

Comparative Study between Umbilical Cord Drainage, Cord Clamping and Intraumbilical Vein Oxytocin Injection in Management of Third Stage of Labour

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ABSTRACT

Background: Postpartum hemorrhage is the major cause of maternal mortality globally. So, the active management during the third stage of labor is recommended as a preventive measure. Active management includes measures that reduce duration and blood loss which occurs in this stage. The aim of this work was to compare between umbilical cord drainage, cord clamping and intraumbilical vein oxytocin injection in management of third stage of labour to reduce the incidence of postpartum hemorrhage and retained placenta. **Patients and Methods:** This is comparative clinical trial study which was conducted in Obstetrics and Gynecology Department – Zagazig University Hospitals and Zagazig General Hospital in the period from 1 January 2020 to 30 November 2020. Which included 90 women who were admitted at term pregnancy being in active phase of labour with Singleton pregnancy, Full term, no Medical disorders with pregnancy, and in whom fetal anomalies ruled out. **Results:** In this study we found that both group I and II had statistically significant shorter third stage duration and less blood loss than patients of group III. Mean \pm SD was 7.73 ± 3.11 for group I and 4.73 ± 1.8 for group II and 9.9 ± 3.69 for group III with highly significant difference P -value < 0.001 . The third stage of labor was significantly shorter in group 1 and 2 as compared to group 3. **Conclusions.** The use of intra umbilical vein injection of oxytocin and placental cord drainage significantly reduced the duration of the third stage of labor and blood loss.

Key words: Postpartum hemorrhage, Normal Labor, Labour, Oxytocin.

INTRODUCTION

Normal labour includes 4 stages: the first stage begins with the onset of labour and end with full cervical dilatation followed by the 2nd stage of labour including the interval between full cervical dilatation and delivery of the fetus then the 3rd stage of labour which is the duration from the birth of fetus to the delivery of placenta, umbilical cord and fetal membranes. The 4th stage of labor is hour or two after delivery when the tone of the uterus is re-established as the uterus contracts again, expelling any remaining contents. These contractions are hastened by breastfeeding, which stimulates production of oxytocin. The puerperium follows delivery and concludes with the resolution of the physiologic changes of pregnancy usually by 6 weeks postpartum in which the reproductive system returns to the nonpregnant state and ovulation may resume⁽¹⁾.

The duration of the third stage of labor is 5-15 min however, in 2-5% of cases, placenta retention occurs and if immediate treatment is not undertaken, these women are at risk of hemorrhage⁽²⁾.

The major complications of the 3rd stage of labor are: Hemorrhage, retained placenta, uterine inversion⁽³⁾.

Postpartum hemorrhage (PPH) is a leading cause of maternal death in low-income countries and the primary cause of approximately one of every four maternal deaths worldwide⁽⁴⁾.

Numerous factors lead to increase incidence of postpartum hemorrhage like prolonged labour. Multifetal gestation, large baby, anemia, eclampsia and operative vaginal delivery. However, two third of PPH occur in women with no known risk factors hence all pregnant women at risk for this catastrophic event⁽⁵⁾.

The third stage of labor is generally managed using two different approaches: active and physiological or expectant management. The active management involves administration of oxytocic drugs, clamping and cutting the cord as well as controlled cord traction. The physiological or expectant mainly involves maternal effort assisted by gravity or putting the baby to the breast without using artificial oxytocin or early clamping or cord traction⁽⁶⁾. The aim of this study was to compare between umbilical cord drainage, cord clamping and intraumbilical vein oxytocin injection in management of third stage of labour to reduce the incidence of postpartum hemorrhage and retained placenta.

PATIENTS AND METHODS

The current study was performed at Obstetrics and Gynecology Department – Zagazig University Hospitals and Zagazig General Hospital., in the period from 1 January 2020 to 30 November 2020.

Ethical consent:

Written informed consent was obtained from all participants and the study was accepted by the Research Ethics Committee of the Faculty of Medicine, Zagazig University. Study has been carried out on experiments involving human subjects in compliance with the Code of Ethics of the World Medical Association (Declaration Helsinki).

Sample size:

The sample size is 90 patients in active labour planed for vaginal delivery divided into 3 groups (30 in

each group) using open Epi with power 80% and C.I 95%.

The Inclusion criteria: Gestational age between (37-41) completed weeks determined by last menstrual period and early ultrasound scan. Singleton pregnancy. Vertex presentation. Living fetus. Patients in active labour (cervix dilatation >3cm , regular uterine contractions and planned for vaginal delivery).

Exclusion criteria:

Patients with obstetrical problems in current pregnancy as (malpresentation, chorioamnionitis, polyhydraminos, oligohydramions and antepartum hemorrhage). Patients with previous uterine scar. Patient with current medical disorders as (Anemia, DM, HTN,..). Patient with bad obstetrical history as (postpartum hemorrhage and retained placenta). Patient with known uterine anomalies, placental anomalies and cord anomalies. Indication of cesarean section delivery or instrumental delivery. Patients take uterotonic drugs for induction or augmentation of labor. Ultrasound evidence of adherent placenta. Patients with current fetal anomalies.

