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EFFICACY OF INTRAMYOMETRIAL CARBOPROST WITH OXYTOCIN (IM&IV) IN REDUCING BLOOD LOSS IN UTERINE ATONY DURING CAESAREAN SECTION

Obstetrics & Gynaecology

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ABSTRACT

Introduction: Postpartum hemorrhage (PPH) is one of the dreadful, fatal yet preventable complication encountered by the obstetrician in day to day life during conduction of either vaginal or caesarean delivery. Uterine atony is the major cause of it and this arise the need to study the efficacy of different regime of uterotonics for prevention and treatment of this condition. **Aims & Objectives:** To study the efficacy of combination of intramyometrial carboprost with oxytocin (IM&IV) in reducing blood loss in atonic uterus during C-section in comparison with only oxytocin (IM&IV) **Materials & Methods:** A comparative study done in 100 women with atonic uterus during C-section. The study group of 50 women received combination of intramyometrial carboprost 250 mcg with oxytocin (IM&IV) 10 units each , the control group of 50 women did not receive carboprost. Outcome measure calculated were blood loss, difference between pre-operative and post-operative haemoglobin, blood transfusions and any side effects. **Results:** The blood loss in study group was 231 ml less than the control group. The drop in haemoglobin in study group was 0.38 gm% and control group was 1.36 gm% the difference of 0.98 gm% between the two group with p value <0.0001 which is statistically significant and minimal side effects noticed. **Conclusion:** The combination of intramyometrial carboprost with oxytocin (IM&IV) can be used safely and effectively in uterine atony during LSCS and it will significantly reduces the amount of blood loss, blood transfusions, the need of any surgical interventions, maternal morbidity and mortality.

KEYWORDS

Intramyometrial carboprost, Oxytocin, Uterine atony , LSCS, PPH

INTRODUCTION

Postpartum hemorrhage (PPH) is one of the dreadful, fatal yet preventable complication encountered by the obstetrician in day to day life during conduction of either vaginal or caesarean delivery. It is a major causal factor(35%) for maternal morbidity and mortality world wide. And the death due to this maternal complication affects badly the family health and thus proven a burden for a development of a society. [1,2]

Postpartum hemorrhage (PPH) defined as estimated blood loss greater than 500 mL during vaginal delivery or greater than 1000 mL during cesarean delivery. In 2017, The American College of Obstetrics and Gynecology redefines it as cumulative blood loss greater than 1000 mL with signs and symptoms of hypovolemia within 24 hours of the birth process, regardless of the route of delivery.[3,4]

Overall incidence of PPH is 1% - 6% and during vaginal delivery is 3.9 % and cesarean section is 6.4%. Among various causes, uterine atony is the primitive cause leading 70 % - 80% of PPH.[5,6]

Uterine atony is one of the most common indications for cesarean or postpartum hysterectomy. Traditionally, oxytocin & misoprostol (PGE1) have been used for active management of the third stage of labor.[7]

The oxytocin a nonapeptide hormone is a potent uterotonic ,mediates its effect through activation of the G protein-coupled oxytocin receptor that is expressed in myometrial cells. can be given as IM injection and IV infusion. Major side effects are Uterine hyperstimulation (overactivity),uterine rupture, water intoxication, hypotension, nausea, vomiting.[8,9]

Myometrial oxytocin receptor saturation may affect its effectiveness, and excessive dosages may result in coronary artery contraction, hypotension and antidiuretic effect-induced water intoxication.[10]

Carboprost tromethamine (15 methyl PGF2α), a synthetic derivative of prostaglandin F2, increases the concentration of intracellular calcium, stimulates contraction of fibrous tissue and increases intra-uterine pressure by binding to a calcium receptor. It can be given by IM route and intramyometrial injection. It is is free from major side effects such as hypertension and pulmonary edema compared to other uterotonics.[11]

In the present study, efficacy of additional intramyometrial carboprost is compared to only oxytocin (IM/IV) regimen in reducing blood loss in atonic uterus during caesarean section has been evaluated.

Aim & Objectives Of The Study

To study the efficacy of combination of intramyometrial carboprost with oxytocin (IM&IV) in reducing blood loss in atonic uterus during C-section in comparison with only oxytocin (IM&IV)

MATERIALS AND METHODS

Source of data

This study was conducted on Pregnant women who were admitted and undergoing LSCS for various indications from January 2022 to December 2022 in obstetrics and gynecology department, Navodaya Medical College Hospital And Research Center Raichur.

Study design: It's a prospective randomized study.

