

Effect of Intraumbilical Oxytocin on Duration of Third Stage of Labour

Tabinda Khalid ¹, Nisar Ahmed Malik ², Zainab Sarfraz ³

1. Department of Gynae/Obs, Cantonment General Hospital Rawalpindi; 2. Cantonment General Hospital Rawalpindi; 3. Medical student, Rawal Medical and Dental College

Abstract

Background: To determine the efficacy of intraumbilical oxytocin in reducing duration of third stage of labor, compared to routine active management of third stage of labor (AMTSL).

Methods: In this randomized controlled trial one hundred parturient women were divided in two groups consisting of 50 each. Active management of third stage was done in both the groups. The study group in addition to active management, received oxytocin 10 international units (IU) diluted in 10ml normal saline through the umbilical vein and control group received equal volume of normal saline as placebo. The mean time taken for the completion of third stage was calculated for both groups in terms of minutes. The mean time "t" between the two groups was compared using Independent sample- t test. P value < 0.05 was taken significant.

Results: The mean duration of third stage of labor was 4.38 ± 0.88 minutes in the study group, compared to 5.12 ± 1.32 minutes in the control group which was significant statistically $p = 0.001$. There was no incidence of retained placenta and none of placenta remain undelivered beyond 15 minutes in both groups.

Conclusion: Intraumbilical oxytocin when given along with active management significantly reduces the mean duration of third stage of labour, compared to active management alone.

Key Words: Oxytocin, Third stage of Labour, Intraumbilical uterotonics.

Introduction

Actively managed third stage is known to reduce the incidence of retained placenta and life threatening blood loss. Recently studies to evaluate the efficacy of uterotonics like oxytocin or misoprostol administered through the umbilical vein using pipingas technique in reducing the duration of third stage of labour, incidence of retained placenta, and associated blood

loss, show controversial results. Third stage of labour is an important event occurring during normal vaginal delivery. Third stage of labour commences with the delivery of the baby till delivery of placenta and membranes. The uterus contracts and retracts even after delivery of the baby, which facilitates the separation of placenta, and occludes the blood flow to the placental site by compression due to criss cross arrangement of smooth musculature. Hence a prolonged third stage and retained placenta can lead to major obstetric haemorrhage. An attempt to prevent such catastrophies has lead to development of third stage of labour. If managed expectantly third stage of labour can last up to one hour. But when actively managed it lasts from 5 to 15 minutes. Risk of postpartum haemorrhage (PPH) increases significantly when duration of third stage is 20 minutes or more.¹ AMTSL, includes the use of uterotonics (Oxytocin), early clamping of umbilical cord and controlled cord traction (CCT) for delivery of placenta using the Brandt Andrews method and uterine massage. AMTSL can save the woman from life threatening blood loss around 1000ml.² Postpartum haemoglobin was higher, and duration of third stage was shorter ($p = 0.001$) in actively managed group.³ Controlled cord traction decreases the risk of manual removal of placenta and PPH.^{4,5} Use of oxytocin in AMTSL and CCT reduce risk of PPH by 66%.⁶

About 83.3% maternal deaths in Pakistan are caused by serious postpartum bleeding⁷. Most women are anaemic due to malnutrition, repeated child births and a general trend in low socio economic group to seek traditional attendants, who have no knowledge about timely use of uterotonics and their importance. AMTSL, with oxytocin as uterotonic is a good strategy for preventing PPH in low resource countries. However due to its heat instability and requirement of a trained person, misoprostol can be used.⁸

Natural Oxytocin is a peptide hormone released from posterior pituitary. Synthetic Preparations have wide spread use. Oxytocin is the preferred uterotonic in AMTSL when compared to, ergometrine, due its serious

cardiovascular side effects⁹. Another study found oxytocin more effective in preventing uterine atony, than misoprostol.¹⁰

