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Umbilical Oxytocin in the 3rd stage of labour

(A substitute to minimize the risk of PPH)

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ABSTRACT

Objective: The aim of this study is to evaluate the efficacy of intra umbilical injection of oxytocin on shortening of the 3rd stage duration, minimizing the blood loss during the 3rd and 4th stages of labour, minimizing the risk of post- partum hemorrhage and retained placenta, found an alternative method for active management of 3rd stage where ergometrine is contraindicated e.g. hypertension, cardiac disease. **Material & Methods:** across sectional prospective study on 100 pregnant ladies in the period between July and August 2012 whose presented for vaginal delivery in labour suite in Aljalaa Maternity Hospital, Tripoli – Libya, exclusion criteria are those associated with risk of hemorrhage such as multiple gestation, preeclampsia, antepartum hemorrhage, and coagulopathy, after enrollment the patient was excluded if C/S is indicated. The cases are divided into two groups (50 cases each), Group A: expectant management was applied via giving 0.4 mg Ergometrine IM after placental delivery,Group B: 20 IU Oxytocin injected into the umbilical vein within 30 seconds of the delivery of the baby and cord clamping, the amount of blood loss during the 3rd and 4th stage of labour was estimated and the time taken for placenta to be delivered was recorded for both groups,Hb concentration was measured and then compared with pre- delivery hemoglobin. **Results:**The incidence of PPH is high in our hospital compared with international figures, blood loss > 500 ml was more (2 fold) in group A, the duration of 3rd stage was significantly less (3fold) with group B, side effects (e.g. nausea and raised BP) were more with group A, 1, There was no significant difference in hemoglobin level reduction.

KEY WORDS**:** Postpartum hemorrhage, Oxytocin, Umbilical vein, 3rd stage of labour

Introduction

Obstetric hemorrhage is the world`s leading cause of maternal mortality causing 24% of an estimated 127000 death annually [1].The world health organization It is found that about 5% of women delivering vaginally lost more than 1000 ml of blood, and as (WHO) defines primary PPH as bleeding in excess of 500 ml in the first 24 hours following delivery [2].

post-partum blood loss is difficult to evaluate, some healthy women tolerate 500 ml loss of blood whereas others become clinically unstable [3].

PPH causes up to 60% of all maternal death in developing countries (59% in Burkina Faso , 53% in Philippines , 43% in Indonesia)[4], PPH in developed world occurs in approximately 5% of all deliveries [5], andincidence of massive PPH in UK is 6.7 per 1000 deliveries [6].

In 1996 pregnancy related maternal mortality in USA is approximately 7-10 women per 100,000 live birth, and national statistics suggest that about 8% of these deaths are caused by PPH.

Uterine atony is the most common cause and it is perhaps the most amenable to prevent [7].

Third stage of labour

Period of time from birth of the child until the placenta is delivered, during this time uterine muscles contracted and retracted which leads to the reduction of the uterine volume and causes placental separation followed by activation of coagulation system which leads to cessation of the bleeding from placental bed [8],the amount of blood loss depends on how quickly this occur typically lasts 5-15 min, and after 30 minutes considered prolonged [9] .

Placental separation has been reported to occur within two contractions after delivery [9] , this stage is thought to be the most dangerous time of labour because of the risk of hemorrhage [10], that is why it should be managed actively.

3rd stage management

Physiological (expectant management)

Allowing the placenta to deliver spontaneously & oxytocic drug given after (or not given)

Active management administration of prophylactic oxytocic drug after delivery of anterior shoulder of the baby & controlled cord traction combined by Brandt-Andrews maneuver [11]

The Bristol randomized control trial provided conclusive evidence that active management of 3rd stage (AMTSL) significantly reduces post-partum hemorrhage, reduces blood loss, and decreases the need for blood transfusion[12]

The hours immediately following delivery is critical and it has been designated by some as (The fourth stage of labour), PPH as a result of uterine atony is more likely at this time.

