

PLACE OF SPARTEINE, SYNTOCINON AND PITOCIN IN INDUCTION AND ACCELERATION OF LABOUR

(A Tocographic and Tocometric Study)

by

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The problem of inducing effective uterine contractions whenever obstetric indication exists has been occupying the minds of obstetricians and pharmacologists alike since the earliest days. A variety of methods to achieve this came into vogue from time to time but were abandoned and are now more or less of historical interest till Kamm *et al* (1928) extracted a fraction of posterior pituitary and named it pitocin. The drug was used as an effective oxytocic intramuscularly, intranasally and intravenously as a drip.

Identification of chemical structure and its synthesis by Du Vigneod and Tuppy (1953) constituted a milestone in the annals of biochemistry. The compound was named O.T.S. 68 (Sandoz) with a trade name of Syntocinon. The drug was found to be highly efficacious and was free from vasopressor effect. However, hazards of intravenous drip, the continued vigilance and the so-called limitations to its use, led the obstetrician

in search of some other drug, which could be administered more easily.

The reports of Plentle, Friedman and Gray on the use of intramuscular Sparteine sulphate opened a new field for research with regard to an ideal oxytocic.

Material & Method

The trial was carried out in the department of Obstetrics and Gynaecology at S. N. Hospital, Agra. Patients were selected from antenatal clinic and routine admissions in the labour room. Only full-term cases without any complication, a ripe cervix and vertex presentation were selected for elective induction by oxytocics.

Cases of normal labour where placebo was used were selected to serve as controls.

Pitocin and syntocinon were administered by intravenous drip, 2.5 units in 500 c.c., starting with 15 drops per minute. The rate was increased by 5 drops every 15 minutes till regular contractions started, up to a maximum of 60 drops per minute. During the third stage the drip rate was 50 drops per minute and was maintained at this rate till 15 minutes after placental expulsion.

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Sparteine sulphate was given intramuscularly, after a test dose of 75mgm.; 150mgm. was given every hour till contractions of good intensity occurred every 3-5 minutes lasting for 50-60 seconds, or a total of 5 injections were given.

The force of contractions was measured by a tocometer. Lorand's tocograph was used to find the pattern of uterine contractions on a special graph. The instrument was fixed on the abdominal wall with the help of a tape at maximum curvature of the uterus. Particular care was taken that the instrument did not slip during a contraction.

Tocometeric readings and graphic records were taken at 2, 3 and 4 fingers dilatation in controls and half hours, 2 hours and 4 hours, after the start of the drug in the study group.

The foetal heart, uterine contraction and relaxation, pulse and blood pressure were watched every 10 minutes in the first hour and then every 15 minutes. A careful observation of the pattern of pains was made and amount of oxytocic varied accordingly. During the second stage, in the pitocin and syntocinon series the drip rate was slowed to half its previous rate to reduce the frequency of contractions.

If no progress was noticed, induction was again given on the second day. Some of the patients who failed to respond with the first responded to the second administration. Few cases who failed to respond to sparteine were successfully induced by pitocin drip given later.

Observation and Comments

1. Control group.

2. Study group, a. Pitocin series, b. Syntocinon series. c. Sparteine series.

Findings are presented in Tables (I to VI) and figures (1 to 5).

Latent Period

Latent period or the lag period (table 1). In pitocin series, the pains

TABLE 1
Latent period (lag period)

Duration in hours	Pitocin	Syntocinon	Sparteine
0.5	32	27	41
.5-1	3	10	18
1.1-1.5	2	4	8
1.6-2	4	2	5
2.1-2.5	1	0	3
2.6-3	3	3	3
3.1-3.5	0	1	2
3.6-4	1	0	0
Abve 4.	4	2	7
Total			

started in 32 cases within 30 minutes of setting the drip and after one hour in 12 cases. Longest latent period encountered was 5 hours. In syntocinon series, out of 49 cases labour started within 30 minutes in 27 cases (55.1%) and after 1 hour in 12 cases (24.5%). Longest latent period recorded was 4 hours 30 minutes. Forty-one cases out of 87 (41.2%) started pains within 30 minutes, in the sparteine series, longest latent period being 6 hours. The latent period was longer in sparteine series as compared to pitocin and syntocinon. It appears, therefore, that intravenous oxytocin starts labour earlier as compared to intramuscular, as lag period is less in the former.

Force of Contractions

Measured by Lorands tocometer, the cases were divided into three groups: (Table II).

8 out of 65 as compared 2 and 3 out of 20 and 30 cases of pitocin and syntocinon series respectively, which was statistically significant.

TABLE II
Tocometeric findings

	Control	Pitocin	Syntocinon	Sparteine
No. of Cases	20	20	30	65
Hypotonic (10-15 MM. of Hg)	2	1	2	3
Normotonic (15-20 MM. of Hg)	18	17	25	54
Hypertonic Above 20	—	2	3	8

1. Hypotonic—tone of the uterus during contractions below 15 mm of Hg.

Pattern of Uterine Contractions

As soon as the drug started its action the base line was raised. The pattern is given in Table III.

