Original Article

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Evaluation of Effect of Bolus Doses of Oxytocin in Caesarean Section Under Spinal Anaesthesia

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Abstract

Background: The aim is to compare effect of bolus doses of oxytocin in caesarean section under spinal anaesthesia. **Subjects and Methods:** A total of seventy- eight women were included. Patients in group I received one unit of bolus oxytocin and in group II received two units of bolus oxytocin. The subject was given a spinal block with 2 mL of 0.5% bupivacaine. The uterine tone was assessed in both groups. Intraoperative blood loss, heart rate, uterine tone and possible side effects were also compared. Results: Mean age was 26.5 years in group I and 24.8 years in group II, gestational age was 38.4 weeks in group I and 38.7 weeks in group II, height was 156.7 cms in group I and 156.2 cms in group II and weight was 68.9 kgs in group I and 70.1 kgs in group II. Uterine tone was adequate in 30 (76.9%) in group A and 35 (89.7%) in group B. Blood loss was 1038.2 mL in group A and 740.6 mL in group B. **Conclusion:** One unit of oxytocin was inadequate for adequate uterine contraction as compared to two doses of oxytocin where uterine contraction rate was high. Blood loss was also lowered in group B where two units of oxytocin was administered.

Keywords: Oxytocin, Caesarean section, Spinal anaesthesia.

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Introduction

The blood loss following delivery of the foeto-placental unit can cause significant haemorrhage if the uterus is not well contracted. Proactive doses of uterotonic agents are quintessential. Caesarean sections face a high risk of bleeding due to uterine atony.[1] Pre-labour, the receptors for oxytocin are about 12 times the non-pregnant uterus. Uterus at term is highly receptive to actions of oxytocin. Due to life-threatening adverse effects, many studies favour lower dose with better outcomes.[2,3]

In 2018, the World Health Organization (WHO) recommended that 10 international units (IU) of oxytocin should be administered to all women during delivery, irrespective of the mode of delivery (vaginal or cesarean delivery [CD]).[4] The WHO recommendations specified that when used for PPH prevention during CD, 10 IU oxytocin should be administered as a divided dose using a smaller initial intravenous (IV) bolus followed by infusion.[5]

Pre-labour, the receptors for oxytocin are about 12 times the non-pregnant uterus. Uterus at term is highly receptive to actions of oxytocin. Due to life-threatening adverse effects, many studies favour lower dose with better outcomes.[6] However, it is essential to reinvestigate the least permissible dose range with effective uterine contraction, reduced blood loss and least side effects.[7] Previous reports have synthesized evidence on oxytocin dosing regimens for PPH prevention during CD, however, none of these were systematic reviews or were published nearly a decade ago.[8–10] In this study, we studied the effect of bolus doses of oxytocin in caesarean section under spinal anaesthesia.

Subjects and Methods

A total of seventy- eight women with singleton pregnancy within the age group 18 to 40 years, American Society of Anesthesiologists (ASA) class I or II and who were suitable to receive spinal anaesthesia were included. The study was commenced with the approval from institutional review board

and written consent from enrolled patients.

Demographic data was recorded. Patients in group I received one unit of bolus oxytocin and in group II received two units of bolus oxytocin. The subject was given a spinal block with 2 mL of 0.5% bupivacaine. The tone of the uterus was evaluated by manual palpation without exteriorising the uterus at 2 mins after oxytocin administration after delivery of placenta. The uterine tone was rated as either adequately retracted or inadequately retracted. Intraoperative blood loss, heart rate (at an interval of 5 minutes) and possible side effects (bradycardia, arrhythmia, flushing, chest pain, nausea & vomiting) were also compared. Results of the present study after recording all relevant data were subjected for statistical inferences using chi- square test. The level of significance was significant if p value is below 0.05 and highly significant if it is less than 0.01.

Results

Mean age was 26.5 years in group I and 24.8 years in group II, gestational age was 38.4 weeks in group I and 38.7 weeks in group II, height was 156.7 cms in group I and 156.2 cms in group II and weight was 68.9 kgs in group I and 70.1 kgs in group II. Uterine tone was adequate in 30 (76.9%) in group A and 35 (89.7%) in group B. Blood loss was 1038.2 mL in group A and 740.6 mL in group B. A non- significant difference was observed (P> 0.05). [Table 1].

Adequate uterine contraction was seen in 55.6% of participants who received one unit of oxytocin, and in 78.3% of participants who received two units of oxytocin (p=0.03).

The mean heart rate in group I was 94.2 beats/min and in group II was 98.1 beats/min, SBP was 134.2 mm Hg in group I and 128.3 mm Hg in group II and DBP was 82.4 mm Hg in group I and 74.8 mm Hg in group II. A significant difference was observed (P< 0.05). [Table 1, Figure 1].

