

OXYTOCIN STIMULATION AND UTERINE RUPTURE IN THE GRAND MULTIPARA

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SYNOPSIS

The use of oxytocin in grandmultipara is usually associated with the risk of uterine rupture. A retrospective study was carried out on 1,226 grandmultiparas seen in 1969 in the University Department of Obstetrics and Gynaecology, Kandang Kerbau Hospital, to determine the safety of oxytocin infusion in pregnant grandmultiparas. More patients who had surgical induction of labour required oxytocin infusion than those with spontaneous labour. More patients without oxytocin infusion delivered within 6 hours (63.3%) than those with oxytocin (25.4%), the difference being more apparent than real. 51.8% given oxytocin required concentrations of one unit or less per 500 ml of dextrose solution. Fifteen out of 191 cases required oxytocin concentrations of more than 2 units/500 ml. dextrose solution. Most cases required oxytocin infusion for less than 4 hours (116 out of 191 cases) and only 14.7% required infusion longer than 8 hours. Caesarean section rate was 11.4% and 1.5% respectively in those cases of spontaneous labour given oxytocin and those without oxytocin. Two uterine ruptures due to undetected cephalo-pelvic disproportion occurred with oxytocin infusion and are described. Oxytocin infusion if given in small doses and after excluding cephalo-pelvic disproportion is safe and has obvious advantages in the management of grandmultiparas in labour.

INTRODUCTION

Recently much interest has been generated in the active management of labour with emphasis on early uterine stimulation and short labour in primigravidas (O'Driscoll *et al*, 1969; Philpott and Castle, 1972). Oxytocin is generally believed to stimulate primiparous uterus which is unlikely to rupture in the face of foeto-pelvic disproportion until the cervix is fully dilated. On the other hand, caution is sounded in the use of oxytocin infusion in the grandmultipara because of fear of uterine rupture. Although the explanation advanced for such uterine rupture is the increase in fibrous tissue of grandmultiparous uteri, a more probable reason is oxytocin stimulation of the uterus in the presence of disproportion. The purpose of this paper is to examine the place and safety of oxytocin infusion in grandmultipara with reference to the risk of uterine rupture.

MATERIALS

All cases of grandmultiparity seen in the Department of Obstetrics and Gynaecology, Univer-

sity of Singapore, Kandang Kerbau Hospital, for the year 1969 were examined. The criteria for grandmultiparity was as laid down by Dawood *et al*, (1973). These cases were divided into those with oxytocin stimulation and those without oxytocin stimulation of the uteri. They were further divided into those with spontaneous onset of labour and those with surgical induction of labour. The duration of labour, the type of delivery and the postpartum complications were analysed.

RESULTS

There were 1,226 cases of grandmultiparity in 1969 of which 13 patients had elective Caesarean section. Of the remaining 1,213 patients, 1,110 had spontaneous onset of labour and 103 had surgical induction of labour. The indications for induction of labour have already been described elsewhere (Dawood *et al*, 1973). Oxytocin infusion was set up in both the spontaneous onset of labour and surgical induction group whenever uterine contractions were not established after four hours. Oxytocin infusion was started in a dilution of one unit per pint of 5 percent dextrose and given at a starting rate of 20 drops per minute. This was increased every half an hour by 10 drops per minute until the uterine contractions were established.

(i) Duration of Labour

One hundred and fourteen patients with spontaneous onset of labour had oxytocin stimulation of the uterus while 991 patients with spontaneous

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labour did not require oxytocin. Among the surgical induction group, 77 out of 103 patients required oxytocin infusion. Thus more cases of induced labour required oxytocin than those with spontaneous labour.

The duration of labour in grandmultipara with spontaneous and induced labours and with and without oxytocin stimulation of the uterus is shown in Table I. In both spontaneous onset of labour and surgical induction of labour where oxytocin was not used, the majority (63.3 and 80.8 percent respectively) delivered within six hours. Labour was less than six hours in only 25.4 and 58.4 percent of spontaneous labour and induced labour respectively where oxytocin was given. The difference in the percentage of cases that delivered within six hours without oxytocin than in those with oxytocin was more apparent than real. Because of the policy of waiting for four hours after surgical induction or spontaneous onset of labour before oxytocin was started, less patients who were given oxytocin delivered within six hours. Secondly, the need for oxytocin infusion in such cases reflects some underlying deficiency of uterine action that requires additional stimulation.

(ii) Concentration of Oxytocin

Table II shows the concentration of oxytocin and its flow rate as well as the number of patients given the infusion at each concentration. Ninety-nine out of 191 cases (51.8 percent) given oxytocin required a concentration of one unit oxytocin in one pint of 5 percent dextrose solution given at a rate of 50 drops or less per minute. Only 15 cases required an oxytocin concentration of more than 2 units per pint of 5 percent dextrose. Thus the dose of oxytocin required in grandmultipara to produce adequate uterine concentrations is less than 2 units per pint of 5 percent dextrose.