All pregnant women in the active phase of labor attending to delivery ward were submitted to detailed complete history taking including: Personal history, Obstetric History, History of previous abortion, Gestational age was calculated according to Naegle's rule (a standard way of calculating the due date for a pregnancy when assuming a gestational age of 280 days at childbirth). The rule estimates the expected date of delivery (EDD) by adding a year, subtracting three months, and adding seven days. The gestational age is confirmed by ultrasound.

General examination had been done including Height, weight, BMI. Vital signs (blood pressure, pulse rate, body temperature and respiratory rate). Colors (jaundice, cyanosis, pallor). Other (lower limb edema, back).

Local examination was done to assess the progress of labor, cervical dilatation, effacement, station, position, vertex presentation, pelvic adequacy and state of membranes.

Investigations:

Recent ultrasound assessment to evaluate GA, fetal weight, AFI, placental site, presentation and position of the fetus. Hemoglobulin level and hematocrit value. Blood grouping and RH.

They were divided into the three groups by using simple random distribution technique immediately after delivery of the baby during third stage of labour.

1st group (I) (cord drainage group): (numbers of patient 30) had placental drainage immediately after delivery. This scenario included unclamping the previously clamped and divided umbilical cord and allowing the blood from placenta to drain freely.

2nd group (II) (oxytocin group): (numbers of patient 30) Receiving 20 IU of oxytocin diluted in normal saline (0.9 % NaCL) to final volume of 20 ML injected though umbilical vein as a bolus.

3rd group (III) (controlled cord traction group): (numbers of patient 30) were a control group, this scenario included delivery of the placenta by clamping of the cord and controlled cord traction.

Statistical Analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) to calculate difference between two or more groups of qualitative variables. Quantitative data were expressed as mean \pm SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

There was no statistical significant difference among three studied groups as regard age and BMI of studied mothers. There was no statistical significant difference among three studied groups as regard parity and gestational age (Table 1).

Table (1): Basic characteristics and obstetric data of the studied groups.

Variables	Group I N=30	Group II N=30	Group III N=30	P-value
Age/years				
Mean \pmSD	28.3 \pm 4.77	26.3 \pm 5.34	26.1 \pm 4.77	0.172
Range	18 – 36	19 – 36	19 – 35	
BMI				
Mean \pmSD	29.3 \pm 1.78	29.1 \pm 1.61	29.6 \pm 1.57	0.59
Gestational age /weeks				
Mean \pmSD	38.2 \pm 1.37	37.9 \pm 1.17	38.4 \pm 1.35	0.32
Parity				
Mean \pmSD	2.7 \pm 1.25	2.23 \pm 1.1	2.33 \pm 1.18	0.29

Table 2; showed that both group I and II had statistically significant shorter third stage duration and less blood loss than patients of group III.

Table (2): Difference in clinical data of the studied groups.

Variables	Group I N=30	Group II N=30	Group III N=30	P-value
Third stage duration/ min.				
Mean ±SD	7.73 ± 3.11	4.73 ± 1.8	9.9 ± 3.69	<0.001* HS
Range	5 – 16	2 – 8	5 – 20	
Median	6	4	9	
Third stage blood loss \ml				
Mean ±SD	288.7 ± 94.2	186.3 ± 35.2	357 ± 119.1	<0.001* HS
Rang	150 – 600	150 – 290	190 – 740	
Median	280	175	335	

HS: P-value<0.001 is high significant

Table 3; showed that there was a statistical significant difference in between three studied groups as regard 3rd stage duration and amount of blood loss, which increased among third group (controlled cord traction group) followed by group I (cord drainage group) then the least level was among group II (oxytocin group).

Table (3): Multiple comparisons in between studied groups.

Variables	Median difference Group I With	P-value	Mean difference Group II With	P-value
Third stage duration\min.	Group II Group III	<0.001 0.006	Group III	<0.001
Blood loss /ml	Group II Group III	<0.001 0.004	Group III	<0.001

Table 4; showed that there was a negative correlation between third stage duration and gestational age but not reach significant level, and there was positive correlation with age, BMI, parity and blood loss.

Table (4): Correlation of third stage duration with other clinical data among patients of group I.

Variables	Third stage duration	
	R	P –value
Age	0.162	0.39
BMI	0.123	0.94
Gestational age	-0.04	0.88
Parity	0.08	0.69
Blood loss	0.188	0.32

R= Pearson Correlation

Table 5; showed that there was a statistically significant negative correlation between third stage duration and gestational age, and there was positive correlation with age, parity and blood loss but not reach significant level.

Table (5): Correlation of third stage duration with other clinical data among patients of group II.

