

Active management of third stage of labour by oxytocin: Umbilical vein versus intramuscular use

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Abstract

Aim: To compare oxytocin used via intraumbilical or intramuscular route in the active management of third stage of labour with respect to duration and amount of bleeding.

Methods: Prospective comparative study conducted in Maternity Hospital, Thapathali, Kathmandu for three months 29th April – July 28th 2004 (061/1/16 to 061/4/12 BS). After immediate umbilical cord clamping following vaginal delivery, 120 women were divided into 2 groups administering 10 units of oxytocin; in Group I: which was diluted mixing with 10 ml of normal saline before it was infused intraumbilical and Group II: injected intramuscularly.

Results: There was no difference in the duration of third stage of labour (3.6 vs. 3.7min) between the two groups. There was significant blood loss in the intraumbilical group as compared to intramuscular group (242ml vs.168ml, p. 0.004). The need for additional oxytocic to control the uterine bleeding was more in intraumbilical group as compared to intramuscular group (28.3% vs 6.7%, p 0.005). There was more postpartum haemorrhage (PPH) in intraumbilical group (8.3% vs 3.3%, p 0.439). The injection delivery interval was significantly longer in the intraumbilical group as compared to intramuscular group (46.9 vs. 30.7 sec).

Conclusion: Intraumbilical oxytocin is technically more difficult to administer without having any added benefit either in decreasing the duration of third stage of labour or reducing the blood loss.

Key words: Intraumbilical oxytocin, intramuscular oxytocin, third stage of labour.

Introduction

The third stage of labour is the duration from the birth of the baby to the delivery of the placenta. Every labour has a potential risk of post partum hemorrhage (PPH) – the foremost cause of maternal mortality in our country as shown from study done by Family Health Division in 1998 at community level; it was responsible for 46.2% of direct cause of maternal death.¹

Active management of third stage of labour (AMTSL) involves the use of prophylactic oxytocic drug within 1-2 minute of birth, controlled cord traction once the uterus is contracted and uterine massage to prevent PPH. Spencer² in 1962 advocated controlled cord traction before signs of placental separation in 1000 women and reported mean duration of third stage of

labour to be 6.3 minutes and mean blood loss as 90 mls. Comparison of active and expectant management of third stage of labour have been systematically reviewed, which is found in Cochrane Library³. In the three large randomized controlled trials, AMTSL reduced the risk of PPH, the incidence of prolonged third stage of labour (>30minutes) and the need for blood transfusion⁴⁻⁶.

Oxytocin require parental route and several investigators think that the administration of oxytocin via the umbilical vessels significantly reduced the duration of third stage of labour, third stage blood loss and fall in hemoglobin in post partum period.

This is one of the busiest hospital with 21,957 annual admission 76% are delivery cases (April, 2001-March

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2002). The routine practice in AMTSL is Oxytocin 10 units IM given within two minutes of delivery of the baby, as the uterus contracts followed by control cord traction. The average duration of third stage was 5.50 min and the average blood loss 143.75ml in 100 studied vaginal deliveries with this practice in this hospital.⁷

This study aims to evaluate whether intraumbilical oxytocin in the AMTSL can reduce the duration and amount of bleeding as compared to routine protocol, given in same doses.

Methods

This was a prospective comparative study conducted in Maternity Hospital, Thapathali, Kathmandu for three months period April – July 2004 (2061/1/16 to 2061/4/12) in 120 laboring women after the vaginal deliveries who were divided into two groups. Exclusion criteria were previous caesarian section, Rh-negative mothers, intrauterine fetal death, oxytocin induction or augmented cases, medical disorders and hypertensive disorders of pregnancy, grand multipara and history of PPH in previous pregnancy. Inclusion criteria was singleton pregnancies with gestational age³ 37 weeks and having normal labour followed by normal vaginal delivery.

Simple random sampling technique (single blind) was used to group them into 2. In Group I - 60 women received intraumbilical injection oxytocin 10 units diluted in 10 ml normal saline immediately after cord clamping and Group II- 60 received intramuscular injection oxytocin 10 units after cord clamping.

Duration of active labour was monitored by following the partograph. In the labour room, after delivery of the baby and cord clamping in-group I, umbilical vein was identified and 10 units oxytocin diluted in 10ml normal saline was injected. Placental delivery was conducted by CCT. Injection-delivery time and the third stage duration were recorded using a clock. In-group

II, oxytocin 10 units IM was given to the mother after cord clamping recording the events in the same way.

Blood loss was collected in bowl by firmly pressing the bowl against the perineum after the delivery of the baby and was measured by measuring cup in milliliters. Soaked gauges, pads and blood clots were weighed standardizing one-milliliter of blood to weighs 1- gram.⁸

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.

