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Original Research Article

Intramuscular oxytocin 10 units versus intravenous methylergometrine 0.2 mg in active management of third stage of labour for prevention of postpartum haemorrhage: a comparative study

Divya Narayana, B. Pathak*, Abha Khurana, Uttara Aiyer Kohli

Department of Obstetrics and Gynecology, Command Hospital Air Force, Bangalore, Karnataka, India

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***Correspondence:**
Dr. B. Pathak,
E-mail: bpathak_go@yahoo.co.in

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ABSTRACT

Background: To compare the effectiveness of 10 IU of oxytocin IM with 0.2 mg methyl ergometrine IV in the prevention of post-partum hemorrhage when used as a part of active management of third stage of labour. This study aims to compare their influence on duration of the third stage of labour, the amount of blood loss during the third stage of labour and the immediate post-partum period and side effects of the drugs if any.
Methods: The study was conducted in a tertiary care teaching hospital. 200 women, who underwent normal delivery with or without episiotomy, were enrolled and were randomly distributed into two groups. 100 women received 10 IU of intramuscular Oxytocin and 100 women received intravenous 0.2 mg of methyl ergometrine. Women of both the groups were given the medication after delivery of anterior shoulder of the baby. Comparison done between percentages fall in Hb from before delivery to 24 hours after delivery, need for additional uterotonic agents, need for blood transfusion, duration of third stage of labour and any side effects including retained placenta and need for manual removal of placenta.
Results: Intravenous methylergometrine was observed to be equally effective as intramuscular oxytocin in prevention of post-partum hemorrhage. There was no difference in the duration of third stage of labour, amount of blood loss, need for additional uterotonic agents, and need for blood transfusion in both the groups. There was no significant side effect in both the groups.
Conclusions: Intramuscular oxytocin is as efficacious as Intravenous methylergometrine in the prevention of postpartum hemorrhage with no side effects.

Keywords: Methylergometrine, Oxytocin, Post-partum hemorrhage, Third stage of labour

INTRODUCTION

In spite of marked improvements in management, postpartum haemorrhage remains a significant contributor to maternal morbidity and mortality both in developing and developed countries.[1] Postpartum bleeding has serious consequences and the proportions range from less than 10 percent to nearly 60 percent of maternal death in various countries.[2]

In developing countries, where maternal mortality rates are exponentially higher, PPH plays an even greater role.[3] Where maternal mortality is high and resources are limited, the introduction of low-cost evidence-based practices to prevent and manage postpartum hemorrhage can improve maternal and infant survival.

The best management of the third stage would be one that effectively minimizes serious problems such as blood

loss and retained placenta, while interfering as little as possible with the physiological mechanisms of placental delivery and minimal side effects.

Active management of third stage of labour, includes administration of prophylactic uterotonic after delivery of baby, controlled cord traction of umbilical cord and uterine massage after delivery of placenta.[4]

Methyl ergometrine is a conventional oxytocic used extensively but is associated with unpleasant side effects like hypertension. Oxytocin is the current drug of choice for prevention of PPH. The main advantages are rapid onset of action and the lack of side effects such as elevated blood pressure or tetanic contractions.[5]

The present study is taken to compare the effectiveness of 10 units of oxytocin given intramuscularly versus methyl ergometrine 0.2 mg IV given at the time of delivery of anterior shoulder as a part of active management of third stage of labour in the prevention of post-partum hemorrhage in our hospital.

METHODS

Institutional ethical committee clearance was taken. 200 women who underwent normal delivery with/without episiotomy in a tertiary care post graduate teaching hospital, were included the study. Subjects already having predisposing factors for post-partum hemorrhage (Severe anemia (Hb < 7 gm/dl), over distended uterus like multiple pregnancy, polyhydramnios, macrosomia, prolonged labour, precipitate labour, chorioamnionitis, previous LSCS, antepartum hemorrhage, coagulation disease, multigravida, preeclampsia, IUD, medical diseases with pregnancy-like liver disorder, previous H/o PPH and instrumental delivery) were excluded from the study. Drug allergy to methyl ergometrine or contraindicated as in case of hypertensive disorders were also excluded from the study. Study group of 200 women were randomly distributed into two groups, i.e. 100 women in Group A received 10 IU of oxytocin IM and 100 women in Group B received 0.2 mg of methyl ergometrine IV after delivery of the anterior shoulder of the baby. Controlled cord traction of umbilical cord and uterine massage after delivery of placenta were done for all the subjects.