Recent trials have compared the efficacy of different uterotonics injected through the umbilical vein using piping as technique. Our local study using intraumbilical oxytocin showed significant reduction in duration of the third stage of labour. This study used combination of oxytocin and Ergometrine as active management. The mean time duration was 2.59±0.52 minutes in study group, and 7.56 minutes±3.9 in control group, which was statistically significant (p=0.001, 95% CI 4.80-5.46).¹¹

According to recent guidelines on PPH, ergometrine + oxytocin versus oxytocin 5 and 10 international units (IU), alone have similar efficacy in prevention of postpartum hemorrhage. The prophylactic of ergometrine needs to be weighed against its adverse effects. Ergometrine itself causes strong uterine contractions and facilitates delivery of placenta, hence appears to be a confounding factor. Therefore in our study diluted oxytocin 10 IU was used both for intravenous and intraumbilical routes. The procedure is simple, inexpensive and without serious maternal or fetal side effects.

Patients and Methods

One hundred parturient women were included in this study conducted at Pakistan Railways hospital between Dec 2012, till May 2013. Fifty patients were assigned randomly to each group after fulfilling the inclusion criteria. Low risk, singleton, term (37-40 completed weeks of gestation) women, with cephalic presentation of the baby in spontaneous labour, were enrolled. All high risk cases, i.e. pre eclampsia hypertension, multiple pregnancies, preterm or post dates, previous cesarean section, diabetes and fetal macrosomia, severe anaemia, other medical disorders, and contraindication for vaginal delivery were excluded. All patients were booked (least six antenatal visits) Parity of the patients ranged from 0-5 and Age from 21-35 years. A time duration of greater than 15 minutes was considered a prolonged third stage. Study was conducted by making two equal groups 50 each. Allocation to either group was random using lottery method. Patients with non reassuring cardiotocograph (CTG) or poor progress of labour were excluded. When cervical dilatation was 7-8cm, labour room staff was alerted to prepare delivery trolley and Intraumbilical injections. Oxytocin solution (10 IU + normal saline 10ml) labelled as syringe A, or equal volume of placebo labelled as syringe B. Active management of third stage was done in both the groups, which included Intravenous oxytocin (10 IU) slowly at the delivery of anterior shoulder of the baby.

Umbilical cord was clamped as soon as baby was delivered. Intraumbilical injection was given after delivery of the baby, through syringe about 2cm away from introitus, over 20 to 30 seconds and solution was milked towards cord insertion. In this way the study group A, in addition to active management, received oxytocin solution through the umbilical vein, and control Group B received active management and equal volume of placebo. Delivery of placenta was facilitated by Brandt Andrew method of controlled cord traction both groups, when signs of placental separation were observed. The time taken for the completion of third stage was calculated in terms of minutes. The mean time "t" between the two groups was compared using Independent sample- t test. A p value < 0.05 was taken significant.

Results

Parity ranged from 0 to 5. Majority were multiparous with only 21 primigravidas (Table 1). Mean parity being 2.9±1.54 in study group and 2.62±1.25 in control group (Table 2). Age ranged from 21 to 35 years, with 60 women between 21-29 years. Mean age in study and control groups were 26.56±0.84, 26.66±0.82 respectively (Table 3). The mean duration of third stage of labor was 4.38±0.88 minutes in the study group, compared to 5.12±1.32 minutes in the control group which was significant statistically p=0.001 (Table 4).

Table 1. Parity of patients and their percentage

Parity	Frequency	Percent
Primigravida	21	21.0
1	26	26.0
2	27	27.0
3	14	14.0
4	6	6.0
5	6	6.0
Total	100	100.0

There was no incidence of retained placenta 0% and none of the placenta remain undelivered beyond 15 minutes (our specified time limit) in either of the groups.

Table 2. Duration of third stage of labour

Intraumbilical oxytocin VS control	No	Mean ± SD	Std. Error or Mean	
Mean duration of 3 rd stage of labour	(A) Study	50	4.38±0.884	0.12451
	(B) Control	50	5.126±1.32	0.18713

p-value = 0.001

Hence third stage was not considered prolonged in both groups (15 ≥ min), although it was shorter with

the addition of intraumbilical oxytocin when given along with the active management of third stage of labor.

