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Original Research Article

The third stage of labour: to bleed or not to bleed - revised role of intra-umbilical oxytocin in management of third stage of labour

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ABSTRACT

Background: Background and Objectives: Postpartum haemorrhage is a single largest and leading cause of maternal morbidity and mortality not only in developing countries but also in developed countries. Every 4 minutes one woman dies from pregnancy or child birth related complications. The present study is an attempt to evaluate the scope of using intraumbilical vs intravenous vs intramuscular injection oxytocin for the active management of third stage of labour.

Methods: Six hundred pregnant women at term of a singleton pregnancy with spontaneous onset of labour were included in the study and were randomly divided into 3 groups of 200 women each. Group 1, intraumbilical oxytocin 10U diluted in 10ml of saline, Group 2, intravenous oxytocin 10U and Group 3, intramuscular oxytocin 10U were given after the delivery of baby. The outcome criteria's with respect to third stage of labour were: duration of the 3rd stage of labour, blood loss by volume, difference in haemoglobin. A significant reduction in duration of third stage ($p = 0.001$) and blood loss in third stage ($p = 0.0001$) in intraumbilical oxytocin group was found when compared with intravenous oxytocin and intramuscular oxytocin.

Conclusions: Intraumbilical oxytocin is better alternative to intramuscular oxytocin and intravenous oxytocin active management of third stage of labour.

Keywords: Postpartum haemorrhage, Intraumbilical oxytocin, Intramuscular oxytocin, Intravascular oxytocin

INTRODUCTION

India has a maternal mortality rate of 167/1,00,000 live births and the most common cause of maternal mortality is haemorrhage which accounts for 25-30%.¹ of maternal mortality of which postpartum haemorrhage is a significant cause and one of the most dreaded and common complication of third stage of labour accounting for 15-25% of maternal deaths in India.² The World Health Organization (WHO) reported that India's MMR, which was 560 in 1990, reduced to 178 in 2010-2012. However, as per the MDG mandate, India needs to reduce its MMR further down to 103. Though India's

MMR is reducing at an average of 4.5 per cent annually, it has to bring down the MMR at the annual rate of 5.5% to meet the Millennium Development Goal.³

The third stage of labour is the most crucial stage, begins with expulsion of baby and ends with expulsion of placenta and membranes. Its average duration is 15 min in both primigravida and multigravida. The incidence of the PPH is 3.9% of vaginal deliveries and 6.4% of CS.⁴

Postpartum bleeding or postpartum haemorrhage (PPH) is often defined as 10% drops in haematocrit from the admission to post-delivery or more than 500 ml of blood

following childbirth till the end of puerperium. Reducing likelihood of PPH by routine active management of 3rd stage of labour, could play an important role in reducing maternal mortality and morbidity.⁵ Active management of third stage of labour (AMSTL) involves the use of prophylactic oxytocic drug within 1-2 minute of birth, expulsion of placenta by controlled cord traction followed by uterine massage. Oxytocin requires parental route. So, the routine practice in AMSTL is oxytocin 10U I/M given within 2 minutes of delivery of baby. Sometimes, it is also given by I/V route. The onset of action of I/M oxytocin is 3-5mins and persist for 2-3hrs, I/V oxytocin acts immediately but action lasts for 1hour. Several investigators think that the administration of oxytocin via the umbilical vessels significantly reduces the duration of third stage of labour, third stage blood loss and fall in haemoglobin in postpartum period.

This study aims to evaluate whether intraumbilical oxytocin given in same doses in the AMSTL, can reduce the duration and amount of bleeding during 3rd stage of labour as compared to routine protocol.

METHODS

This was a randomized prospective comparative study conducted in Muzaffarnagar Medical College, Muzaffarnagar, UP from April 2015 to September 2016. Exclusion criteria- preterm labour, previous caesarean section, Rh-negative mothers, intrauterine fetal death, mal presentation, multiple pregnancy, polyhydramnios, oxytocin induction or augmented cases, PROM, IUGR, medical disorders and hypertensive disorders of pregnancy, grand multipara, history of PPH in previous pregnancy, anaemia (Hb<11g/dl). Inclusion criteria: cephalic presentation, singleton pregnancies, gestational age more than 37 weeks, previous normal vaginal delivery, Age 18-35 years, Hb \geq 11g/dl.

Cluster sampling technique was used to group them into three. In group 1, 200 women received intraumbilical oxytocin in 10U was diluted in 10ml in saline, Group 2, 200 women received intravenous oxytocin and Group 3, 200 women received intramuscular oxytocin after delivery of baby.

