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THE USE OF INTRA-UMBILICAL OXYTOCINE FOR THE MANAGEMENT OF RETAINED PLACENTA

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Abstract

Postpartum haemorrhage & retained placenta are the most common serious abnormalities encountered during the third stage of labour, the aim of this study was to compare three different management protocols for retained placenta. This prospective study was carried out in Basrah Maternity & Children hospital during the period from march 2001 till march 2002. A total of 75 women with retained placenta after active management of third stage of labour were included, they were divided into three groups , the first group received oxytocin and normal saline injected in the umbilical vein, the second received normal saline and the third was the expectant group. In 56% of women in the oxytocin group, placental expulsion occurred within 45 minutes compared to 16% in the expectant group and 24% in the saline group respectively. Also 44% of women in the oxytocin group needed manual removal of the placenta compared to 84% in the expectant and 76% in the saline group. We conclude that intraumbilical vein injection in cases with retained placenta seems simple and promising technique to reduce the incidence of potentially morbid procedures.

Introduction

For most parturients the third stage of labor is short and uneventful; placental separation has been reported to occur usually within two contractions after delivery of the neonate[1]. A prolonged third stage of labour may be associated with an increase in hemorrhage and/or a need for manual removal of the placenta[2]. Post-partum hemorrhage and retained placenta are the most common serious abnormalities encountered during the third stage of labour. The incidence of postpartum haemorrhage and retained placenta has decreased with the use of synthetic oxytocin, ergometrine maleate and controlled cord traction[3].

Retained placenta is defined as failure of placental delivery within 20 minutes (or sometimes 30 minutes) after delivery of the fetus. Retained placenta can be classified into 2 types[4]:

a- Retained separated placenta which is caused by atony of the uterus, constricting ring and/or ruptured uterus.

b- Retained non separated placentae due to atony of uterus and abnormal adherent placenta. The latter condition can result from simple adhesions removed by manual separation or

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morbid adhesion like placenta accreta, increta and percreta[4]. An abnormally adherent placenta is an uncommon condition for which the main predisposing factors are previous curettage, previous cesarean section scar, multiparity and endometrial destruction after infection[5]. Retained placentas have been reported to occur with a frequency of 1.1%, 1.5%, and 3.3% of deliveries.

The incidence of retained placenta is reported to be significantly higher in preterm deliveries than in those at term[6,7]. In modern practice, manual removal of the placenta carries a risk of trauma, hemorrhage, rhesus alloimmunization, postpartum infection and anaesthetic complications. Therefore less invasive form of management may be valuable to reduce the need for operative manual removal[8]. Delivery of high concentrations of oxytocin directly to the placental site may result in more efficient myometrial contraction and placental separation. Dynamic ultrasonographic imaging during the third stage of labor has shown that placental separation occurs when the uterine muscles beneath the placental site contract[9]. One possible method to facilitate this process is to deliver oxytocin beneath the placental site through umbilical vein injection[9], a technique that was first described by Mojon and Asdrubali in 1826[10]. Although umbilical vein oxytocin injection may reduce the need for manual removal of the placenta, more evidence is required to confirm this conclusion; so the aim of this study is to compare three different management protocols for retained placenta.

Material and Methods

This is a prospective study carried out in Basrah Maternity and Children Hospital during the period from March, 2001 to March 2002. A total of 75 women were included in the study whose age ranged from 19 to 42 (mean: 29.17± 5.823). Those were among women who underwent normal vaginal delivery and had standard active management of the third stage of labor, including administration of 0.2 mg ergometrine maleate intravenously or 5 iu of oxytocin intravenously after fetal delivery. Following delivery of the fetus, the umbilical cord is clamped as soon as possible, and if there was evidence of placental separation (i.e. change in apparent cord length, vaginal bleeding and/or change in uterine shape) then maternal effort was encouraged for the expelling of the placenta. If this was insufficient then controlled cord traction was used. Women were considered eligible for the study if, in the presence of intact umbilical cord, the placenta remained undelivered 20 min after completion of the second stage of labour. Vaginal examination was done to confirm the diagnosis. Excluded from the study were women with previous uterine scar, multiple gestation, chorioamnionitis, placenta praevia, postpartum haemorrhage requiring immediate intervention and, finally, known uterine malformation. Full explanation was given for all women included and written consent was obtained.

