

**Original article****Title- comparison of oxytocin, methergin and carboprost in active management of third stage of labour****A. Lamba<sup>\*</sup>, G. Joshi, R.C. Purohit***Department of obstetrics and gynecology, kumaon university, India.*<sup>\*</sup>Corresponding author; Department of obstetrics and gynecology, kumaon university, India.

## ARTICLE INFO

## ABSTRACT

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To compare the efficacy of 10 units oxytocin, 0.2 mg methylergometrine and 250 microgram carboprost in the active management of third stage of labour. A randomized comparative study enrolling 300 women was done in the Department of Obstetrics and Gynecology of Dr. Susheela Tiwari Government Hospital, Haldwani. They were randomly allotted into one of the groups. Active management of third stage of labour was done using one of the three uterotonics as per the group of the patient. The main outcome measures were the amount of blood loss, the duration of third stage of labour, drop in hemoglobin and hematocrit levels, need for additional oxytocics and side effects of the drugs. Statistical analysis was done with ANOVA. The three groups were comparable with regard to age and parity. Carboprost was associated with least amount of blood loss ( $p = 0.01$ ) and least duration of third stage of labour ( $p = 0.02$ ) amongst the three groups. There was no significant difference in the fall in hemoglobin and hematocrit concentration. Need for additional oxytocics was highest in methylergometrine group (5%). Methylergometrine and carboprost were associated with a number of unpleasant side effects as compared to oxytocin. However all the side effects were acceptable and preferable to the excessive blood loss. Thus it is concluded that carboprost shortened the third stage of labour, minimised bleeding and safeguarded against postpartum hemorrhage effectively as

compared to oxytocin and methylergometrine but it is expensive and associated with a number of unpleasant side effects.

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## 1. Introduction

Postpartum hemorrhage is one of the most common causes of maternal deaths throughout the world. Pregnancy and childbirth involves significant health risks, even to women with no preexisting health problem. Worldwide there are an estimated 500,000-600,000 deaths of mothers in childbirth annually of which 25% are due to severe bleeding. World Health Organization also estimated 20 million annual maternal morbidities due to hemorrhage. In developing countries, where maternal mortality rates are exponentially higher, postpartum hemorrhage plays an even greater role<sup>1</sup>. World Health Organisation defines postpartum haemorrhage as blood loss of more than 500ml during the third stage of labour or during the first 24 hours after delivery<sup>2</sup>. It occurs in approximately 4% of vaginal deliveries<sup>3</sup>. 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 bonding between mother and baby, and has few side effects. Recent studies show that there are still wide variations in practice around the world in the management of third stage of labour. Thus this study is an attempt to analyse the efficacy of 10 units of oxytocin, 0.2mg of methylergometrine and 250 microgram of carboprost (all given intramuscularly) individually in the management of third stage of labour for the prevention of postpartum hemorrhage and compare each of them with the other two and also study their side effect profile.

## 2. Materials and methods

A randomized comparative study was done to compare the efficacy of 10 Units of oxytocin, 0.2 mg of methylergometrine and 250 microg of carboprost (all given intramuscularly) in the active management of third stage of labour in preventing postpartum hemorrhage.

The study was conducted in the department of Obstetrics and Gynaecology of Dr. Sushila Tiwari Memorial Hospital, Haldwani. A total number of 300 cases delivering in the labour room of Dr. Sushila Tiwari Memorial Government Hospital Haldwani from November 2011 to May 2013 who fulfilled the selection criteria were included in the study. Women with singleton pregnancy, between 37 and 42 weeks of gestation, anticipated vaginal delivery, longitudinal lie, no high risk factors and who gave written and informed consent were enrolled in the study. While women with hemoglobin < 7 gm%, pregnancy induced hypertension, abruption placenta, placenta previa, multiple pregnancy, grandmultipara, malpresentation, polyhydramnios, previous uterine scar, chorioamnionitis, prolonged labor, intrauterine fetal death, coagulation abnormalities were excluded. Patients with history of medical disorders like asthma, epilepsy, heart or renal disease were also excluded from the study.

A thorough general and systemic examination of all the cases was done including cardiovascular system, respiratory system, per abdomen and per vaginal examinations. All relevant investigations including a pre labour evaluation of the hemoglobin and hematocrit were done. A total number of 100 cases in each of the three groups were considered. Each of the patients was allotted to one of the groups by lottery method (random sampling method). One of the standard uterotonics was administered to each of the case just after the delivery of the anterior shoulder of baby. Mode of administration of the drug in all the three groups was by intramuscular route. The blood loss during the third stage of labour was measured in blood collecting bag (BRASS-V-DRAPE). Blood clots were weighed separately considering 1gm equal to 1 ml of blood<sup>4</sup>. Blood soaked swabs were weighed, the known dry weight subtracted and the calculated volume added to that of the blood volume of measuring bag.

