

OXYTOCIN SENSITIVITY TEST AND INDUCTION OF LABOUR

by

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Introduction

Smyth (1958) devised oxytocin sensitivity test to note myometrial response and its relation to the spontaneous onset of labour. Smyth later on assessed the value of this test in relation to amniotomy for induction of labour. Barmanac (1960) and McCarthy and Fugo (1961) confirmed its use for the prediction of spontaneous onset of labour. Eddie (1963) laid emphasis on the use of the syntocinon test prior to amniotomy. In the present series the syntocinon test was carried out as a preliminary procedure to be certain whether the induction would successfully end in labour.

Technique

By an ordinary syringe diluted syntocinon was injected intravenously, 0.01 unit per minute, till the initiation of a contraction or a total dose of 0.1 unit had been completed. Uterine contractions were watched by abdominal palpation and Lorand's tocometer, from five minutes before the beginning of the test until its end. Presence of a contraction and/or higher tone prior to the test appeared to be favourable signs and mostly led

to strongly positive results. In one case contractions were initiated by venipuncture itself.

Shortly after the test, in selected cases, induction was carried out with syntocinon or by low rupture of membranes. Syntocinon drip was started, with 2 units in 540 ml. of 5% glucose or gluco-saline, except in 6 cases, in whom foetal asphyxia was likely to develop, in which only 1 unit was used. The drip was commenced at the rate of 16-20 drops per minute. If the foetal heart rate did not alter within half an hour, the flow was increased up to 40 drops per minute, depending on myometrial response. In most cases the infusion was continued from 6 A.M. to 10 P.M. and if labour did not supervene the drip was discontinued. In successful cases normally the drip was continued till the completion of delivery. In one case of artificial rupture of membranes group syntocinon drip was added after 24 hours' latent period. In all other cases labour did commence within 24 hours after rupture of membranes. Duration of labour was calculated from the onset of labour pains as complained of by the parturient up to the delivery of the baby.

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Results

Seventy-four cases were analysed in the present series with oxytocin

sensitivity test and clinical records of parity, duration of pregnancy, station of the presenting part, condition of the cervix and baby weight and an attempt was made to correlate these findings with duration of labour and foetal results.

In 100% cases the induction was effective either with syntocinon or after rupture of membranes, follow-

ing a positive test with up to 0.03 units of syntocinon (strongly positive). When 0.04-0.06 unit was necessary (weekly positive) for the test to be positive, 62% of primigravidae and 77% of multiparae went into labour with syntocinon drip. A positive result with 0.07 unit was not favourable and induction failed in 75% (3 of 4) cases. In

TABLE I
Number of cases

	Syntocinon	A.R.M.	Hypertonic glucose
Primiparae	28	11	
Multiparae	23	11	1
Total	51	22	1

TABLE II
Relation of the period of pregnancy to the duration of labour.

		Syn.	ARM.	Total	Syn.	ARM.	Total	Syn.	ARM.	Total
38 wks. or less	Primiparae	1	2	3	1		1			
	Multiparae	1	3	4						
39-40 wks.	Primiparae	2	1	3	5		5	2		2
	Multiparae	3	4	7				1		1
41 wks or more	Primiparae	3	2	5	8	2	10	4	2	6
	Multiparae	9	4	13	9		9			
Dur. of lab.		Less than 12 hrs.			12-24 hrs.			More than 24 hrs.		

TABLE III
Relation of station of the presenting part to the duration of labour.

		Syn.	ARM.	Total	Syn.	ARM.	Total	Syn.	ARM.	Total
Floating	Primiparae	2		2	9	2	11	3	2	5
	Multiparae	6	5	11	8		8	1		1
Engaged	Primiparae	4	5	9	4	1	5	3		3
	Multiparae	7	6	13	1		1			
Dur. of labour		Less than 12 hrs.			12-24 hrs.			More than 24 hrs.		

TABLE IV

Relation of the thickness of the cervix to the duration of labour.

