Original Article

Routine Oxytocin Infusion *versus* Discontinuation during Active Phase of Labour : Does it Make a Difference in Outcome — A Prospective Longitudinal Study

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A randomized prospective study was carried out at a large tertiary maternity care center in West Bengal where 132 non risk laboring mothers at term receiving IV oxytocin for induction or augmentation recruited to study the difference in feto-maternal outcome when oxytocin was deliberately stopped during active labour. Cases were randomly divided into 2 groups, those received oxytocin infusion till the end of labour (n_1= 66) & those whose oxytocin drip was stopped at 5 cm cervical dilatation with uterus contracting actively (n_2=66). All the 132 cases were monitored on WHO parto-graphic paper allowing a trial for vaginal delivery maximum for 8 hours. The maximum dose of oxytocin required to complete the labour barring the third stage administration was 30 iu. Overall, fetal distress occurred in 24 (18.2%) cases; 104 (78.8%) cases had vaginal delivery and 28 (21.2%) cases required Emergency Caesarean Section; mean duration of active labour was 216.88 ± 88.99 minutes when all 132 (n) cases were considered. It was 189.66 ± 80.27 min for n_1 cases (oxytocin continued) & 244.09 ± 89.52 minutes for n_2 cases (oxytocin discontinued). For n1 group incidence of fetal distress was 20 (30.3%) cases, Hyperstimulation 5 (7.6%) cases, Augmentation failure 4 (6.06%) cases, Caesarean section 22 (33.3%) cases, Sick Neonatal Care Unit (SNCU) admission was 6 (9.09%) cases. The corresponding figures for n2 group were 4(6.06%), NIL, NIL, 6(9.1%) and 1(1.5%). The study showed a significant reduction of fetal distress, hyper-stimulation,emergency caesarean section and SNCU admission when oxytocin drip was deliberately stopped during active labour but at the cost of prolongation of first stage of labour by nearly one hour.

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Key words **: Oxytocin, Active labour, Oxytocin drip: continued/discontinued.**

Oxytocin is the most frequently used drug in the labour room to hasten the labour process to allow a trial for a vaginal delivery in a slowly progressing labour; to prevent postpartum hemorrhage and the third stage bleeding. The credit for its discovery goes to Sir Henry Dale in 1906, who first described the posterior pituitary extract contracts the uterus during labour when administered intravenously[1]. Subsequently, the drug was used in the subcutaneous and intravenous route by Alek Bourne in 1927 and Theobald, *et al* in 1948 to study its safety and efficacy[5]. Some cases of ruptured uterus were reported which restricted its use before the birth of the baby. But the drug again came to limelight when O'Driscoll published the article "Active Management of Labour" in BMJ in 1973 stressing the routine use of oxytocin in all primi-gravidae to complete a labour process within 12 hours and significantly reducing caesarean section rate to 4.8%; where the only indication to stop oxytocin infusion was fetal distress[2]. Since then oxtocin became a routine drug to augment a slow progressing labour and standardized labour ward practices established in different countries[4]. But till date, not a single guideline in this regard has been found to be superior to the other to have an optimum feto-maternal outcome as well as optimum Caesarean section rate.

Editor's Comment :

- Use of oxytocin during labour should be carefully monitored. Injudicious use of oxytocin may cause complications like hyper stimulation, fetal distress, even rupture uterus.
- Oxytocin does reduce the duration of first stage of labour and when its infusion is stopped during established active labour, the labour does progresses well though a bit slowly with a significant decrease in complications.

It is now established that IV oxytocin drip in doses 5 to 40 mIU/min during labour in a primi-para is safe although fetal hypoxia, uterine tachysystole & hyper-stimulation are recognized complication & hence each and every case needs to be monitored frequently. Question has arisen that if we stop oxytocin drip during active labour - does it make a difference? Here, we present a study on laboring mother with continuous oxytocin drip versus when oxytocin is stopped during

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active labour in terms of duration of labour, number of caesarean sections, neonatal outcome, incidence of hyper-stimulation.

Materials and Methods

Ours is a large tertiary care centre situated in a district town of the state of West Bengal, India offers undergraduate degree to 200 students and postgraduate degree in Obstetrics and Gynaecology to 15 trainees each year. The number of deliveries conducted is more than twenty thousand a year, including seven thousand plus Caesarean sections. The current study is a prospective randomized trail spanning 8 months (34 weeks). Only in-house cases were selected observing strict inclusion/exclusion criteria.

