

## MID-TRIMESTER ABORTIONS BY INTRA-AMNIOTIC PROSTAGLANDIN

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### *Introduction*

The Prostaglandins (PG) are of interest in the regulation of fertility for two reasons. (1) Endogenously occurring Prostaglandins seem to play an important role within a variety of reproductive processes which may involve the possibility of interfering with their action by different means. (2) Exogenous Prostaglandins are under certain conditions capable of influencing the life span of the corpus luteum and pregnancy can be terminated at any stage of gestation as a result of the uterotonic action of these compounds.

### *Material and Methods*

The study includes 46 cases of induction of mid-trimester abortions by intra-amniotic prostaglandin F2 alpha. To compare its effects 30 controlled cases were taken in whom abortion was induced by hypertonic saline 20%.

Patients admitted to the study were all healthy pregnant women between the 13th and 20th week of gestation calculated from the 1st day of the last menstrual period.

Prostaglandin F2 alpha (Tham Salt) each ampoule contained 40 mg. Prostaglandin F2 alpha in 8.0 ml. of sterile

solution stored in refrigerator at 4°C was used.

Anterior abdominal wall was antiseptically prepared and draped. A lumbar puncture needle with a stylette was inserted through the anaesthetized skin into the uterus and 40 mg. of Prostaglandin was injected only when it was certain that the tip of the needle was inside the amniotic sac.

Patients were kept under observation for 24-28 hours following the initial therapy. If abortion was not imminent the same dose of Prostaglandin F2 alpha was repeated, or high concentration pitocin drip started to enhance the process.

Temperature, pulse respiration and recumbent blood pressure were recorded prior to the start of treatment and during treatment important side effects of the drug were looked after.

Some of the patients required analgesics and sedatives in the form of diazepam etc. All the patients were given antibiotics routinely to prevent infection.

### *Observations*

#### *Parity*

There were 20 primigravidae, and 26 multigravidae in cases in whom Prostaglandin F2 alpha was administered, and 21 primigravidae and 9 multigravidae in whom hypertonic saline was administered.

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*Onset of uterine contractions*

Patients were divided into 5 groups after instillation of Prostaglandin F<sub>2</sub> alpha.

Group I: Patients started getting uterine contractions immediately after or within 1-5 minutes after instillation in 13 per cent of the cases (6 cases).

Group II: Patients started getting contractions between 6 minutes to 1 hour after instillation in 32.6 per cent of the cases (13 cases).

Group III: Patients started getting contractions between 61 minutes to 3 hours in 22 per cent of the cases (14 cases).

Group IV: Patients started getting contractions between 3-6 hours in 15.2 per cent of the cases (7 cases).

Group V: Patients started getting contractions 6-8 hours after instillation in 6.8 per cent of the cases (4 cases).

*Induction of abortion by Prostaglandin F<sub>2</sub> alpha*

Out of 46 cases induced by Prostaglandin F<sub>2</sub> alpha, 42 (90 per cent) aborted, 28 (60 per cent) completely, 14 (28.3 per cent) incompletely, and 4 (8.6 per cent) failures.

Two cases aborted after reinstillation of prostaglandin F<sub>2</sub> alpha (40 mg.), as abortion did not occur with one instillation. Both the patients aborted completely after second instillation.

One patient went into shock during instillation. She was an unmarried girl of 18 years age. Hardly 0.3-0.5 cc. that was injected when the patient complained of acute substernal pain, perspiration and went into shock. She had 2-3 vomits, blood pressure and pulse was not recordable. Patient was revived by oxygen inhalation, intravenous drip of 5 per cent glucose, Wymisone 4 mg. intravenously, mephentine 30 mg. added in the drip. Patient was revived completely within 1-2 hours. She started getting uterine contractions and bleeding per vaginam 12 hours after instillation. Patient aborted incompletely and evacuation was done under general anaesthesia.

With hypertonic saline, 27 (89 per cent) aborted, 17 (56.6 per cent) completely, 10 (33.3 per cent) incompletely and 3 (10 per cent) failures (Table I).

*Relation with parity*

Out of the total of 20 primigravidae instilled with prostaglandin F<sub>2</sub> alpha, 16 (80 per cent) aborted completely, 3 (15 per cent) incompletely, 1 went into shock, as previously stated; whereas out of total 24 multigravidae 12 (42 per cent) aborted completely, 10 (40 per cent) incompletely and 4 (16 per cent), were failures. With hypertonic saline, out of 21 primigravidae, 9 cases (42.8 per cent) aborted completely, 6 (28.9 per cent)

TABLE I  
Success Rate

Agent	Total No. of cases	Abortions	Complete	Incomplete	Failure
Prostaglandin F <sub>2</sub> alpha	46	42 (90%)	28 (60%)	14 (28.2%)	4 (8.6%)
Hypertonic saline	30	27 (89%)	17 (56.6%)	10 (33.3%)	3 (10%)

incompletely, and 2 (9.4 per cent) were failures.