Postpartum hemorrhage in the present study was considered as blood loss of more than 500 ml during the third stage of labour. Once the blood loss exceeded 500ml the patients were managed by giving additional oxytocics (carboprost 250 microgram intramuscularly) The amount of blood loss, duration of the third stage of labour (interval between administration of oxytocic and expulsion of placenta) third stage complications like retained placenta and need for additional oxytocics were noted. The maternal hemoglobin and hematocrit were

repeated 24 to 48 hours after the delivery and the change in haemoglobin and hematocrit were taken as an objective measure of postpartum hemorrhage. Blood pressure was recorded before onset of labour and thirty minutes after delivery. Patients were observed for two hours following delivery for vital signs and bleeding per vagina. The occurrence of side effects like nausea, vomiting, shivering, fever, diarrhoea etc. within the first two hours of delivery were recorded.

Statistical analysis of the three groups was done by one way ANOVA and the post hoc test used for multiple comparisons was TUKEY. A p value of less than 0.05 was considered to be statistically significant. Analysis was done in Statistical Software for Social Sciences (SPSS) version 18 package.

### 3. Results

All the groups were comparable with regard to age and parity (Table 1):

**Table 1**  
Groups with regard to age and parity.

Groups	Mean age $\pm$ SD (in yrs)	p value	Mean parity $\pm$ SD	p value
Group A	24.86 $\pm$ 3.3	0.341	1.54 $\pm$ 0.83	0.361
Group B	24.38 $\pm$ 3.7		1.49 $\pm$ 0.98	
Group C	24.36 $\pm$ 3.2		1.68 $\pm$ 1.08	

The mean duration of third stage of labour was 5.7  $\pm$  2.6 minutes in the oxytocin group, 5.53  $\pm$  2.4 minutes in the methyl ergometrine group and 4.35  $\pm$  1.9 minutes in carboprost group. The difference in mean duration of third stage of labour was statistically significant.

**Table 2**  
Groups with regard to mean duration of third stage of labour and mean amount of blood loss.

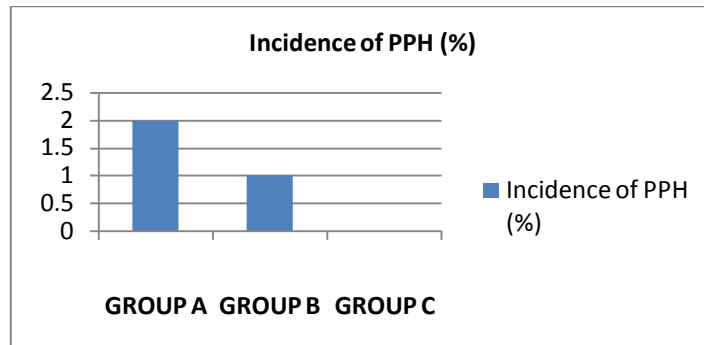
Groups	Mean duration of third stage of labour $\pm$ SD	p value	Mean amount of blood loss	p value
A	5.7 $\pm$ 2.6	< 0.05	148.80 $\pm$ 63.17	< 0.05
B	5.5 $\pm$ 2.4		152.25 $\pm$ 67.2	
C	4.32 $\pm$ 1.9		127.60 $\pm$ 54.14	

The mean blood loss in the third stage was 148  $\pm$  63.15 ml in the oxytocin group, 152.25  $\pm$  67.2 ml in the methyl ergometrine group while it was 127.6  $\pm$  54.14 in the carboprost group. Comparison between the above three groups with regard to blood loss showed p < 0.05, which was statistically significant. The intergroup comparison of systolic and diastolic blood pressure of the three groups after delivery was statistically highly significant. The difference was found to be insignificant between Group A and C but was highly significant between Group A and B and between Group B and C. Intergroup comparison showed the reduction in Hb% between all the three groups with p>0.05 which was not significant.

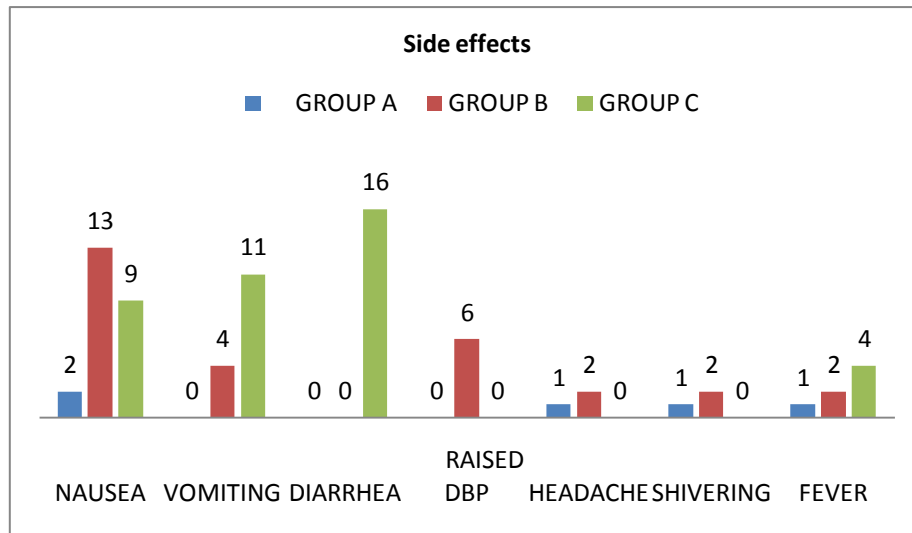
**Table 3**  
Groups with regard to difference in Pre and Post Delivery Hemoglobin Levels.