		Syn.			ARM.			Total		
		Syn.	ARM.	Total	Syn.	ARM.	Total	Syn.	ARM.	Total
Grade I	Primiparae				5	1	6			
	Multiparae							1		1
Grade II	Primiparae	2	3	5	7	2	9	4	2	6
	Multiparae	11	7	18	6		6			
Grade III	Primiparae	4	2	6	1		1	2		2
	Multiparae	2	4	6	3		3			
Dur. of labour		Less than 12 hrs.			12-24 hrs.			More than 24 hrs.		
Grade I	3.5 — 5 cm.	Grade II 1.5 — 3.5 cm.			Grade III Less than 1.5 cm.					

altogether 10 cases syntocinon failed to induce labour and in 7 cases a second attempt was made.

In 12 cases, after syntocinon, and in 9 cases, after artificial rupture of membranes uterine functions were recorded during labour with the help of Lorand's tocograph. Frequency of contractions was 21 and 18 per minute in syntocinon and rupture of membranes group respectively, compared to 14 per minute in the control of 11 cases.

Foetal heart rate was counted for 2 minutes after a strong uterine contraction of 10-15 m.m. (Lorand's tocometer) elicited during a positive syntocinon test or produced by injecting further 0.03 units rapidly if the contraction was a weak one. A strong contraction of 10-15 m.m. was evoked to simulate that of latter part of labour. Foetal heart rate returned to almost normal within one minute after the contraction ceased, except in 8 cases, in 7 of which foetal bradycardia of 10 beats or more per minute was noted and in one the rate increased. Out of these 7 cases, in 3 labour

continued more than 24 hours and all 3 babies were depressed at birth, with Apgar score 6 or less. In another case out of these seven, of an elderly primigravida with blood pressure 140/90, in whom foetal heart was depressed by 20 per minute during syntocinon test, meconium-stained liquor drained after low rupture of membranes. A grossly asphyxiated baby with Apgar score 3, was delivered by abdominal section. None of these cases, with depressed babies at birth, was associated with cord complications.

Duration of labour in syntocinon group was under 24 hours in 87% cases with a strongly positive test and in 72% with a weakly positive test. The corresponding figures after rupture of membranes were 94% and 66% respectively. Caesarean section in 4 cases and hysterotomy in one, became necessary in this series.

In the case of intra-uterine death of foetus with the height of the fundus corresponding to 20 weeks' pregnancy and thick closed and firm cervix, syntocinon test was positive.

TABLE V
Syntocinon test and average duration of labour.

Syntocinon	Primiparae	17 hrs. 7 min.	22 hrs. 41 min.	
	Multiparae	7 hrs. 47 min.	12 hrs. 34 min.	26 hrs. 12 min.
A.R.M.	Primiparae	13 hrs. 3 min.	23 hrs. 33 min.	
	Multiparae	6 hrs. 56 min.	9 hrs. 47 min.	
		0.03 unit.	0.04—0.06 unit.	0.07 Unit or more

TABLE VI
Relation of weight of the babies with the duration of labour.

		Syn.	ARM.	Total	Syn.	ARM.	Total	Syn.	ARM.	Total
5 lbs. or less	Primiparae	1		1				1		1
	Multiparae	2	2	4						
5-6 lbs.	Primiparae	1	3	4	4	3	7			
	Multiparae	6	5	11	2		2			
6-7 lbs.	Primiparae	1	1	2	7		7	3		3
	Multiparae	3	4	7	6		6			
More than 7 lbs.	Primiparae	3	1	4	2		2	2	1	3
	Multiparae	2		2	1		1	1		1
Dur. of labour		Less than 12 hrs.			12-24 hrs.			More than 24 hrs.		

with 0.04 unit. After injection of 50% glucose solution (230 ml.) into the uterus the parturient went into labour after 9 hours and it took only 5 hours 45 minutes for the labour to be completed.

