

Original research article

Carbetocin vs oxytocin in caesarean section to prevent post-partum haemorrhage: A randomized controlled trial

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Abstract

Prevention of post-partum haemorrhage (PPH) is a major issue due to its impact on maternal morbidity and mortality. Pharmacologic measures such as anti-fibrinolytic agents, carboprost and recombinant factor VII a have been added to the obstetricians arsenal. Mechanical measures such as non-pneumatic anti-shock garments, intrauterine balloon tamponade, vacuum-induced uterine tamponade and interventional radiological procedures have surfaced as alternatives to bimanual or aortic compression when PPH occurs. This consist of patient admitting in OBG department of Basaveshwara medical college and hospital during the period of August 2022 to August 2023. This study showed that carbetocin was as effective and safe as oxytocin for prevention of postpartum hemorrhage in women undergoing cesarian section and the choice of carbetocin for routine zprophylaxis will depend on cost-effectiveness.

Keywords: Carbetocin, Oxytocin, Post-partum haemorrhage

Introduction

Postpartum hemorrhage remains to be the largest direct cause of maternal death, accounting for nearly one-fourth death worldwide and contributes to long term disability and severe maternal morbidity such as blood transfusion, emergency surgery, and admission to intensive care unit.

Prophylactic administration of uterotonic agents is identified as the most important component of active management of the third stage of labor, which has reduced the incidence of postpartum hemorrhage nearly by 50%.

Oxytocin, which has a short half-life and duration of action, is the current standard therapy for the prevention of postpartum hemorrhage. However, as it is susceptible to heat, its efficacy cannot be assured in many low- and middle- countries where access to cold-chain transport and storage is unavailable ^[1].

Carbetocin, which is a long-acting oxytocin analogue, has been widely used in preventing postpartum hemorrhage since 1997, and heat-stable carbetocin, and has been shown to maintain active for more than 36 months at 30 °C and 75% relative humidity.

Prevention of post-partum haemorrhage (PPH) is a major issue due to its impact on maternal morbidity and mortality. Pharmacologic measures such as anti-fibrinolytic agents, carboprost and recombinant factor VII a have been added to the obstetricians arsenal ^[2]. Mechanical measures such as non-pneumatic anti-shock garments, intrauterine balloon tamponade, vacuum-induced uterine tamponade and interventional radiological procedures have surfaced as alternatives to bimanual or aortic compression when PPH occurs ^[3, 4]. One prophylactic drug which has been introduced in recent times is carbetocin, a synthetic long-acting oxytocin analogue. It has a longer half life of 41 min, allowing it to stimulate a prolonged uterine response of up to an hour after a single intravenous dose, obviating the need for infusion ^[6]. The administration of oxytocics after the delivery of the neonate reduces the likelihood of PPH and 5 IU oxytocin by slow intravenous injection is currently recommended for al caesarean sections. Several data of literature 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.

Nonetheless, primary prevention of a post-partum haemorrhage begins with the assessment of identifiable risk factors. Hence the current study aims to know the efficacy and hemodynamic effects of carbetocin vs oxytocin in caesarean section to prevent post-partum haemorrhage.

Methodology

This consist of patient admitting in OBG department of Basaveshwara medical college and hospital during the period of August 2022 to August 2023.

Study Design: Randomized Control Trial.

Place Of Study: Department of OBG at Basaveshwara medical college and hospital

Sample Size: The study includes of 30 patients in each group. Total sample size is 60.

Study Period: August 2022 to August 2023.

Inclusion Criteria

- Women with a single pregnancy undergoing caesarean delivery 37 weeks and above (gestational age was recorded according to the last menstrual period and was confirmed by ultrasound report).
- Age >= 18 years
- Singleton live gestation
- Women who ready to give consent will be included.

Exclusion Criteria

Women with placenta previa, multiple gestation, placental abruption (determined by history and ultrasound report) hypertensive disorders in pregnancy, preeclampsia, and known case of cardiac, renal, liver diseases, epilepsy and moderate anaemia will be excluded from the study.

The study was conducted after obtaining Institutional Ethics Committee approval, 30 patients in each group who met the eligibility criteria and after explaining the purpose of study with written informed consent was included in the study.

Detailed history including name, age, sex, address, contact number, history of medication was noted.

The selection of patients in each group will be in a subsequent order in the ratio of 1:1.

Women in the Carbetocin group (group A) receives a bolus of 100 µg IM after caesarean delivery; women in the Oxytocin group (group B) received 40 IU of oxytocin in 1000 ml of 0.9% NaCl solution IV (150 mL/hour) after caesarean delivery.

The primary outcome of this study will be the evaluation of the early haemodynamic effects of carbetocin and oxytocin, in terms of impact on the blood pressure (BP) suddenly after the injection.

All patients undergo the same combined spinal-epidural (CSE) anaesthesia. After the anaesthesia, subjects would be placed in supine position and continuous blood pressure measurement will be done.

To evaluate the haemodynamic effects between carbetocin and oxytocin, we consider the drop in the blood pressure by comparing the BP after combined spinal-epidural (CSE) procedure at 1 minute, 3 minutes and 5 minutes after drug administration, at time of uterine repair and at term of caesarean procedure on supine position.

Results

- Regarding the hemodynamic effects, both drugs have a hypotensive effect, but we found a greater reduction in blood pressure within the oxytocin group.
- Significantly more women needed additional uterotonic agents in the oxytocin group (23,5% vs 0%, *p*<0.01).
- Blood loss on POD 0 was assessed by number of pads changed, group 1 (2.93±0.5) and group 2 (2.4±0.4).