Duration of active labour was monitored by following the partogram in the labour room. In group 1, after delivery of the baby and cord clamping, umbilical vein was identified and 10 units oxytocin diluted in 10ml normal

saline was injected. Placental delivery was conducted by control cord traction. Injection-delivery time and the third stage duration were recorded using a clock. In-group 2, oxytocin 10 units IV slowly was given to the mother and in group 3, oxytocin 10 units IM was given to the mother, recording events in the same way as in group 1.

Blood loss was collected in a bowl by firmly pressing the bowl against the perineum after the delivery of the baby and was measured by measuring cup in millilitres. Soaked gauges, pads and blood clots were weighed standardizing one-millilitre of blood to weighs 1- gram. Women were followed for one-hour post-delivery and all additional blood loss was recorded. Baby's Apgar, weight, sex and weight of placenta were noted. The mean duration of third stage of labour and the mean blood loss was analysed in relation to age, parity, duration of pregnancy, duration of labour, baby's weight. All women had repeat haemoglobin after 24hours of delivery.

Data analysis

The mean duration of third stage of labour and the mean blood loss during third stage is analysed in relation to parity, duration of pregnancy, duration of labour. The level of significance tested by t test and chi square test. The resultant P value is considered significant if $p < 0.05$. SPSS version 10 has been used for calculations and tabulations.

RESULTS

The three groups of women were similar in age, parity, gestational age and duration of first and second stage of labour (Table 1). There was statistically significance difference in the duration of third stage of labour using either IU, IV, IM oxytocin (1.703 vs 2.53 vs 2.93 mins).

The third stage blood loss was more in IV than in IU and IM groups, however it is significantly higher when blood loss for one hour postpartum was taken (95.35 vs 190.6 vs 125.9 ml $p=0.00001$) in IU, IV and IM respectively (Table 2). There was no need for additional oxytocin to control bleeding in the postpartum period. The fall in Hb after 24hrs of delivery was (0.11 \pm 0.13 vs 0.16 \pm 0.15 vs 0.12 \pm 0.13) in group 1, 2 and 3 respectively. There was no statistically significant fall in Hb after 24hrs of delivery. There was no PPH and no retained placenta in either groups.

Table 1: Baseline profile (mean \pm SD).

Characteristics	Group 1	Group 2	Group 3	p value
Age	26.38 \pm 5.058	25.39 \pm 4.73	25.89 \pm 4.907	$p=0.433$ (NS)
Parity	1.725 \pm 1.036	2.165 \pm 1.133	2.45 \pm 1.133	$p=0.878$ (NS)
Gestational age	38.25 \pm 0.87	38.31 \pm 0.889	38.49 \pm 0.86	$p=0.602$
1 st stage duration	7.52 \pm 1.09	7.458 \pm 1.194	7.54 \pm 1.062	$p=0.181$
2 nd stage duration	18.56 \pm 8.165	18.34 \pm 8.40	18.636 \pm 8.39	$p=0.993$

Table 2: Duration of third stage of labor in group 1, group 2 and group 3.

Time (mins)	Group 1(%)	Group 2(%)	Group 3 (%)
<1	8(4%)	5(2.5%)	10(5%)
1 to 2	140(70%)	18(9%)	12(6%)
2 to 3	25(12.5%)	109(54.5%)	35(17.5%)
3 to 4	17(10%)	64(32%)	135(67.5%)
>4	10(5%)	4(2%)	8(4%)
Chi Square value= 361.1121 Df= 8 p=0.00001 (Significant)			
Mean±SD (mins)	1.703±0.918	2.53±0.76	2.931±0.87405

Table 3: Blood loss in third stage of labor in group 1, group 2 and group 3.

MI	Group 1 (%)	Group 2 (%)	Group 3(%)
<50	7(3.5%)	4(2%)	6(3%)
50 -100	130(65%)	11(5.5%)	37(18.5%)
100-150	42(21%)	36(18%)	135(67.5%)
150-200	11(5.5%)	98(49%)	12(6%)
>250	7(5%)	51(25.5%)	10(5%)
Mean±SD (ML)	95.35±51.15	190.6±77.13	125.9±54.768
Chi Square value= 398.542 Df=8 p=0.00001 (Significant)			