Discussion

From this series it appears that length of labour was shorter in term and pre-term period than that in post-term pregnancy. In 84% of the cases with the duration of pregnancy at 38 weeks or less, labour was less than 12 hours in duration. But the figure at 41 weeks' of pregnancy or beyond was only 45%. (Table II).

The process of labour was quicker

when the presenting part was engaged in comparison to that with the floating presenting part. In 70% (22) of the cases, with the engaged part, delivery took place within 12 hours from the onset of labour, but with floating presenting part labour completed within that period in 35% cases. (Table III).

The cervix as well played an important role in the duration of labour (Table IV). In 66% of cases with grade III cervix labour was less than 12 hours; but with grade I cervix all 7 cases experienced labour longer than 12 hours. Thickness of the cervix was found to be more important than the dilatation. Embrey

(1962) observed shorter latent period with favourable cervix.

Experience in this study suggests that a strongly positive syntocinon test upto 0.03 unit is highly favourable and the parturient is certain to go into labour, if induction is carried out either by syntocinon or rupture of membranes. But a weakly positive or doubtful test, requiring 0.04 unit or more of syntocinon, has a limited value specially in primigravidae. When the test was positive with 0.04 unit or more, in no case was rupture of membranes performed, so as to avoid longer latent period and unsuccessful induction. Syntocinon induction has been preferred in these cases. If induction fails it would help to sensitise the myometrium and ripen the cervix so that a repeat induction by either of the two methods would be effective.

Frequency of contractions increased both after syntocinon and artificial rupture of membranes, slightly higher with the former. But the labour was shorter in rupture of membranes group in comparison with that after syntocinon, which may be accounted for by the direct pressure and stretching of the cervix by the presenting part.

Foetal bradycardia, persisting after one minute of a strong uterine contraction during oxytocin sensitivity test, suggested the possibility of foetal distress and was associated with foetal asphyxia in 4 out of 7 cases. When this is evident the physiological dose of syntocinon should not be exceeded to induce labour and labour should not be allowed to be prolonged. Brady *et al* (1962) noticed that foetal bradycardia lasting more than

one minute after the cessation of contractions in the first stage was associated with depressed infant at birth.

The average duration of labour was found to be shorter with a strongly positive test in comparison to that with weakly or doubtfully positive test. Eddie (1963) narrated a similar experience of shorter labour of 8 hours 52 minutes taking all parity together after artificial rupture of membranes when syntocinon test was positive with 0.02 unit. In this series the average duration of labour after rupture of membranes was 13 hours 3 minutes in primigravidae and 6 hours 56 minutes in multiparae, following a strongly positive test (Table V). No correlation was found between baby weight and duration of labour. (Table VI).

Summary and conclusion

Seventy-four cases of induction have been analysed, 51 cases with syntocinon, 22 after artificial rupture of membranes and one after intra-amniotic infusion of hypertonic glucose solution.

Duration of labour was shorter at term and pre-term period. Engaged head and Grade I cervix were favourable factors for induction of labour.

Oxytocin sensitivity test appears to be a valuable guide before induction of labour. Induction by syntocinon or artificial rupture of membranes would be effective in 100% cases if the test is positive with up to 0.03 units. A positive test with a higher dose proved to be of relatively less significance.

Frequency of uterine contractions was higher both after syntocinon and

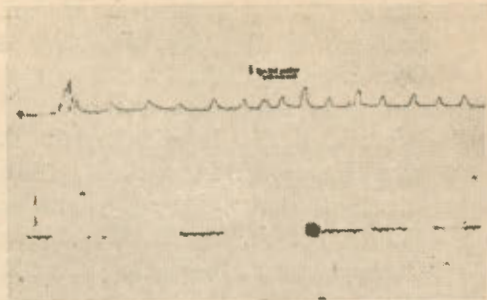


Fig. 1
Oxytocin sensitivity test. Braxton Hick's contraction — recorded with the help of intrauterine device of Embrey's Tocograph. The tone was slightly higher and contractions were frequent after the test (arrow). First strong and irregular contraction was initiated by introduction of intrauterine balloon.