Groups	Difference in Pre and Post Delivery Hemoglobin Levels	p value
A	0.78 $\pm$ 0.32	0.220
B	0.72 $\pm$ 0.30	
C	0.72 $\pm$ 0.31	

Incidence of postpartum hemorrhage in Group A and B was 2% and 1% respectively. No patient suffered a blood loss of more than 500ml in Group C.



Women in methyl ergometrine group had side effects like increase diastolic blood pressure (6%), nausea (13%), vomiting (4%), shivering (2%) and fever (2%) whereas women in carboprost group had side effects like nausea (9%), vomiting (11%), diarrhoea (16%) and fever (4%). Only 2% patients in oxytocin group had nausea and only 1% of them complained of shivering and fever. None of the patients in both the groups required blood transfusion or surgical intervention.



### 3. Discussion

Postpartum hemorrhage is one of the most important causes of maternal deaths throughout the world. Active management of third stage of labor and the use of prophylactic oxytocics has reduced its incidence. Any means of reducing blood loss in the third stage without considerable side effect is welcomed in labour and postpartum care for the well being of mother and the child.

It is seen that the mean age of patients in our study and various others available from Indian literature<sup>5</sup> is slightly lower than that from the western population<sup>6</sup>. This observation may be due to the fact that the age at marriage and subsequent pregnancy is lower in the rural areas of the Indian subcontinent as most of the patients in these studies were illiterate and belonged to rural areas. The mean parity in our study was in accordance with that of the available literature<sup>5</sup>.

In the present study mean duration of third stage of labour was  $5.7 \pm 2.6$  minutes in the oxytocin group,  $5.53 \pm 2.4$  minutes in the methylergometrine group and  $4.32 \pm 1.9$  minutes in carboprost group. The difference was found to be statistically significant. Our results are in accordance with the study conducted by Bhide P et al<sup>7</sup>. In the

present study mean blood loss in the third stage was  $148 \pm 63.15$  ml in the oxytocin group  $152.25 \pm 67.2$  ml in the methyl ergometrine group while it was  $127.6 \pm 54.14$  in the carboprost group. The difference was found to be statistically significant. Our results regarding the amount of estimated blood loss in third stage of labour corroborated with the available literature<sup>8,9</sup>. Savita rani singhal et al<sup>5</sup> conducted a similar study and found that the mean blood loss in oxytocin group was 264.2ml which was possibly higher due to inclusion of high risk cases. Orji et al<sup>10</sup> compared the efficacy of oxytocin and methyl ergometrine and reported the mean blood loss to be 243ml and 260 ml in both the groups respectively. Higher amount of blood loss in third stage in their study may be due to more number of multiparous patients and a wider inclusion criteria. It was analysed that the fall in hemoglobin was considerably minimized with the use of active management of third stage of labour irrespective of the uterotonic used and its mode of administration. With the appropriate use of uterotonics in our study, no patient required a blood transfusion thereby avoiding the hazards associated with it. Despite the administration of uterotonics to all cases, contrary to our belief 2 patients in oxytocin group (2%) and 1 patient in the methylergometrine group (1%) suffered a blood loss of more than 500ml. No patient in the carboprost group had such a severe blood loss. Two patients out of the three who developed postpartum hemorrhage were grand multipara, which could be one of the possible causes of excessive bleeding. The incidence of postpartum hemorrhage in our study was lower than that found in the study done by Nisha Singh et al<sup>11</sup> due to inclusion of high risk cases like twin pregnancy and cases with anemia which were major causes of atonic PPH in their study. It is seen that methylergometrine and carboprost are associated with a number of unpleasant side effects. On the other hand oxytocin causes minimal side effects. Thus it is of paramount importance for the obstetrician to consider all the side effects and contraindications of a drug and select the most suitable one for every individual case.

#### Limitations of the study:

- The trial was not double blinded.
- Limitation in accuracy of collection of blood due to possibility of mixing with amniotic fluid, bleeding from episiotomy wound and spattering of blood.
- To establish equivalence of these three uterotonics in high risk group a large trial is needed. This study was conducted are in low risk group.

#### 4. Conclusion

Carboprost shortened the third stage of labour, minimised bleeding and safeguarded against postpartum hemorrhage effectively as compared to oxytocin and methylergometrine but it is expensive and associated with a number of unpleasant side effects.

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