We recruited 132(n) women carrying singleton term pregnancy presenting vertex with a cervical dilatation of less than or equal to 4 cm (≤4 cm) and all of them needed an Oxytocin infusion for the purpose of induction or augmentation. Women having risk factors associated with increased Cesarean Delivery eg, Multiple pregnancy, diabetes, cervical incompetence harboring an encirclage suture, pregnancy induced hypertension, pre-eclampsia, elderly primi-gravida >35 years, post cesarean pregnancy were excluded in our study. Cervical ripening with intracervical prostaglandin E2 gel (maximum two doses 500 microgram each 6 to 8 hours apart) was accepted in the study. The cases were arbitrarily divided into two groups when cervical dilatation reached 5cm showing a blind eye to parity and period of gestation (POG). Thus each group n1 & n2 consisted of 66 laboring mothers having synto drip. When the cervical dilatation reaches 5 cm n1 group had continued drip till delivery whereas for n2 group the synto drip was stopped and a Ringer lactate drip started at the rate of 40 drops/min till delivery. The dose of oxytocin used was according to recommendation of Danish society ie, 5 units oxytocin diluted in 500 ml isotonic saline & was initiated 3.3 mIU/min and increased every 20 mins by 3.3 mIU until a regular uterine contraction of 3 to 5 /10 mins lasting for ≥40 secs <60 secs was achieved. The maximum dose of oxytocin used in the study was 30 mIU/min[3] where oxytocin @ 30mIU/min given for 30 mins but patient failed to achieve "Active labor" the cases were declared "Induction failure" & proceeded for Emergency Cesarean section. Cases where after initial successful induction cervical dilatation did not progress for more than two hours the condition was marked as "Arrest of Labour" & went for Emergency Cesarean section. All the 132 cases were monitored by postgraduate students on individual partographic paper recommended by WHO. The only deviation was 2 hourly p/v examination instead of 4 hourly (as envisaged by WHO) to have an easier plotting on partograph. We allowed a trial of vaginal delivery for a maximum of 8 hours. starting from the active phase provided there was no feto-maternal distress and therefore logically we had to ignore to some extent the significance of alert line & action line. The trial & methodology was duly approved by our Institutional Ethics committee.

We have categorized the cases according to their parity; the neonates were categorized as normal & hypoxic with low Apgar score who needed Sick Neonatal Care Unit (SNCU) admission; the labor events are categorized as duration of active labor& occurrence of complication eg, fetal distress, hyperstimulation, augmentation failure; mode of delivery as normal &cesarean.Finally these events were analysed under continued oxytocin infusion group (n1) vis-a-vis oxytocin discontinued group (n2). Descriptive statistics were expressed in terms of mean ± SD, median, range of numerical data & ratio & proportion for categorical data. Analytical statistics were done by chi-square t-test, ANOVA & Fischer's exact test; P-value less than 0.05 taken as statistically significant.

Analysis and Results

Among 132 term pregnancies, the number of cases that crossed 37 weeks was 32 (24.2%), those above 38 weeks was 27 (20.5%), above 39 weeks was 37 (28%) & finally, above 40 weeks was 36 (27.3%). Total dose of oxytocin required 20 to 30 units in 60 (45.5%) cases; 10 to 20 units in 46(34.8%) cases & 5 to 10 units 26 (19.7%) cases for induction/ augmentation of labor. Over all, fetal distress occurred in 24 (18.2%) cases. In 5 (3.8%) cases there was augmentation failure. Twenty-eight (21.2%) cases underwent emergency cesarean section & 104 (78.8%) undergone normal delivery. Mean duration of active labor (4 cm cervical dilatation to delivery) was 216.88±88.99 minutes, all 132 (n) cases being considered.

Table 1 shows the analysis and division of cases according to parity where oxytocin drip was continued till the completion of labor (n1) & where oxytocin was discontinued (n2) at 5 cm cervical dilatation.

Table 2 shows the analysis of cases (n1 & n2) according to weeks of gestations. Here, the null hypothesis is there is no association between parity and study groups; also there is no association between period of gestation and study groups. The alternative hypothesis is there is statistical association between

the parity,period of gestation and selected group of cases. Since P values both in Table 1 & Table 2 are >0.05 the study failed to reject the null hypothesis and there is no statistical association between parity and period of gestation among the study cases (n1 & n2) is a valid statement.

Table 3 shows the analysis of labor outcome and perinatal events between oxytocin continued (n1) and oxytocin discontinued (n2) groups.

The difference of occurrence of fetal distress, hyper-stimulation, augmentation failure, Cesarean Section, SNCU admission are obvious between two groups. Fetal distress occurred in 20 (30.3%) cases in the oxytocin continued group compared to only 4 (6.06%) cases in the discontinued group. There was no case of hyper-stimulation in oxytocin discontinued group, but 5 (7.6%) cases had hyper-stimulation with oxytocin continued group(n1). Even with continued oxytocin drip 4 (6.06%) cases failed to reach the 2nd stage of labor indicating an augmentation failure whereas no such case was reported where oxytocin drip was discontinued during active labor. Continued oxytocin drip (n1) reported 22 (33.3%) cases of cesarean section as against only 6 (9.1%) cases when oxytocin was discontinued during active labor. Duration of active labour where there was successful vaginal delivery with oxytocin augmentation was 189±80 mins against 244±89 mins when oxytocin augmentation stopped at the onset of active labour.Number of SNCU admission was 6 (9.09%) when oxytocin drip continued throughout labour against only 1 (1.5%) case when oxytocin drip was stopped at the onset of active labour.

