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Comparative study between Intraumbilical Oxytocin Injection and Placental Cord Drainage in Management of Third Stage of Labour

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ABSTRACT

Background: Active management of the third stage of labour is common practice today that leads to significant decrease in postpartum hemorrhage and maternal peripartum mortality and morbidity rates.

Aim of the work: To compare the effectiveness of intraumbilical oxytocin and cord drainage in the management of third stage of labour.

Patients and methods: This study is a prospective randomized clinical trial study that was conducted at El-Hussein University hospital-Al-Azher University, during the period from June 2020 to December 2020. 150 women from the delivery ward participated in the study. Outcome: Third stage duration, main hemoglobin drop after delivery and the presence of a retained placenta necessitates manual removal.

Results: According to the duration of the third stage and the reduction in hemoglobin level, all study groups differed significantly.

Conclusion: According to the results of this study, intraumbilical oxytocin injection and cord drainage shorten third stage duration and decrease the reduction of hemoglobin level.

Keywords: Intraumbilical; Oxytocin; Cord; Drainage.

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INTRODUCTION

Normal labour includes four stages: The 1st stage starts with the beginning of true labour pain and ends with fully dilated cervix, followed by the 2nd stage, from fully dilated cervix until the fetus is delivered, then 3rd stage, which starts after fetal delivery and ends with delivery of placenta and fetal membranes, the fourth stage follows 3rd stage and ends 6 weeks postpartum.¹

3rd stage is managed by two different clinical ways active and expectant management. 3rd stage complications are reduced when 3rd stage is actively managed.²

3rd stage is actively managed by using either oxytocin or methylergometrine IM or IV after fetal shoulder delivery, uterine massage and controlled cord traction to prevent postpartum hemorrhage.³

3rd stage is managed expectantly by waiting for placental separation and let it to deliver spontaneously.⁴

Intraumbilical oxytocin injection is one of active management approaches that facilitate placental delivery because oxytocin is injected directly toward placental bed.⁵

Placental cord drainage is considered as a Physiological method to manage 3rd stage where the cord is unclamped and allow the cord's blood to drain freely.^{6,7}

The goal of this study was to see if intraumbilical oxytocin injection or cord drainage more effective in 3rd stage management.

PATIENTS AND METHODS

This was a randomized controlled study that was conducted at El-Hussein University hospital, Al-Azher University, during the period from June 2020 to December 2020.

150 women from delivery ward participate in the study after they had noticed about the steps and purpose of the study .During the prenatal period they had signed a formal consent form. They subdivided randomly into 3 groups:

Group A (n = 50) this group injected by oxytocin (20 IU diluted in 20ml normal saline) in the umbilical vein.

Group B (n = 50) cord drainage group, after fetal delivery and cutting of umbilical cord the clamped maternal aspect of the cord was unclamped and allow the cord's blood to drain freely.

Group C (n = 50) control group, after two minutes of fetal delivery, the cord is clamped and cut without any intervention.

Inclusion criteria: all women in three groups had a single cephalic presentation fetus with a gestational age ranging from 37 to 42 weeks and a neonatal birth weight ranging from 2500 to 4500 grams.

Exclusion criteria: women that had indications for cesarean section, previous cesarean section or previous myomectomy, fetal anomalies, hypertensive disorders, , instrumental delivery, intrauterine fetal death, multiple pregnancies, antepartum hemorrhage, known coagulation disorder or any risk factor for PPH.

History taking: women in active phase of labour were submitted to complete history taking including:

Personal history: age and socioeconomic status.

Obstetric history: gravidity, parity, history of multiple pregnancies, history of macrosomic fetus, history of pregnancy induced hypertension, gestational diabetes mellitus, liver diseases, renal diseases and coagulation disorders, previous operative delivery as caesarean section, instrumental delivery, prolonged labour and previous PPH.

Present history: throughout history to exclude any induced medical or surgical disorder.

Menstrual and maternal medical history.

Clinical Examination: includes full general examination with special concern to blood pressure, pulse, temperature, respiratory rate and general condition.

Abdominal examination for assessment of gestational age, fetal lie, fetal presentation, amount of liquor, fetal heart rate, uterine contractions and scars of previous sections and operations.

Pelvic examination was done to assess the progress of labour, cervical dilation, effacement, station, position, vertex presentation and pelvic adequacy.