Women were divided into 3 groups: The first one included 25 women who received 20 units of oxytocin diluted in normal saline (0.9% NaCl) solution to a final volume of 20ml (Solution A). The second group included 25 women who received 20 ml of normal saline solution without oxytocin (solution B), while the third group included 25 women who did not receive active treatment apart from routine management (expectant group).

Solution A and B were given in a double blind manner. In group 1 and 2, the umbilical cord was cut just below the

clamp and grasped by a hand to prevent bleeding, then a feeding tube with a length of 50 cm was introduced into the umbilical vein as far as possible to reach the placental bed along with clamping of the remaining part of the cord with two artery forceps (haemostat) to prevent bleeding and leakage of the solution. After that, the solution was injected using 50 ml syringe into the feeding tube and the tube is closed by its seal. The time of the solution administration varied from 10-15 minutes. In all cases, the controlled cord traction was continued for 15 minute regardless of the randomization. If the placenta was not delivered 15 minutes following the injection (45 minutes after delivery) examination was done to verify whether the placenta is trapped in the cervical os, and if not, arrangement was made to perform manual removal in the operating room. Blood loss was measured using a scaled container. Haemoglobin (Hb) estimation was done for all women in the next day. Statistical analysis was carried out using Chi-square test. P. value of <0.05 was considered statistically significant.

Results

Seventy-five women consented to participate. Table I shows the characteristics of women with retained placenta. The age of the women in the study ranged from 19-42 years with a mean of (28.84±6.1), (29.56±7.38) and (29.46±5.66) for the oxytocin, saline and expectant groups respectively. The majority of women (54) were in the age group 20-40 years; of these, 19 women were in the expectant group, 18 in the oxytocin and 17 in the saline group. The parity of the women was in the range of (0-11) with mean of 2.56, 3.4 and 2.857 for the oxytocin, saline and expectant groups. More than 50% were multiplara, while nullipara and grandmultipara (>5) represented about a quarter (each) of the total. The gestational age ranged from 28-42 weeks. The mean gestational age was (37.32±3.262), (37.28±2.63) and (38.179±2.038) for the same groups respectively. The majority of women (40 pts., 53%) had gestational age of more than36 weeks. The type of labour was spontaneous in 68 women (90.7%) while labour was induced in 7 (9.3%) and the largest number of those who had induction of labour occurred in the expectant group (16%). Finally, augmentation of labour by oxytocin were performed in 42 women (56%) compared to 33 (44%) who had their labour not augmented. Table II presents the duration of 1st stage of labour. In the expectant group, 72% of women had aduration of 1st stage of labour of more than 180 min with 52% with duration of 360-540 min. In the oxytocin group, 68% of women had duration of more than 180 min with 44% with duration of 360-540 min while in the saline group 64% had duration of 80-540 min. There were no significant difference between the 3 groups regarding the duration of 1st stage of labour (P>0.05). Table III presents the duration of 2nd stage of labour, where 56% of women in the expectant group had duration of second stage of more than 30 minutes, the comparable figures for oxytocin and saline were 76% and 40% respectively. Also there were no significant differences in the duration of 2nd stage amongst either group (P>0.05). Placental expulsion is presented in table IV. In 56% of women in the oxytocin group, placental expulsion occurred within 45 minutes compared to 16% in the expectant group and 24% in the saline group, and 44% of women in the oxytocin group needs manual removal compared to 84% in the expectant group and 76% in the saline group; these

differences were statistically significant between oxytocin and expectant groups (P<0.01), oxytocin and saline groups (P<0.05) but not between expectant and saline group (P>0.05).Table V shows the blood loss during the third stage in the three study groups, where only 32% of women in the oxytocin group lost more than 500ml of blood, compared to 60% in the expectant group and 52% in the saline group. These differences were statistically significant (P<0.05). There was no significant difference in the blood loss during the 3rd stage between the expectant and saline group (P>0.05). Table VI shows the Haemoglobin (Hb) level among women in the 3 groups, where 82% of women in the expectant group, 80% of women in the oxytocin group and 72% of women in the saline group had Hb level less than 11gm/dl with 36%, 24% and 28% of them having Hb level below 9gm/dl in the expectant, oxytocin and saline groups respectively. The differences between the 3 groups were statistically not significant (P>0.05). Fetal weight is presented in table VII, where 64%, 56% and 44% in the expectant, oxytocin and saline group had the fetal weight above 3.5 kg. There were also no significant differences in fetal weight between the 3 study groups (P>0.05).