Table 3. Age of patients and their percentage

Age of patients in years	Frequency	Percent
21-24yrs	29	29.0
25-29yrs	31	31.0
30-35yrs	40	40.0
Total	100	100.0

Table 4. Age, duration of third stage, parity

A study, B control	Parity of patients	Age in yrs	Time In minutes
A Mean	2.9000	26.56	4.3880
N	50	50	50
Std.deviation	1.5419	0.8429	0.8804
B Mean	2.6200	26.66	5.1262
N	50	50	50
Std deviation	1.2599	0.8171	1.3232
Total Mean	2.7600	26.61	4.7571
N	100	100	100
Std	1.4079	0.8274	1.17808

Discussion

According to a study rate of AMTSL was 57% in Irani population. Oxytocin was used by 94% ,71% applied early clamping of umbilical cord and 65% used controlled cord traction.¹² Another study showed adequately performed AMTSL was only 48% in vaginal deliveries.¹³ There are variations in relation to choice of uterotonic, optimal dosing and time of administration. A study comparing intraumbilical oxytocin, intravenous carbetocin and sublingual misoprostol found that carbetocin was more effective (16.6±3.76 min) than Intraumbilical oxytocin (18.28±3.34 min) and misoprostol (23.00±3.38min).¹⁴ Habek D et al compared oxytocin, prostaglandins and ergot via umbilical route. The success rates in reducing duration of third stage were, 76.9%, 85.7% and 64.2% respectively.¹⁵ While some studies showed that misoprostol was more effective than oxytocin solution when given through umbilical route.¹⁶ Gungorduk et al found significant reduction in mean time of third stage in oxytocin group as compared to placebo (4.5±1.6min compared to 7.9±3.4 min p<0.001).¹⁷ Studies found the Intraumbilical intervention effective and safe.^{18,19} According to a randomized controlled trial a significant reduction in the rate of manual removal of placenta, uterine atony and need for additional uterotonics observed in the Intraumbilical oxytocin group compared to

controls.²⁰ Contrary to this, a systemic review found no role of oxytocin once a diagnosis a retained placenta was made.²¹

The strength of present study includes its design. In present study 10 IU oxytocin was used to avoid any harmful effect. Active management of third stage was done in both groups. In order to minimize the bias we provided the doctors conducting deliveries with equal volume of normal saline as placebo. One of the limitations of our study is that all term pregnancies (≥37-40 weeks of gestation) were included, while the risk of retained placenta and delayed third stage is more commonly associated with preterm deliveries. Secondly the age limit in our study was up to 35 years. Once again older maternal age is correlated with prolonged third stage and risk of PPH. We excluded the high risk cases e.g previous scar, multiple pregnancies, prolonged second stage and instrumental deliveries, medical disorders such as preeclampsia, severe anaemia, diabetes etc. So any benefit to high risk group has not be studied. Since there was no incidence of retained placenta, and none of placenta delivered beyond 15 minutes so active management of third stage still proved to be effective, and at present is the gold standard.

Use of intraumbilical route is an additional intervention, which may be attempted by a skilled person if placental separation has not occurred till 15 minutes, before attempting manual removal of placenta and in patients who are at very high risk of retained placenta and prolong third stage. This will not only reduce the third stage duration, but saves the patient from anaesthesia hazards, risks of manual removal of placenta, blood transfusions, and cost of prolonged hospital stay.

Conclusion

1. In a dedicated maternity unit, active management with timely use of uterotonic in optimal dose and route of administration can significantly reduce span of third stage.

2. Prophylactic use of intraumbilical oxytocin along with active management can cause a significant reduction in the mean duration of third stage of labor. However use of intraumbilical route is an additional intervention, which may be attempted by a skilled person if placental separation has not occurred till 15 minutes, before attempting manual removal of placenta and in patients who are at very high risk of retained placenta and prolong third stage. This will not only reduce the third stage duration, but saves the patient from anaesthesia hazards, risks of manual removal of placenta, blood transfusions, and cost of prolonged hospital stay.

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