

Comparative Study between Intra-Umbilical Vein Injection of Oxytocin and Intramuscular Injection of Oxytocin in Third Stage of Labour

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Received: 17-12-2023 / Revised: 27-01-2024 / Accepted: 16-02-2024

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Conflict of interest: Nil

Abstract:

Background: Maternal mortality refers to the death of a woman in either during or after her pregnancy including the time after an abortion or after giving birth. Maternal mortality rates and reasons vary throughout nations and cultures. Maternal fatalities differ for different states, regions, and categories of women in India due to the significant regional differences in healthcare availability and socioeconomic conditions. According to the most recent report from the national Sample Registration system (SRS), India's maternal mortality ratio (MMR) for the period of 2018–20 is 97/100,000 live births, a decrease of 33 points from 130/ 100,000 live births in the 2014–16 period. The aim of this study was to assess the effectiveness of oxytocin injections into the umbilical vein and the muscles in reducing the amount of blood loss and the length of the third stage of labor.

Methods: From November 2021 to October 2022, 134 cases at SDH/CHC, Biraul, Darbhanga, were the subject of a comparative analysis. The cases were then split into two groups of 67 participants each, one of which received an intramuscular injection of 10 units of oxytocin while the other group received 10 units of oxytocin diluted in 20 milliliters of saline. With the use of specific drapes known as "Brass-V drapes," blood loss was measured in milliliters, and the length of the third stage of labor was recorded in minutes. The blood loss (measured in milliliters) and time (measured in minutes) of the two groups were compared.

Results: Group 1 experienced a considerably shorter mean length of the third stage of labor (4.89 ± 1.50 minutes vs. 5.79 ± 2.20 minutes) than group 2. Group 1 experienced a considerably lower mean blood loss in the third stage of labor (94.64 ± 43.38 ml vs. 120.42 ± 43.41 ml) than Group 2.

Conclusion: Compared to a traditional intramuscular injection, an intraumbilical vein injection of oxytocin is more effective at shortening the duration of the third stage of labor and reducing the amount of blood lost during it. Compared to intramuscular oxytocin injection, the intraumbilical method is painless, safer, simpler, and has a faster acting duration.

Keywords: Intra-umbilical; AMTSL; Postpartum haemorrhage; Brass V drapes.

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Introduction

In the third and fourth phases of labor, the mother's life is in danger due to acute complications. Postpartum hemorrhage (PPH), the most frequent complication, continues to be the primary cause of mother death, particularly in underdeveloped nations. [1] In order to unify clinical criteria in obstetrics, the American College of Obstetricians and Gynecologists launched the revitalize initiative. This program defines PPH as blood loss greater than 1,000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours of delivery, regardless of vaginal or cesarean delivery. Globally, 27.1% of all maternal deaths are caused by bleeding. [3]

The World Health Organization (WHO) reports that in 2015 PPH during or shortly after delivery was the cause of 20% of maternal mortality in the United

States. Furthermore, 8.2% of Latin American women giving birth are predicted to have severe PPH that necessitates transfusion. [3] Pregnancy or childbirth may be associated with PPH risk factors. PPH can also happen to women who have no known risk factors, therefore medical professionals need to be ready to handle this complication with expectation at every delivery. [4] The separation of the placental membranes and hemostasis during the third stage of labor are caused by myometrial contraction, which is accompanied by uterine blood vessel constriction. [5]

Uterine atony, on the other hand, is the term for when there is insufficient contraction of the uterine myometrial cells in response to endogenous oxytocin release. [6] Eighty percent of the cases of PPH are caused by uterine atony. [4] Stimulating

uterine contractions is a well-known early reflex intervention in PPH. In order to prevent PPH, the WHO advises active treatment of the third stage of labor, which involves a prophylactic injection of 10 international units (IU) of oxytocin within two minutes of delivery.¹ The nonapeptide hormone oxytocin causes a regular contraction of the upper uterine region. [7]

It is typically the first-choice uterotonic for this purpose because to its quick onset of action and safety. By inducing contractions in the uterus, intramuscular (IM) or intravenous oxytocin treatment minimizes bleeding after delivery. However, because oxytocin is administered via the umbilical vein, it can quickly reach the uterine wall and placental bed.

