**ORIGINAL ARTICLE**

# COMPARISON OF MEAN DURATION OF 3RD STAGE OF LABOUR IN PATIENTS TREATED WITH AND WITHOUT INTRAUMBILICAL VEIN INJECTION OF OXYTOCIN

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## ABSTRACT

**Background:** Third stage of labor is managed actively to enhance the process of the placental delivery and decrease the duration of 3rd stage so as to minimize the risk of postpartum hemorrhage. A recent study concluded that infraumbilical administration of oxytocin significantly reduced the duration of 3rd stage as compared to control group and suggested its use in routine practice for the reduction in the risk of postpartum hemorrhage.

**Objectives:** The objective of this study was to compare the mean duration of 3rd stage of labor in patients treated with and without infraumbilical vein injection of oxytocin.

**Methods:** This study, a randomized controlled trial was conducted at Government Teaching Hospital, Shahdara from Jan-July 2022.This study involved 60 pregnant women who underwent vaginal delivery, divided further into two groups. After clamping and cutting of umbilical cord, women in Group-A also received intraumbilical oxytocin while the women in Group-B were taken as controls and only routine steps were taken to shorten 3rd stage of labor. Outcome variable was mean duration of 3rd stage which was recorded in minutes from delivery of baby to the delivery of placenta. Results were analyzed and compared between the groups.

**Results:** Mean age of the patients was 27.2±4.3 years while the mean parity was 2.85±1.83. There were 22 (36.7%) primiparas, 21 (35.0%) multiparas and 17 (28.3%) grand multiparas. Mean duration of 3rd stage was much shorter in women receiving intraumbilical oxytocin as in comparison to controls (4.33±1.52 vs. 9.40±2.77 minutes; p-value<0.001). Similarly, there was variation amongst subgroups based on age, parity and BMI.

**Conclusion:** Intraumbilical administration of oxytocin significantly reduced the mean duration of 3rd stage of labor which along with anticipated reduced risk of postpartum hemorrhage calls for the preferred use of intraumbilical oxytocin in the active management of 3rd stage of labor in future.

**Key Words:** 3rd Stage of Labor, Postpartum Hemorrhage, Intraumbilical Oxytocin

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## INTROCUTION

PPH is a leading reason of maternal mortality and morbidity wide-reaching and across many countries with a mortality rate of around 1.4 million per annum or one maternal death after every four minutes. PPH is

seen in 5% of all cases, most of death occurs in the first four hours of delivery showing that it has a relationship to third stage of labor[1].

PPH is defined as the blood loss of more than 500 ml for vaginal and further 1000 ml for cesarean deliveries within 24 hours of delivery. An authority defines it as blood loss of more than or equal to 1000 ml of blood, or blood loss along with clinical features of shock, within 24 hours of birth, irrespective of mode of birth. Royal College of Obstetrician and Gynecologists It is categorized by RCOG into minor and major categories depending on the blood loss[2].

Labor has three stages. First stage of labor signifies effective uterine contractions, leading to effacement the cervix, and dilatation to about 10 cm in diameter to facilitate the expulsion of the fetus from uterus. It comprises of latent and active phases. Second stage starts from full dilatation of the cervix to fetal expulsion and third stage is from delivery of the fetus from uterus to the delivery of the placenta and membranes. There is occlusion of blood flow to the placental site. The whole sequence of events explains the need for AMTSL. If left to nature the third stage could last for an hour. When managed actively it lasts for 5-15 minutes[3,4].

The published data on the subject has shown that risks of maternal complications, including postpartum hemorrhage and the morbidity that results, rise once after third stage gets prolonged more than 30 minutes. There has now been a shift towards active management of the third stage on a routine basis. This comprises of injecting an uterotonic drug, clamping the cord early, and giving controlled cord traction till the placenta is delivered. These management strategies have been decreased the incidence of postpartum hemorrhage more than by half[5,6].

Oxytocin a hormone released from posterior pituitary is a natural peptide. Synthetic formulations are available in Pakistan and widely used in labor management. Oxytocin has a better cardiovascular profile than ergometrine and more effective in the management of uterine atony. Few trials have also been conducted regarding the intraumbilical vein injection of oxytocin[7].

Nankali et al. in 2013 established that mean period of 3rd stage of labor in women receiving Intraumblical vein oxytocin was much shorter, ($p<0.001$)[8].

The rationale for this study is that there is not much local published data present on this topic to the best of our knowledge. As the prolonged period of 3rd stage of labor increases the rate of maternal complications, it is imperative to conduct this study in our set up so that the effect of this intervention could be experienced on set up and be of help in reducing the mortality and morbidity associated with prolonged 3rd stage of labor.

