INDUCTION OF LABOUR WITH INTRAMUSCULAR 15(S) 15 METHYL PGF2 ALPHA TROMETHAMINE SALT (CARBOPROST TROMETHAMINE)

by

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SUMMARY

There is much to recommend the use of PGF 2 alpha analogue through intramuscular route as an effective method for inducing and stimulating labour, even in patients in whom intravenous oxytocin has proved ineffective. The disadvantages of intravenous oxytocin can be overcome by this method, though the effect on labour by both routes showed closed parallelism.

A variety of methods to induce labour came into vogue from time to time, but were abandoned due to one reason or other. Attempts to induce labour with oxytocic agents have been undertaken with variable success during the last 50 years but this method is not ideal for cases with unfavourable cervix. Till date no method has been derived which is certain in outcome and could be proclaimed as absolutely safe for mother and foetus. The use of prostaglandins for the induction of labour was first described by Karim (1969) and since that time he has consistently led the way in discovery of new indications and routes of administration. Intramuscular route for induction and acceleration of labour has been used till now. This study was carried out to compare its efficacy with intravenous oxytocin infusion.

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The naturally occuring prostaglandins have shorter duration of action as they are rapidly metabolised and inactivated, modifications at C-15 which protects it against enzymatic degradation by prostaglandin 15(S)-15 Methyl PGF 2 alpha dehydrogenase. The tromethamine salt of this analogue was formulated into a nonirritating aqueous solution for intramuscular injection i.e. carboprost tromethamine.

It was considered desirable to study the effect of this drug on induction and acceleration of labour and to study the comparative evaluation of this drug with intravenous oxytocin. This formed the basis of present study.

Material and Methods

Under this clinical trial, cases were selected from labour room and antenatal clinics, S.N. Medical Colllege, Agra. In all 150 patients were selected, and divided into 2 categories: (a) Control group—

consisted of 2 types of patients, 1st group (A-1) composed of 25 patients who went into spontaneous labour and were normal in all respects. The other group (A-II) consisted of 25 patients in whom labour was induced by intravenous oxytocin for various indications. (b) Study cases—consisted of 100 patients who received prostaglandin by intramuscular route for induction and acceleration of labour for various indications.

Besides indication, certain other criterias like parity, period of gestation, presentation and position, pelvic findings and absence of contraindications were observed.

All patients were prepared and examined as per proforma especially noting the Bishop's inducibility score. Patients in A-II group were given oxytocin drip and total dose of oxytocin used was noted. In study group, the sensitivity dose of 25 ugm of carboprost, was given and then doses of 50-100 ugm (0.2-0.4 ml) at 2-3 hourly interval, depending on patient's response till delivery in successful cases. The drug was stopped after 8 hours if no uterine contractions were present or any untoward side effect appeared (failure cases). Patient was watched for latent period (exception A-I), duration of labour, mode of delivery, duration of 3rd stage, apgar of newborn (after 1 mt). Tocographic recordings were taken before and after administration of drug and at different dilatations of cervix in 1st stage.

Observations

As it is evident from Table I, out of 25 women in control A-I group, 8 were primigravida and 17 were multigravida. The age ranged from 19 to 35 years, gestational age from 32 to 40 weeks and pelvic score (at the time of admission) from 6 to 8 in primigravida and 7 to 9 in multigravida. All of them delivered vaginally with a duration of labour ranging from 6 hours 30 minutes to 18 hours 30 minutes in primigravida and 4 hours 25 minutes to 10 hours 30 minutes in multigravida.

In control A-II group, there were 9 primi and 16 multigravida with age ranging from 20 to 32 years and gestational age from 34 to 42 weeks.

TABLE II

Different Indications for Induction in Oxytocin and Prostaglandin Groups

Indications	Oxytocin group	Prostaglandin group
Postmaturity	9	40
Premature rupture of membranes	8	22
Hypotonic uterine inertia	8	4
Intrauterine death	1	24
Placenta praevia	2	2
Preeclamptic toxaemia	2	2
Congenital anomaly	—	2

The varying indications for the induction and acceleration are shown in Table II. As it is evident from Table III, in A-1

TABLE I

Distribution According to Age, Parity and Gestational Age

Group	Total cases	Age (Range) Yrs.	Parity		Gestational age wks.
			Primi	Multi	
A-I	25	19-35	8	17	32-40
A-II	25	20-32	9	16	34-42
Study	100	16-35	54	46	28-44

TABLE III

Inducibility, Score, Latent Interval, Duration of Labour and Mode of Delivery in Different Groups

Group	Parity	Inducibility score	Latent interval Hrs. and Mts.	Duration of labour in Hrs. and Mts.	Mode of delivery			
					Vag.	Low Forc.	LSCS	SB
A-I	Primi	6-8	NA	6.30-18.30	7	1	—	—
	Multi	7-9	NA	4.25-10.55	16	1	—	—
A-II	Primi	6-9	0.30-1.45	7.40-13.15	4	0	2	1
	Multi	6-9	•0.15-2.00	6.20-11.5	12	2	3	1
Study group	Primi	2-9	.20- .35	.30-16.25	53	3	5	—
	Multi	3-7	.15- .40	.20-14.00	34	1	4	—

group pelvic score ranged from 6-9 with duration of labour from 4 hours 25 minutes to 18 hours 30 minutes. 23 patients delivered normally and 2 had low forceps delivery.