Therefore, the adverse labour events and Caeserean Section rate was definitely higher when oxytocin drip was continued during labour than when it was stopped at the onset of active labour. But, the duration of active phase of labour was nearly 60 mins (1 hour) shorter among the oxytocin continued group of cases (n1) than among the discontinued group of cases (n2).

Table 1 — *Association of Parity versus Group (n1 & n2)*

Parity	Oxytocin Continued (n1)	Oxytocin Discontinued at 5 cm (n2)	Total
G1 P0+0	30	34	64
Row %	46.9	53.1	100.0
Col %	45.5	51.5	48.5
G2 P1+0	30	24	54
Row %	55.6	44.4	100.0
Col %	45.5	36.4	40.9
G3 P2+0	6	8	14
Row %	42.9	57.1	100.0
Col %	9.1	12.1	10.6
Total	66	66	132
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0
Chi square value : 1.202; p- value : 0.548			

Table 2 — *Association of Groups (n1 & n2) with Gestational ages*

GA Weeks	Continued	Discontinued at 5 cm	Total
37	16	16	32
Row %	50.0	50.0	100.0
Col %	24.2	24.2	24.2
38	14	13	27
Row %	51.9	48.1	100.0
Col %	21.2	19.7	20.5
39	22	15	37
Row %	59.5	40.5	100.0
Col %	33.3	22.7	28.0
40	14	22	36
Row %	38.9	61.1	100.0
Col %	21.2	33.3	27.3
Total	66	66	132
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0
Chi square value : 3.139 ; p-value : 0.370			

Table 3 — *Analysis of labour outcome and Perinatal events*

Total no of cases n = 132	Oxytocin continued (n_1)	Oxytocin discontinued (n_2)
P0+0	30	34
P1+0	30	24
P2+0	6	8
Fetal distress	20(30.3%)	4(6.06%)
Hyperstimulation	5 (7.6%)	NIL
Augmentation failure	4(6.6%)	NIL
Caesarean section	22 (33.3%)	6(9.1%)
Duration of active labour	189.66±80.27 min	244.09±89.51min
SNCU admission	6(9.09%)	1(1.5%)

Discussion

There was no debate about the fact that oxytocin is an essential drug in a labour room. Once we declare a mother that she is in labour and place her on the labour table, obviously, the next point of discussion would be when would labour be completed and how the baby is doing and when to resolve to an Emergency Caesarean Section leaving the hope of a normal delivery. Use of oxytocin in pharmacological doses and the response of the uterus and the fetus are the two major factors in answering these queries. Since its routine use in the 1970s after O'Driscoll's pioneering work on active management oxytocin has proved itself a reasonably safe drug barring few instances of hyper-stimulation and fetal distress causing an increased emergency cesarean section rate. Few unfortunate incidence of ruptured uterus would show cases not properly monitored, lack of knowledge regarding signs

of rupture uterus or an abusive use. The WHO partograph shows that once the cervix dilates 4 cm with effective uterine contraction the laboring mother should attain her second stage within 6 hours and any slowness of the progress of labour should be corrected by an artificial rupture membrane and judicious use of oxytocin. Our study shows that oxytocin in doses of 5 to 30 milli units/min significantly shortens the first stage of labour with cases of hyper-stimulation/fetal distress occurring in 7.6% & 30.3% cases which was reduced to nil & only 6.06% by stopping oxytocin infusion at ≥5 cm cervical dilatation with active uterine contraction but at the cost of a prolonged first stage by nearly one hour. Also, our study shows a fairly higher emergency caesarean section rate of 33.3% when oxytocin continued throughout labour against only 9.1% when it is stopped in established active labour. There was no perinatal mortality in our study although Sick Neonatal Care Unit admission was 9% in oxytocin continued group against 1.5% in the discontinued group and there was nil incidence of ruptured uterus even among multipara indicates the fact that oxytocin is safe with standard intra-natal care. Previous authors Bor, *et al* in 2015 reported a 12% incidence of hyper-stimulation when oxytocin was continued throughout labour against only 2% when it was discontinued in active labour and a caesarean section rate of 22% in the oxytocin continued group against 15% in oxytocin discontinued group[3]; overall, our study indicates that stoppage of oxytocin infusion is a valid option in a busy labour care centre which ensures a reasonable safety with optimum feto-maternal outcome.

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