

## Comparison of methylergometrine and carboprost for prophylaxis of postpartum haemorrhage

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### Abstract

**Introduction:** This study aims at comparing the effectiveness of two drugs available in the market in the prophylaxis of postpartum haemorrhage, i.e., carboprost and methylergometrine.

**Aim:** To compare the efficacy of Carboprost and methylergometrine as prophylaxis of postpartum haemorrhage.

**Methodology:** This was an observational study involving 150 pregnant women who received either methylergometrine (250 mcg) or carboprost (125 mcg) following the delivery of anterior shoulder of the baby. Incidence of postpartum haemorrhage, median duration of third stage of labour, median post-partum blood loss, fall in haemoglobin and fall in hematocrit along with side effect profile of the drug were studied.  $\chi^2$  test and students unpaired t test were the test of statistical significance employed.

**Results:** Median duration of third stage of labour was 6.3 minutes in women who received Methylergometrine and 5.5 minutes in those who received carboprost.(p value <0.001). Median postpartum blood loss was 300 ml in patients who received methylergometrine and 150 ml in those who received carboprost.(p value <0.001). Change in haemoglobin and PCV were 0.6 and 2.4 respectively in patients who received methylergometrine and 0.3 and 1.2 respectively in women who received carboprost (p value <0.001).

**Conclusion:** Carboprost was superior to methylergometrine with respect to the above mentioned outcome measures with no significant difference in side effects; thus should be preferred to methylergometrine in active management of third stage of labour.

**Keywords:** Active management of third stage of labour, carboprost, duration of third stage, Methylergometrine, Post-partum blood loss, post-partum haemorrhage

### Introduction

The most accepted definition of postpartum haemorrhage is any bleeding from or into the genital tract following delivery of the baby, excessive enough to alter the maternal haemodynamics.<sup>(1)</sup> After delivery of the placenta a woman may lose up to 20% of her blood volume before clinical signs due to haemorrhage become evident; which means waiting for signs of excessive bleeding may delay timely initiation of appropriate treatment.<sup>(2)</sup> Incidence of postpartum haemorrhage is approximately 2% of all women following child birth. It is associated with almost twenty five percent of all maternal deaths globally. It is also the leading cause of maternal mortality in most low-income countries.<sup>(3)</sup> During the latter half of twentieth century, a new concept of "active management of the third stage of labour" was introduced, to prevent post-partum haemorrhage and administration of a uterotonic immediately after delivery of the anterior shoulder of the baby was the most important component of active management of third stage of labour.<sup>(4)</sup> An interesting observation is that despite being a good uterotonic agent, WHO has not yet included carboprost in the list of drugs for active management of third stage of labour. This study aims at comparing the effectiveness of two drugs available in the market in the prophylaxis of postpartum haemorrhage, i.e., carboprost and methylergometrine.

### Aims and Objectives

To compare the effect of methylergometrine (250 µg i.m.) and carboprost i.e.15 Methyl PGF<sub>2</sub>α (125 µg i.m.) as prophylaxis for postpartum haemorrhage

### Materials and Methodology

It was an observational study done on 150 patients at a tertiary care centre. Ethical committee clearance was obtained. All Pregnant ladies between 37 to 42 weeks of gestation having vaginal delivery at the study setting between September 2015- Sep 2016 were included in the study. Pregnant women with hypertensive disorders, heart disease, renal or hepatic disorder, bronchial asthma, epilepsy, patients on antiretroviral drugs, history of allergic reaction to ergot alkaloids were excluded from the study. Following delivery of the anterior shoulder of the baby, either methylergometrine 250 mcg or carboprost 125 mcg was administered intramuscularly. Apex of the episiotomy was sutured after delivery of the baby. Haemostatic clamps were applied on the bleeders.<sup>(5)</sup> Placenta was delivered by controlled cord traction and time taken for complete placental delivery was noted using a stop watch. Once placenta was delivered patient was placed over a blood collection drape (BRASS V bag) which is a conical, graduated plastic blood collection bag.<sup>(6)</sup> BRAAS V bag is shown in Fig. 1. Patients with profuse

bleeding following episiotomy were excluded from study. The parturients randomly received either methylergometrine 250 mcg i.m or carboprost 125 mcg i.m following delivery of anterior shoulder of the baby. Various outcome measures were median duration of third stage of labour, median third stage blood loss measured using BRAAS V bags, requirement of additional oxytocic therapy, difference between prenatal and postnatal haemoglobin and hematocrit values, need for transfusion of blood and blood products, side effects of the drugs like nausea, vomiting, shivering, diarrhoea, headache and hypertension. Data was analysed using SPSS version 17.0.  $\chi^2$  test and students unpaired t test were the test of statistical significance employed.