Discussion

Active management of third stage of labour includes systemic administration of oxytocic drugs, namely oxytocin, ergometrine, or, more recently, misoprostol. They are used because of their ability to produce tonic uterine contractions capable of promoting placental separation. However, in some cases, both physiologic and pharmaco-logic approaches fail leading to retention of an adherent placenta[13]. If a retained placenta is left untreated there is high risk of maternal death. However, manual removal of the placenta is an invasive procedure with it's own serious complications including haemorrhage, infection or genital tract trauma[14].

No significant differences were found among the women regarding the gestational age, type of labour, whether spontaneous or induced, and also regarding augmentation of labour by oxytocin. On the other hand, some studies documented that prematurity is associated with progressively longer duration of third stage and higher incidence of retained placenta[1]. Also no significant differences had been observed with regard to the effect of the duration of first and second stage of labour between the three groups of women, similar results were obtained in other studies[3,8]. There was a great deal of controversy regarding the most effective method for placental delivery. The effectiveness of umbilical vein administration of oxytocin for retained placenta had also been subjected to debate and controversy. The number of patients in the trials were small and some trials were not randomized. The volume, concentration and timing of the injection of oxytocin administrated in the studies were also quite variable. The volume of oxytocin ranged from 10 to 100 iu in 10-30 ml saline solution. In most studies a dose of 10 iu oxytocin was used[13,15,16]. Reddy and Carey[17] used 20 iu oxytocin, Heinonen and Pihkala[3] 75 iu and Wilken-Jensen et al.[18] 100 iu. All trials used 20 ml saline solution except kristiansen, et al.[19] and Chestnut and Wilox[2] who used 10 ml and Reddy and Carey[17] who used 30 ml. In the majority of the studies, the timing of injection ranged from 20-30 min after delivery[3]. Finally in all reports the injection was done by syringe into the umbilical cord on the proximal side of the clamp with the cord clamp left in

place. After the injection, digital pressure was applied over the injection site and the contents of the cord were then milked toward the placenta to facilitate perfusion[8].

In this study we used 20 iu oxytocin in 20 ml saline solution, but the method of injection of the solution was by using a feeding tube introduced through the umbilical vein as far as possible to reach the placental bed in order to ensure high concentration of oxytocin reaching the placental bed. The high concentration of oxytocin ensured by this method stimulates contraction of uterine muscle and decreases the area of the placental implantation site which will result in cleavage of the placenta. To our knowledge, there is no previous study that reported the introduction of umbilical vein catheterization as a method for oxytocin delivery. Although the injected volume of fluid itself may have some additional beneficial effect, our data suggest that this effect is unlikely to be clinically significant as shown by the comparison of oxytocin-saline versus saline alone. The present study revealed a statistically significant reduction in the duration of third stage, where in 56% of women in the oxytocin group, the placenta was expelled within 45 min, compared with 24% and 16% of women in the saline and expectant groups respectively. Also a reduction was gained in the rate of manual removal of the placenta, as only 44% of women with retained placenta needed manual removal in the oxytocin group compared to 76% and 84% of women in the saline and expectant groups respectively. Several studies have reported a similar result[8,14,17,22,23,24], however, many studies failed to demonstrate a significant reduction in the need for manual removal of the placenta or reduction in the duration of third stage[2,3,15,16,20,21]. This might be due to small sample size, the concentration of oxytocin used or the volume of saline injected. In this study we used a high concentration of oxytocin 1 iu/ml and the method of administration might be an important variable, too. Saline solution alone does not appear to be effective in the management of retained placenta which comes in agreement with other studies[14]. This study also documented a significant reduction in blood loss during the third stage of labour in association with intraumbilical vein oxytocin administration group, where only 32% of women had blood loss less than 500ml, compared to 52% and 60% in the saline and expectant group respectively. This finding is in agreement with observations of others[8,17]. However, blood loss during the third stage of labour was not reduce in most trials[14, 16, 18, 20]. There were no side effects reported amongst all women in the oxytocin group at time of administration or in the period of hospital stay thereafter. However, this work is a preliminary one and needs further studies on a wider scale to establish it's effectiveness and safety with high degree of certainty. Although blood loss was reduced when oxytocin was used, no significant differences were found in the results of haemoglobin estimation done on the following morning. This may be due to that predelivery haemoglobin level was unknown or to the time of doing Hb estimation (may be few hours after the procedure) which may give false idea, because Hb estimation should be done at least 24 hours after bleeding situation[25], but unfortunately we could not keep our patients longer than the next morning. Still, the results agreed with other studies[14, 24, 26]. Finally, no significant differences were observed regarding the fetal weight between the three groups. It was concluded that oxytocin was