Table 5: Comparison of the present study with others studies

Author	Methods of management	3 rd stage of labour in mins	Blood loss in 3 rd stage of labour in ml
Dahiya et al	20 units of oxytocin diluted in 20 ml saline in umbilical vein	1.48	
	Oxytocin IV infusion i.e. 10 units in 250 ml of dextrose saline	3.27	
Kore et al	10 units of oxytocin 20 ml saline IU	5.6±3.2	125±30
	20units of oxytocin in 20 ml of saline IU	10.2±2.8	275±55
Shrestha et al	10 units of oxytocin diluted with 10 ml of normal saline IU	6.02	143.30
	10 units of oxytocin in 500 ml of normal saline intravenous infusion	5.42	151.43
Ojha et al	10 units of oxytocin in 10 ml of normal saline IU	3.6±1.5	96.2±79.
	10 units of oxytocin IM	3.7±1.3	77.7±58.1
Manhas et al	20units of oxytocin in 20 ml of saline IU	3.17±1.55	107±13
	0.2 mg of methylergometrine	8.22±2	195±33
	10 units of oxytocin IM	4.6±2	113±15

He reported significant reduction in duration of third stage of labour (1.48min vs 3.27min), fall in haemoglobin (<1.2g/dl vs 1.96g/dl) and fall in haematocrit (<3.88% vs 7.2%) in cases as compared to control. Kore et al, injected 100 patients with 10 units of oxytocin in 20 ml of saline and 100 controls with I.V oxytocin, mean duration of third stage in study group was 5.6±3.2 min which was statistically less than 10.2±2.8min in control (p<0.01).⁷

DISCUSSION

The use of oxytocics immediately after the delivery of the baby is one of the most important intervention, to prevent blood loss postpartum, as uterine atony is the most important and common cause of postpartum haemorrhage.

Several studies have reported intraumbilical oxytocin to be effective in reducing the duration of third stage of labour and blood loss. Dahiya managed 50 study cases with 10 units of oxytocin diluted in 20 ml saline given through umbilical vein immediately after cord clamping and 50 control, managed actively with 10 units of oxytocin diluted in 250 ml saline at rate of 125ml/hr given after delivery of the baby.⁶

Table 4: Haemoglobin level at the time of admission and after 24hrs of delivery.

Hb	Group 1	Group 2	Group 3
At the time of admission	11.91±0.91	11.80±0.88	11.50±0.88
24hrs after delivery	11.80±0.78	11.64±1.03	11.38±0.75
Fall in haemoglobin	0.11±0.13	0.16±0.15	0.12±0.13
P value	0.210	0.100	0.125

Also the average blood loss in study group 125±30ml was significantly less than control group 275±55ml (p<0.01). Shrestha P et al, injected 10 units of oxytocin diluted with 10 ml of normal saline given through umbilical vein while control group was managed with 10 units of oxytocin in 500 ml of normal saline through intravenous infusion after delivery of the baby.⁸ She reported the mean blood loss in the third stage of labour was 143.30 ml for the case group and 151.43 ml for the

control group while the duration of the third stage of labour was 6.02 and 5.42 minutes for each group respectively. There was significant reduction of blood loss in case group.

Ojha et al, managed 120 women, who were divided into 2 groups administering 10 units of oxytocin; in Group I: oxytocin was diluted mixing with 10 ml of normal saline before it was infused intraumbilical and Group II: injected intramuscularly. There was no difference in the duration of third stage of labour (3.6 vs. 3.7min) between the two groups.⁹ There was no significant blood loss in the intraumbilical group as compared to intramuscular group (96.2±79.2 ml vs. 77.7±58.1 ml, p= 0.148). Manhas A et al conducted a study in which Group 1 received umbilical vein injection of oxytocin.¹⁰ Group 2 received intraumbilical vein saline injection while subjects in group 3 were managed with systemic methylergometrine, 0.2mg intravenous at the delivery of anterior shoulder. He reported the reduction of the duration of 3rd stage of labour (3.17± 1.55 vs 8.22±2 vs 4.6±2, p<0.001), blood loss in the 3rd stage of labour (107.11±13.86 vs 195.04±33.30 vs 113.17±15.79). There was significant difference in the duration of third stage of labour and reduction of blood loss in third stage of labour.

Present study showed significant difference in third stage of labour 1.703±0.918 vs 2.53±0.76 vs 2.931±0.87, p=0.00001). There was significant blood loss in the intraumbilical group as compared to intramuscular group (95.35±51.15 vs 190.6±77.13 vs 125.9±54.768, p 0.00001).

CONCLUSION

We concluded that the method of intra-umbilical injection of oxytocin immediately after the delivery of the baby but before the delivery of placenta, significantly reduced the duration of the third stage of labour and the amount of blood loss in the third stage of labour as compared to the intramuscular and intravenous oxytocin injection. It appears to be safe, useful and practical method for the active management of third stage of labour with no significant effect on maternal and perinatal health. Further large scale studies with more number of patients are needed to confirm these findings and make recommendations.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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