The American Academy of Pediatrics (AAP) and American College of Obstetricians and Gynecologists (ACOG) in 2002 recommend that vital signs (pulse, BP) should be recorded immediately after delivery and every 15 minute for the first hour after placental delivery.

Retained placenta

Retained placenta occurs in 12% of deliveries, the frequency of retained placenta is markedly increased (20 fold) at gestation less than 26 weeks and even up to 37 week it remains 3 times more common than at term. At term 90% of placentae will be delivered within 15 minutes, once the 3rd stage exceeds 30 minutes there is 10 fold increases in the risk of hemorrhage13. There is some suggestion from limited data that routine administration of Ergometrine in AMTSL increases the risk of retained placenta 14.

Aljalaa Maternity Hospital policy in 3rd stage management Methergin (Methyl Ergometrine hydrogen maleate) 0.4 mg IM, after placental delivery is used as prophylactic oxytocic drug for the 3rd stage in all deliveries. Active management of 3rd stage is practiced in some high risk cases e.g. H/O PPH, anemia, over distended uterus, etc.… , Syntometrine (5 IU oxytocin + 0.4 mg Ergometrine IV) with the delivery of anterior shoulder of the baby and then controlled umbilical cord traction.

Materials and methods

We have been applied a prospective study on 100 pregnant ladies in the period between July and August 2012 whose presented for vaginal delivery in labour suite in Aljalaa Maternity Hospital, Tripoli – Libya.

Exclusion criteria are those associated with risk of hemorrhage such as multiple gestation, preeclampsia, antepartum hemorrhage, and coagulopathy.

After enrollment the patient was excluded if C/S is indicated.

The cases are divided into two groups (50 cases each)

Group A:-

Expectant management was applied via giving 0.4 mg Methergin® IM after placental delivery.

Group B:-

20 IU Oxytocin diluted in 20 cc normal saline injected into the umbilical vein

within 30 seconds of the delivery of the baby and cord clamping, associated with the cord while providing counter traction against the uterine fundus and with signs of placentalseparation a greater traction was applieduntil placenta delivered, the fundus is held up in the abdomen with another hand to prevent inversion of the uterus (Brandt- Andrew method)[11]

If the labour was augmented with oxytocin, it was discontinued when the 2nd stage started, to abolish the effect of oxytocin as it's eliminated from the circulation within 3-5 minutes.

To estimate the amount of blood loss during the 3rd and 4th stage of labour , gauzes ,packs, and towels used after the delivery of the baby being weighted in both groups, the difference in grams is equivalent to blood loss in ml (1 gm of blood = 1ml)[15].

The time taken for placenta to be delivered was recorded for both groups.

Hemoglobin concentration was measured from a sample of venous blood drawn at least 12 hours post-partum and then compared with pre- delivery hemoglobin.

DiscussionStatistical analysis using the mean, chi square, and P-value.The incidence of PPH in this study group was 11% (this figure is about the double of developed countries incidence of 5%), the uterine atony was the underlying reason in 82% of cases, however the reported incidence of uterine atony was 80-90% [16]From our study the two groups were applying steady gentle traction to

nearly similar in respect to maternal age, parity, 2nd stage duration, & baby birth weight (Table 1-4, chart 1,2).Labour induction by prostaglandin gel or vaginal tablet was reported as a risk factor for PPH by Stones et al 1993, Gilbert et al 1987, and Van Danger et al 1991[17], but in our study there was no statistical significant difference between those who were received prostaglandin and those who were not (Table 5). There was a statistical significant increase in the amount of blood loss in patients who were received oxytocin augmentation during the 1st stage of labour (Table 6), this is corresponding to the result of Combs et al 1991 that was reported labour augmentation is a risk factor for PPH[18]There was no statistical significant change in hemoglobin level in both groups (Table 7), Martinez MM, 2006, reported the same finding in his study[19]Incidence of retained placenta was 1% in this study group (the universal incidence is 0.6-3.3% of normal deliveries)[13], only one case of retained placenta reported in group A and no cases reported in group B (Table 8), this may be due to short duration of 3rd stage of labour which act as a contributing factor in prevention of retained placenta[20].Carroli G, Bergel E, 2006 reach to the conclusion of their study that umbilical vein injection of oxytocin + saline solution is effective in

management of retained placenta[21].The only one reported case of retained placenta was managed by the umbilical vein injection of 20 IU oxytocin in diluted saline when the retention time exceeds 30 minutes, but unfortunately the procedure was failed and she undergone manual removal of placenta under general anesthesia, this one single case is of course not conclusive regarding the management and needs further evaluation.