**Fig. 1**

## Results

We had a total of 150 patients in our study out of which 75 received carboprost and 75 received methylergometrine as a part of active management of third stage of labour. Demographic characteristics are as given in the Table 1. Mean age of patients in our study was  $25.97 \pm 3.6$  years. The mean age in the patients who received methylergometrine was  $26.05 \pm 3.6$  and in who received carboprost was  $25.89 \pm 3.6$  years. Number of patients from rural and urban areas in our study was 87(58%) and 63(42%) respectively. Among the patients who received methylergometrine, 43(57.3%) were from rural and 32(42.7) were from urban area respectively. Among the patients who received carboprost, 44(58.7) and 31(41.3%) were from rural and urban areas respectively.

Booked cases in our study was 61(40.3%) and unbooked were 89(59.3%). Among patients who received methylergometrine 34(45.3%) were booked and 41(54.7%) were unbooked. Among the patients who received carboprost 27(36%) and 48(64%) were booked and unbooked respectively.

Primigravidas and multigravidas were 75 (50%) each. Primigravida who received methylergometrine and carboprost were 39(52%) and 36(48%) respectively. Multigravida who received

methylergometrine and carboprost were 36(48%) and 39(52%) respectively.

The various risk factors we encountered in the patients included in our study are as given in Table 2. Patients with anaemia was 24(16%), of which 9(6%) patients received methylergometrine and 15(10%) received carboprost. Number of grand multiparas were 9(6%). Among these 5(3.3%) received methylergometrine and 4(2.65%) patients received carboprost. Three (2%) patients had macrosomic babies, among who 3 (2%) patients received methylergometrine. Number of patients with fibroid were 3(2%) and all of them received carboprost. Two patients had polyhydramnios in our study, of which one received carboprost and other received methylergometrine.

All patients underwent vaginal delivery, of which 149(99.3%) had vaginal delivery and 1 had instrumental delivery. The patient with instrumental delivery received methergine.

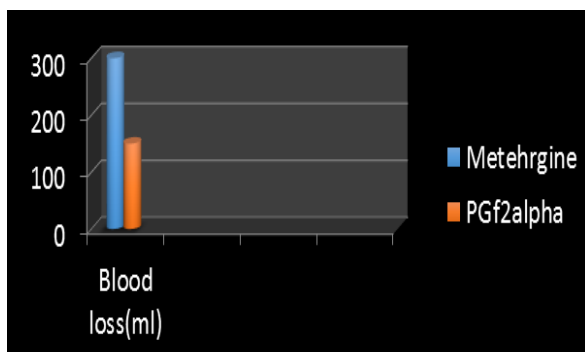
Thirty seven (24.7%) patients had vaginal delivery with intact perineum; 106 (70.7%) patients had right medio lateral episiotomy; seven (4.7%) had second degree perineal tear. Of the patients with intact perineum, 23 patients (15.35%) received methylergometrine and 14(9.35%) received carboprost. Of the patients with right mediolateral episiotomy 45(60%) received methylergometrine and 61(40.65%) received carboprost. Of the patients with second degree perineal tear, methylergometrine was administered to 7(4.65%).

Nineteen (12.7%) patients in our study had postpartum haemorrhage. All these patients received additional oxytocics. Of these 12 (8%) received methylergometrine and 7(4.6%) received carboprost. Among the 75 patients who received methylergometrine, 12 went in to post-partum haemorrhage and among the 75 who received carboprost, 7 developed post-partum haemorrhage. All cases of postpartum haemorrhage were managed as per the standard postpartum haemorrhage management protocol. All postpartum haemorrhage was atonic. None of these patients needed surgical intervention as a part of management of post-partum haemorrhage. None of them needed packed cell transfusion.

Two (1.3%) had vomiting as side effect. Of these 2 patients, 1 received carboprost and 1 received methylergometrine. One patient who received carboprost had diarrhoea. Manual removal of placenta had to be done for 2(1.3%) patients among which one received methylergometrine and other received carboprost.

