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Comparison between carbetocin and oxytocin in active management of 3rd stage of labour in preventing post partum hemorrhage

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Original Contribution

Comparison between Carbetocin and Oxytocin in Active Management of 3rd Stage of Labour in Preventing Post Partum Hemorrhage

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The third stage of labour is considered to be the most critical part of child birth due to the risk of post partum haemorrhage (PPH). To compare the effectiveness of carbetocin and oxytocin in the management of 3rd stage of labour in preventing post partum hemorrhage, this experimental clinical trial was conducted in the Department of Obstetrics and Gynecology, Sir Salimulla Medical College Hospital, Dhaka, Bangladesh from January 2015 to June 2016. Three hundred women undergoing normal vaginal delivery were consecutively enrolled. They were divided into two groups, one group was treated with carbetocin 100μg IV and another group was treated with oxytocin 10 unit IV. Post partum haemorrhage was developed in 23(15.3%) and 31(20.7%) patients in carbetocin and oxytocin groups respectively. Among these PPH patients, 17(73.9%) patients received oxytocin, 21(91.3%) patients received Ergometrin and 14(60.9%) patients received misoprostol in carbetocin group as additional drug. In oxytocin group 30(96.8) patients received ergometrin and 26(83.9) patients received misoprostol. Significantly higher number of patients was treated with balloon catheter in oxytocin group (77.4%) than carbetocin group (39.1%). Thirteen (41.9%) patients in oxytocin group and 4 (17.4%) patients in carbetocin group needed to treat in ICU. In carbetocin Group I patient (4.3%) and in oxytocin Group II patients (6.5%) died. carbetocin is better than oxytocin in the management of 3rd stage of labour to prevent post partum haemorrhage (PPH).

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Key words: Post partum haemorrhage (PPH), Carbetocin, Oxytocin

Introduction

The interval from the delivery of the baby to the separation and expulsion of the placenta is known as third stage of labor. Postpartum hemorrhage (PPH) is the major complication associated with this period, which is the most common cause of maternal morbidity and mortality in developing countries. Though maternal mortality rates are much lower in developed countries, PPH remains a major concern[1]. It ranks just behind thromboembolic events and hypertensive disease as a common cause of maternal death. Postpartum hemorrhage (PPH) is defined as blood loss >500ml within 24 hours following vaginal delivery, >1,000ml following cesarean delivery, or the requirement for a blood transfusion within 24 hours of delivery[2,3]. PPH is reported to occur in ~5% of all deliveries, and the risk is significantly greater with cesarean delivery than vaginal delivery[4,5]. The leading cause of PPH is uterine atony, followed by retained placenta and injury to the genital tract. Risk factors for PPH include fetal macrosomia, prolonged labor, multiple pregnancies, polyhydramnios, uterine myoma, placenta previa, grand multiparity and uterine infection[2,4]. There are still wide variations in practice around the world in management of PPH[6]. Conventionally oxytocin, misoprostol, ergot alkaloids are used. Oxytocin is currently the uterotonic of first choice. Oxytocin (10 IU), administered intra-muscularly, is the preferred medication for the prevention of PPH in low-risk vaginal and caesarean deliveries.

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It has proved to decrease the incidence of PPH by 90% and has a rapid onset of action and a good safety profile. A disadvantage of oxytocin is its short half life of 4-10 minutes, regularly requiring a continuous intravenous infusion or repeated intramuscular injections. Oxytocin degrades in elevated temperature (>30ºC) and now a days in Bangladesh the temperature remains more than 30ºC. So there is a huge chance of degradation of oxytocin in chemist shops. Carbetocin is new invention. It is a synthetic analogue of oxytocin with a half life approximately 4-10 times longer than oxytocin and uterine contractions occur in less than two minutes after intravenous administration of optimal dosage of 100µg[7]. It combines the safety and tolerability profile of oxytocin with the sustained uterotonic activity of injectable ergot alkaloids. Furthermore, carbetocin can be administered as a single dose injection intravenously or intramuscularly rather than as an infusion over several hours as in the case with oxytocin. Several data of literature[8,9,10] suggest that prophylactic administration of carbetocin may be a good alternative to oxytocin to prevent post-partum haemorrhage, but which uterotonic agent is ideal for prophylactic use is being debated. Primary prevention of a post-partum haemorrhage begins with the assessment of identifiable risk factors. The aim of this study was to compare the efficacy of oxytocin and carbetocin in the prevention of PPH.

Methods

This comparative clinical trial was conducted in the Department of Obstetric and Gynecology, Sir Salimullah Medical College & Hospital, Dhaka, Bangaldesh from January 2015 to June 2016. Three hundred women undergoing normal vaginal delivery were consecutively enrolled. Subjects with hypertension, preeclampsia and epilepsy were excluded from the study. Even number ID patients were treated with carbetocin 100μg IV and odd number ID patients were treated with oxytocin 10 IU IV. Data were analyzed with SPSS 12.0. Data were summarized as frequency and percentage. Chi square test was used to analyse the difference in proportions. For analysis, a value of $p<0.05$ was considered statistically significant.

