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Original Research Article

A comparative study of oral prostaglandin and intravenous oxytocin for induction of labour

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Abstract

History reveals an understandable reluctance to interfere with the course of labour by hastening its onset partly because the methods were uncertain, bizarre and often dangerous. The penalties of failure and the hazards of delayed labour have been recognised for centuries and have, influenced thinking in obstetrics right upto the present. The present study is a comparative study between oral prostaglandin E2 (PGE2) and intravenous oxytocin (IV oxytocin) for induction of labour carried out at Hospital. One hundred and twenty consecutive patients stated for induction of labour satisfying the selection criteria for the study were alternately recruited to Prostaglandin or oxytocin groups. 7 of 17 patients (77.78%) induced with PGE2 and 8 of 15 (88.89%) patients had spontaneous vaginal delivery. Patient (11.11%) of PGE2 group delivered by outlet forceps. One patient in both PGE2 (11.11%) and oxytocin (11.11%) were delivered by vacfuum extraction.

Keywords: Oral prostaglandin, intravenous oxytocin, induction of labour

Introduction

An induced labour is one in which the pregnancy is terminated artificially any time after 28 weeks of gestation by a method that aims to secure delivery per via naturals [1].
Whether or not the intention is fulfilled does not alter the definition,for occasionally, labour may indeed be started only to be concluded by Caesarean section either because some fresh complication arises, as for example uterine incoordination, fetal distress or because the grounds for induction have been inaccurately assessed [2].
History reveals an understandable reluctance to interfere with the course of labour by hastening its onset partly because the methods were uncertain, bizarre and often dangerous. The penalties of failure and the hazards of delayed labour have been recognised for centuries and have, influenced thinking in obstetrics right upto the present [3].
The control of infection however and the more effective management of uterine behaviour is rapidly modifying our traditionally conservative attitude to what was regarded once as

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meddlesome midwifery, so that the day cannot be far off when labour of a forseable sort and at a predictable time become common place. For induction to be safe and effective, fetal assessment and monitoring both before and during labour are essential prerequisites [4].

Methodology

The present study is a comparative study between oral prostaglandin E2 (PCE2) and intravenous oxytocin (IV oxytocin) for induction of labour carried out at Hospital.

One hundred and twenty consecutive patients stated for induction of labour satisfying the selection criteria for the study were alternately recruited to Prostaglandin or oxytocin groups

The following criteria were adhered for to include patients in the present study;

- Singleton pregnancy
- Age of women 18 years or more
- Women with gestational age of more than 37 weeks
- No contraindications for vaginal delivery like CPO, contracted pelvis
- Avoid a case with a previous scar on the uterus
- Cephalic presentation
- Patients were excluded from the study. They are in labour had vaginal bleeding of uncertain etiology had known active gynaecological disease had history of cardiac disease and convulsive disorder had abnormal presentation

Results

The mean Bishop's score in the low Bishop's score patients is 4.14 and 4.5 in nullipara and multipara respectively induced with oral PGE2.

The mean Bishop's score in the I.V. Oxytocin induced patients is 4.7 and 4.33 in nullipara and multipara respectively as shown in Table.

Table 1: Mean Bishop's Score

Study group	Nullipara	Multipara
PGE2	4.14	4.5
Oxytocin	4.7	4.33

In patients with poor Bishop's score 3 and 4 patients with pregnancy induced hypertension, 8 and 5 patients with past dated pregnancy, 5 and 6 patients with premature rupture of membranes were induced with oral PGE2 and IV oxytocin respectively. One patient with diabetes was induced with oral PGE2 as shown in Table.

Table 2: Indication for induction

Indication for induction	PGE2	Oxytocin
Past dated Pregnancy	8 (14.05%)	5 (33.33%)
Pregnancy induced Hypertension	3 (17.64%)	4 (26.66%)
Premature rupture of membranes	5 (29.41%)	6 (40.00%)
Rh Negative pregnancy	-	-
Diabetes	1 (5.88%)	-
Total	17	15

The mean induction onset interval is 3.23 and 3.00 hours in nullipara and 2.16 and 2.00 hours in multipara respectively in PGE2 and oxytocin treated groups as shown in table.