effective in reducing the incidence of complications of third stage of labour and this reinforces the clinical rationale for active management of third stage. The injection of oxytocin delivered effectively via the umbilical cord, especially when using intraumbilical vein catheterization, enables a high dose of oxytocin to reach the placental bed resulting in more efficient contraction of the myometrium beneath the placental site and in cleavage of the placenta. So intraumbilical vein injection in case of retained placenta seems a simple and promising technique to reduce the incidence of potentially morbid procedure. Further studies should address the question of volume, concentration and method of administration.

Character	Classification	Expectant	Oxytocin	Saline	Total
Age	<20	3 (12%)	4 (16%)	4 (16%)	11 (14.7%)
	20-40	19 (76%)	18 (72%)	17 (68%)	54 (72%)
	≥40	3 (12%)	3 (12%)	4 (16%)	10 (13.3%)
	Total	25 (100%)	25 (100%)	25 (100%)	75 (100%)
Parity	Nullipara	4 (16%)	10 (40%)	5 (20%)	19 (25.3%)
	Multipara (1-5)	17 (68%)	7 (28%)	14 (56%)	38 (50.7%)
	Grand multipara>5	4 (16%)	8 (32%)	6 (24%)	18 (24%)
	Total	25 (100%)	25 (100%)	25 (100%)	75 (100%)
Gestational age	28-	3 (12%)	4 (16%)	4 (16%)	11 (14.6%)
	32-	6 (24%)	3 (12%)	4 (16%)	13 (17.3%)
	36-	12 (48%)	15 (60%)	13 (52%)	40 (53.3%)
	≥40	4 (16%)	3 (12%)	4 (16%)	11 (14.6%)
	Total	25 (100%)	25 (100%)	25 (100%)	75 (100%)
Type of labour	Spontaneous	21 (84%)	23 (94%)	24 (96%)	68 (90.6%)
	Induced	4 (16%)	2 (6%)	1 (4%)	7 (9.3%)
	Total	25 (100%)	25 (100%)	25 (100%)	75 (100%)
Augmentation by oxytocin	Augmented	14 (46%)	16 (64%)	12 (48%)	42 (56%)
	Non	11 (44%)	9 (36%)	13 (52%)	33 (44%)
	Total	25 (100%)	25 (100%)	25 (100%)	75 (100%)

Table I: Characteristic of women in the study

	Time (minutes)	Expectant	Oxytocin	P-value
First stage (minute)	<180	4 16%	3 12%	$X^2 = 0.9$ D.F = 3 P>0.05
	180-	3 12%	5 20%	
	360-	13 52%	11 44%	
	≥540	5 20%	6 24%	
	Total	**25 100%**	**25 100%**	
		Expectant	**Saline**	
First stage (minute)	<180	4 16%	5 20%	$X^2 = 3.42$ D.F = 3 P>0.05 N.S
	180-	3 12%	9 36%	
	360-	13 52%	7 28%	
	≥540	5 52%	4 16%	
	Total	**25 100%**	**25 100%**	
		Oxytocin	**Saline**	
First stage (minute)	<180	3 12%	5 20%	$X^2 = 2.92$ D.F = 3 P>0.05 N.S
	180-	5 20%	9 36%	
	360-	11 44%	7 28%	
	≥540	6 24%	4 16%	
	Total	**25 100%**	**25 100%**	

Table II: Duration of the first stage of labour

	Time (minute)	Expectant	Oxytocin	P-value
First stage (minute)	<15	5 20%	3 12%	$X^2 = 2.7$ D.F = 3 P>0.05 N.S
	15-	6 24%	3 12%	
	30-	5 20%	9 36%	
	≥54	9 36%	10 40%	
	Total	**25 100%**	**25 100%**	
		Expectant	**Saline**	
First stage (minute)	<15	5 20%	4 16%	$X^2 = 3.38$ D.F = 3 P>0.05 N.S
	15-	6 24%	10 40%	
	30-	5 20%	7 28%	
	≥54	9 36%	4 12%	
	Total	**25 100%**	**25 100%**	
		Oxytocin	**Saline**	
First stage (minute)	<15	3 12%	4 16%	$X^2 = 2.92$ D.F = 3 P>0.05 N.S
	15-	3 12%	10 40%	
	30-	9 36%	7 28%	
	≥54	10 40%	4 12%	
	Total	**25 100%**	**25 100%**	