Results

A total of 300 patients who underwent vaginal delivery were included in this study. Of them 150 patients received carbetocin and 150 patients received oxytocin. In carbetocin group 23(15.3%) and in oxytocin group 31(20.7%) patients had atonic PPH. In oxytocin group 30(96.8) patients received ergometrin and 26(83.9) patients received misoprostol. Significantly higher number of patients was treated with balloon tamponade in oxytocin group (77.4%) than carbetocin group (39.1%). One patient in oxytocin group needed laparotomy and β - lynch suture. Thirteen (41.9%) patients in oxytocin group and 4(17.4%) patients in carbetocin group needed ICU admission. In carbetocin Group I (4.3%) and in oxytocin Group II (6.5%) patients died.

Table I: Distribution of patients according to atonic PPH in carbetocin and oxytocin groups (n=300)

Atonic PPH	Group		P value
	Carbetocin (n=150)	Oxytocin (n=150)	
	No. (%)	No. (%)	
Yes	023 (15.3)	031 (20.7)	0.229
No	127 (84.7)	119 (79.3)	

Chi-square test was done to measure the level of significance

In carbetocin group 23(15.3%) and in oxytocin group 31(20.7%) patients had atonic PPH.

Table II: Other uterotonic drugs used by atonic PPH patients in carbetocin and oxytocin groups (n=54)

Other utertonic drug used	Group		P value
	Carbetocin (n=23)	Oxytocin (n=31)	
	No. (%)	No. (%)	
Oxytocin	17 (73.9)	31 (100.0)	0.003
Engomethin	21 (91.3)	30 (96.8)	0.386
Misoprostol	14 (60.9)	26 (83.9)	0.056

Chi-square test was done to measure the level of significance

Among atonic PPH patients, 17(73.9%) patients received oxytocin, 21(91.3%) patients received Ergometrin and 14(60.9%) patients received Misoprostol in carbetocin group. In oxytocin group 30(96.8) patients received Ergometrin and 26(83.9) patients received Misoprostol.

Table III: Other treatment taken by atonic PPH patients in carbetocin and oxytocin groups (n=54)

Other treatment required	Group		P value
	Carbetocin (n=23)	Oxytocin (n=31)	
	No. (%)	No. (%)	
Baloon catheter	9 (39.1)	24 (77.4)	0.004
ICU	4 (17.4)	13 (41.9)	0.055

Chi-square test was done to measure the level of significance.

Significantly higher number of patients was treated with balloon in oxytocin group (77.4%) than carbetocin group (39.1%). Thirteen (41.9%) patients in oxytocin group and 4(17.4%) patients in carbetocin group needed to treat in ICU.

Table IV: Outcome of atonic PPH patients in carbetocin and oxytocin groups (n=54)

Outcome	Group		P value
	Carbetocin (n=23)	Oxytocin (n=31)	
	No. (%)	No. (%)	
Recovered	22 (95.7)	29 (93.5)	0.739
Death	01 (04.3)	02 (06.5)	

Chi-square test was done to measure the level of significance

In carbetocin Group I (4.3%) and in oxytocin Group II (6.5%) died.

Discussion

One of the most important causes of maternal mortality is postpartum hemorrhage. Active management of third stage of labor and the use of prophylactic oxytocics has reduced its incidence in many countries. But oxytocin has lot of limitations,

such as, short half life, bolus dose of oxytocin associated with fluid overload, convulsion, pulmonary edema, arrhythmias, severe hypertension, shivering and fever. Carbetocin has 4 to 10 times longer half life and fewer limitation than that of Oxytocin. The aim of this study was to compare the efficacy of oxytocin and carbetocin in preventing PPH.

In this study, post partum hemorrhage developed in 23(15.3%) and 31(20.7%) patients in carbetocin and oxytocin groups respectively which indicates PPH rate is higher in oxytocin group than that of carbetocin group. Among these PPH patients additional drugs needed in both groups. Additional oxytocin was provided with 31(100.0%) and 17(73.9%) patients in oxytocin and carbetocin group respectively. Apart from Oxytocin, 21(91.3%) patients received ergometrin and 14(60.9%) patients received misoprostol in carbetocin group whereas 30(96.8) patients received Ergometrin and 26(83.9) patients received Misoprostol in oxytocin group. Significantly higher number of patients were treated with balloon tamponade, in oxytocin group 24(77.4%) than carbetocin group 9(39.1%). Thirteen (41.9%) patients in oxytocin group and 4(17.4%) patients in carbetocin group needed ICU admission. In carbetocin Group I (4.3%) and in oxytocin Group II (6.5%) patients died.

Dansereau et al.[11] observed that the carbetocin group had a decreased incidence of PPH and of the need for therapeutic oxytocics. They conducted double blinded comparison of carbetocin versus oxytocin in prevention of uterine atony after cesarean section. Carbetocin appears to be more effective than a continuous infusion of oxytocin and has a similar safely profile. Boucher and colleagues[12] demonstrated that women with at least 1 risk factor for PPH who were given carbetocin (100μg IM) immediately after placental delivery were less likely to require uterine massage as a uterotonic intervention than those given a continuous infusion of oxytocin over 2 hours. Prenat Med, 2013 Jan-Mar, conducted a study-Cabetocin versus oxytocin in caesarean section with patients with high risk of post partum haemmorrhage; and carbetocin was more effective compared with the oxytocin. In carbetocin group, there were less need for additional uterotonic medication and blood transfusion.

Conclusion

From above findings it can be concluded that Carbetocin is better than oxytocin in the management of 3rd stage of labour in preventing post partum hemorrhage.

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