In our study also there was a statistically significant increase in occurrence of nausea with group A, also 62% of patients in group A have increase in systolic blood pressure (the mean increase about 20 mmHg), while in group B there was no change in BP (Table 9), this was corresponding to a result of the study conducted in Abu Dhabi 1995 (a trial of Oxytocin versus Syntometrine in the active management of 3rd stage of labour) [22]

There were 4 cases in each group who required additional oxytocic drug, however those reported cases with PPH was 11 cases ,8 of them needs additional oxytocic drug while the other 3 were managed expectantly (Table 10).Kenneth et al, 2001 reported that active intervention reduced the need for additional oxytocic agent compared to expectant intervention[23], also Prendiville et al 1988 reported that there is less need for additional oxytocic drugs after prophylactic administration of oxytocic drugs. The study also revealed that expulsion of the placenta is faster with intra-umbilical oxytocin injection (mean of 3rd stage duration was 2.5 min).

In 86% of group B the placenta expelled within 5 minutes, comparing to 10% of group A.

By the end of 10 minutes 100% of group B have the placenta expelled comparing with 64% in group A. By the end of 20 minutes 98% of group A have the placenta expelled The difference in the time taken for expulsion of the placenta between group A and group B was strongly significant (Table 11 & Chart 3).(

Golan et al 1983 proposed that injection of intra-umbilical oxytocin leads to high concentration of oxytocin at the uterine wall and this may be the cause of rapid expulsion of the placenta[24], Dahiya P et al 1995 conduct the same study that is reports statistically significant decrease in duration of 3rd stage of labour[25] The data revealed that the difference in the total blood loss in the 3rd and 4th stage between both groups was not statistically significant (Table 12), but cases with blood loss > 500 ml (which is the cut line in the definition of PPH) was increase about 2 fold in group A (7 vs.4), none of cases which were reported with blood loss > 500 ml received blood transfusion because they were stable hemodynamically.

Conclusion

From this prospectively study we conclude:

The incidence of PPH (as a definition, but not massive bleeding) is high in our hospital compared with international figures. Induction of labour via PGE2 is not a risk factor for PPH, but labour augmentation via oxytocin infusion in the 1st stage of labour may enhance this risk. In comparing the 2 options in the management of 3rd stage of labour A. Intramuscular 0.4 mg Ergometrine after placental separation B. Intra-umbilical 20 IU oxytocin in 20 ml N/S following cord clamping There was no significant difference in hemoglobin level reduction and in the total blood loss in the 3rd and 4th stage of labour, but cases with blood loss > 500 ml was more (2 fold) with method A The duration of 3rd stage was significantly less (3fold) with method B Side effects (e.g. nausea and raised BP) were more with method A

The notion that oxytocin may be delivered directly to the retro placental myometrium by injecting it into the placental bed via the umbilical vein has stimulated a lot of interest , this technique allows the treatment to be directed specifically at the area with the contractile failure whilst sparing the reminder[26]

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Age (year)	Group A	Group B
<20	3	0
20-24	9	6
25-29	13	17
30-34	21	13
35-39	2	9
40- 45	2	5

