

PROPHYLACTIC INTRAMUSCULAR INJECTION OF OXYTOCIN VS INTRAVANOUS INFUSION OF OXYTOCIN TO MINIMISE BLOOD LOSS AT CAESAREAN SECTION

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Abstract

Background: The aim of the present study were to compare the effectiveness of prophylactic administration of oxytocin intramuscularly before giving uterine incision with intravenous infusion just after delivery of neonate in prevention of uterine atony and thereby minimizing blood loss at caesarean section. **Materials and Methods:** The study included 400 informed & consented singleton, full-term pregnant women undergoing elective lower segment caesarean section under spinal anaesthesia. They were randomly allocated to receive either 10 units of oxytocin intramuscularly just before giving uterine incision or intravenous infusion of 10 units of oxytocin soon after delivery of the neonate. The placenta was delivered using cord traction combined with external massage. Intra-operatively, for each patient blood loss was assessed subjectively by visual estimation by the attending staffs. **Result:** The estimated mean blood loss and time lag between delivery of the baby and placenta were less in intramuscular group (397.04 ± 108.95 ml vs 488.99 ± 159.53 ml; $P=0.001$ & 17.01 ± 7.2 sec. vs 27.96 ± 13.03 sec; $P= 0.001$). The incidence of side effects of drug (I.e., Nausea, vomiting, tachycardia & hypotension) were more in intravenous group. No neonatal side effects were observed in intramuscular group. **Conclusion:** Intramuscular injection of oxytocin appears to be more effective than the conventional intravenous infusion in reducing blood loss at caesarean section. It is saved and facilitated the delivery of the placenta more quicker.

INTRODUCTION

Peripartum haemorrhage is the leading cause of maternal mortality and morbidity worldwide.^[1] It affects 5% of all women given birth around the world and about 26438 women dies in child birth every year in India (2018 UNICEF), 830 women dying each day roughly one every two minutes.^[2] Uterine atony occur in 50-80% of patients with post-partum haemorrhage (PPH) and the rates of PPH from uterine atony appears to be increasing.^[3,4] This trend is likely to be related to changing patterns of obstetric practice, such as more liberal approaches to the duration of labour, changes in the obstetric management of the second and third stage of labour.^[5] Oxytocin is one of the most widely used drug in obstetric and it remains the first line agent in prevention and management of uterine atony and PPH.^[6] The majority of women who experience PPH have no identifiable nearing risk factors and no PPH prevention programs rely on universal use of

prophylactics for all women in the immediate post-partum period.^[7] In the setting where multiple uterotonic options are available, oxytocin (10IU IM/IV) is the recommended agent for the prevention of PPH for all birth.^[8] While obstetric guidelines recommends universal use of oxytocin, debate still continues over the most appropriate dose, method of administration, best timing of administration and its outcome.^[9] The current guidelines for the administration of oxytocin during caesarean delivery are diverse, empiric and vague 10. Society of Obstetricians and Gynaecologist of Canada suggest that oxytocin IU can be given as an I.V push.^[10,11] WHO suggests an infusion of 20 IU/L 60 drops/min.^[12] American college of obstetricians and Gynaecologist recommend 10 IU to 40 IU/L for the prevention of PPH and the Royal College of obstetricians and Gynaecologist recommend 5 IU by slow I.V injection.^[13] Oxytocin is associated with preventable maternal and fetal adverse events during the peripartum period which lead to renewed interest in new approaches for improving oxytocin

administration. The administration of oxytocin via intramuscular has become increasingly practice due to its favourable safety profile and practical advantages.^[14] Early rapid delivery of the uterotonic drug may be associated with a lower risk of PPH; however this may increase the risk of cardiovascular side effects compare to IM administration which results in a slower onset of action but produces a longer lasting effect.^[15] This clinical study was conducted to improve the patient's safety and standardization of oxytocin in caesarean section.

MATERIALS AND METHODS

The prospective study was conducted in J.N. Institute of Medical Sciences, Porompat in the Department of Obstetrics & Gynaecology from 2014 to 2015. Hospital ethical committee approval and patient's informed consent were taken. It included total of 400 full term pregnant women. Gestational age was confirmed in 1st trimester by ultrasonography.