Investigations: Ultrasound to evaluate gestational age, site of placenta fetal weight and AFI, hemoglobin level, hematocrit value (just before delivery and 24 hours after delivery), blood grouping and Rh.

Outcome measures: 3rd stage duration (the main outcome), main hemoglobin drop after delivery (The difference between hemoglobin level just before delivery of the fetus and 24 hours after delivery)and the presence of a retained placenta necessitates manual removal.

Statistical analysis: IBM SPSS version 21 was used to analyse the obtained data.

RESULTS

| Demographic data | Group A (IUV Oxytocin) | Group B (Cord Drainage) | Group C | F p | P1 P2 P3 |
|---------------------|------------------------|-------------------------|---------|-------|----------|
| Age by years | 19.00 | 19.00 | 20.00 | | |
| Min | 35.00 | 35.00 | 36.00 | 0.505 | 0.416 |
| Max. | 26.62 | 27.14 | 27.62 | 0.604 | 0.365 |
| Mean | ±5.09 | ±5.11 | ±4.71 | N.S. | 0.452 |
| ± S.D. | | | | | |
| BMI | | | | | |
| Min | 19.60 | 20.90 | 19.40 | 0.150 | 0.802 |
| Max. | 33.30 | 32.90 | 33.30 | 0.861 | 0.685 |
| Mean | 25.61 | 25.97 | 25.78 | N.S. | 0.771 |
| ± S.D. | ±3.106 | ±2.997 | ±3.619 | | |
| GA in weeks | | | | | |
| Min | 37.00 | 38.00 | 37.00 | 1.745 | 0.211 |
| Max. | 40.00 | 41.00 | 42.00 | 0.178 | 0.198 |
| Mean | 39.08 | 39.74 | 39.72 | N.S. | 0.213 |
| ± S.D. | ±1.848 | ±1.67 | ±1.565 | | |
| Parity | | | | | |
| Min | 0.00 | 0.00 | 0.00 | 0.808 | 0.421 |
| Max. | 3.00 | 4.00 | 3.00 | 0.448 | 0.365 |
| Mean | 1.42 | 1.60 | 1.32 | N.S. | 0.254 |
| ± S.D. | ±1.18 | ±1.03 | ±1.13 | | |

F = Anova test

P probability

P1, p2, p3 comparison between group A&B, A&C, B&C respectively

Table 1: Comparison between study groups regarding demographic data.

Table (1) shows the demographic data distribution including (Age, BMI, Gestational age and Parity) among women under the study. On comparing the 3 groups together it was found that there's no statistical difference between all groups regarding demographic data (p >0.05).

| Clinical data | Group A (IUV Oxytocin) | Group B (Cord Drainage) | Group C | F P | P1 P2 P3 |
|------------------------------|------------------------|-------------------------|--------------------|------------|----------|
| Neonatal weight in gm | | | | | |
| Min | | | | 1.012 | 0.231 |
| Max. | 2870.0-3600.0 | 2870.00-3560.00 | 2900.00- | 0.366 | 0.365 |
| Mean | 3232.00 | 3185.20 | 3600.00 | N.S. | 0.412 |
| ± S.D. | ±216.63 | ±223.96 | 3242.60 ±203.05 | | |
| Hb Before in gm/dl | | | | | |
| Min | | | | 0.842 | 0.236 |
| Max. | 8.90-14.20 | 9.20-13.70 | 9.10-15.00 | 0.433 N.S. | 0.445 |
| Mean | 11.56 | 11.58 | 11.88 | | 0.512 |
| ± S.D. | ±1.29 | ±1.27 | ±1.56 | | |

Table 2: Comparison between study groups regarding clinical data.

Table (2) and shows the clinical data distribution including (neonatal weight and hemoglobin level before delivery) among women under the study. On comparing the 3 groups together it was found that there's no statistical difference between all groups regarding the clinical data ($p > 0.05$).

| 3rd stage duration in minutes | Group A (IUV Oxytocin) | Group B (Cord Drainage) | Group C |
|-------------------------------|------------------------|-------------------------|------------|
| Range | 3.00-12.00 | 2.00-8.00 | 3.00-32.00 |
| Mean | 7.72 | 5.52 | 8.80 |
| ± S.D. | ±2.72 | ±2.04 | ±4.92 |
| F | | 11.732 | |
| P | | 0.0001* | |
| P1 | | 0.001* | |
| P2 | | 0.042* | |
| P3 | | 0.0001* | |

Table 3: Comparison between study groups regarding 3rd stage duration.