Table (1) Age of the patients

Mean age for group A = 28.8Y
Mean age for group B =30.7 Y

Parity	Group A	Group B
0	13	7
1	15	11
2	8	14
3	11	9
4	2	3
5	1	2

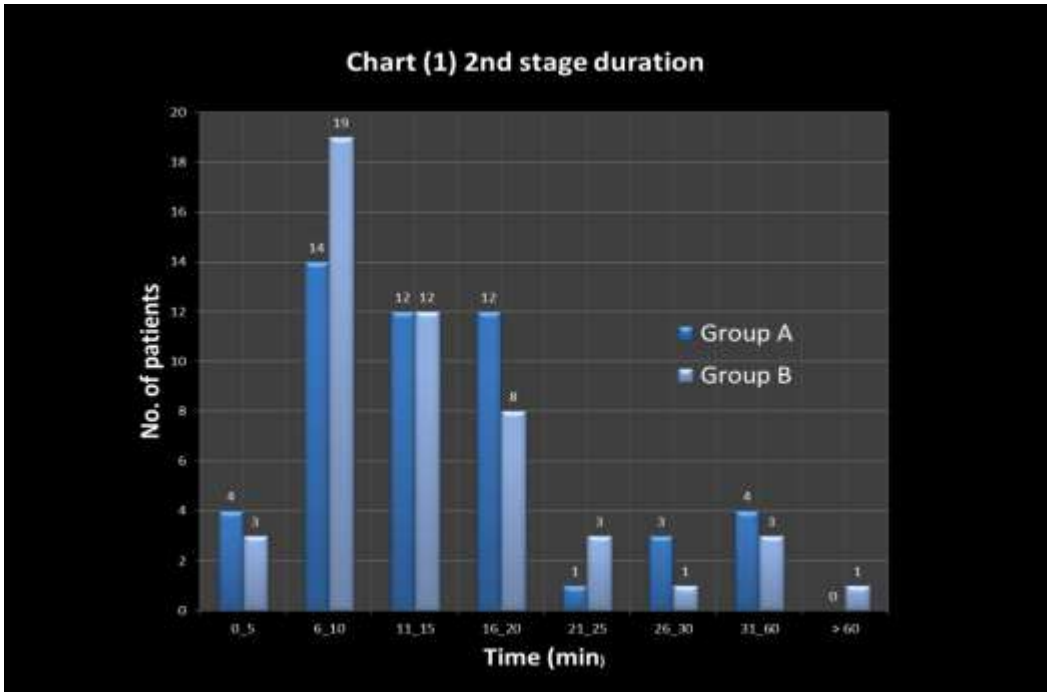
Table (2) Number of parity

The mean parity for group A = 1.5
The mean parity for group B = 2

2nd stage duration (min)	Group A	Group B
0-5	4	3
6-10	14	19
11-15	12	12
16-20	12	8
21-25	1	3
26-30	3	1
31-60	4	3
> 60	0	1