Table III:Duration of the second stage of labour

Third stage of labour	Expectant	Oxytocin	
Placental expelled within 45 min.	4 (16%)	14 (56%)	$X^2 = 8.68$ D.F = 1 P<0.01
Manual removal	21 (84%)	11 (44%)	
Total	**25 (100%)**	**25 (100%)**	
	Expectant	**Saline**	
Placental expelled within 45 min.	4 (16%)	6 (24%)	$X^2 = 0.5$ D.F = 1 P>0.05
Manual removal	21 (84%)	19 (76%)	
Total	**25 (100%)**	**25 (100%)**	
	Oxytocin	**Saline**	
Placental expelled within 45 min.	14 (56%)	6 (24%)	$X^2 = 5.34$ D.F = 1 P<0.05
Manual removal	11 (44%)	19 (76%)	
Total	**25 (100%)**	**25 (100%)**	

Table IV: Duration of the third stage of labour and the need for manual removal of placenta

Blood loss (ml)	Expectant	Oxytocin	P-value
≤ 500	10 (40%)	17 (68%)	$X^2 = 3.96$ D.F = 1 P<0.05
> 500	15 (60%)	8 (32%)	
Total	**25 (100%)**	**25 (100%)**	
	Expectant	**Saline**	
≤ 500	10 (40%)	12 (48%)	$X^2 = 0.32$ D.F = 1 P>0.05
> 500	15 (60%)	13 (52%)	
Total	**25 (100%)**	**25 (100%)**	
	Oxytocin	**Saline**	
≤ 500	17 (68%)	12 (48%)	$X^2 = 3.90$ D.F = 1 P<0.05
> 500	8 (32%)	13 (52%)	
Total	**25 (100%)**	**25 (100%)**	

Table V: Blood loss during third stage of labour

	Time (minute)	Expectant	Oxytocin	P-value
Hb%	<9	9 36%	6 24%	**X^2 = 2.06**
	9-	8 32%	11 44%	**D.F = 3**
	10-	5 20%	3 12%	**P>0.05**
	11-	3 12%	5 20%	**N.S**
	Total	**25 100%**	**25 100%**	
		Expectant	**Saline**	
Hb%	<9	9 36%	7 28%	**X^2 =5.486**
	9-	8 32%	5 20%	**D.F = 3**
	10-	5 20%	6 24%	**P>0.05**
	11-	3 12%	7 28%	**N.S**
	Total	**25 100%**	**25 100%**	
		Oxytocin	**Saline**	
Hb%	<9	6 24%	7 28%	**X^2 = 3.65**
	9-	11 44%	5 20%	**D.F = 3**
	10-	3 12%	6 24%	**P>0.05**
	11-	5 20%	7 28%	**N.S**
	Total	**25 100%**	**25 100%**	

Table VI: The level of haemoglobin (gm/dl) (next morning after the procedure)

	Time (minute)	Expectant	Oxytocin	P-value
Foetal weight	<2.5	4 16%	3 12%	**X^2 = 2.06**
	2.5-	5 20%	8 32%	**D.F = 3**
	3.5-	12 48%	11 44%	**P>0.05**
	≥4	4 16%	3 12%	**N.S**
	Total	**25 100%**	**25 100%**	
		Exp.	**Saline**	
Foetal weight	<2.5	4 16%	4 16%	**X^2 = 3.776**
	2.5-	5 20%	10 40%	**D.F = 3**
	3.5-	12 48%	6 24%	**P>0.05**
	≥4	4 16%	5 20%	**N.S**
	Total	**25 100%**	**25 100%**	
		Oxytocin	**Saline**	
Foetal weight	<2.5	3 12%	4 16%	**X^2 = 2.321**
	2.5-	8 32%	10 40%	**D.F = 3**
	3.5-	11 44%	6 24%	**P>0.05**
	≥4	3 12%	5 20%	**N.S**
	Total	**25 100%**	**25 100%**	

Table VII: Foetal weight in the three groups

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