This causes the placental attachment site to decrease and uterine contractions to occur earlier. The decidua separate as a result of the pressure that follows, hastening the process and helping the retroplacental hematoma form. [8,9]

Material and Methods

From November 2021 to October 2022, SDH/CHC, Biraal, Darbhanga, was the site of this comparative study. In all, 134 examples were chosen for this investigation. It was obtained via the subjects' informed permission. The cases were divided into

two groups at random: Group 1 received 10 units of intraumbilical oxytocin diluted in 20 milliliters of saline, whereas Group 2 received 10 units of oxytocin intramuscularly.

This study covered all cases with live pregnancies that present to the labor and delivery unit and are appropriate for vaginal delivery at a gestational age of greater than or equal to 37 weeks.

The following conditions were excluded from this study: septic shock, antepartum eclampsia, active convulsion disorder; cases of chorioamnionitis (high CBC count, foul-smelling vaginal discharge, warm and hot vagina on PV examination, fever, tachycardia), renal or hepatic disease as indicated by the subjects' history and biochemical tests (Abnormal Liver Function Test and Kidney Function Test). The attending resident recorded height, weight, and vital signs after taking a thorough medical history. In order to evaluate the fetal heart sound (FHS), uterine contractions, labor stage, and to rule out cephalopelvic disproportion (CPD), malpresentation, and malpositions, an abdominal and vaginal examination was performed.

Results

Table 1 shows the initial attributes of the two groups. Each baseline variable showed some degree of group comparability ($p > 0.05$).

Table 1 : Base line characteristics between two groups

	Group1	Group2	P-Value
Meanage group (years)	25.62±4.14	25.31±3.89	$p > 0.05$
Mean gestational age(week)	38.51±1.69	38.84±1.79	$p > 0.05$
Primigravida	67.2%	65.7%	$p > 0.05$
Multigravida	32.8%	34.3%	$p > 0.05$
Duration of first stage of labour(hours)	7.88±1.18	7.59±1.23	$p > 0.05$
Duration of second stage of labour(minutes)	18.71±6.22	18.28±6.39	$p > 0.05$

In group 1, the third stage of labor lasted for less than three minutes in eight (11.94%) and thirty-five (52.24%) cases, respectively; in twenty-three (34.33%) and one (1.49%) cases, the duration was between six and nine minutes and more than nine minutes, respectively (Table 2). Group 2 saw three instances (4.47%) and 28 cases (41.79%) with third stage labor lasting less than three minutes and three

to six minutes, respectively, while 33 cases (49.25%) and three cases (4.47%) had third stage labor lasting six to nine minutes and more than nine minutes, respectively. Group 1 experienced a significantly lower mean length of the third stage of labor (4.89 ± 1.50 minutes vs. 5.79 ± 2.20 minutes) than Group 2. According to the Student t-test, the difference was statistically significant ($p < 0.05$).

Table 2: Duration of third stage of labour

Duration (mins)	Group 1		Group 2		p-Value
	Number	Percentage	Number	Percentage	
<3mins	8	11.94%	3	4.47%	<0.05
3-6mins	35	52.24%	28	41.79%	
6-9mins	23	34.33%	33	49.25%	
>9mins	1	1.49%	3	4.47%	
Total	67	100.00%	67	100.00%	
Mean±SD	4.89±1.50		5.79±2.20		

Table 3 shows that in group 1, the blood loss at the third stage of labor was <50 ml in 2 (2.99%) and <50-100 ml in 44 (65.67%) cases. In 14 (20.90%), 3 (4.5%), and 4 (5.9%) cases, the blood loss during the third stage of labor was 100-150 ml, 150-200 ml, and >200 ml, respectively. In group 2, the blood loss during the third stage of labor was between 50 and 100 milliliters in 2 cases (2.99%) and 13 cases

(19.40%), respectively. In 46 (68.66%), 4 (5.9%), and 2 (2.99%) cases, the blood loss during the third stage of labor was 100–150 ml, 150–200 ml, and >200 ml, respectively. Group 1 reported a considerably lower mean blood loss in the third stage of labor (94.64 ±43.38 ml vs. 120.42 ± 43.41 ml) than Group 2. According to the Student t-test, the difference was statistically significant (p<0.05).