Data analysis

The mean duration of third stage of labour and the mean blood loss is analysed in relation to parity, duration of pregnancy, duration of labour, baby's weight. The level of significance tested by t test and chi square test. The resultant P value is considered significant if $p < .05$. SPSS version 10 has been used for calculations and tabulations.

Results

The two groups of women were similar in age, parity, gestational age and length of first and second stage of labour (Table 1). The birth weight of the newborn was higher in the intraumbilical group (3025 vs 2875 gm, p 0.003). Table 2. Clearly shows no difference in the duration of third stage of labour using either IU or IM oxytocin (3.6 vs. 3.7 min). The third stage blood loss was more in IU than in IM group, however it is significantly higher when blood loss for one hour postpartum was taken (242 vs. 168 ml, p .004).

The need for additional oxytocin to control bleeding in the postpartum period was more in intraumbilical than with intramuscular group (28.3 vs 6.7%, p 0.005). Similarly PPH was more with intraumbilical oxytocin though not significant (8.35% vs. 3.45%) (Table 3).

Table 1. Baseline profile (mean \pm SD)

Characteristics	IU oxytocin(n=60)	IM oxytocin (n=60)	p value
Age (yr.)	22.9 \pm 3.9	22.5 \pm 3.3	0.536
Parity	.58 \pm .61	.73 \pm .73	0.228
Hb-predelivery (gm/dl)	11.5 \pm .94	11.7 \pm .92	0.259
Gestational age (wks)	39.9 \pm 1.7	40.0 \pm 1.2	0.765
1 st stage duration (min)	251.9 \pm 115.9	276.4 \pm 145.9	0.310
2 nd stage duration (min)	26 \pm 13.5	24.4 \pm 14.1	0.524
Inj delivery interval (sec)	30.7 \pm 10.3	46.9 \pm 11.6	<0.001*
Newborn weight (gms)	3025 \pm 404.7	2875 \pm 351.8	0.033*

*p value significant

Table 2: Studied variables (mean \pm SD)

Characteristics	IU oxytocin(n=60)	IM oxytocin (n=60)	p value
3 rd stage duration (min)	3.6 \pm 1.5	3.7 \pm 1.3	0.600
3 rd stage blood loss (ml)	96.2 \pm 79.2	77.7 \pm 58.1	0.148
Blood loss in upto 1 hr (ml)	242 \pm 156.3	168 \pm 119.5	0.004*

*p value significant

Table 3. Third stage problems

Characteristics	IU oxytocin(n=60)	IM oxytocin (n=60)	p value
Additional oxytocin required	17 (28.3)	4 (6.7)	0.005*
PPH in one hour	5(8.3)	2 (3.4)	0.439

*p value significant

There was no retained placenta in either group.

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. Reddy et al⁹ in 1989 randomized women to receive intravenous oxytocin after placental delivery (n=25) or oxytocin via umbilical vein after cord clamping (n=25). Those who received umbilical oxytocin had shorter third stage of labour (4.1 vs. 9.4min) (p<.0001), less measured blood loss (135 vs. 373ml) (p<.02), and a lower drop in hematocrit (3.9 vs. 6.2%) (p<.01). Similarly, Dahiya et al¹⁰ in 1995, 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. 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 al¹¹ in 2000, 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 \pm 3.2 min which was statistically less than 10.2 \pm 2.8min in control (p<. 01). Also the average blood loss in study group 125 \pm 30ml was significantly less than control group 275 \pm 55ml (p<.01).

On the contrary, present study showed almost no difference in third stage of labour (3.6 vs.3.7 min, p 0.60). There was significant blood loss in the intraumbilical group as compared to intramuscular group (242ml vs 168ml, p 0.004). This is difficult to explain or could be reasoned out because of larger newborn weight (3025 vs 2875.8gm) and longer injection delivery interval (46.9 vs 30.7 sec) in the intraumbilical group. Another speculation is lower amount of normal saline used 10ml in the study vs. 20ml in other researches which is less effective in facilitating uterine contraction. Similar findings have been obtained in study by 'Porter et al¹² who randomized women to receive either IU or IV oxytocin. Women who received IU oxytocin had significantly greater calculated blood loss compared with those who received peripheral administration (p=.01). There was no difference between the groups in the length of the third stage of labour.

Conclusion

Intramuscular oxytocin in the doses of 10 mg used in the active management of third stage of labour is technically easier to use and is more beneficial in reducing the blood loss than diluted oxytocin in the same dose prepared by mixing 10 ml of normal saline infused intraumbilically.

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