Table (3) Duration of 2nd stage

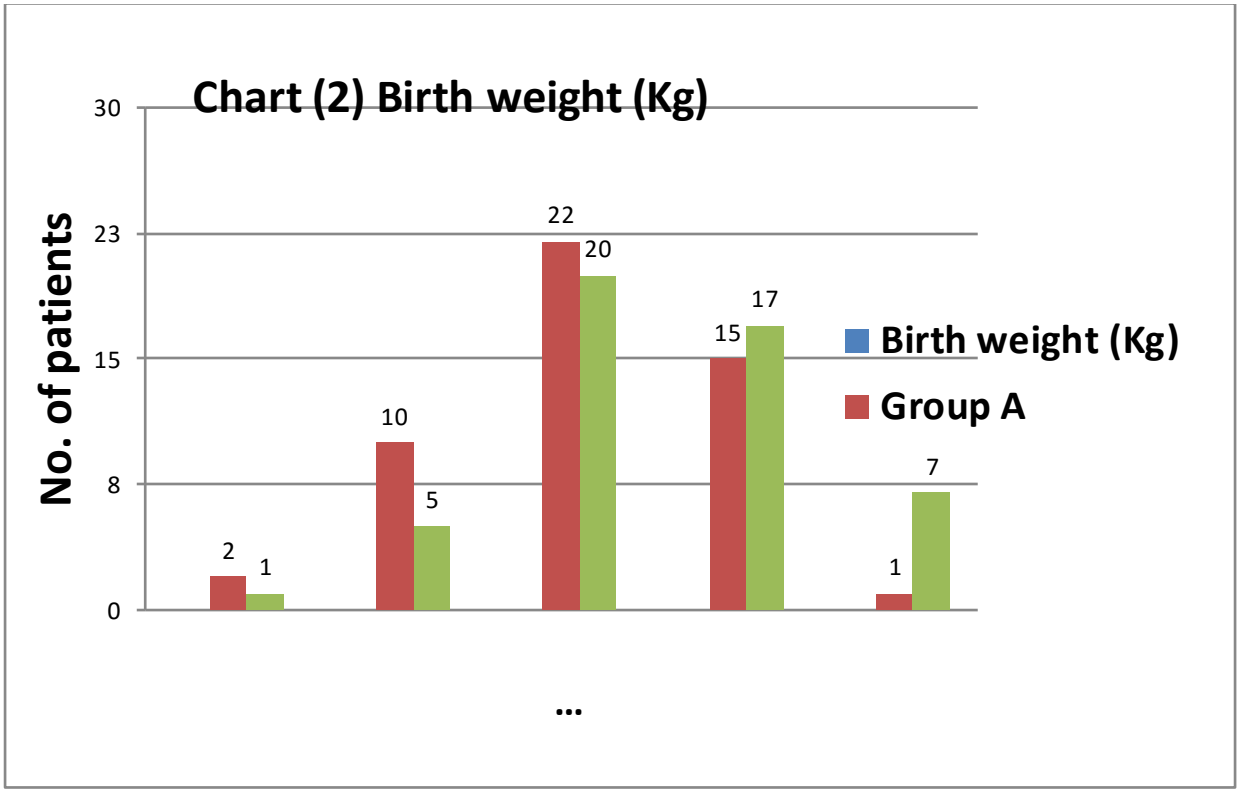
Mean duration time for group A = 13.1 min.
Mean duration time for group B = 12.5 min.



Birth weight (Kg)	Group A	Group B
<2	0	0
2-2.4	2	1
2.5-2.9	10	5
3-3.4	22	20
3.5-3.9	15	17
≥ 4	1	7

Table (4) Weight of babies

Mean birth weight for group A = 3.2 kg.
Mean birth weight for group B = 3.4 kg.



Group A			Group B		
Induction PGE2	Blood loss (ml)		Induction PGE2	Blood loss (ml)	
	500 ≤	> 500		500 ≤	00
Yes	3	0	Yes	4	0
No	40	7	No	42	4

Table (5) Induction of labour

Group A			Group B		
Oxytocin use in 1st stage	Blood loss (ml)		Oxytocin use in 1st stage	Blood loss (ml)	
	500 ≤	> 500		500 ≤	>500
Yes	19	5	Yes	16	3
No	24	2	No	30	1

X^2 =1.79 0.5 > P > 0.1 X^2 = 2.526 0.5 > P >0.1

Table (6) Oxytocin use in 1st stage of labour

Hb reduction (g/dl)	Group A	Group B
< 2	49	49
2≥	1	1

X^2 = 1.042 P> 0.5

Table (7) Hemoglobin change

Retained placenta	Group A	Group B
No	49	50
Yes	1	0

X^2 = 1.01 0.5 > P > 0.1

Table (8) Retained placenta

Nausea	Group A	Group B
No	41	48
Yes	9	2
Increase BP	Group A	Group B
No	19	50
Yes	31	0