A plastic pouch was placed under the buttocks after the delivery of the baby. The blood lost was collected in this pouch. After delivery of the placenta and after suturing the episiotomy/tear, the contents of the pouch were transferred to the graduated jar. The blood volume was expressed in milliliters. The soiled linen and sponges used were weighed. The weight 1gm was considered equal to 1 ml. The known dry weight was subtracted. Placenta were examined for completeness after expulsion. A record of Hb before labour and 24 hours after delivery was recorded. Pulse rate and BP before and 1 hour after delivery were recorded.

Use of additional Oxytocics or need for blood transfusion was noted in both groups. The duration of third stage of labour was calculated using a stop watch from time of delivery of baby to time of complete expulsion of the placenta. All women were kept under observation for one hour after delivery to look for any complications. Conventional therapy was given immediately if bleeding was considered to be more than usual. Patients were followed up in post-partum period during the hospital stay for any complication till discharge.

Statistical analysis

Student t-test (two tailed, dependent), Chi-square test and Fisher exact test were used for statistical analysis.

RESULTS

A comparative clinical study with 200 patients, 100 patients in Group A (administered with10 units IM Oxytocin) and 100 patients in Group B (administered with 0.2 mg IV Methergin) was undertaken to study the comparative effectiveness in preventing postpartum hemorrhage, blood loss, duration of third stage of labour, fall in Hb level and change in hemodynamics.

Age distribution

The age group ranged between 18-35 years. The mean age of Group A was 24.47±3.49 years and mean age group of Group B was 24.38±3.49 years. Age distribution in both the groups was comparable (Table 1).

Table 1: Age distribution of patients studied.

Age in years	Group A		Group B		P-value
	No.	**%**	**No.**	**%**	
18-20	17	17.0	17	17.0	
+21-25	41	41.0	45	45.0	
26-30	37	37.0	33	33.0	0.856
31-35	5	5.0	5	5.0	
Total	**100**	**100.0**	**100**	**100.0**	
Mean ± SD	24.47±3.49		24.38±3.49		

Table 2: Parity distribution of patients studied.

Parity	Group A		Group B		p-value
	No.	%	No.	%	
Primi	72	72.0	76	76.0	0.519
Multi	28	28.0	24	24.0	
Total	**100**	**100.0**	**100**	**100.0**	

Table 3: Duration of third stage (min) of patients studied.

Duration of 3rd stage in minutes	Group A		Group B		p-value
	No.	%	No.	%	
< 3 minutes	0	0.0	0	0.0	0.893
4-5 minutes	69	69.0	69	69.0	
> 5 minutes	31	31.0	31	31.0	
Total	**100**	**100.0**	**100**	**100.0**	
Mean±SD	5.42±1.04		5.44±1.06		

Table 4: Comparison of blood loss in two groups.

Blood loss (ml)	Group A		Group B	
	No.	%	No.	%
< 90	11	11.0	8	8.0
90-180	74	74.0	76	76.0
180-270	9	9.0	11	11.0
> 270	6	6.0	5	5.0
Total	**100**	**100.0**	**100**	**100.0**
Mean ± SD	149.90±75.32		155.00±77.92	
P-value = 0.640				

Parity distribution

Among 100 women in Group A, 72 were primigravida and 28 were multigravida. In Group B, 76 women were primigravida and 24 were multigravida. There was no statistically significant difference between the two groups (Table 2).

Duration of 3rd stage of labour

Mean duration of 3rd stage of labour in Group A was 5.42±1.04 minutes whereas in Group B it was 5.42±1.06 minutes. There was no statistically significant difference between either group (Table 3).

Amount of blood loss

The mean blood loss in Group A (Oxytocin) was 149.90±75.32 while that in Group B (Methyl ergometrine) was 155.00±77.92. The difference between the two groups was insignificant (Table 4).

Fall of Hb level

The difference in the Hb percentage before and 24 hours after delivery is significant, with P-value (< 0.001 in Group A) and (< 0.001 in Group B). However, the difference of fall of Hb level between Group A and Group B remained statistically insignificant (Table 5).

Table 5: Comparative evaluation of hemoglobin in two groups of patients studied.

Hemoglobin	Group A	Group B	p-value
Before delivery	12.34±1.09	12.19±1.04	0.321
After delivery	11.52±1.22	11.28±0.99	0.128
Difference	0.82	0.90	-
P-value	< 0.001**	< 0.001**	-

A total 01 woman from each group required blood transfusion of one unit each. 03 women from each group required additional Oxytocics to attain uterine tone even after initial oxytocin and/or methyl ergometrine. There was no statistically significant difference between the two groups in change in pulse rate, systolic blood presser, diastolic blood presser and need of additional Oxytocics.

