

A study of carbetocin versus oxytocin as a prophylaxis for prevention of postpartum hemorrhage

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Abstract

Introduction: Postpartum haemorrhage is always a nightmare for obstetricians and one of the leading causes of maternal deaths. Using uterotonics in third stage of labour helps in reducing PPH. Carbetocin, has longer duration of action when compared to oxytocin and other uterotonics. It is an analogue of oxytocin but is heat-stable and does not require cold storage. In the study, we have compared the efficacy of carbetocin with oxytocin for prevention of postpartum haemorrhage.

Aims and objectives: To study the effect of carbetocin as a prophylaxis for prevention of postpartum haemorrhage in multigravidas when compared to oxytocin.

Materials and methods: This study was a randomised controlled trial conducted at Basaveshwar teaching and general hospital on 50 multigravidas who were divided into 2 groups- Group A & B. Patients in Group A & B

were managed with Inj. Oxytocin 10 units IM and Inj. Carbetocin 100mcg IM respectively in third stage of labour in both vaginal delivery and caesarean section. Results were interpreted in terms of blood loss, uterine tone, hemodynamic stability and use additional uterotonics.

Results: In Group A out of 25 patients, 5 patients had uterine atonicity and were subjected to other uterotonics. In Group B out of 25 patients, 2 patients had uterine atonicity and were subjected to other uterotonics. Blood loss was estimated by number of mops used. The onset of action of carbetocin needed minimum 3 minutes and maximum 5 minutes and the effect lasted for almost 90 minutes. Oxytocin infusion was needed in Group A patients who underwent caesarean section while in Group B it was not needed.

Conclusion: According to the study, Carbetocin had a better effect for prevention of postpartum haemorrhage

compared to Oxytocin. When compared to oxytocin, Carbetocin had both long onset of action and duration of action and hence a better option as a prophylaxis for prevention of Postpartum haemorrhage.

Keywords: Carbetocin, Oxytocin, utero tonics, Post partum hemorrhage.

Introduction

Postpartum haemorrhage remains the largest cause of maternal deaths worldwide and accounts for nearly one-fourth of deaths and is defined as either blood loss of more than 500ml during vaginal delivery or blood loss of more than 1000ml during caesarean section or blood loss of more than 1500ml during caesarean hysterectomy¹. It also causes long term disabilities and maternal morbidities such as blood and blood products trans fusion, surgical trauma, longer hospital stay and admission to intensive care unit². Amongst the 4 T's of PPH, uterine atony remains the most common cause, which results from poor contraction of the uterus during labour.

Prophylactic administration of uterotonics is identified as the most important component of active management of the third stage of labor, which has reduced the incidence of postpartum haemorrhage nearly by 50%³. Carbetocin, is a long-acting synthetic octapeptide that binds to oxytocin receptors on the smooth muscles of the uterus, resulting in strong and regular uterine contractions^{4,5}. Carbetocin, is a newer analogue of oxytocin and has a greater biological effect and longer half-life when compared to oxytocin and other uterotonics. It is heat-stable and does not require cold storage and maintains stability over a period of 36 months at 30°C and 75% relative humidity⁶.

Oxytocin has side effects like nausea, vomiting, hypotension, sodium and water retention. Since Carbetocin is

analogue of oxytocin, the side effects of both the drugs remains same but severity of the side effects with carbetocin is relatively less^{7,8}.

Aims and objectives

To study the effect of Carbetocin as a prophylaxis for prevention of postpartum haemorrhage in multigravidas when compared to oxytocin.

Materials and methods

The study was a randomised controlled trial done at Mahadev Appa Rampure Medical College on 50 multigravidas. Patients were divided into 2 groups – Group A & Group B. Patients in Group A were managed with Inj. Oxytocin 10 units IM/IV as active management of third stage of labour. Patients in Group B were managed with Inj. Carbetocin 100mcg IM in third stage of labour. The study was done both during vaginal delivery as well in caesarean section. The results were interpreted in terms of blood loss, uterine tone, hemodynamic stability and use of additional uterotonics. Blood loss was estimated with number of mops used. Hemodynamic stability of the patient was monitored. Uterine tone was assessed after delivery of placenta. Onset of action and duration of action of both oxytocin and carbetocin was noted. Patients with atonic uterus in Group A were treated with Inj. Carbetocin 100 mcg IM and results were noted. Number of additional uterotonics and number of doses required were noted.