Variables	Third stage duration	
	R	P –value
Age	0.214	0.244
BMI	-0.237	0.209
Gestational age	-0.485	0.008 *
Parity	0.285	0.169
Blood loss	0.707	0.132

Table 6; showed that there was a negative correlation between third stage duration, gestational age and BMI but not reach significant level, and there was a statistically significant positive correlation with blood loss.

Table (6): Correlation of third stage duration with other clinical data among patients of group III.

Variables	Third stage duration	
	R	P –value
Age	0.02	0.91
BMI	-0.09	0.633
Gestational age	-0.04	0.821
Parity	0.115	0.991
Blood loss	0.478	0.006

Discussion:

In this study there was no significant difference between three groups regarding age and BMI of studied mothers.

Gestational age mean was 38.2± 1.37weeks in group I, 37.9±1.17weeks in group II and 38.4±1.35 weeks in group III. Range was 37-41weeks in the three groups. Parity median 2 in all groups

In the current study the mean duration of the third stage of labour of women in study group I was 7.73 ± 3.11 minutes, in group II was 4.73 ± 1.8 minutes and group III was 9.9±3.69 minutes with P-value<0.001 is high significant. The duration of group I and II had significant difference shorter than group III (controlled cord traction).

We reported that blood loss in group I was (mean ±SD) 288.7±94.2ml, in group II 186.3±35.2ml and 357±117ml in group III.

Group I had significant difference with group II, but with high significant difference with group III, so less blood loss in oxytocin group and cord drainage group. The same results were concluded in different studies⁽⁷⁻⁹⁾.

Also, in 2020 randomized control trial was performed on 300 patients in the third stage of labour underwent normal vaginal delivery at term were included. Patients were divided into 2 groups: Group A cord blood drainage while group B cord blood was not drained after delivery of fetus. The third stage duration (mean ±SD) was 4.48± 1.17 minutes in group A and 6.53 ±1.19 minutes in group B. So, there was statistically significant difference in the study concluded that cord drainage is an effective and simple technique that minimize the loss of blood and length of third stage of labour as compared to without cord blood drainage group⁽¹⁰⁾.

In contrast to our study, a recent randomized clinical trial by **Vasconcelos et al.**⁽¹¹⁾ proved that placental cord drainage had no significance in reducing the duration or blood loss in the third stage of labor.

As regarding the group of intra-umbilical vein oxytocin injection, our study reported statistically significant shorter duration of 3rd stage and less blood loss compared to control cord traction group. We used in our study 20 IU oxytocin in 20 ml of normal saline, given after cord clamping immediately.

On the other hand, the study of **Ghulmiyyah and his colleagues**⁽¹²⁾ disagreed with our study, it conducted

that oxytocin injection had no role in shorting the duration of third stage of labour.

The objective of this study was to determine whether intraumbilical injection of oxytocin shortens the third stage of labor. A randomized, double-blind, placebo-controlled trial was used to assess the effectiveness of an intraumbilical injection of oxytocin on the duration of the third stage. Following randomization, each of 79 women received 30 mL of saline (n = 40) or 20 U of oxytocin in 30 mL of saline (n = 39). The primary outcome of interest was the effect on the duration of the third stage. There was no difference in the duration of the third stage between the two groups (7.8 ± 6.1 min in the saline-only group versus 5.9 ± 2.6 min in the oxytocin group). The percentage of undelivered placentas beyond 15 minutes was significantly lower in the oxytocin group (0% in the oxytocin group versus 12.5% in the saline-only group)⁽¹²⁾.

The Correlation of third stage duration with other clinical data among patients of group I, was found negative correlation between third stage duration and gestational age but not reach significant level, and there was positive correlation with age, BMI, parity, BW and blood loss.

In other study **Miran and Dawood**,⁽¹³⁾ there was no correlation (no significant relation) between birth weight, gestational age with duration (P>0.05). There was a significant correlation between parity and age (P=0.0005).

The Correlation of third stage duration with other clinical data among patients of group II, was found a statistically significant negative correlation between third stage duration and gestational age, and there was positive correlation with age, parity and blood loss but not reach significant level.

In Miran study, there was a significant negative correlation between duration and gestational age (P = 0.010, r = -0.464) while there was no correlation (no significant relation) between birth weight, age and parity with duration (P>0.05)⁽¹³⁾.

The Correlation of third stage duration with other clinical data among patients of group III, was found a negative correlation between third stage duration, gestational age and BMI but not reach significant level, and there was a statistically significant positive correlation with blood loss.

Miran and Dawood⁽¹³⁾ found that there was no correlation (no significant relation) between birth

weight, gestational age with duration ($P>0.05$). There was a significant correlation between parity and age ($P=0.0005$).

CONCLUSIONS

The use of intra umbilical vein injection of oxytocin and placental cord drainage significantly reduced the duration of the third stage of labor and blood loss. Intra umbilical vein oxytocin injection had more significant results than cord drainage in management of 3rd stage of labour.

Financial support and sponsorship: Nil.

Conflict of interest: Nil.

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