

Comparison of Intravenous Versus Intra-Umbilical Oxytocin for Blood Loss and Placental Separation Time for Active Management of Third Stage of Labour

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ABSTRACT

Objectives: To compare intravenous (IV) versus intra-umbilical oxytocin for blood loss and placental separation time for active management of third stage of labour (TSL).

Methodology: This randomized controlled trial was done at "The department of Obstetrics & Gynaecology", Sialkot Medical College, Sialkot, Pakistan from December 2021 to May 2022. A total of 100 women (50 in each group), aged 18-40 years with singleton cephalic pregnancy having active labour were randomly allocated to either Group-A (IV oxytocin) or Group-B (intra-umbilical oxytocin). Time of placental separation along with blood loss were noted in all women.

Results: In a total of 100 women, mean age was 27.1±7.18 years. Mean gestational age was 38.12±1.3 weeks. Mean blood loss in Group-A (IV group) was 416.80±23.24 ml vs. 186.74±34.72 ml in Group-B (intraumbilical group), $p < 0.0001$. Placental separation time was 4.84±1.22 minutes in Group-A versus 1.70±0.72 minutes in Group-B ($p < 0.0001$).

Conclusion: Mean blood loss and time of placental separation were significantly less with intra-umbilical oxytocin in comparison to IV oxytocin for active management of TSL.

Keywords: Blood loss, intraumbilical, intravenous, oxytocin.

INTRODUCTION

The time span in between the birth of the baby and delivery of the placenta is termed as the third stage of labour (TSL). The life of the mother might be at higher risk because of the complexity during TSL. In developing countries, due to "postpartum hemorrhage (PPH)", maternal morbidity and mortality are high.¹ In order to deal with the TSL, two techniques are applied: active management and expectant management. It takes 6 minutes to 30 minutes for the completion of TSL. If the extent of the TSL can be curtailed, PPH can be handled. The reduction of the TSL time span is the active management, by which the chances of PPH are reduced up to 50%.²⁻⁴ It has been observed at times that there is a connection between the increased hemocratic morbidity and therapeutic interventions, if the TSL is extended.^{5,6}

We can avoid uterine atony and post-partum hemorrhage (PPH) by putting in active management of 3rd stage, so that the delivery of placenta could be made in a shorter period of time.⁷ In the prevention of PPH, oxytocin is administered right after the birth of the baby, which might be a distinct and significant preventative. The prior introduction of oxytocin in women prevents blood loss and it takes less time for the delivery of placenta, subsequently, there are less chances of PPH and the removal of the placenta manually.^{8,9} In the active management of the TSL, the common usage of injectable oxytocin has been suggested by the health experts, having half-life in between 4 to 10 minutes, therefore, normally it is infused slowly by maintaining IV line of the patient.¹⁰ To deliver the placenta oxytocin is injected into the umbilical cord as another option. Through umbilical vein, there is a direct transfer of oxytocin injection to the placental bed and the wall of uterus, so that early contraction of the uterus and disconnection of placenta takes place.¹¹ According to the report of a study, 421.40 ml was the mean loss of the blood in IV group and it took 4.32 minutes to disconnect placenta, whereas, mean blood loss in intra-umbilical group was found to be 179.25 ml and umbilical separation was done in 1.29 min.¹² For the active management of the TSL, it has always been into discussion to minimize the blood loss and to reduce the time to separate placenta, in this context mostly the intravenous oxytocin has been used in our routine practice without going for a comparative analysis for intra-umbilical oxytocin. Therefore, we planned to go for a comparison between intravenous oxytocin and intra-umbilical oxytocin to establish a better option. We were only able to find insufficient

randomized trials in the international literature, whereas, In Pakistan no such data is available, that is why, these trial would be a valuable contribution.

METHODOLOGY

This randomized controlled trial was conducted at "The department of Obstetrics & Gynaecology", Sialkot Medical College, Sialkot, Pakistan from December 2021 to May 2022. Approval from "Institutional Ethical Committee" was acquired and written consents were taken. Inclusion criteria were women aged 18-40 years having singleton cephalic pregnancy (as per ultrasound findings) with gestational age between 36-40 weeks, parity 1-5 and having active labour (complete cervical dilatation [10 cm] and descent of the presenting fetal part). Exclusion criteria were women having gestational diabetes mellitus, history of hypertension, bleeding disorders, arrhythmias, heart failure or asthma.

A total of 100 women (50 in each group) were randomly allocated to either Group-A (20 units of oxytocin diluted in 500ml of normal saline following delivery) or Group-B (20 units of oxytocin diluted in 20ml of normal saline instilled into umbilical vein following clamping of the cord. Time of placental separation along with blood loss were noted in all women.

Data analysis was performed by "Statistical Package for Social Sciences (SPSS)" version 26.0. Effect modifiers were handled through stratification while post-stratification chi-square test was applied to see their effects on the outcomes for qualitative data while student t-test was used to compare quantitative data considering $p < 0.05$ as statistically significant.

RESULTS

In a total of 100 women, the mean age was 27.1±7.18 years (ranging between 18-44 years) while 51 (51.0%) women were aged between 18-30 years. Mean gestational age and mean BMI were 38.12±1.3 weeks and 30.53±2.72 kg/m² respectively. Table-1 is showing comparison of characteristics of the women.