Results & discussion

In our study we found that in Group A out of 25 patients, 5(20%) patients had uterine atonicity and were subjected to other uterotonics like Tab. Misoprostol 800-1000 mcg, Inj. Carboprost 250mcg 1-2 doses, Inj. Methergine 0.2 mg 1-2 doses.

In Group B out of 25 patients, 2(8%) patients had uterine atonicity and were subjected to other uterotronics as mentioned previously.

In group A atonicity was managed in approximately 20 minutes while in Group B it was managed in 10 minutes. Blood loss was estimated by number of mops used and amount of blood in suction machine. Hemodynamic stability of patients was recorded.

2 patients in Group A went into hypovolemic shock which was corrected with fluid resuscitation and blood and blood products.

The duration of action of oxytocin was found to be only 5 minutes and therefore oxytocin infusion was needed in Group A.

The duration of action of carbetocin was approximately 90 minutes and therefore no infusions were needed in Group B.

Table 1: No. of patients enrolled in two groups randomly

Study Groups	Group A (Oxytocin)	Group B (Carbetocin)
No. of Patients	25	25

Table 2: No. of patients with uterine atonicity

Study Groups	Group A (Oxytocin)	Group B (Carbetocin)	P Value
No. of Patients with atonic uterus	5 (20%)	2 (8%)	<0.01*

20% of patients had uterine atonicity in Group A compared to 8% in Group B making p value significant.

Table 3: Mean Estimated blood loss

Study Groups	Group A (Oxytocin)	Group B (Carbetocin)
Vaginal delivery	300ml	200ml
LSCS	550ml	500ml

Mean blood loss during vaginal delivery in Group A was 300ml compared to 200ml in Group B.

Mean blood loss during LSCS in Group A was 550ml compared to 500ml in Group B.

Table 4: Estimated blood loss in both the groups during caesarean section and vaginal delivery

	Group A (Oxytocin)	Group B (Carbetocin)	P Value
During caesarean section			
500-1000ml	10 (40%)	13 (52%)	<0.01*
>1000ml	2 (8%)	1 (4%)	<0.01*
During vaginal delivery			
<500ml	10 (40%)	10 (40%)	1
500-1000ml	3 (12%)	1 (4%)	<0.01*

During caesarean section 40% of patients in Group A had blood loss between 500-1000ml, while 52% of patients had blood loss between 500-1000ml making P value significant.

8% of patients in group A had PPH whereas only 4% patients in Group B had PPH making p value significant. During vaginal delivery blood loss <500ml was equal in both groups.

While 12% patients in Group A had PPH compared to only 4% patients having PPH in Group B making p value significant.

Table 5: Additional uterotronics required in Group A

Additional Uterotronics required	No. of patients required (in Group A)
Tab. Misoprostol	5 (100%)
Inj. Carboprost	2 (40%)

Inj. Methergine	3 (60%)
Other methods	2 (40%)

Other methods included mechanical compression by Bakri balloon, compression sutures → B-Lynch sutures, Cho square sutures.

Table 6: Additional uterotonics required in Group B

Additional uterotonics (in required)	No. of patients required (in Group B)
Tab. Misoprostol	2 (100%)
Inj. Carboprost	1 (50%)
Inj. Methergine	1 (50%)

Danzereau et al described a lower additional uterotonic need for treatment of uterine atony in women who took carbetocin soon after delivery⁹.

In Razali N et al study involving more than 1000 patients, findings of the investigators also showed a significant reduction in PPH in women undergoing cesarean section when carbetocin was used rather than oxytocin (16.36% vs 30.45%)¹⁰.

Conclusion

Postpartum haemorrhage is a life-threatening situation for obstetricians. Prevention is always better than cure. Likewise postpartum haemorrhage should be prevented by active management of third stage of labour.

According to the study, Carbetocin had a better effect for prevention of postpartum haemorrhage compared to Oxytocin.

Carbetocin has longer duration of action compared to oxytocin and required less additional uterotonics.

Since World Health Organization (WHO) has not included a recommendation for carbetocin in its 2012 guideline regarding postpartum haemorrhage we still continue to use oxytocin for third stage of labour¹¹.

There have been trials of carbetocin and most of the trials involved women undergoing cesarean section and sample size were small, used an intravenous route of administration¹².

Therefore, Oxytocin remains the choice of drug for active management of third stage of labour.

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