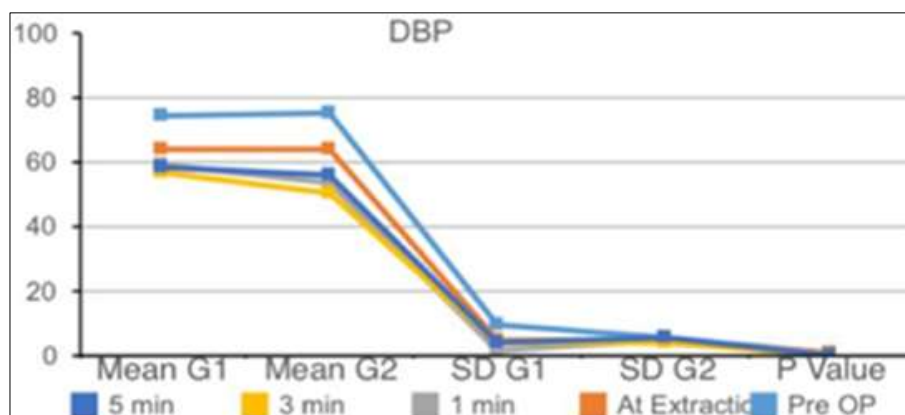


Fig 1: DBP

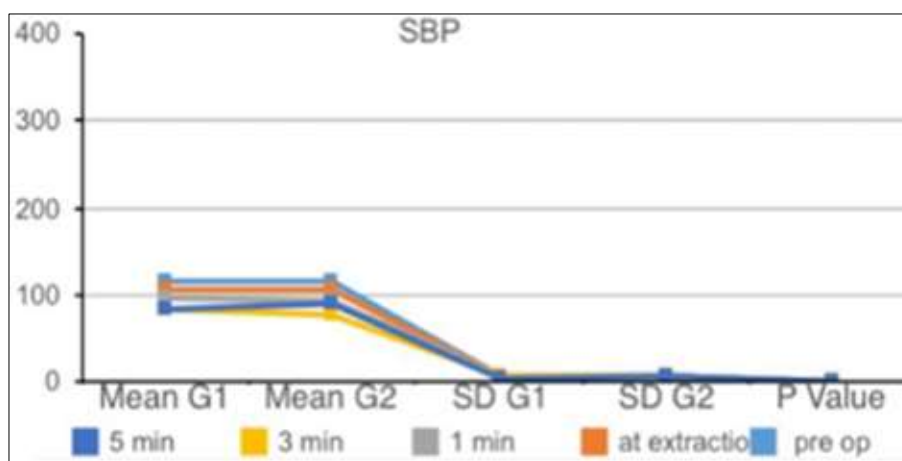


Fig 2: SBP

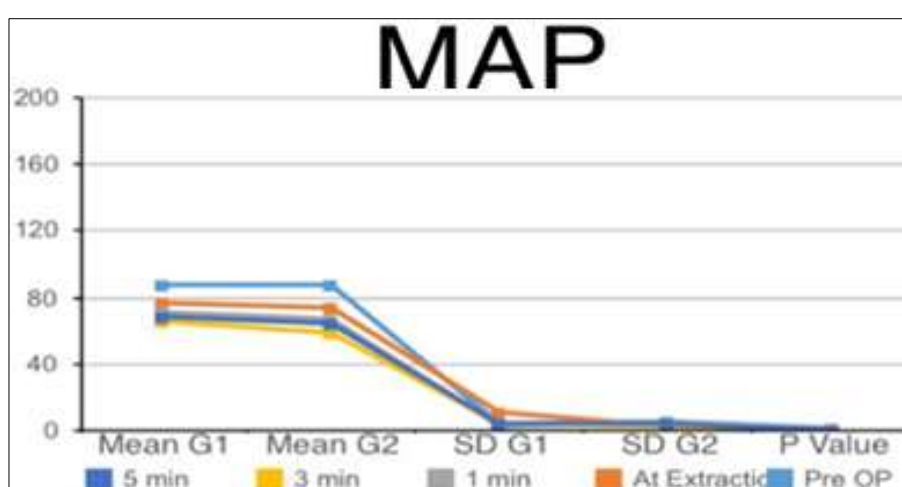


Fig 3: MAP

Discussion

- Carbetocin has advantages over oxytocin for prevention of postpartum hemorrhage.
- Compared with oxytocin, heat-stable carbetocin, does not need cold-chain transport and storage. Therefore, it is convenient to be stored in facilities at room temperature in low and middle income countries where cold-chain transport and storage are not available.
- The half-life of carbetocin is 40 minutes, which is 4-10-fold longer than that of oxytocin, and the duration of action is 2 hours after an intramuscular injection, avoiding side effects of intravenous injection, there is a disparity in price between carbetocin and oxytocin.
- Currently, the WHO does not include a recommendation for carbetocin in preventing postpartum hemorrhage.
- No significant differences were found between carbetocin and oxytocin in blood loss ≥ 1000 ml, use of additional uterotonic agents, blood transfusion, uterine massage, and side effects such as abdominal pain, vomiting, dizziness, and palpitation.

Conclusion

- This study showed that carbetocin was as effective and safe as oxytocin for prevention of postpartum hemorrhage in women undergoing cesarian section and the choice of carbetocin for routine zprophylaxis will depend on cost-effectiveness.
- A single injection of carbetocin appears to be more effective than a continuous infusion of oxytocin to prevent the PPH, with a similar hemodynamic profile and minor antidiuretic effect.

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