2. Normotonic — tone of the

TABLE III
Tocographic findings

	Control	Pitocin	Syntocinon	Sparteine
No. of cases	20	30	25	50
Amplitude (in MM)	4.59	5.14	5.18	5.22
Frequency (Cycle per hour)	22.6	22.9	24.7	25.1
Duration	1 mt. 9 sec.	1 mt. 10 sec.	1 mt. 5 sec.	1 mt. 12 sec.
Contraction phase	26.94 sec.	25.14 sec.	24.72 sec.	27 sec.
Relaxation phase	54.78 sec.	58.20 sec.	55.82 sec.	56.2 sec.

uterus between 15-20 mm of Hg.

3. Hypertonic — tone of uterus above 20 mm of Hg.

In the control group of 20 cases, 2 were hypotonic, rest were normotonic. In the study group hypotonia was present in one case out of 20 in pitocin series, 2 out of 30 in syntocinon, 3 out of 30 in sparteine series, showing no statistical difference. So also normotonic group did not show any difference. However, hypertonic cases were more in the sparteine series i.e.

1. *Amplitude* (height of the waves in mm.) for control group mean was 4.59 mm. In pitocin and syntocinon series it was 5.14 and 5.18 mm., which is greater e.g. 5.22 mm. This increase again is significant when compared to the control group, but is statistically insignificant when compared to pitocin and syntocinon.

2. *Frequency*: In the control group it was 22.6 per hour; in pitocin syntocinon and sparteine series it was 22.9, 24.7 and 25.1 respectively. The variation is not significant statistical-

ly. The duration of contractions also did not show any significant variation in different series.

3. *Contraction phase:* In the control group it lasted for 26.94 secs. In pitocin and syntocinon series it was 25.14 secs. and 24.72 secs. In sparteine it was 27 secs., meaning no significant difference from the control group; however, the contraction phase is definitely longer in sparteine series.

4. *Relaxation phase:* Shows no significant variation in the different series.

On the whole, once the labour sets in with these oxytocins the pattern of uterine contractions is practically the same as in normal labour except for amplitude.

Third Stage

Third stage of labour was reduced in all the series when compared with controls. The reduction was greater in pitocin and syntocinon series as compared to sparteine. The difference between pitocin and syntocinon series is of no significance (Table 4). On the other hand the blood loss is least with sparteine i.e. 143 cc. while it is 157.9 cc. (Table V) and 165.8 cc. in pitocin and syntocinon respectively. The placenta was delivered spontaneously in all cases except one of sparteine series where manual removal was done.

TABLE IV
Mean duration of third stage of labour

	Mean duration in mts.	Range in Mts.
Pitocin	4.87	1-30
Syntocinon	4.84	1-15
Sparteine	6.8	2-25
Control	10.6	5-45

TABLE V
Blood loss in third stage

	Men in C. C.	Range in C. C.
Pitocin	157.9	5.8-398.6
Syntocinon	165.8	85.2-369.0
Sparteine	143.4	0-400
Control	177.2	85-341.0

Mode of Delivery

The mode of delivery is analysed in Table VI. Delivery was spontaneous in 91% cases of sparteine series, while it was 85% and 89.8% in the pitocin and syntocinon series. In pitocin and syntocinon group rest of the cases, 15% and 10.1% respectively, needed forceps application, while in sparteine series 5% needed forceps and 4% had cesarean section done. The apparent high cesarean section rate in sparteine series was due to our desire not to expose the patient to hazards of abnormal uterine activity because it was our intention to study the pattern of contractions and we did not want an experimental loss of foetus.

TABLE VI
Mode of delivery

	Spontaneous	Forceps	C. Section
Pitocin	85%	14.9%	
Syntocinon	89.8%	10.2%	
Sparteine	91%	5%	4%
Control	100%		

