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Original Research Article

Comparison of Carbetocin and Oxytocin for Prevention of Postpartum Haemorrhage

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Conflict of interest: Nil

Abstract:

Background: Postpartum haemorrhage (PPH) is a potentially serious and life-threatening complication that can occur after childbirth. The present study was conducted to compare carbetocin and oxytocin for the prevention of postpartum hemorrhage.

Materials and Methods: 136 women with postpartum haemorrhage were divided into two groups of 68 each. Patients in group I were given a single intramuscular injection of heat-stable carbetocin, and patients in group II were given an intramuscular injection of oxytocin. The outcome measures were mean blood loss after vaginal delivery, proportion of women with blood loss > 500 ml, requirement of other uterotonic or surgical procedures, and incidence of adverse events.

Results: Patients in whom labour was induced were 5 in group I and 3 in group II; patients in whom labour was augmented were 12 and 15; and patients with previous postpartum haemorrhage were 3 and 4 in group I and 3 in group II, respectively. The difference was non-significant (P > 0.05). Post-partum blood loss > 500 ml was seen in 7 and 12, additional uterotonic agents in 8 and 11, blood transfusion in 1 and 2, and additional surgical procedures in 2 and 3 in groups I and II, respectively. Adverse events recorded were chest pain in 5 and 4, flushing in 2 and 1, abdominal pain in 1 and 3, and nausea and vomiting in 3 and 2 patients in groups I and II, respectively.

Conclusion: It was discovered that when it comes to reducing postpartum hemorrhage in women who have had a singleton vaginal delivery, carbetocin works marginally better than oxytocin.

Keywords: Postpartum Haemorrhage, Bleeding, Carbetocin, Oxytocin.

Introduction

Postpartum haemorrhage (PPH) is a potentially serious and life-threatening complication that can occur after childbirth. It is defined as excessive bleeding, typically occurring within the first 24 hours after giving birth, although it can sometimes occur later. PPH is a major cause of maternal morbidity and mortality worldwide. There are several potential causes and risk factors associated with postpartum haemorrhage [1]. The signs and symptoms of postpartum haemorrhage may include excessive bleeding, either continuous or sudden, rapid heart rate (tachycardia), low blood pressure, pale skin and cool extremities, dizziness or light headedness, and reduced urine output[2]. In order to prevent postpartum hemorrhage, the World Health Organization (WHO) advises active treatment of the third stage of labor. The most crucial element of active management of the third stage of labor, which has decreased the rate of postpartum hemorrhage by almost 50%, is the prophylactic injection of uterotonic drugs [3]. The current standard of care for preventing postpartum haemorrhage is oxytocin, which has a brief duration of action and half-life. However, because it is heat-sensitive, its effectiveness cannot be guaranteed in many low- and middle-income nations where cold-chain transportation and storage are not available [4]. In addition, quality problems like impurity and insufficient active components further undermine its effectiveness. On the other hand, heat-stable carbentocin, a long-acting oxytocin analogue that has been demonstrated to be active for over 36 months at 30°C and 75% relative humidity, has been used extensively since 1997 to reduce postpartum bleeding [5].

Aims and objectives: The present study was conducted to compare carbetocin and oxytocin for the prevention of postpartum haemorrhage.

Materials & Methods

The present prospective cross-sectional study consisted of 136 women with postpartum hemorrhage. After receiving approval from the institutional ethical committee, the present study has been carried out in the Departments of Pharmacology at Nalanda Medical College & Hospital, Patna, Bihar, India, in collaboration with the Departments of Obstetrics and Gynaecology at Nalanda Medical College & Hospital, Patna, Bihar, India. The study was carried out over a one-year period, from January 2023 to December 2023. All gave their written consent to participate in the study. Data such as name, age, etc. was recorded. Patients were divided into two groups of 68 each. Patients in group I were given a single intramuscular injection of heat-stable carbetocin at a dose of 100 µg, and patients in group II were given an intramuscular injection of oxytocin at a dose of 10 IU. The drugs were administered immediately after the birth of the baby. The primary outcome measure was mean blood loss after vaginal delivery. The proportion of women with blood loss > 500 ml, the requirement of other uterotonic or surgical procedures, and the incidence of adverse events were secondary outcome measures. The data thus obtained were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) software version 22. A P value < 0.05 was considered significant.

Results

Maternal age (mean ± SD) in carbetocin using group I was 36.92±4.16 years and in oxytocin using group II was 35.50±4.65 years, respectively, with a p value of 0.62. All relevant maternal subject characteristics were comparable in the two study groups, with the exception of the carbetocin group's significantly higher use of anticoagulant drugs during pregnancy (19.1% vs. 4.41%, p<0.05).

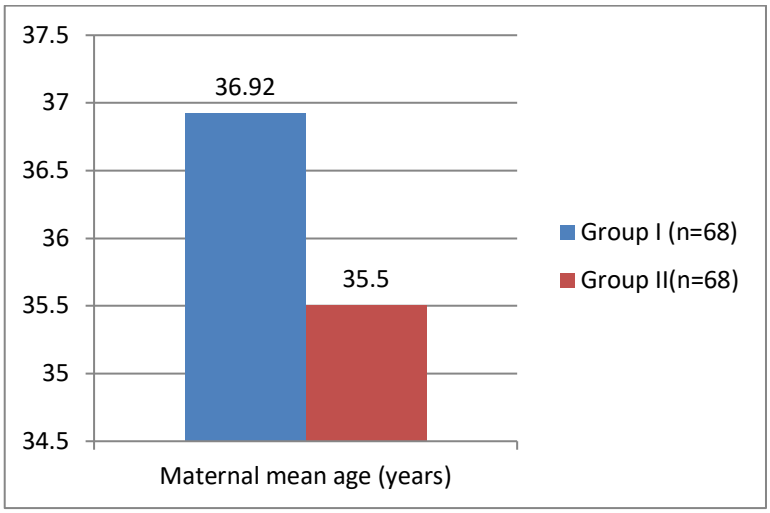

Figure 1: Distribution of Maternal age in study patients

Table I: Assessment of parameters

Clinical features	Group I (n=68)	Group II (n=68)	P value
Patients in which labor was induced	5	3	0.91
Patients in which labor was augmented	12	15	
Patients with previous postpartum haemorrhage	3	4	
Use of anticoagulants in pregnancy	13	3	