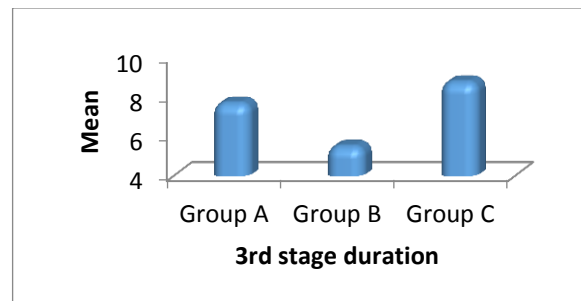


Fig. 1: show 3rd stage duration distribution among women under the study.

Table (3) and figure(1) shows that: On comparing the 3 groups together it was found that there's statistical difference between all study groups according to 3rd stage duration ($p < 0.05$).

The control group C had a longer duration than the study groups A&B.

Group B had a considerably shorter duration than Group A ($P1=0.001 > 0.05$).

| Hb Reduction in gm/dl | Group A (IUV Oxytocin) | Group B (Cord Drainage) | Group C |
|-----------------------|------------------------|-------------------------|-------------|
| Range | 0.70 – 1.20 | 0.40 – 0.70 | 1.00 – 2.00 |
| Mean | 0.98 | 0.54 | 1.51 |
| ± S.D. | ± 0.17 | ±0.11 | ±0.30 |
| F | | 260.321 | |
| p | | 0.0001* | |
| P1 | | 0.001* | |
| P2 | | 0.016* | |
| P3 | | 0.0001* | |

Table 4: Comparison between study groups regarding hemoglobin level Reduction.

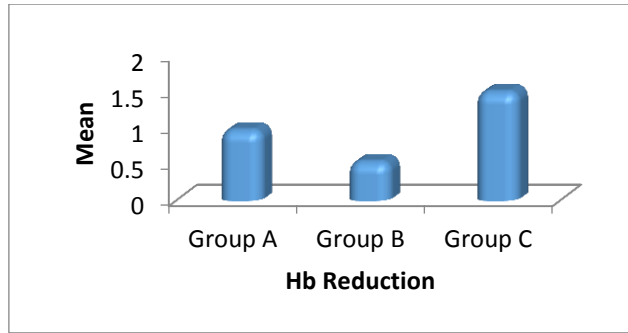


Fig. 2: shows hemoglobin level reduction distribution among women under the study.

Table (4) and figure(2) shows that :On comparing the 3 groups together it was found that there’s statistical difference between all groups regarding Hb reduction (p <0.05).

The hemoglobin level was significantly reduced in the control group C than the study groups A&B.

There was significantly higher reduction in group A than Group B.

| Manual Placental delivery & Retained Placenta | | Group A (IUV Oxytocin) | Group B (Cord Drainage) | Group C | Total |
|---|----------------|------------------------|-------------------------|---------|-------|
| No | Count | 50 | 50 | 48 | 148 |
| | % within Group | 100.0% | 100.0% | 96.0% | 98.7% |
| Yes | Count | 0 | 0 | 2 | 2 |
| | % within Group | 0% | 0% | 4% | 1.3% |
| Total | Count | 50 | 50 | 50 | 150 |
| | % within Group | 100% | 100% | 100% | 100% |
| | X ² | 4.449 | | | |
| | P | 0.108 N.S. | | | |
| | P1 | 0.125 | | | |
| | P2 | 0.311 | | | |
| | P3 | 0.089 | | | |

Table 5: Comparison between study groups regarding the need for manual placenta delivery and retained placenta.

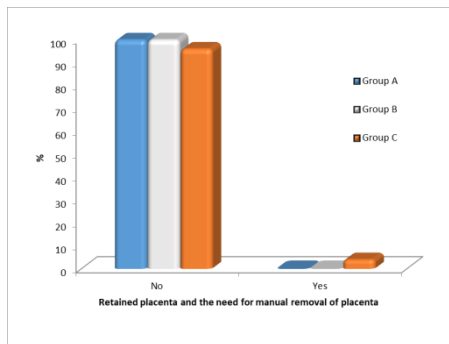


Fig. 3: shows comparison between study groups according to the need for Manual Placenta delivery and Retained Placenta.