Table 3: Blood loss in third stage of labour

Blood Loss(ml)	Group 1		Group 2		p-Value
	Number	Percentage	Number	Percentage	
<50ml	2	2.99%	2	2.99%	<0.05
50-100ml	44	65.67%	13	19.40%	
100-150ml	14	20.90%	46	68.66%	
150-200ml	3	4.5%	4	5.9%	
>200ml	4	5.9%	2	2.99%	
Total	67	100.00%	67	100.00%	
Mean±SD	94.64±43.38		120.42±43.41		

In group 1, 3 cases (4.47%) required an intravenous drip of oxytocin (20 I.U.), whereas 2 cases (2.99%) and 1 case (1.49%) required intramuscular injections of methergine (0.2 mg) and carboprost (250 mcg), respectively (Table 4). In group 2, three cases (4.47%) and two instances (2.99%) required injections of methergine 0.2 mg and carboprost 250

mcg intramuscularly, respectively. Five cases (7.46%) required injections of oxytocin 20 units intravenously in a drip.

Although it was noted that more patients in group 2 required more uterotonics, the Chi-Square test revealed no statistically significant difference between the two groups (p>0.05).

Table 4: Additional need of uterotonics

	Group 1		Group 2		p-Value
	Number	Percentage	Number	Percentage	
Inj. Oxytocin 20 I.U. i.v. drip	3	4.47%	5	7.46%	>0.05
Inj. methergine 0.2mg i.m.	2	2.99%	3	4.47%	
Inj. Carboprost 250 mcg i.m.	1	1.49%	2	2.99%	

Discussion

The present study shown that when oxytocin was administered intraumbilically as opposed to intramuscularly, the duration of the third stage of labor and blood loss was dramatically reduced. Additionally, we saw that uterotonics were required more when oxytocin was administered intramuscularly as opposed to intraumbilically, however this difference was not statistically significant.

Several researchers have looked into the management of the third stage of labor with intraumbilical oxytocin injection. The results of our investigation were in line with those of earlier investigations. [10–12]

In a randomized clinical trial, Gungorduk K et al. found that intra-umbilical vein injections of oxytocin dramatically shortened the duration of the third stage of labor and reduced blood loss compared to the placebo. [1] The oxytocin group had greater mean postpartum hemoglobin and hematocrit levels than the placebo group. Compared to the oxytocin group, the women in the placebo group required

more extra uterotonic drugs. Furthermore, two females in the placebo group developed severe PPH.

In a randomized trial, Ghulmiyyah et al. discovered no difference in the length of the third stage between the saline group and the intraumbilical injection of oxytocin. [10] The failure to indicate the significant difference could be attributed to the limited sample size (n=79). The study did find, however, that oxytocin injected intravenously decreased the amount of placentas that did not deliver after 15 minutes and the resulting hemorrhage.

In order to actively manage the third stage of labor, Sharma et al. tested the effectiveness of intra-umbilical oxytocin (group I) to intravenous oxytocin (group II). [11] In groups I and II, the mean postpartum blood loss was 95.35 ml and 125.9 ml, respectively, and the mean duration of the third stage of labor was 1.703 min and 2.53 min, respectively. Both the length and the blood loss varied in a statistically significant way. [12]

In addition, Gupta et al. found that for the active management of the third stage of labor, intra-

umbilical oxytocin is a superior substitute for intramuscular oxytocin. [12]

Conclusion

Compared to the more common intramuscular injection of oxytocin, the intra-umbilical vein injection is more effective at shortening the duration of the third stage of labor and reducing the amount of blood lost during it. Maternal anemia exacerbates PPH in low-income nations; hence, oxytocin treatment may lower maternal morbidity and death. Compared to intramuscular oxytocin injection, the intraumbilical method is painless, safer, simpler, and has a quicker action time.

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