(iii) Duration of Oxytocin Infusion

One hundred and sixteen out of 191 cases required less than four hours of oxytocin infusion, 47 required four to eight hours of infusion, 17 required 8 to 12 hours of infusion and only 11 required more than 12 hours of infusion (Table III). Thus only 14.7 percent of patients who had oxytocin infusion required more than 8 hours infusion.

(iv) Type of Delivery

The type of delivery achieved in patients requiring oxytocin infusion and those not requiring oxytocin is given in Table IV. The Caesarean section rate was 11.4 percent and 1.5 percent respectively in those with and without oxytocin amongst the spontaneous onset of labour. In the surgically induced patients 9.1 percent of those given oxytocin and 11.6 percent without oxytocin required Caesarean section.

The higher Caesarean section rate amongst the spontaneous onset of labour group who were given oxytocin than those without oxytocin reflects the basic underlying cause necessitating oxytocin stimulation rather than a failure of oxytocin to achieve vaginal delivery. This is further supported by the higher Caesarean section rate (11.6 percent) in surgically induced patients not given oxytocin than in those given oxytocin.

Although it might appear that oxytocin stimulation in grandmultipara produced longer labour and higher Caesarean rates, it actually enabled more vaginal deliveries and shorter duration of labour in grandmultiparas with abnormal uterine action because many of these cases would have ended up in Caesarean section from prolonged labour and no progress or slow progress in labour due to poor uterine contractions.

TABLE I
DURATION OF LABOUR IN GRANDMULTIPARAS WITH AND WITHOUT OXYTOCIN INFUSION

Duration of Labour (in Hours)	Spontaneous		Surgical Induction	
	With Oxytocin	Without Oxytocin	With Oxytocin	Without Oxytocin
0-6	29 (25.4)*	617 (62.3)	45 (58.4)	21 (80.8)
6-12	47 (41.2)	301 (30.4)	25 (32.6)	4 (15.4)
12-18	26 (22.8)	63 (6.4)	5 (6.5)	1 (3.8)
>18	12 (10.6)	10 (0.9)	2 (2.5)	0 (0)
All Cases	114 (100)	991 (100)	77 (100)	26 (100)

* Figures in brackets denote percentages.

TABLE II
CONCENTRATION & RATE OF OXYTOCIN INFUSION IN
GRAND MULTIPARA DURING LABOUR

Maximum Concentration of Oxytocin Infusion (Units per pint 5% Dextrose)	Flow Rate of Oxytocin Infusion (Drops per Minute)	Number of Cases	
		Surgical Induction	Spontaneous Labour
1	20	4	30
1	30	5	12
1	40	13	23
1	50	5	7
2	30	18	21
2	40	5	9
2	50	15	9
4 and above	—	12	3

(v) Post-partum Complications

Some of the post-partum complications in grandmultiparas are listed in Table V. There were 38 cases of atonic post-partum haemorrhage. Post-partum haemorrhage occurred in 5.2 percent of patients given oxytocin. The incidence of post-partum uterine atony could have been higher had oxytocin been withheld in the group given oxytocin. The higher incidence of post-partum uterine atony in the oxytocin stimulated patients reflects the underlying deficiency in uterine action rather than the failure of oxytocin to prevent atony.

Uterine rupture occurred in two cases, both of whom had oxytocin stimulation of the uterus. The two cases are reported here to establish the contribution of oxytocin to such rupture:

Case 1

Madam N.A.H., a 30 year old gravida 6 para 5, Chinese housewife with unknown dates was admitted with leaking liquor for 9 hours.

On examination, the uterus was term size and there was a single foetus presenting by the head that was not engaged. Vaginal examination confirmed leaking liquor and a 2 cm dilated cervix. Artificial rupture of the membranes was performed and moderate meconium stained liquor was obtained. Oxytocin infusion (one unit in one pint of 5 percent dextrose) was given at 20 drops per minute and was increased at half hourly intervals by 10 drops per minute. Uterine contractions were established at 50 drops per minute. A female baby weighing 3,450 grams was delivered 3 hours after administration of oxytocin and was followed by post-partum haemorrhage of 700 ml. The blood pressure dropped to 60/30 mm. of mercury and she was given 920 ml. of blood. However, the blood pressure remained at 70/50 mm. of mercury 2 hours after delivery and the pulse rate rose

to 100 per minute while the uterus was atonic. Four hours after delivery, her general condition deteriorated and her blood pressure had not risen in spite of blood transfusion. Nine hours after delivery, vaginal bleeding persisted although the uterus was well contracted. A laparotomy was performed and revealed a small left broad ligament haematoma and a vertical tear measuring 4 cm. long on the left side of the lower uterine segment opening into the broad ligament. A total hysterectomy was done. Altogether 3,630 ml. of blood was given. She made an uneventful post-operative recovery.