Table(5) and figure(3) shows that: There was no significant statistical difference between the study groups according to the need for manual placental delivery and retained placenta.

Note that there is non-significant increase in the control group C (2 cases) which wasn’t statistically significant.

DISCUSSION

The goal of this study was to see if intraumbilical oxytocin injection or cord drainage was more effective in 3rd stage management.

The main outcome measure in our study was 3rd stage duration and the secondary outcome was the main hemoglobin drop after delivery and the

presence of a retained placenta necessitates manual removal.

According to the results of this study, in terms of statistical significance, there was no difference in demographic data (age, parity, BMI, and gestational age) and clinical data (hemoglobin level before delivery and neonatal weight) across all study groups(p > 0.05).

In our study 3rd stage mean duration of women in Study group A was 7.72 ± 2.72 minutes, group B was 5.52 ± 2.04 minutes and in control group C was 8.80 ± 4.92 minutes, This indicates that there is a statistically significant difference in the duration of the 3rd stage across all groups ($P > 0.05$).

The study groups A&B had significantly shorter durations than group C, with group B having significantly shorter durations than group A (P_1 is $0.001 > 0.05$).

Results of the this study as regard 3rd stage duration agreed with the study of Makvandi and her colleagues in 2013, the study included 152 primigravida women divided into 3 groups.⁸ Group A (n=51) the same as group A in our study. Group B (n=50) as group B. Group C (n=51) as a control group. The 3rd stage duration in groups A and B was substantially shorter than in group C ($P = 0.001$). They concluded that using intraumbilical oxytocin injections or cord drainage resulted in a considerable reduction in 3rd stage duration.

Also Sharma and his colleagues agreed with the current study regarding 3rd stage duration, but they included only 2 groups, cord drainage group and the other as control group. They came to the conclusion that using cord drainage in 3rd stage management reduces its duration significantly.⁹

On the other hand, the study of Ghulmiyyah and his colleagues disagreed with our study results regarding 3rd stage duration, it concluded that intraumbilical oxytocin has no rule in decreasing 3rd stage duration, in 2007, the study was done in Georgia of USA, included 79 women were divided into 2 groups, study group injected with oxytocin intraumbilical (20IU diluted in 30 ml saline) while the control group received only 30 ml saline intraumbilical. According to this study there was no significant difference in the duration of the third stage (5.9 min vs 7.8 min).¹⁰

This could be due to a small sample size that is insufficient to reveal statistical differences.

The current study revealed that hemoglobin level was reduced in the group C than groups A&B (P_2 is $0.016 < 0.05$ and P_3 is $0.0001 < 0.05$) with significantly higher reduction in group A than Group B (P_1 is $0.001 < 0.05$).

The study of Movahed and her colleagues agreed with the results of the current study regarding the mean drop of hemoglobin level postpartum, but it included only two groups, group for intraumbilical oxytocin injection and the other as control group. In 2012, a clinical trial in Ghazvin Kowsar of Iran was conducted on 200 women undergone vaginal delivery randomly divided into 2 groups one group (study) received 10 IU oxytocin diluted in 9 cc ringer intraumbilical with 10 cc Ringer IV, while the other group (control) received 10 cc Ringer intraumbilical and 10 IU Oxytocin diluted in 9 cc ringer IV. The study showed that the mean drop in hemoglobin was 1.5 ± 0.96 gm/dl in the intraumbilical oxytocin injection group which is significantly lower compared to 1.35 ± 0.94 gm/dl in control group. They concluded that the use of intraumbilical oxytocin

results in significant reduction of hemoglobin level drop postpartum.¹¹

According to the current study, there was no significant statistical difference between three groups in terms of retained placenta and the necessity for manual placental delivery, with results (0%, 0% and 4% respectively) where $p > 0.05$.

Makvandi and her colleagues reported no cases of retained placenta or cases in which the placenta had to be manually removed.⁸

On the other hand, regarding the need for manual delivery of the placenta, the clinical trial of Nankali and his colleagues in 2013 disagreed with the results of the current study. They concluded that the necessity for manual placental delivery was reported to be significantly higher in the control group than in the intraumbilical vein oxytocin injection group.¹²

CONCLUSION

The present study demonstrated that the use of intraumbilical injection of oxytocin and placental cord drainage significantly reduced the duration of the third stage with a significant decrease in the hemoglobin level drop postpartum.

Conflict of interest : none

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