

## ORIGINAL ARTICLE

# A Comparative Study of High Dose vs Low Dose Oxytocin for Labour Augmentation: A Partographic Analysis

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### ABSTRACT

This study was randomized trial to compare labour outcomes using high dose oxytocin or low dose oxytocin management protocols. Healthy nulliparous women in active labour, at term, with a healthy singleton pregnancy and cephalic presentation were enrolled. The women were randomized to either high dose oxytocin (n=100) or low dose oxytocin (n=100) management protocols. Both the groups used entailed using a WHO partogram, a vaginal examination every two hours and use of an oxytocin infusion if the line was crossed. The study contrasted two interventions for labour augmentation: high dose vs low dose oxytocin. For the women assigned to high dose oxytocin (n=100), the cesarean-section rate was 11 percent, as compared with 14 percent for those assigned to low dose management. The 26 percent reduction in the cesarean section rate was due primarily to a decrease in dystocia. The program we studied for the active management of labour with high dose oxytocin reduces the incidence of dystocia and increases the rate of vaginal delivery without increasing maternal or neonatal morbidity.

**Key Word:** Oxytocin, Partographic Analysis.

### INTRODUCTION

The rise in cesarean section continues to be a matter of obstetric concern<sup>1</sup>. Recent reports suggest that high cesarean rates may have an adverse impact on maternal and neonatal morbidity and mortality<sup>2</sup>. Dystocia is the leading indication for primary

cesarean section<sup>3,4</sup>. Inadequate uterine activity has been described as the most frequent cause of dystocia. Augmentation of labour with oxytocin is a frequent intervention in modern obstetric practice<sup>5</sup>. If labour fails to progress, oxytocin is administered to augment contractile effort and to correct dystocia with the objective of achieving a normal vaginal delivery<sup>6</sup>. Despite the frequency with which oxytocin is used in clinical practice, there is little consensus regarding the optimal dose of oxytocin for labour augmentation<sup>7</sup>.

This study was designed to estimate the efficacy and safety of high dose vs low dose oxytocin in the augmentation of labour, on method of delivery and on indicators of maternal and neonatal morbidity.

Hence, there is considerable doubt as to which protocol is best for management of labour. To resolve this dilemma, a randomized trial was conducted on nulliparous women in labour to compare a policy of high dose oxytocin management with low dose oxytocin management.

### AIM OF STUDY

To compare rate of vaginal delivery and cesarean section in patients undergoing augmentation of labour by high dose versus low dose oxytocin protocols

### MATERIALS AND METHOD

Nulliparous women with term pregnancy in the active phase of labour with inclusion criteria were invited to participate in the trial. The active phase of labour was

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identified when contractions were regular and painful, and the cervix was four or more centimeters dilated. Exclusion criteria were obstructed labour, non cephalic presentation, fetal distress on admission, severe maternal disease.

The protocol used was determined by taking the next sealed opaque study envelope from a box in the labour ward. Each envelope contained the detailed protocol. Both the groups were managed using the WHO partogram. The cervical dilatation was plotted and a repeat vaginal examination was performed after 2 hours. If cervical dilation had progressed on or to the left (above) the alert line, the cervix was re-evaluated in two to four hours depending upon when full cervical dilatation was anticipated. If cervical dilatation had moved to the right of the alert line we confirmed fetal well being and excluded cephalopelvic disproportionation. As long as neither condition was present, the we started an oxytocin infusion according to the standard labour ward protocol to ensure adequate contractions. The protocol required that intact membranes be ruptured at this stage if not already ruptured. Reassessment was to occur after two hours. If obstructed labour or fetal distress was diagnosed, a cesarean section was performed. If progress was good, the woman was reassessed every two hours until delivery. Analgesia was prescribed according to request of women. The study contrasted two interventions for labour augmentation: high dose vs low dose oxytocin. "High dose" was defined as an initial dose of  $>4$  Mu/min and dose increments of at least 4 Mu/min; "Low dose" protocols were defined as those with an initial dose ranging between 1-4 Mu/min with increments of 1-2 mU/min.

We made the diagnosis of cephalopelvic disproportionation when there were three pluses of moulding of the fetal skull. When there were no signs of severe moulding, the indication of cesarean section was recorded as poor progress. The diagnosis of fetal

distress was made when recurrent late decelerations on continuous electronic fetal heart rate monitoring was made. The data was entered in MS Excel sheet and results were compared between the two protocols of oxytocin infusion. Informed written consent was obtained from each woman in the labour ward before entry to the study. The ethics committee of the S.M.S Medical College, Jaipur has approved the study.