Mean blood loss in Group-A (intravenous group) was 416.80±23.24 ml versus 186.74±34.72 ml in Group-B (intraumbilical group), $p < 0.0001$. Placental separation time was 4.84±1.22 minutes in Group-A versus 1.70±0.72 minutes in Group-B ($p < 0.0001$).

Table-1: Distribution of Study Variables (n=100)

Study Variables	Group A (n=50)	Group B (n=50)	P Value
Age (years)			
18-30	23 (46.0%)	28 (56.0%)	0.3172
31-40	27 (54.0%)	22 (44.0%)	
Gestational age (weeks)			
36-38	26 (52.0%)	27 (54.0%)	0.8412
39-40	24 (48.0%)	23 (46.0%)	
Parity			
1-3	42 (84.0%)	40 (80.0%)	0.6027
4-5	08 (16.0%)	10 (20.0%)	
BMI			
≤30	26 (52.0%)	23 (46.0%)	0.5484
>30	24 (48.0%)	27 (54.0%)	
h/o Previous Cesarean Section	17 (34.0%)	19 (38.0%)	0.6769

Table-2: Comparison of Mean Blood Loss (ml) and Mean Placental Separation Time (minutes)

Outcomes	Group A (n=50)	Group B (n=50)	P-Value
Blood Loss (ml)	416.80±23.24	186.74±34.72	<0.0001
Placental Separation Time (minutes)	4.84±1.22	1.70±0.72	<0.0001

DISCUSSION

Postpartum hemorrhage (PPH) is the frequently occurring problem in the TSL, and looking into the basic reasons of PPH, the extended TSL due to the incomplete separation of placenta and uterine atony are the most frequent to be observed among the patients.¹³ Way back in 1995, a study was conducted in Rohtak Hospital, India, looking for out-turn of oxytocin given through umbilical vein to prevent the blood loss and lessen the duration of placental separation in TSL. They executed the study on two groups, including 50 pregnant females to each group. In the experimental group, they instantly administered a dilution of 10 IU of oxytocin into 20 ml of normal saline, through umbilical vein, as they clamped the umbilical cord. In the control group of the females, placenta was detached traditionally. The duration of the TSL came out to be 1.48 minutes for experimental group and 3.27 minutes for the control group. The separation of the placenta can be achieved through the hydraulic effect of the injected solution by pressing mechanically.¹⁴

According to our study results, in group A (intravenous group), the mean blood loss was recorded 416.80±23.24 ml and the mean time taken for the removal of placenta was 4.84±1.22 minutes, whereas, in group B (intraumbilical group), was 186.74±34.72 ml and 1.70±0.72 min respectively (p<0.0001). Another study analyzing 178 women with singleton pregnancy and normal delivery revealed that intra-umbilical vein administration of oxytocin reduced TSL in comparison to placebo (4.2±3.3 min vs. 10.7±7.4 min, p<0.001). Moreover, it was noted that the requirement of the delivery of placenta manually had been reduced in the experimental group i.e., (1.1% vs. 5.1%) (P=0.024).¹⁵

Nazarpour S described that the extent of TSL was shortened substantially (4.45 min vs. 6.93 min) in the group which received oxytocin through umbilical vein in contrast to the control group.¹⁶ In the same way, Kore et al reported that the TSL in study cases administered oxytocin lasted for lesser period of time giving a mean value of 5.6 ± 3.2 minutes versus 10.2 ± 2.8 minutes in control group (p<0.01).¹⁷

In a prospective, randomized, double-blind trial of 412 women¹⁸ who were bearing a normal delivery and had no prospects of postpartum hemorrhage, were unbiasedly divided into two groups, one of the groups (n=207) was served with 20 IU of oxytocin diluted with 26 ml of normal saline, and the other group (n=205) received only 30 ml of normal saline through umbilical vein. It was assessed that in patients who received oxytocin, prominently less blood was lost as compared to the patients who did not receive oxytocin (195.3±81.0 ml vs. 288.31±34.1 ml, p<0.001). In the experimental group there was a remarkable decrease in the duration of the TSL when compared with placebo group (4.5±1.6 minutes vs. 7.9±3.4 minutes p<0.001). In the oxytocin group it was noted that the percentages of undelivered placentas were 0% after 15 minutes and in the placebo group it was 4.4% (p=0.002). In a locally conducted study, 500 females pertaining to birth with minimal risk singleton term pregnancy were registered. In a randomized way, 250 females were contained in each study and control group.¹⁹ It was noted that the loss of blood in the women placed in the study group and were given syntocinon through umbilical vein, was

234.03 ml, whereas 276.51 ml (p=0.001) blood was lost in the control group. In 1995, a study was conducted in Bangkok, which represented that no substantial difference was found between the two groups.²⁰ A study described that no major differences among women who had intra-umbilical oxytocin or normal saline regarding management in third stage of labour.²¹ In Florida, USA, a study showed that the time taken to complete the TSL by the group which received intravenous oxytocin was not very much different than that of the group which received oxytocin through umbilical vein additionally. In contrast, 50 patients were studied in March 1998 in the very same hospital, which established that lesser time was taken to complete the TSL by experimental group.²²

CONCLUSION

Mean blood loss and time of placental separation were significantly less with intra-umbilical oxytocin in comparison to IV oxytocin for active management of TSL.

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