Inclusion criteria:

- Reproductive age (20-35 yrs)
- Parity ≤ 3
- Elective caesarean section
- Hb% $\geq 11\text{gm}\%$

Exclusion criteria:

Pregnant women complicated with

- Placenta previa
- Fibroid uterus

- Multiple pregnancy
- Previous uterine incision
- Medical disorders
- Malpresentation

The subjects were divided into 2 groups: In study group (n=200) oxytocin 10 units was given intramuscular just before making uterine incision. In control group (n=200) oxytocin 10 units in 500ml Ringer's lactate, 60 drops/min intravenous started soon after delivery of the neonate. Caesarean sections were performed under spinal anaesthesia. Placenta delivered by cord traction combined with fundal massage. No premedication except prophylactic antibiotic was given. Intraoperative blood loss was assessed subjectively by visual estimation by obstetrician, anaesthetist and scrub nurses.

RESULTS

The [Table 1] showing the variables like heart rate per min, & mean arterial pressure of both study and control group where are observed significant statistical difference. In control group the changes in both heart rate (P0.005) and mean arterial blood pressure (P0.004) as compare to study group (P0.42 & P0.26 respectively).

The [Table 2] shows that the amount of blood lose. (P0.001), time taken between delivery of placenta a baby (P0.001) & duration of operation (P0.01) were statistically significant.

Table 1: Mean \pm SD of mean arterial pressure and heart rate in the 2 groups

Variables	Control group (Intravenous oxytocin)		P value	Study group Intramuscular oxytocin		P value
	Before	After		Before	After	
Heart rate per min	92 \pm 15	119 \pm 20	0.005	90 \pm 13	104 \pm 15	0.42
Mean arterial blood pressure (mm Hg)	84.2 \pm 14.1	76.2 \pm 13.3	0.004	83.6 \pm 15.6	79.4 \pm 13.8	0.26

Table 2: Mean \pm SD of amount of intraoperative blood loss, duration of operation and time lag between the delivery of placenta and baby

Variables	Study group Intramuscular oxytocin	Control group (Intravenous oxytocin)	P value
Blood loss	397.04 \pm 108.95 ml	488.99 \pm 159.53 ml	0.001
Time lag between the delivery of placenta and baby	17.01 \pm 7.2 sec	27.96 \pm 13.03 sec	0.001
Duration of operation (min)	34.5 \pm 5.7	37.56 \pm 6.2	0.01

DISCUSSION

Oxytocin is beneficial as the primary therapy in the management of PPH. However the literature is inconclusive regarding its most appropriate dose and timing and routs of administration. As a consequence, the guidelines for oxytocin administration during caesarean delivery are diverse and empirical, leading to significant variability in global clinical practices. Active management of third stage of labor involving prophylactic intra muscular administration of oxytocin before delivery of the placenta has been shown to reduce PPH by

>60%.^[16] Westhoff G, cotter AM et al reported that intramuscular prophylactic oxytocin prevent PPH. This study also shows that the mean blood loss is less in IM oxytocin group. Abdelaleem AD et al 20/9, reported that mean intra operative blood loss was significantly lower in women who received oxytocin infusion before uterine incision compare to after fetal delivery. Similar result was found in this study also. Magnan EF et al 2005 concluded that longer duration of 3rd stage of labour causes more amount of blood lose.^[17] The paradoxical respond with vasoconstriction, diminished blood flow, or both of coronary circulation resulting to significant

higher occurrence of ST depression with oxytocin injection, as observed by Jonsson et al was not found in this study.

This finding is compatible to the present study (17.01 ± 7.2 sec Vs 27.96 ± 13.03 sec, $P = 0.001$) with significant reduce in blood loss (397.04 ± 108.95 ml Vs 488.99 ± 159.53 ml $P = 0.001$).

The most common side effects after oxytocin administration at CS are dose related hypotension and tachycardia due to transient relaxation of vascular smooth muscle cells. In our study the decrease in mean arterial blood pressure and increase in heart rate were significantly more common in control group compare to study group (MAP 0.004 Vs 0.26, HR 0.005 Vs 0.42). This finding is comparable to the finding of Svanstrom et al.^[18]

The possible side effects of administration of oxytocin can result in nausea vomiting, headache, flushing and neonatal jaundice were not significantly different in both study and control group.

CONCLUSION

Intramuscular injection of oxytocin just before the uterine incision is made during caesarean section appears to be more effective than the conventional intravenous injection. It is safe and facilitated the delivery of placenta quicker. Understanding of this agent and its use deserves further investigations and refinement.

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