### **RESULTS**

This study was conducted between June, 2019 to February, 2020. A total of 200 nulliparous women were recruited and randomized to the study after taking permission from ethical committee. 100 women were in the high dose oxytocin management group and 100 in the low dose oxytocin management. According to Table 1 there was no significant difference in maternal age of the two groups. The gestational age of the two groups was also similar. The dilatation of cervix at admission, of the two groups was also comparable.

According to Table 2 the Cesarean Section rate in high dose oxytocin group was 11 percent, as compared with 14 percent in the expectant group. The reduction was due primarily to a decrease in the frequency of arrest disorders. The rates of operative vaginal delivery did not differ significantly between the high dose oxytocin and low dose oxytocin groups.

Table 3 summarizes the progress of patients who delivered vaginally. The interval from admission to amniotomy was significantly shorter for patients in the high dose oxytocin group. Both the first stage of labour and total duration of labour were also significantly shorter for patients in the high dose oxytocin group,  $p < 0.001$ ). As shown in the Table 4, was no increase in complications of labour associated with high dose oxytocin infusion. Table 5 shows that the neonatal complications were comparable in both groups.

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**Table 1: Demographic Characteristics**

Characterstics	High Dose Oxytocin(N=100)	Low Dose Oxytocin(N=100)	PValue
Maternal Age(Yr)	27.3+ 5.8	26.7+6.1	NS
Gestational Age(Wk)	39.8+ 1.1	39.7+1.1	NS
Dilation at Admission(cm)	3.2±_1.5	3.2±1.5	NS

**Table 2: Type of Delivery and causes**

Type of Delivery	High Dose Oxytocin(N=100)	Low dose Oxytocin(N=100)
Caserean section no.(%)	11	14
FHR abnormalities	1	1
Arrest of dilation	8	10
Arrest of descent	2	3
Vaginal delivery no.(%)	89	86
Normal	80	78
Outlet, low forceps	2	3
Vaccum	7	5

**Table 3: Labour Intervals for Patients with Vaginal Deliveries**

Interval(in hrs)	High Dose Oxytocin(N=100)	Low Dose Oxytocin(N=100)	PValue
Admission to amniotomy	0.55+0.23	2.36+2.21	<0.001
Amniotomy to delivery	5.63+2.56	5.79+3.23	NS
Admission to augmentation	2.73+1.91	4.11+2.26	<0.0001
Augmentation to 10 cm dilation	3.16+2.19	4.13+2.57	<0.0001
Augmentation to delivery	4.62±2.90	5.37±3.12	<0.02

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Length of first stage	5.05±2.33	6.72±3.64	<0.0001
Length of second stage	1.44±0.097	1.43±1.08	NS
Admission to delivery	16.49±2.75	18.15±3.89	<0.0001

**Table 4: Complications of Labour and Delivery.**

Complications	High Dose Oxytocin(N=100)	Low Dose Oxytocin(N=100)	PValue
Antepartum mecomum	8	11	NS
Placental abruption	2	13	INS

**Table 5: Neonatal complications**

NICU Admission	High Dose Oxytocin(N=100)	Low Dose Oxytocin(N=100)	P Value
Observation	5	9	NS
Phototherapy	2	4	NS
Meconium Aspiration	6	8	NS

**DISCUSSION**

In this we observed that, the active management of labour with high dose oxytocin was associated with a statistically significant decrease in the rate of cesarean section with no detectable increase in maternal and neonatal morbidity. This was due to a decrease in the frequency of dystocia. The criteria for diagnosis of labour used in the active management of labour may also contribute to the efficacy of the program. Dujardin, et al<sup>8</sup>. have shown there is a significant effect of early intervention on maternal prognosis. Similarly we have found out that early intervention by high dose oxytocin has lead to significant reduction in rate of cesarean section. Dujardin, et al<sup>8</sup> have shown that crossing the alert line increases neonatal complications. In our study also there was no increase in neonatal complications in high dose group.

Thornton and Liliford<sup>9</sup> using meta - analysis have shown that there is no convincing evidence that the

early use of oxytocin in slow progress of labour confers any advantage to the mother. In our study the use of high dose oxytocin has led to decreased length of first and second stage of labour. The efficacy of active management is not due solely to the higher doses of oxytocin used, but rather to the program of labour management as a whole.

A frequent challenge for obstetricians is how to reduce maternal and neonatal morbidity when faced with arrested or protracted progress in labour. Although oxytocin is widely used in obstetric care, there is a lack of consensus with respect to the optimum oxytocin dosage, safety and efficacy of this intervention.

In our study high dose oxytocin with augmentation of labour was found to be associated with a moderate reduction in the rate of cesarean section and a small increase in the rate of spontaneous vaginal deliveries and shortened labour.

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