Table I shows that patients in whom labour was induced were 5 in group I and 3 in group II; patients in whom labour was augmented were 12 and 15; and patients with previous postpartum haemorrhage were 3 and 4 in group I and 3 in group II, respectively. The difference was non-significant (P > 0.05).

Table II: Comparison of outcome measures

Outcome measures	Group I (n=68)	Group II (n=68)	P value
post-partum blood loss > 500 ml	7	12	0.84
additional uterotonic agents	8	11	
Blood transfusion	1	2	
Additional surgical procedure	2	3	

Table II shows that post-partum blood loss > 500 ml was seen in 7 and 12, additional uterotonic agents in 8 and 11, blood transfusion in 1 and 2, and additional surgical procedures in 2 and 3 in groups I and II, respectively. The difference was non-significant (P > 0.05).

Table III: Comparison of adverse events

Clinical features	Group I	Group II	P value
Chest pain	5	4	0.91
Flushing	2	1	
Abdominal pain	1	3	
Nausea & vomiting	3	2	

Table III shows that adverse events recorded were chest pain in 5 and 4, flushing in 2 and 1, abdominal pain in 1 and 3, and nausea and vomiting in 3 and 2 patients in groups I and II, respectively. The difference was non-significant (P > 0.05).

Discussion

Postpartum haemorrhage (PPH) is defined as bleeding of greater than 500 mL after vaginal delivery and greater than 1000 mL after a caesarean section from the genital tract [6]. Primary PPH is bleeding within 24 hours after delivery, and secondary PPH is excessive bleeding after 24 hours but within 12 weeks after delivery [7]. The most frequent cause of postpartum haemorrhage is uterine atony, which results from poor contraction of the uterine muscles after childbirth [8,9]. The present study was conducted to compare carbetocin and oxytocin for the prevention of postpartum haemorrhage.

We found that patients in whom labour was induced were 5 in group I and 3 in group II; patients in whom labour was augmented were 12 and 15; and patients with previous postpartum haemorrhage were 3 and 4 in group I and 3 in group II, respectively. Jha et al. [10] compared the efficacy and safety of carbetocin and oxytocin in preventing postpartum haemorrhage in women undergoing normal vaginal delivery. 100 women were randomly assigned to groups C and O, with 50 women in each group. Women of group C were given a single intramuscular injection of heat-stable carbetocin, and women of group O were given an intramuscular injection of oxytocin. The mean blood loss after women who were given carbetocin was lower than that of women who were given oxytocin, and this difference was statistically significant ($p < 0.05$). However, there was no significant difference with respect to the proportion of women with PPH (blood loss > 500 mL). The number of women requiring additional uterotonic agents or blood transfusions was also lower in the carbetocin group, but this difference was also not statistically significant ($p > 0.05$). Carbetocin was as safe as oxytocin, with no statistically significant difference between the two groups ($p > 0.05$).

We found that post-partum blood loss > 500 ml was seen in 7 and 12, additional uterotonic agents in 8 and 11, blood transfusion in 1 and 2, and additional surgical procedures in 2 and 3 in groups I and II, respectively. Jin et al. [11] evaluated the efficacy and safety of carbetocin for the prevention of postpartum haemorrhage in women undergoing vaginal delivery compared with oxytocin. This meta-analysis of 5 randomised controlled trials (30,314 women) indicated that there was no significant difference between carbetocin and oxytocin in blood loss ≥500 mL in women undergoing vaginal delivery. Sensitivity analyses showed the same results. No significant differences were found in blood loss ≥1000 ml, use of additional uterotonic agents, blood transfusion, uterine massage, flushing, vomiting, abdominal pain, nausea, dizziness, headache, palpitation, itching, and shivering.

We found that adverse events recorded were chest pain in 5 and 4, flushing in 2 and 1, abdominal pain in 1 and 3, and nausea and vomiting in 3 and 2 patients in groups I and II, respectively. Voon et al. [12] included in their study seven studies involving 2012 patients in the meta-analysis. There was a significant reduction in the rates of postpartum haemorrhage (RR 0.79; 95% CI 0.66 to 0.94; $p = 0.009$), use of additional uterotonics (RR 0.57; 95% CI 0.49 to 0.65; $p < 0.001$), and transfusion (RR 0.31; 95% CI 0.15 to 0.64; $p = 0.002$) when carbetocin rather than oxytocin was used. There was significant heterogeneity across studies, however, for the outcome of additional uterotonic usage.

Limitation of the Study: The limitation of the study is the small sample size.

Conclusion

In the present study, in order to prevent PPH, a single injection of carbetocin appears to be more effective than a continuous oxytocin infusion. It has a minor antidiuretic effect and a similar hemodynamic profile. It seems that when it comes to reducing postpartum haemorrhage in women who have had a singleton vaginal delivery, carbetocin works marginally better than oxytocin.

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