## METHOD

Study was a randomized controlled trial which was conducted at department of Obstetrics & Gynecology Government Teaching Hospital Shahdara, Lahore, from Jan-July 2022. Sample size of 26 cases was calculated according to the given variables which was then increased to sixty cases (30 in each group). It was calculated with 80% power of test and 95% confidence interval,[8] Subject selection was done by non-probability, Consecutive Sampling. Gravid females who were in the range of 18-35 years presenting at term (>37 week of gestation as per ultrasound) having delivered neonate through vaginal route were included in the study. Patients having undergone uterine surgery (as per clinical record), patients with history of postpartum hemorrhage (loss of >1000ml blood loss in 24 hours after the delivery), patients with multiple pregnancy, polyhydramnios (amniotic fluid index >95th percentile for the gestational age), placenta previa, detached placenta (on ultrasound), bleeding disorders (INR >1) as per investigations and patients who had epidural analgesia were excluded. Duration of third stage of labor was defined as time calculated in minutes starting from when the neonate is born till the delivery of placenta and is presented as mean.

After getting approved from Institutional review board of the hospital, 60 cases (divided into two groups) , admitted to labour room Government Teaching Hospital Shahdara fulfilling the above quoted criteria were counseled regarding the details of the study. Informed consent and detailed history obtained from each patient. Then these patients were divided randomly into following using lottery method

Group I: Intraumbilical oxytocin

Group II: Without Intraumbilical oxytocin

A 20 IU oxytocin in one Liter Ringer's lactate solution was infused at a rate of 100 mL/min, started after delivery of the fetus immediately, in both groups of the patients. In group-I, 10IU of oxytocin was injected into the umbilical vein at proximal most site to the placenta after clamping and cutting of the cord. The duration of 3rd stage of labor was noted. All recorded into the document along with demographic details of the patients. All deliveries were managed by the same team of the obstetric department including the

researcher for eliminating bias and confounding variables were checked by exclusion.

The data was entered and analyzed through SPSS version 25.0. Numerical variables (age, BMI and duration of 3rd stage of labor) were represented by mean ±SD. Independent sample t-test was used to compare mean duration of 3rd stage of labor between groups by taking p-value≤0.05 as significant. Categorical variables (parity) has been presented by percentage and frequency.nData was stratified for age, parity and BMI for handle effect modifiers. Post-stratification, t-test was used considering p-value≤0.05 as significant.

## RESULTS

Mean age of the patients was between 18 to 35 years with a mean of 27.2±4.3 years while the range of parity of the patients was from 1 to 6 with a mean of 2.85±1.83. There were 22 (36.7%) primiparas, 21 (35.0%) multiparas and 17 (28.3%) grand multiparas. The BMI of the patients ranged from 21.3 to 34.4 Kg/m$^2$. 19 (31.7%) patients were obese as shown in Table 1.

Both groups were comparable as far as mean age (p-value=0.860), mean parity (p-value=0.834), mean BMI (p-value=0.844) were concerned and distribution of various subgroups based on age (p-value=0.795), parity (p-value=0.866) and BMI (p-value=0.781) as indicated in Table 2.

Duration of 3rd stage of labor ranged from 1 to 16 minutes. It was significantly shorter in women receiving intraumbilical oxytocin in comparison to controls (4.33±1.52 vs. 9.40±2.77 minutes; p-value<0.001) as shown in Table 3. Similarly, the groups had differences across a variety of subgroups based on patient's age, parity and BMI as shown in Table 4.

Table No.1 Baseline Features of Participants

| Features | Participants n=60 |
|---|---|
| Age (years) | 27.2±4.3 |
| 18-26 years | 33 (55.0%) |
| 27-35 years | 27 (45.0%) |
| Parity | 2.85±1.83 |
| Primiparas | 22 (36.7%) |
| Multiparas | 21 (35.0%) |
| Grand Multiparas | 17 (28.3%) |
| BMI (Kg/m$^2$) | 27.5±3.9 |
| Non-Obese | 41 (68.3%) |
| Obese | 19 (31.7%) |

Table No.2 Baseline Features of Study Participants *n=60*

| Characteristics | Intraumbilical Oxytocin n=30 | Controls n=30 | P-value |
|---|---|---|---|
| Age (years) | 27.1±4.4 | 27.3±4.3 | 0.860 |
| 18-26 years | 17 (56.7%) | 16 (53.3%) | 0.795 |
| 27-35 years | 13 (43.3%) | 14 (46.7%) | |
| Parity | 2.80±1.81 | 2.90±1.88 | 0.834 |
| Primiparas | 12 (40.0%) | 10 (33.3%) | |
| Multiparas | 10 (33.3%) | 11 (36.7%) | 0.866 |
| Grand Multiparas | 8 (26.7%) | 9 (30.0%) | |
| BMI (Kg/m$^2$) | 27.6±3.9 | 27.4±3.9 | 0.844 |
| Non-Obese | 21 (70.0%) | 20 (66.7%) | 0.781 |
| Obese | 9 (30.0%) | 10 (33.3%) | |