X^2 = 5.005 0.05 > P > 0.01

Table (9) Drugs side effects

Need for additional oxytocic drug	Group A	Group B
No	46	46
Yes	4	4

Table (10) Need for additional oxytocic drug

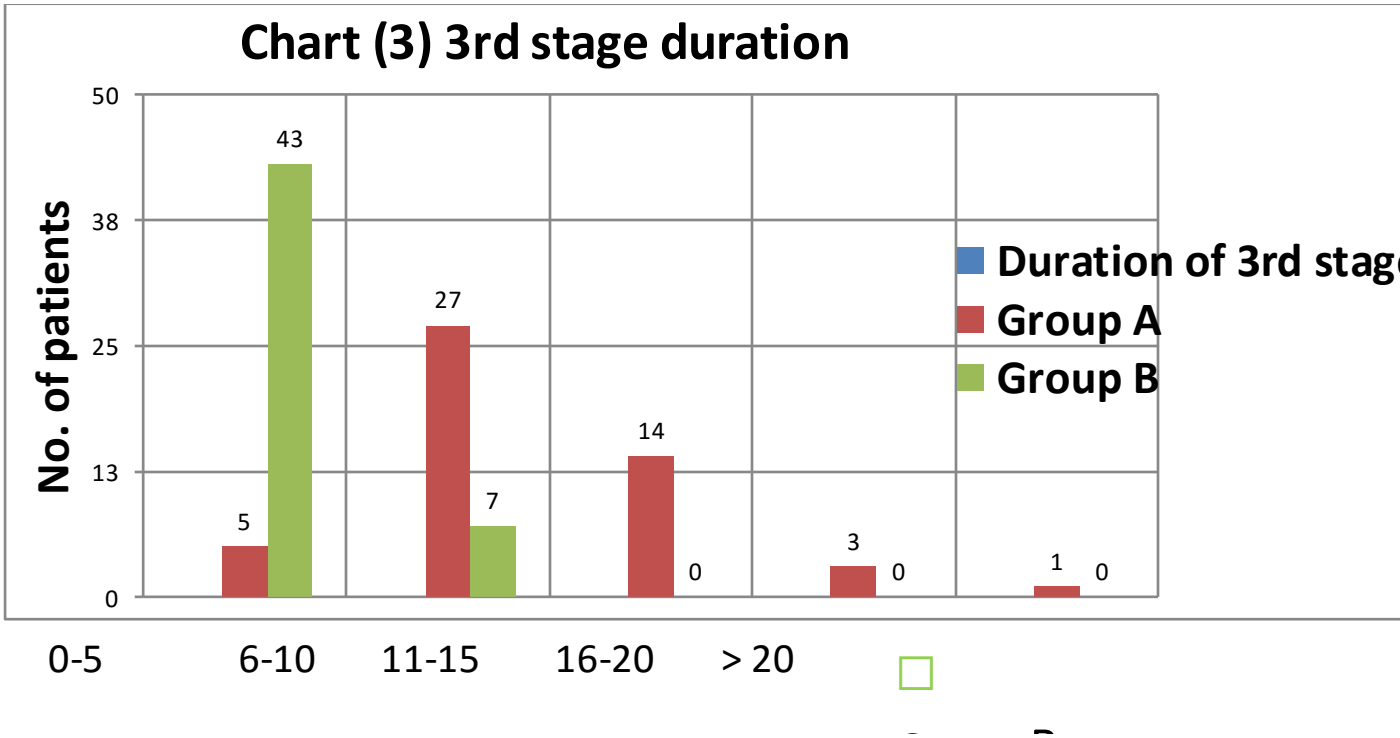
Duration of 3rd stage (min.)	Group A	Group B
0-5	5	43
6-10	27	7
11-15	14	0
16-20	3	0
> 20	1	0

Table (11) Duration of 3rd stage

Mean duration of group A = 8.16 min.

Mean duration of group B = 2.5 min.

$X^2 = 59.848$ P< 0.001



Estimated blood loss (EBL) in (ml)	Group A	Group B
100-149	4	5
150-199	13	8
200-249	5	15
250-299	12	7
300-349	4	5
350-399	3	2
400-449	0	3
450-499	2	1
≥ 500	7	4

Table (12) Blood loss during 3rd& 4th stage of labour

Mean EBL in group A = 291.9 ml X^2= 13.150 P > 0.1

Mean EBL in group B = 272.6 ml