#### Induction Abortion Interval

The patients were divided into four groups (Table II).

Group III: The patient aborting between 49-72 hours was only one (2.4 per cent) after prostaglandin F2 alpha. The induction-abortion interval was 52.15 hours.

With hypertonic saline 23.3 per cent

TABLE II  
Induction Abortion Interval

Agent	Total No. of cases	Abortion in 24 hours		Mean induction-abortion interval
		No.	percentage	
Abortion between 0-24 hours.				
Prostaglandin F2 alpha.	46	23	68.8	17.1 Hrs.
Hypertonic saline	30	5	16.6	22.1 Hrs.
Abortion between 25-48 hours.				
Prostaglandin F2 alpha.	46	7	17.0	30.2 Hrs.
Hypertonic saline	30	13	43.3	39.7 Hrs.
Abortion between 49-72 hours.				
Prostaglandin F2 alpha.	46	1	2.4	52.15 Hrs.
Hypertonic saline	30	7	23.3	69.2 Hrs.
Abortions after 72 hours.				
Prostaglandin F2 alpha.	46	5	12.1	91.6 Hrs.
Hypertonic saline	30	5	16.6	87.4 Hrs.

Group I: Patients aborting within 24 hours of instillation of Prostaglandin F2 alpha were 68.2 per cent (28 cases). The mean induction-abortion interval was 17.1 hours.

With hypertonic saline 16.6 per cent (5 cases) aborted within 24 hours. The mean induction-abortion interval was 22.1 hours.

Group II: The patients aborting between 25-48 hours after Prostaglandin F2 alpha instillation were 17 per cent (7 cases). The mean induction-abortion interval was 30.2 hours.

With hypertonic saline, 43.3 per cent (13 cases) aborted between 25-48 hours. The mean induction-abortion interval was 39.7 hours.

(7 cases) aborted between 49-72 hours. The mean induction-abortion interval was 69.2 hours.

Group IV: The patients aborting 72 hours after prostaglandin F2 alpha instillation were 12.1 per cent (5 cases). The induction-abortion interval was 91.6 hours.

With hypertonic saline, 16.6 per cent (5 cases) aborted after 72 hours. The mean induction-abortion interval was 87.4 hours.

The minimum induction-abortion interval for prostaglandin F2 alpha was 10 hours and maximum was 151 hours.

The minimum induction-abortion interval with hypertonic saline was 23

hours and maximum was 120 hours 15 minutes.

The mean induction-abortion interval for total number of cases with prostaglandin F2 alpha was 31.2 hours.

The mean induction-abortion interval for total number of cases with hypertonic saline was 46.6 hours.

#### *Concomitant Therapy*

##### *Pitocin*

High concentration pitocin drip (5 per cent glucose), starting with 5 units initially, increasing every half an hour till 60 units was given in 5 cases, 24-48 hours after instillation of prostaglandin F2 alpha.

In the case of hypertonic saline high concentration pitocin drip was given as a routine (22 cases) for enhancement of abortion process, 1-12 hours after instillation of saline.

##### *Side effects*

##### *Immediate side effects*

Side effects that were seen immediately or within a few minutes after instillation of prostaglandin F2 alpha were (i) severe abdominal pain (5 cases) (ii) allergic rashes all over the body 1 case, (iii) shock—1 case.

##### *Delayed side effects*

Temperature ranging between 99°F to 101°F was observed in 3 cases 4-12 hours after administration of prostaglandin F2 alpha and temperature came down to normal within 8-10 hours.

With hypertonic saline 3 patients had vomiting, and 3 had mild pyrexia. None went in shock.

#### *Changes in foetus, membranes and placenta*

##### *Gross appearance of foetus*

All the foetus aborting within 48 hours

of instillation appeared fresh, only foetus aborting 48 hours after instillation were mecerated.

##### *Membranes*

Membranes appeared normal, there was no oedema, haemorrhage or thrombosis on gross examination.

##### *Placenta*

In none of the placentae, oedema or infarcts were found on gross examination.

##### *Microscopic examination*

Microscopic examination was done in 20 placentae.

##### *Maternal surface*

An important observation was that maternal surface appeared normal in all the placentae, except one.

*Foetal surface.* Showed following changes.

- (i) Haemorrhages (intravillous).
- (ii) Necrosis of villi which was mild or extensive.
- (iii) Hydropic change in the villi and vacuolation.
- (iv) Superficial inflammatory cells.
- (v) Oedema and syncytial knotting.
- (vi) Haemorrhagic necrosis of villi.
- (vii) Hyalinization.
- (viii) Extensive inflammatory reaction, and pyogenic exudate was present in one placenta of patient treated for pyrexia of unknown origin. Cord showed inflammatory cells.
- (ix) Intervillous haemorrhage.
- (x) Complete necrosis of villi.