Case 2

Madam L.S.C., a 42 year old Chinese housewife, gravida 10 para 9, was admitted at 42 weeks gestation for induction of labour because of post-maturity. On examination, the uterus was full term size with a single foetus presenting by the head which was not engaged. Surgical induction was performed the next day. Four hours after artificial rupture of the membranes, an oxytocin infusion was started (one unit oxytocin in one pint 5 percent dextrose at 20 drops per minute) to

TABLE III
DURATION OF OXYTOCIN INFUSION IN
GRAND MULTIPARA DURING LABOUR

Duration of Oxytocin Infusion	No. of Patients
0—4 hours	116 (60.7)*
4—8 hours	47 (24.6)
8—12 hours	17 (8.9)
more than 12 hours	11 (5.8)
All Cases	191 (100)

* Figures in brackets represent percentages.

TABLE IV
TYPE OF DELIVERY IN GRAND MULTIPARA WITH AND WITHOUT OXYTOCIN INFUSION DURING LABOUR

Type of Delivery	Spontaneous		Induced Labour	
	With Oxytocin	Without Oxytocin	With Oxytocin	Without Oxytocin
Normal	78	936	63	23
Assisted	9	4	5	—
Assisted Breech	11	26	2	—
Breech Extraction	1	3	—	—
Caesarean Section	13 (11.4)*	15 (1.5)	7 (9.1)	3 (11.6)
Others (twins, triplets)	2	7	—	—
All Cases	114	991	77	26

* Figures in brackets denote percentages.

TABLE V
POST-PARTUM COMPLICATIONS IN GRAND MULTIPARAS WITH AND WITHOUT OXYTOCIN INFUSION DURING LABOUR

Complications	Spontaneous		Induced Labour	
	With Oxytocin	Without Oxytocin	With Oxytocin	Without Oxytocin
Atonic PPH*	7	28	3	0
Ruptured Uterus	1	0	1	0
Pyrexia	1	0	3	3
U.T.I.**	1	4	1	0
Others	0	8	0	0

* P.P.H. = Post-Partum Haemorrhage.

** U.T.I. = Urinary Tract Infection.

promote uterine contractions. The foetal head was still unengaged and remained high. Good uterine contractions were achieved at 30 drops per minute. Four hours after oxytocin was started, she bled vaginally and her blood pressure dropped to 70/50 mm. of mercury. Vaginal examination revealed a ruptured uterus on the left postero-lateral aspect of the lower uterine segment. A laparotomy was performed and confirmed the uterine rupture and a large left broad ligament haematoma. A classical Caesarean section was performed and a male infant weighing 4,220 grams was delivered. A subtotal hysterectomy was performed and she made an uneventful recovery.

DISCUSSION

It has been maintained that in grandmultiparity, oxytocin stimulation of the uterus carries a significant risk of uterine rupture either spontaneously or as a result of foeto-pelvic disproportion. The present study shows that oxytocin

stimulation of the uterus in the grandmultipara is safe provided there is no significant disproportion. The two cases of uterine rupture occurred in patients who were given oxytocin infusion but the primary cause was the undetected foeto-pelvic disproportion due to large babies. The uterine rupture would probably have occurred even without oxytocin administration.

The early administration of oxytocin in physiological doses following surgical induction will reduce the induction-delivery interval. Therefore, in grandmultiparas with no foeto-pelvic disproportion, the simultaneous administration of physiological doses of oxytocin will shorten the duration of labour. The policy of waiting for 4 to 6 hours after surgical induction before setting up oxytocin in the present series did not permit significant difference in the induction-delivery interval in oxytocin and non-oxytocin treated groups.

More of the patients treated with oxytocin for poor uterine contractions would have ended in

Caesarean section for slow progress in labour if oxytocin had not been given. Thus oxytocin probably saved a few Caesarean sections in these patients. This is well illustrated by the higher incidence of Caesarean section in surgically induced patients who were not given oxytocin compared to the lower incidence in surgically induced patients who were given oxytocin.

The sensitivity of the human uterus varies from individual to individual, the stage of gestation, the stage of labour and the integrity of the membranes (Theobald, 1970). The grandmultiparaous uterus is believed to be more sensitive to oxytocin. More than half of the patients in the present series require less than 5 milliunits per minute of oxytocin. This is similar to the dose level required for 80 percent of women with amniotomy and syntocinon infusion (Theobald, 1970) but considerably less than the maximum of 64 milliunits per minute advocated by Dewhurst (1972).

Our experience shows that with proper selection to exclude foeto-pelvic disproportion and starting with a smaller physiological dose, oxytocin in-

fusion is of benefit and advantage in the management of labour in the grandmultipara. However, care should be exercised in watching for uterine hypertonia and its effects on placental blood flow which is more likely to happen in primigravida rather than in the grandmultipara.

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