primi & 2.93 + 1.02 mg in multi. Lower dose was required with high Bishop's score.

Eighty percent patients in Group A had normal vaginal delivery compared to 68% in Group B. A high caesarean section rate of 10% was noted with oxytocin while only 2% had caesarean in PGE_2 Group similar to that reported by Kelly et al (1973). Overall success was 90% in Group B.

The incidence of maternal and foetal side effects were much lower with PGE_2. Foetal distress and hypertonic uterine contractions were noted to be in higher frequency with oxytocin.

Thus it is evident from preceding comparative discussion that oral PGE_2 offers an advantage over the routine use of IV oxytocin with a higher success rate. PGE_2 induced labour shows shorter latent phase & I-D interval. There is low incidence of foetal distress and caesarean section and uterine hypertonus. So also the neonatal outcome is better with PGE_2. Patient's acceptability, ease of administration and ambulation during labour are appreciable factors which offer advantages of oral administration of PGE_2 over IV oxytocin.

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