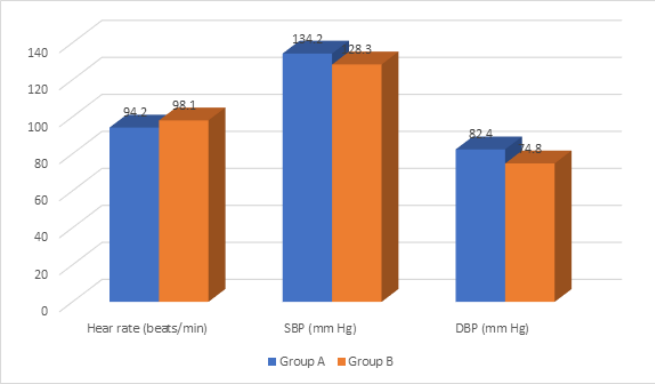

Figure 1: Haemodynamic Parameters

Nausea was seen among 2 in group I and 1 in group II, vomiting in 1 in group I, chest pain in 1 in group II, arrhythmia 1 in group II and flushing in 1 in both group I and II each. A significant difference was observed (P< 0.05). [Table 3].

Discussion

We studied the effect of bolus doses of oxytocin in caesarean section under spinal anaesthesia in 78 women. Oxytocin dosing in labouring mothers has been extensively studied for over three decades. The dosing has gradually evolved from a high dose to a low bolus dose.[11] In elective caesarean, there has been a hesitancy to standardise the lowest possible dose. The UK directive on caesarean sections endorses five units of oxytocin as slow intravenous bolus dose after delivering the new-born.[11] This may be attributed to lack of comparability in studies performed with oxytocin doses less than five units, and increased reports on serious side effects on doses greater than five units with no added benefit on the tone of uterus or reduction of haemorrhage.[12]

We observed that mean age was 26.5 years in group I and 24.8 years in group II, gestational age was 38.4 weeks in group I and 38.7 weeks in group II, height was 156.7 cms in group I and 156.2 cms in group II and weight was 68.9 kgs in group I and 70.1 kgs in group II. It was found in our study that uterine tone was adequate in 30 (76.9%) in group A and 35 (89.7%) in group B. Blood loss was 1038.2 mL in group A and 740.6 mL in group B.

Joseph et al,[13] determined the optimal dose of bolus oxytocin for uterine contractions for elective caesarean section under spinal anaesthesia. Ninety term mothers (37 to 41 weeks) undergoing caesarean section electively under spinal anaesthesia were considered for the trial and divided into three groups to receive oxytocin bolus of one, two or three units. Adequate uterine contraction was seen in 66% of participants who received one unit of oxytocin, and in 83.3% of participants who received two units of oxytocin. All those who received three units of oxytocin had an adequate uterine contraction. Blood loss was inversely related to the bolus dose of oxytocin

We found that mean heart rate in group I was 94.2 beats/min and in group II was 98.1 beats/min, SBP was 134.2 mm Hg in group I and 128.3 mm Hg in group II and DBP was 82.4 mm Hg in group I and 74.8 mm Hg in group II. Nausea was seen among 2 in group I and 1 in group II, vomiting in 1 in group I, chest pain in 1 in group II, arrhythmia 1 in group II and flushing in 1 in both group I and II each. Phung et al,[14] included randomized or nonrandomized study published in peer-reviewed journals that compared at least 2 different dosing regimens of intravenous oxytocin for postpartum hemorrhage prevention in women undergoing cesarean delivery. A total of 35 studies (7333 women) met our inclusion criteria and included 30 randomized trials and 5 nonrandomized studies. There were limited data available from the trials for most outcomes, and the results were not

Table 1: Patient demographic variables

Parameters	Group I	Group II	P value
Age (years)	26.5	24.8	>0.05
Gestational age (weeks)	38.4	38.7	>0.05
Height (cms)	156.7	156.2	>0.05
Weight (Kgs)	68.9	70.1	>0.05
Adequate uterine tone	30 (76.9%)	35 (89.7%)	>0.05
Blood loss (mL)	1038.2	740.6	

Table 2: Comparison of parameters

Parameters	Group I	Group II	P value
Hear rate (beats/min)	94.2	98.1	<0.05
SBP (mm Hg)	134.2	128.3	<0.05
DBP (mm Hg)	82.4	74.8	<0.05

Table 3: Side effects

Side effects	Group A	Group B	P value
Nausea	2	1	<0.05
Vomiting	1	0	<0.05
Chest pain	0	1	<0.05
Arrhythmia	0	1	<0.05
Flushing	1	1	>0.05

conclusive. Compared with bolus plus infusion regimens, bolus only regimens probably result in slightly higher mean blood loss (mean difference, 52 mL; 95% confidence interval, 0.4-104 mL; moderate certainty). Among the bolus plus infusion regimens, initial bolus doses.

Stephens et al,[15] in meta-analysis concluded that before an infusion of 20 units to 40 units in 1 L isotonic solution over 4 h, a bolus of 0.3 units to one unit administered slowly will be effective in reducing haemorrhage and minimising side effects during elective caesarean section. A study on caesarean for failed induction concluded that ED90 of oxytocin is 2.99 units i.e., three units oxytocin as a 'loading dose' can achieve uterine tonicity before an oxytocin infusion for maintenance is continued, which may be diluted and be given as a rapid infusion to avoid a sudden drop in blood pressure.[16]

Conclusion

It was found that one unit of oxytocin was inadequate for good uterine contractions as compared to two doses of oxytocin.. Blood loss was also less in patients where two units of oxytocin was administered.

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