Table No3 Comparison of Mean Duration of 3rd Stage of Labor (minutes) between Study Groups *n=60*

| | Intraumbilical Oxytocin n=30 | Controls n=30 | P-value |
|---|---|---|---|
| Duration of 3rd Stage (minutes) | 4.33±1.52 | 9.40±2.77 | <0.001* |

Table No.4 Comparison of Mean Duration of 3rd Stage of Labor (minutes) between the Study Groups across various Subgroups *n=110*

| Subgroups | Duration of 3rd Stage (minutes) | | P-value |
|---|---|---|---|
| | Intraumbilical Oxytocin n=30 | Controls n=30 | |
| Age | | | |
| 18-26 years | 4.24±1.56 | 9.38±2.63 | <0.001* |
| 27-35 years | 4.46±1.51 | 9.43±3.03 | <0.001* |
| Parity | | | |
| Primiparas | 4.25±1.60 | 9.40±2.17 | <0.001* |
| Multiparas | 4.40±1.17 | 9.36±2.87 | <0.001* |
| Grand Multiparas | 4.38±1.92 | 9.44±3.50 | 0.002* |
| BMI | | | |
| Non-Obese | 4.29±1.45 | 9.25±2.88 | <0.001* |
| Obese | 4.44±1.74 | 9.70±2.67 | <0.001* |

## DISCUSSION

Uterine atony is a serious obstetrical condition as it contributes to the majority of the cases of postpartum hemorrhage. PPH a prominent source of loss of maternal life so, it requires immediate medical attention, regardless of the fact whether delivery occurred vaginally or by a cesarean section[1]. Prolonged labor especially prolonged 3rd stage of labor is a major contributor to uterine atony and leads to PPH[1,2]. AMTSL has demonstrated promising results as compared to the traditional management.

AMTSL aims at reduction of length of 3rd stage. It leads to early uterine contraction and resumption of the tone[4,5].

AMTSL has proven to decrease the rate of severe PPH by 70% [6,7]. However, as there is a routine practice to administer oxytocin either intramuscularly or intravenously which may affect the drug efficacy as shown by a recent study where the researchers reported that intraumbilical administration of oxytocin led to limitation of the period of 3rd stage as compared to controls[8]. However, there was limited evidence and no such locally published material on the subject which led to the idea for conducting present study.

In the present study, the females undergoing vaginal delivery had a mean age of 27.2±4.3 years. Almost similar figures have been quoted by Iqbal et al. (2015) among pregnant women at term undergoing vaginal delivery at Karachi[9]. Shafer et al. (2014) also reported a mean age of 26.41±3.87 years among post-date patients who underwent SVD at the same hospital[10]. Fatima et al. (2013) reported a similar mean age of 26.3±5.3 years among women receiving labor induction at Divisional Head Quarter Hospital, Faisalabad[11].

Usman et al. also presented similar mean in such patients at Lady Reading Hospital Peshawar[12]. A much different mean age of 22±5.2 years is seen in a study by Abbasid et al. (2008) in patients who deliver vaginally[13]. Kumari et al. (2016) and Sharma et al. (2016) also quoted a mean age of 25.9±5.2 and 24.12±3.47 years respectively in Indian women undergoing simple vaginal delivery[14,15].

We observed that the mean duration of 3rd stage of labor was significantly shorter in women receiving intraumbilical oxytocin in comparison to controls (p-value<0.001). Similar difference was found in between groups across various subgroups based on patient's age, parity and BMI.

Our results are in conformity with those by Nankali et al. (2013) who also reported reduced mean duration of 3rd stage of labor in patients receiving intraumbilical oxytocin as compared to controls (4.24±3.27 vs. 10.66±7.41 minutes; p-value<0.001)[8].

A study done at Banha University, it was seen that intra umbilical vein oxytocin injection resulted in shorter duration of labour as well as less blood loss and less hemoglobin reduction[16]. In another trial conducted in 2017, it was observed that use of intraumbilical oxytocin, vigorously managing of third stage of labour considerably less the mean duration labor as compared to active management of third stage alone[17]. Both these recent studies substantiate our claim.

The present study is the one its kind done in local setup and is an addition to the existing data. The firmness of the present study includes its relatively large sample size and its study design. Strict exclusion criteria were followed and the results were stratified to address effect modifiers like parity, age and BMI.

The present study is the one its kind done in local setup and is an addition to the existing data. The firmness of the present study includes its relatively large sample size and its study design. Strict exclusion criteria were followed and the results were stratified to address effect modifiers like parity, age and BMI. However, various fetomaternal side effects with the intraumbilical administration of oxytocin were not considered which could have shed some light on the safety of this novel practice.

## CONCLUSION

In the index study, intraumbilical administration of oxytocin shortened the mean duration of 3rd stage of labor significantly which could lead to an anticipated reduction in the risk of postpartum hemorrhage. Such a study is vital and highly recommended in future clinical research.

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