Table 3: Mean Induction Onset Interval

Study group	Nullipara					Multipara
	N	mean	±	S.D	N	Mean

ISSN 2515-8260 Volume 09, Issue 04, 2022

PGE2	7	3.23	±	0.45	2	3.00
Oxytocin	6	2.16	±	0.61	2	2.00

The mean induction onset interval is less in oxytocin group when compared to PGE2 and is statistically significant.
The mean duration of labour in nullipara is 12.09 and 11.05 hours and multipara is 9.00 and 7.50 hours of oral PGE2 and I.V. oxytocin treated groups as shown in the following Table.

Table 4: Mean duration of labour

Study group	Nullipara					Multipara
	N	Mean	±	S.D	N	Mean
PGE2	7	12.09	±	1.86	2	9.00
Oxytocin	6	11.05	±	2.35	3	7.50

Duration of labour was less in IV oxytocin group than PGE2 group.
The mean induction delivery interval in nullipara is 15.33 and 13.38 hours in PGE2 and oxytocin groups respectively, 12.00 and 9.50 hours in multipara induced with PGE2 and Oxytocin groups respectively as shown in Table.

Table 5: Induction delivery interval

Study group	Nullipara					Multipara
	N	Mean	±	S.D	N	Mean
PGE2	7	15.33	±	2.08	2	12.00
Oxytocin	6	13.38	±	2.53	3	9.50

The induction delivery interval was significantly less in oxytocin group.
The total dose of PGE2 in cases successfully induced in patients with a low Bishops's score was 6.93mg (14 tablets) in Nullipara and 4.75mg (10 tablets) in multipara.
The total dose of oxytocin administered is 8.28 IU and 6.23 IU in nullipara and multipara respectively as shown in Table.

Table 6: Induction delivery interval

Study group	PGE2 (mg)			Oxytocin (IU)		
	Mean	±	S.D	Mean	±	S.D
Nullipara	6.93	±	0.932	8.28	±	1.15
Multipara	4.75	±	1.32	6.23	±	1.66

5 of 17 patients (29.42%) induced with oral PGE2 failed to respond to the drug, later treated with I.V. Oxytocin and had spontaneous vaginal delivery. 2 of 15 patients (13.33%) from the oxytocin group failed to induce, delivered spontaneously later. 3 of 17 patients (17.61%) with PGE2 and 4 of 15 patients (26.68%) with IV oxytocin induction was interrupted as a result of fetal distress as shown in the following table.

Table 7: Trial interruption

Reason for trial interruption	PGE2	Oxytocin
Failure of induce	5/17	2/15
Prolonged labour	-	-
Foetal distress	3/17	4/15
Hypertonic uterine action	-	-

7 of 17 patients (77.78%) induced with PGE2 and 8 of 15 (88.89%) patients had spontaneous vaginal delivery.

ISSN 2515-8260 Volume 09, Issue 04, 2022

1 patient (11.11%) of PGE2 group delivered by outlet forceps. One patient in both PGE2 (11.11%) and oxytocin (11.11%) were delivered by vacfuum extraction as shown in Table.

Table 8: Delivery

Mode of delivery	PGE2	Oxytocin
Spontaneous vaginal delivery	7 (77.78%)	8 (88.89%)
Outlet forceps	1 (11.11%)	-
Vacuum extraction	1 (11.11%)	1 (11.11%)

3 patients of PGE2 (17.66%) and 4 patients (26.66%) of oxytocin group had foetal distress. No patient had hypertonic uterine contractions as shown in table.

Table 9: Indication for caesarean section

Indications	PGE2	Oxytocin
Foetal distress	3/17	4/15
Hypertonic uterine action	-	-
Failed induction	-	-

Discussion

In the present study with Bishop's score >6, 72.72% and 84% nullipara were successfully induced with prostaglandin and oxytocin respectively; 81.81% and 90% of multipara were successfully induced with PGE2 and IV oxytocin respectively, the difference being not statistically significant.

In patients with Bishop's Score < 5, 53.85% and 60% belonging to PGE2 and oxytocin group respectively were successfully induced in nulliparous patients, the difference is not statistically significant. 50% and 60% of multipara os PGE2 and oxytocin group were induced successfully.

The present study results were comparable with J.F. Miller *et al*. 80.7% in PGE2 group and 96% in oxytocin group and Kalia *et al*. with 85% and 93.3% in PGE2 and oxytocin group respectivey, with oxytocin as better agent for successful induction [5, 6].