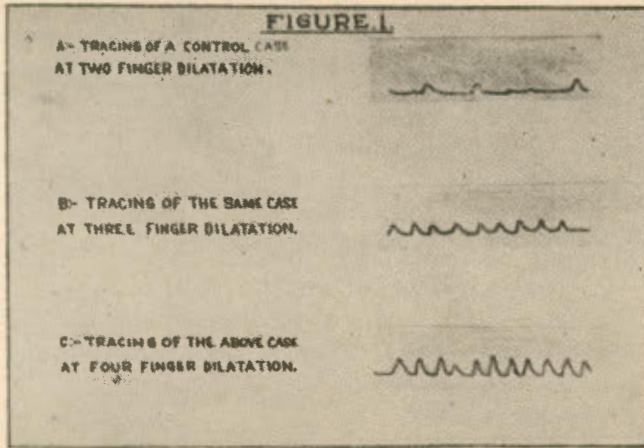


Fig. 1

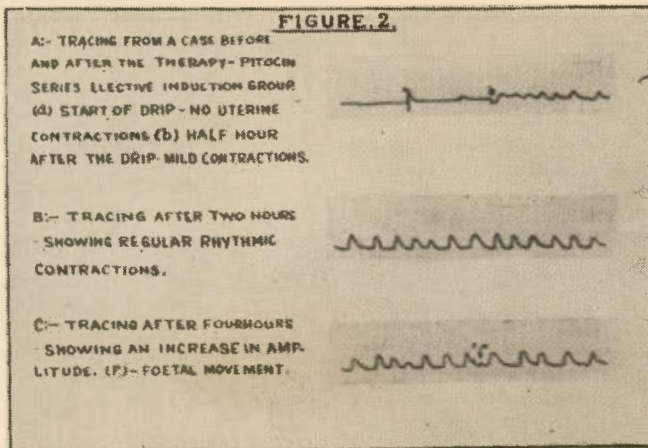


Fig. 2

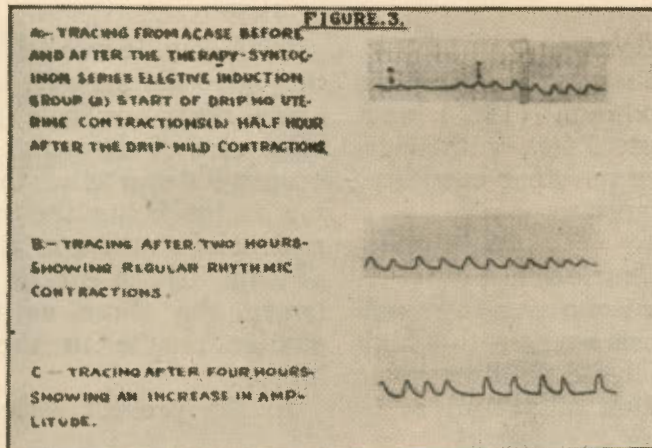


Fig. 3

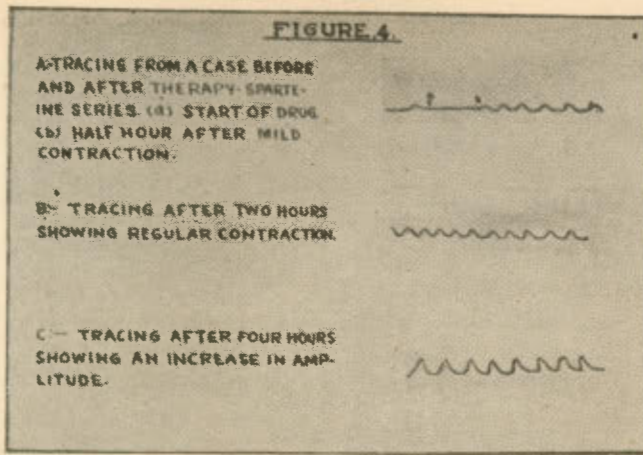


Fig. 4

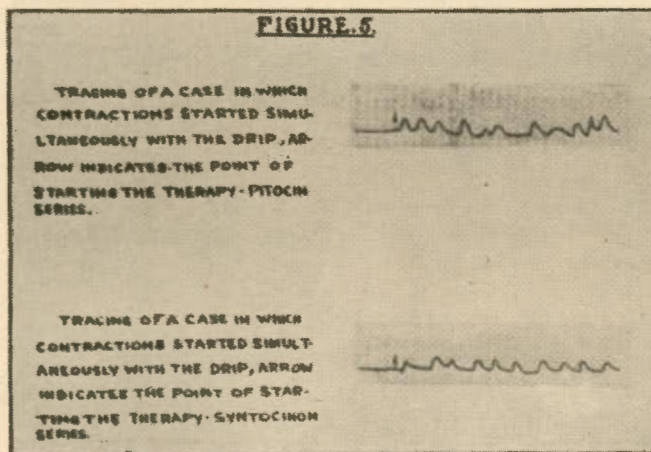


Fig. 5

Maternal Complications

Except for nausea and vomiting, which was maximum (18%) with pitocin and least, 3.4%, with sparteine, there were no other complications of significance.

Summary and Conclusion

Till recent past one was in search of an ideal oxytocic agent with a high success rate which did not necessitate a close observation of patient as in

pitocin drip. It was felt that sparteine may give the answer. Looking to the above study one feels that an equally close care of the patient is necessary even with sparteine, the only relieving factor being the sparing of the patient of a stiff arm after few hours of drip. There is little to choose between the three as they produce similar results in the outcome of labour.

In the present series the success

rate was 85.7%, 89.1% and 87% in the pitocin, syntocinon and sparteine groups respectively.

One finding of this study, which is of significance, is the finding of hypertonic and incoordinate uterine action which was found in the sparteine series which may result in serious maternal complication and foetal loss.

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