Duration of third stage of labour in patients who received methylergometrine was 6.3 minutes and in patients who received carboprost the duration was 5.5 minutes. Mean blood loss in patients who received methylergometrine was 300ml and in those who received carboprost it was 150ml. (p value<0.001).

Mean change in haemoglobin was 0.6g% in patients who received methylergometrine and 0.3 g% in patients who received carboprost. Mean fall in hematocrit in patients who received methylergometrine was 2.4 and in patients who received carboprost was 1.2. This was statistically significant (p value <0.001).



**Fig. 2: Median blood loss in patients who received methylergometrine and carboprost**

**Table 1: Demographic characteristics**

Mean Age (years)	25.97
Area	
• Rural	87 (58%)
• Urban	63(42%)
Parity	
• Primi	75(50%)
• Multi	75(50%)
Antenatal care	
• Booked	61(40.6%)
• Unbooked	89(59.3%)

**Table 2: Risk factors**

Anemia	24(16%)
Grand Multi	9(6%)
Macrosomia	3(2%)
Fibroid	3(2%)
Polyhydramnios	2(1.3)

**Table 3: Comparison of duration of third stage, blood loss following delivery, fall in haemoglobin and PCV in patients who received methylergometrine and carboprost. (The values quoted in table are the median of values observed)**

	Birth Weight (Kg)	Duration of third Stage (minutes)	Total Blood Loss (ml)	Change in haemoglobin (g%)	PCV Change
Methylergometrine	2.8	6.3	300	0.6	2.4
Carboprost	2.8	5.5	150	0.3	1.2
P value		p value <0.001	p value <0.001	P value 0.001	p value <0.005

## Discussion

It has been a matter of debate since a long time regarding the ideal uterotonic drug in active management of third stage of labour. This is not based on efficacy of the drugs alone; but also on many other factors like easy availability, storage conditions, side effects and cost factor of the drugs. Methylergometrine and carboprost are two of the most efficacious drugs available in the market. Our attempt in this study was to figure out which among these two drugs are more efficacious in active management of third stage of labour.

In our study incidence of postpartum haemorrhage was found to be more in patients who received methylergometrine. Though this observation was not statistically significant (p value 0.154), it agrees with observations made by other investigators like A Lamba et al<sup>(7)</sup> and B J Purushottam et al.<sup>(8)</sup> Despite the higher prevalence of anemia in patients who received carboprost (12% vs 20%), the incidence of post-partum haemorrhage was lesser in them.

Duration of third stage of labour in patients who received carboprost was much lesser than patients who received methylergometrine (6.3 minutes vs 5.5 minutes). This observation was statistically significant (p value <0.001) and similar to other studies by A Lamba et al, N Singh et al<sup>(9)</sup> and B J Purushotham et al and A Gupta et al.<sup>(10)</sup> There is a difference in the actual duration of third stage measured in these studies when compared with ours. This difference is probably due to the duration being measured till the beginning of signs of separation of placenta in other studies; whereas it was measured till the delivery of placenta in our study.

Post-partum blood loss was much lesser in patients who received carboprost. The blood loss observed in patients who received carboprost was almost half of that observed in patients who received methylergometrine. This observation was found to be statistically significant (p value < 0.001). Similar observations were made by P Vaja et al,<sup>(11)</sup> A Lamba and A Gupta et al. But the actual blood loss measured by these investigators differed from each other; which could probably be due to the different methods adopted for the measurement of blood loss along with inter observer variation.

Fall in haemoglobin and hematocrit was lower in patients who received carboprost as compared to methylergometrine. This was statistically significant (p value 0.001) and similar to other studies by A Lamba, A Gupta and B J Purushotham et al. Fall in hematocrit was also more in patients who received methylergometrine and this finding too was statistically significant (p value < 0.001) and agrees to the findings by A Gupta et al. Side effect profile of the drugs were similar and within acceptable limits.

### Conclusion

Carboprost is more effective than methylergometrine in prophylaxis of post-partum haemorrhage as evidenced by its lower duration of third stage of labour, lesser postpartum blood loss, lower fall in haemoglobin and hematocrit. Carboprost (125 mcg) doesn't cause the undesirable side effects usually associated with the drug, if used in the lower dosage, i.e., 125 mcg. Hence carboprost should be preferred over methylergometrine, as an alternative to oxytocin in the active management of third stage of labour.

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