In A-II group pelvic score ranged from 6 to 9 in primigravida as well in multigravida. The latent interval ranged from 30 minutes to 2 hours (interval between the beginning of therapy and commencement of painful uterine contractions). In 5 patients pains did not start on the first day after a total dose of 7.5-10 units. The course was repeated next day. The duration of labour ranged from 7 hours 40 minutes to 13 hours 15 minutes in primigravida and 6 hours 20 minutes to 11 hours 5 minutes in multigravida. Sixteen patients had normal delivery, 2 had forceps and 5 had caesarean section (20% of patients)—3 were for failed induction and leaking more than 24 hours and in 1 case head failed to engage despite of successful induction. Two were stillbirth—1 was a case with intrauterine death and the other with placenta praevia. In all these patients, no side effects other than foetal distress (in 4 cases) were noted. Most of the babies had an apgar score of 8 or more.

In study group (Table I) there were 54 primigravida and 46 multigravida with a age range of 16 to 35 years and gestational age varying from 28 to 44 weeks. Various indications are shown in Table II. Pelvic score ranged from 2-9 (Table III). Patient with two pelvic score was a primigravida, a case of intrauterine death. This patient had section as there was no response to the drug. On opening it was found to be a case of secondary abdominal pregnancy. Latent interval varied from 15 to 40 minutes in successful cases. There was no difference with parity. The duration of labour ranged from 30 minutes to 16 hours 25 minutes in primi and 25 minutes to 14 hours in multigravida. Out of 100 cases, 87 patients had normal vaginal delivery, 3 cases had forceps application for foetal distress and tight perineum. Ten patients delivered abdominally—9 had caesarean section and 1 had laparotomy for secondary abdominal pregnancy. Six caesarean sections were done for foetal distress and 3 for obstructed

labour. The drug had side effects in form of nausea, vomiting and diarrhoea (Table IV) but not serious enough to stop the drug.

TABLE IV
Side Effects

Side effects	No. of patients	Percentage
Nausea	40	40
Vomiting	20	20
Diarrhoea	18	18
Hypertonus	0	0
Tachycardia/ headache	—	—

Apgar score of newborns in study group are shown in Table V.

TABLE V
Apgar Score of the Newborns

Average apgar score	Total No. of cases
10	6
9	8
8	32
7	16
6	6
6	6

The total dose of drug varied from 0.2 ml to 2.4 ml (Table VI).

TABLE VI
Total Prostaglandin Used

No. of Milli-Litres	Dose in ugm	Primipara	Multipara
0.2-0.6	50-150	19	21
0.7-1 ml	175-250	9	4
1.1-1.5	275-375	22	9
1.6-1.9	400-475	6	8
2.0-2.4	500-600	—	2

Discussion

For proper evaluation of oxytocin activity of this compound, the result was analysed with regard to age, parity, gestational period, inducibility score, indications, latent internal, duration of labour and success rate.

As far as age is concerned correlation with duration of labour in all these series were within normal physiological range. Parity can affect duration of labour and success rate and it has been observed that duration of labour is much shorter with prostaglandin as compared to control or oxytocin series in different parity. As far as success rate is concerned, overall success rate in primigravida with oxytocin drip is 77.8% and with prostglandin F 2α it is 98.14%. In 2nd para success rate is 85.7% with oxytocin group while 100% with prostaglandins. In rest of the cases in both series it was 100% success rate (Table VII).

Beazley and Gillespie (1971) also studied the induction of labour by oral PGE 2 and oxytocin infusion in primigravida; the success rate was 67% and 69% respectively. In multigravida the success rate was equal in both groups (73%). The study by Helson and Bryan (1976) revealed that prostaglandins are far more effective than oxytocin, as with oral PGE 2 success rate in primigravida was 92% while with oxytocin it was 64% with overall success rate of 85% and 65%.

Gestational age was found to have an important bearing in the success rate. The nearer to term, more the oxytocin sensiti-

vity and it was found that success rate was better in patients who were induced at term than in those induced preterm. In PG series only 1 case did not respond, while in oxytocin series a number of failures were present which clearly proves that PGF 2 alpha derivature is much powerful stimulants of uterine musculature than oxytocin at all ages of gestation.

The overall success rate of PG group was more than with oxytocin infusion, especially in cases of premature rupture of membranes in whom it was found that oxytocin infusion failed to induce labour in 38.5% cases. On the other hand, 1 case of intrauterine death did not respond to prostaglandin but this was a case of undiagnosed secondary abdominal pregnancy.

Bishops inducibility score was also found to affect the dose required, latent interval, duration of labour and success rate. Patients with score of 6 onwards were induced with success in both series, the results clearly indicate that as the score rises the duration of labour and dose required falls and success rate increases.

In prostaglandin series, 86% had normal vaginal delivery (72% in oxytocin group and 92% in control group), 4% had forceps application and rest 10% had caesarean section (Nil in control and 20% in oxytocin group), which clearly indicates that caeserean rate is not increased with prostaglandins. Foetal well being was unaffected as observed by apgar score of newborns. There was a difference in apgar score (8.04 in spontaneous delivery group, 7.6 in oxytocin group and 7.5 in PG group) due to the fact that high-risk pregnancies were selected in the induction group. The drug was also found to be safe for mother as well due to low incidence of gastrointestinal side effects. There was no case of hypertonus. Foetal distress was encountered in 7 cases but it was difficult to evaluate the role played by prostaglandin on producing foetal distress as there were additional factors as pre-eclamptic toxaemia, postmaturity and prolonged labour.

The overall success rate recorded in our study is 99% (keeping in view the criteria of failure) higher than that recorded in oxytocin infusion —88%). This success rate is also higher than the published series of several other workers.

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