##### *Cord*

There were no specific changes, except in one specimen where marked inflammatory reaction was seen in the placenta and the cord.

### Discussion

Forty-six cases were induced with prostaglandin F2 alpha, and for comparison 30 cases were induced by hypertonic saline.

Prostaglandin F2 alpha seemed superior to hypertonic saline, because of ease of administration, and induction-abortion interval was less in prostaglandin F2 alpha (mean 31.2 hours) as compared to hypertonic saline (46.6 hours) even though high concentration pitocin drip was given in only 12.1 per cent (5 cases) induced by prostaglandin F2 alpha, but in 73.3 per cent (22 cases) induced with hypertonic saline.

Twenty-eight cases (68.2 per cent) induced with prostaglandin F2 alpha aborted within 24 hours, whereas only 16.6 per cent (5 cases) aborted with hypertonic saline.

These results coincide with the results of other workers like Anderson *et al* (1972) who reported 100 per cent success rate, and Wiquist *et al* (1972) who obtained 25 abortions in 33 cases by giving a single injection of 40 mg. of Prostaglandin F2 alpha. In the present series success rate was 90% with prostaglandin F2 alpha and 89 per cent with hypertonic saline.

Primigravidae responded better with prostaglandin F2 alpha than multigravidae. Hundred per cent success was there as compared to 80 per cent success with multigravidae. This difference in response of prostaglandin F2 alpha as far as parity is concerned, is not mentioned by other workers. With hypertonic saline such difference in success rate as far as parity is concerned, was not observed.

Ratio of complete to incomplete abortion was nearly the same in both the methods.

Mean induction-abortion interval for all the successful cases induced by prostaglandin F2 alpha was 31.2 hours, as compared to the interval in cases induced by hypertonic saline which was 46.6 hours. Mean interval by other workers induced with prostaglandin F2 alpha was 34 hours.

High concentration pitocin drip was given only in five cases (12.1 per cent) 24-48 hours after instillation of prostaglandin F2 alpha if abortion was not imminent, whereas 22 cases (73.3 per cent) induced by hypertonic saline received pitocin drip, thus indicating that induction-abortion interval could have been shortened if pitocin drip was used after 0-12 hours after prostaglandin F2 alpha instillation. Morbidity was more in cases induced with hypertonic saline, than with prostaglandin F2 alpha.

Induction-abortion interval was very short with prostaglandin, uterus contracting within a few seconds to maximum 8 hours after instillation. All the cases who aborted successfully had uterine contractions within 6 hours of instillation.

With hypertonic saline induction-abortion interval was between 7-42 hours. It appears as if hypertonic saline first had its lethal effect on foetus and placenta, and afterwards stimulated the uterus to contract, thus explaining the longer induction-abortion interval usually taken by hypertonic saline.

Hypertonic saline seemed to be superior to prostaglandin F2 alpha, as far as side effects were concerned. There were no immediate serious side effects, as seen in prostaglandin F2 alpha i.e. shock and allergic rashes. Blood transfusion was not required in hypertonic saline, whereas 2 patients induced with prostaglandin F2 alpha required blood transfusion.

Mechanism of action seemed to be of physiological type with prostaglandin F2 alpha, as it first initiated contractions of uterus and then death of the foetus, since foetus and placenta appeared fresh, if aborted within 48 hours of induction. Microscopic appearance of placenta proved this point, because of normal appearance of maternal surface.

Hypertonic saline seemed to kill the foetus first and then start the uterine contractions by seeming long induction-abortion interval and induction-contraction with macerated foetus and necrotic placenta in all cases, irrespective of time interval.

In failure, or with prolonged induction-abortion interval after prostaglandin F2 alpha, even though uterine contractions subsided, it did kill the foetus, creating something like "missed abor-

tion", which aborted spontaneously or pregnancy was terminated by other procedures.

Histopathological examination has not yielded any significant changes by other workers.

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TABLE I  
Clinical Features of 10 Cases

Case No.	Age (years)	Parity	Duration of pregnancy (weeks)	Method of abortion	Outcome
1	28	0	24	Prostaglandin	Successful
2	27	0	24	Prostaglandin	Successful
3	27	0	24	Prostaglandin	Successful
4	27	0	24	Prostaglandin	Successful
5	27	0	24	Prostaglandin	Successful
6	27	0	24	Prostaglandin	Successful
7	27	0	24	Prostaglandin	Successful
8	27	0	24	Prostaglandin	Successful
9	27	0	24	Prostaglandin	Successful
10	27	0	24	Prostaglandin	Successful

Women reporting in termination of pregnancy in the first trimester were selected for this study. It was made sure that the size of the uterus was less than 10 weeks.

*Materials and Methods*

Women reporting in termination of pregnancy in the first trimester were selected for this study. It was made sure that the size of the uterus was less than 10 weeks.

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