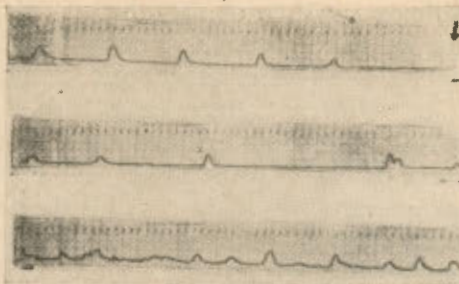


Fig. 4
Low rupture of membranes (arrow mark in "a") was performed in a multipara, for induction of labour. (b) Showed a latent period with infrequent and weak contractions. (c) 2½ hours after A.R.M. contraction — frequent and strong. Duration of labour — 5 hours 35 minutes.

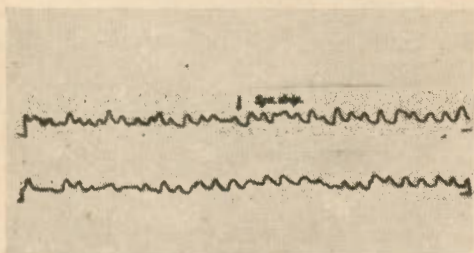


Fig. 2
Multigravida-Oxytocin. Sensitivity with 0.01 unit. Induction was carried out with Syntocinon I.V. (arrow mark). The pattern of contractions remained same though frequency intensity and duration increased. Duration of labour was 3 hours 35 minutes.

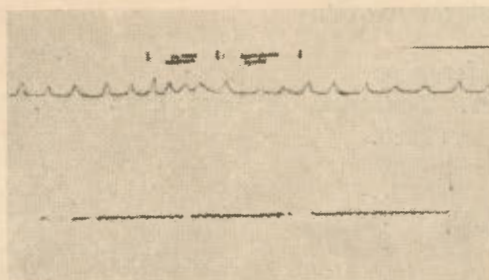


Fig. 5
A multipara with intrauterine death of the foetus. 150 ml of Liq. amnii was withdrawn and 230 ml of hypertonic glucose was infused. Contractions were recorded with intrauterine channel of Embrey's tocograph.

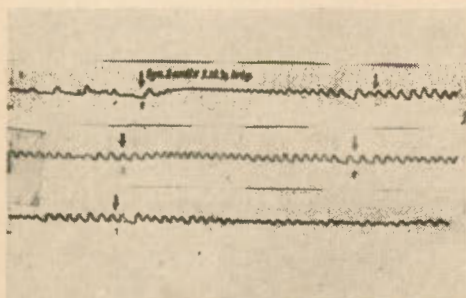


Fig. 3
Labour in a multigravida with intrauterine death of the foetus was induced with syntocinon 2 units I. M. — ½ hourly upto 6 injections. Spastic contractions of the uterus were noticed after the injections which gradually relaxed. The induction failed.

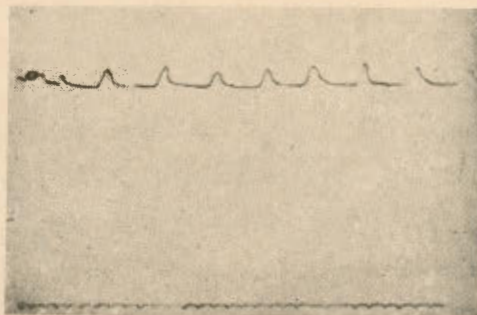


Fig. 6
The same case (I.U.D.) — No changes were noticed in the contractions when the os was dilated 5 cm.

artificial rupture of membranes than that in the control. Foetal bradycardia, persisting after one minute of a uterine contraction, during oxytocin test may be measured as an index of the possibility of foetal asphyxia during labour. Duration of labour was shorter with a strongly positive syntocinon test.

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