The results were not comparable with Usha *et al*., 80% and 73.33% in PGE2 and IV oxytocin respectively and haeri AD *et al*. with 96% and 90% in PGE2 and IV oxytocin respectively with Prostaglandin as successful agent for induction [7, 8].

Other studies showed almost equal results for both PGE2 and IV oxytocin.

The difference in percentage in Prostaglandin and oxytocin group may be as a result of variation in dosage of drug in each study.

In the present study the mean induction onset interval belonging to Bishop's score >6 in nullipara is 2.53 and 2.24 hours in PGE2 and oxytocin group respectively, 2.11 and 1.57 hours in multipara in PGE2 and oxytocin group respectively, the difference being not statistically significant.

The induction onset interval with Bishop's score <5 in nullipara is 3.23 and 2.16 hours in PGE2 and oxytocin groups respectively, the difference being statistically significant. In multipara it is 3.0 and 2.0 hours when induced with PGE2 and oxytocin group.

In the present study the mean induction – onset interval was found to be less in oxytocin group.

The results were comparable with miller *et al*. with 3.5 and 1.9 hours in nullipara and 2.2 and 2 hours in multiparous partients in PGE2 and oxytocin group, M.G. Elder et ak 2.7 and 1.7 hours in nullipara and 2.2 and 1.3 hours in multipara induced with PGE2 and oxytocin group [9].

The results were not comparable with other study with 2.2 and 2.6 hours for nulliparous and 1.4 and 1.67 hours in multipara induced with PGE2 and oxytocin respectively in which it was shown that induction onset interval was delayed in oxytocin group.[10]

ISSN 2515-8260 Volume 09, Issue 04, 2022

Active labour was established more slowly with oral PGE2 group than intravenous infusion of ioxytocin, important explanation for this lies in the different routes of administration. It takes longer time to achieve effective blood levels of the compound via oral administration than with intravenous infusion.

In the present study the duration of labour in patients with Bishop's score >6, 8.00 and 7.37 hours in nulliparous patients, 5.14 and 5.09 in multiparous patients in PGE2 and oxytocin group respectively, the difference being not statistically significant.

12.09 and 11.05 hours in nulliparous and 9.00 and 7.50 hours in multiparous patients induced with PGE2 and oxytocin respectively with Bishop's score < 5.

The results were similar to the study by Usha R. Krishna with 8.9 and 8.3 hours for nullipara and 3.3 and 3.13 hours for multiparous patients induced with PGE2 and oxytocin respectively. Similar results were found by M.G. Elder *et al*. and Katarina Bremme *et al*. Duration was found to be normal in both the groups.

Induction –Delivery interval in patients with Bishop's score >6 in the present study is 10.14 and 9.61 hours in nulliparous and 7.20 and 6.56 hours in multiparous patients induced with PGE2 and Iv oxytocin respectively, the difference is not statistically significant in patients with Bishop Score >6.

In patients with Bishop's score <5 the mean – induction delivery interval was 15.33 and 13.88 hours in nulliparous and 12.00 and 9.50 in multiparous patients induced with PGE2 and oxytocin respectively.

Conclusion

- The mean induction delivery interval in nullipara is 10.14 and 9.61 hours in PGE2 and oxytocin induced groups respectively.
- The mean induction delivery interval in multipara is 7.20 and 6.56 hours in PGE2 and oxytocin induced groups respectively.
- The mean total dose of oral PGE2 administered was 4.28 mqms (9. Tablets) in nullipara and 2.58 mgms (5 tablets) in multipara, the dose being higher in nullipara.
- The mean dose of oxytocin administered was 6.04 units IV in nullipara and 3.91 IV in multipara the dose being higher in nullipara.
- The reason for trial interruption were failure to induce 4.61%: 0, hypertonic uterine action 2.32%: 0, fetal distress 13.9% 13.3% of cases induced with both PGE2 oxytocin.
- 82.4% and 84.61% patients induced with oral PGE2 and IV oxytocin respectively were delivered by spontaneous vaginal delivery 5.88% and 5.13% were delivered by outlet forceps.
- 11.77 and 10.24% delivered by vacuum extraction in PGE2 and oxytocin induced groups respectively.
- 15. In patients in whom trial was interrupted 16.2% and 13.33% were delivered by Caesarean section in PGE2 and oxytocin group respectively.

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ISSN 2515-8260 Volume 09, Issue 04, 2022

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