DISCUSSION

The primary aim of management of postpartum haemorrhage should be its prevention. The active management of third stage of labour with routine

prophylactic administration of oxytocics at the time of delivery of the anterior shoulder of the fetus has been shown to reduce the risk of postpartum haemorrhage.[6,7]

Recent studies show that there are still wide variations in practice around the world in the management of third stage of labour.[8] Methyl ergometrine is a conventional oxytocic used extensively but is associated with unpleasant side effects like hypertension. Intramuscular oxytocin used alone has been found effective in preventing postpartum hemorrhage and results in fewer side effects and is recommended by world health organization.

Current oxytocic drugs are far from ideal particularly for routine use in developing countries, where simple route of administration, and stable, inexpensive drugs are needed because many deliveries take place far from hospitals and are supervised solely by birth attendants.

The present study showed that 10 IU oxytocin IM is as effective as 0.2 mg methyl ergometrine IV in preventing blood loss with relatively no side effects. There was one blood transfusion in each of the groups.

In this study, the mean maternal age (years) is 24.47±3.49 and mean age group of Group B was 24.38±3.49 years. The women included in the present study have maternal age ranging from 18-35 years (Table 1). The distribution of parity (Table 2) shows that the majority of women are primigravida.

In a similar study by Choy et al, where IV oxytocin was compared with syntometrine, the mean maternal age group was 28 years in both the groups and statistically insignificant.[9]

Duration of third stage of labour in Group A (Oxytocin) the mean duration was 5.42±1.04 minutes. In Group B (Methyl ergometrine), the mean duration was 5.44±1.06 minutes. Duration of third stage is statistically similar in two groups with P = 0.893. In a study by Neeba et al duration of third stage was found to be 3.7±1.3 minutes. In a similar study by Sanjay B et al, the same was found to be 6.2 minutes. In another study by Choy et al, where oxytocin was used intravenously, prolonged third stage (> 30 min) was reported in 9 cases i.e., 1.8%.[9] In our study there are no cases with prolonged third stage.

In our study, the mean blood loss in Group A (Oxytocin) was 149.90±75.32 while that in Group B (Methyl ergometrine) was 155.00±77.92.

The difference between the two groups was insignificant, mean blood loss (ml) is statistically similar in two groups with P = 0.640. In the study by Choy et al, where IV oxytocin was used the mean blood loss in third stage is 200 ml (100-250 ml). Therefore, in our study the mean blood loss in third stage is significantly low.

In this study, the difference in the hemoglobin percentage before delivery and 24 hours after delivery has been found to be statistically significant in both the groups with P-value < 0.001. Mean fall in the percentage in group A was 0.82% as compare to 0.90% in Group B. However, the difference of fall of Hb level between both the groups remained insignificant.

In a study at Choy et al, where oxytocin was given intravenously, the fall in haemoglobin (g/dl) was 0.8 (0.2-1.8).[9] In 61.6% case the % reduction in haemoglobin level was <10%, in 26.1% between 10-20% and in 12.3% case it is >20% drop.

In our study, there was no statistically significant difference in changes in pulse rate, systolic and diastolic blood presser between the two groups when compared before, one hour and 24 hours after delivery.

In our study there is not a single case that needed manual removal. 03% cases in both the groups needed additional Oxytocics in the form of PGF 2α given intramuscularly. Comparatively, the study by Choy et al, 7.3% cases needed additional Oxytocics.[9]

Though various studies have found minor side effects like shivering, fever, vomiting etc, no such side effects have been observed in either groups in our study.[10]

The usage of oxytocin in active management of third stage of labour is beneficial in reducing the blood loss in third stage and thus helps in preventing postpartum haemorrhage. Oxytocin given at dose 10 units intramuscularly is technically easier to use and can be used in situations where intravenous access is unavailable. Oxytocin is very safe to use with least adverse effects and can be used even in high risk women. It can be used even in hypertensive women and in those with cardiovascular disease. The limitation of our study is the small sample size and further studies with larger number of subjects are needed.

In summary, it has been found in this study that intramuscular oxytocin is equally effective as intravenous methergine in reducing post-partum hemorrhage. Intramuscular injection of oxytocin is technically easier to use and can be used in situations where intravenous access is unavailable or in peripheral areas where deliveries are still conducted by traditional birth attendants.

CONCLUSION

This study has shown that both oxytocin and methylergometrine are equally effective in preventing postpartum haemorrhage when used as a part of active management of third stage of labour. Because of ease of administration, significantly better safety profile and lesser contraindications, oxytocin should be considered as more preferable prophylactic uterotonic than

methylergometrine in the active management of the third stage of labour.

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