Sample size: 100 (50 cases + 50 controls)

Inclusion criteria

- Patients who gave consent to participate in the study.
- Pregnant women belonging to age group of 20-35 years
- Singleton pregnancy with cephalic presentation.
- Primi gravida with term pregnancy
- Multigravida with term pregnancy with history of one previous LSCS
- Multigravida with term pregnancy with history of two previous LSCS

Exclusion criteria

- Patient who did not gave informed consent to participate in the study
- Pregnant women with history of Bronchial asthma or any respiratory disorders
- Patient with history of prostaglandin hypersensitivity.
- More than two Previous LSCS ,
- Pre term pregnancy
- Multiple pregnancy
- High risk Pregnancy with complications such as oligohydromnios, polyhydramnios, pregnancy induced hypertension, gestational diabetes mellitus, placenta previa, placental abruption, or placenta accreta spectrum disorders
- Severe medical and surgical complications like k/c/o type DM, hypertension, epilepsy or any liver disease, kidney disease, heart disease and coagulation disorders

Procedure of the study

After the approval of institutional ethical committee for the study and obtaining written informed consent from each patient, 100 patients who fulfils inclusion and exclusion criteria were randomly selected to minimize bias and divided into study and control group equally.

Study group:
Intraoperatively , carboprost 250mcg intramyometrial injection given to anterior wall of atonic uterus + Oxytocin 10 units IM & 10 units IV drip given during third stage management of labour in C- section .

Control group:
Only Oxytocin 10 units IM & 10 units IV drip given during third stage management of labour in C- section .

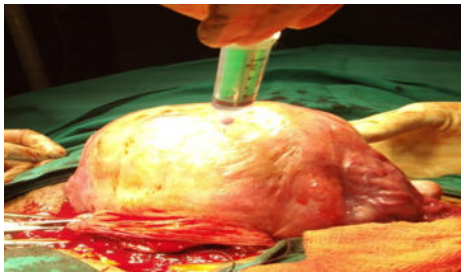


Figure 1- Showing intramyometrial carboprost(250mcg) injection administration

Assessment tools
The parameters use to assess the efficacy of these two combination are:

- Intra operatively, Palpatory method is used by the surgeon to identify any atonicity and to assess contraction and retraction of the uterus and need of any additional uterotonics
- Estimation of blood loss during LSCS is done by measuring the blood volume after delivery of placenta in the graduated cylindrical suction jar and by weighing the sponges used during operation and pads used for 2 hours post operatively soaked with blood (1gm=1ml)
- Post operatively, The change in haemoglobin percentage before and after operative procedure will be compared in both the groups by measuring haemoglobin percentage after 24 hours of surgery.
- Side effects and need of blood transfusion will be compared.

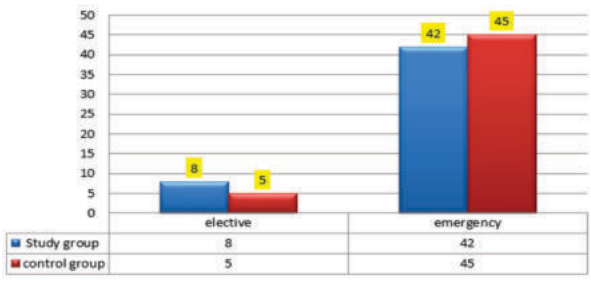
RESULTS

Descriptive statistics has been done for all data. Master charts are plotted using Microsoft Excel and statistical software used is SPSS version 21.0

Table 1 : Comparison of age , gravidity , parity and period of gestation

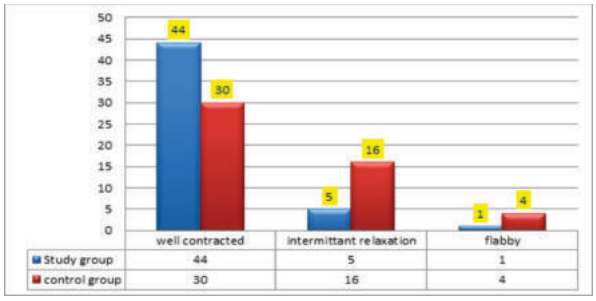
Variables	Study group (carboprost+ oxytocin) (n=50)	Control group (oxytocin) (n=50)	P value
	Mean +/- SD	Mean +/- SD	
AGE	24.62 +/- 4.2	24.16 +/- 2.87	0.5
GRAVIDITY	2.06 +/- 1.01	2.00 +/- 0.98	0.7
PARITY	0.82 +/- 0.84	0.8 +/- 0.95	0.9
Period of gestation	38.5 +/- 1.73	38.34 +/- 1.17	0.5

Table 1 shows in study group mean value of age is 24.62 , gravidity is 2.06 , parity is 0.82 and period of gestation is 38.5 and in control group mean value of age is 24.16 , gravidity is 2.00 , parity is 0.8 and period of gestation is 38.34 and not significant statistically.



Graph 1 - Showing type of LSCS undergone among study and control group

Graph 1 shows study group has 8 cases of elective and 42 cases of emergency LSCS while in control group 5 cases of elective and 45 cases of emergency LSCS .



Graph 2- Bar graph showing intra operative condition of uterus on palpation after giving medications between study and control group.

Graph 2 shows Intra operatively, after medications given uterus on touch in study group, 44(88 %) were well contracted, 5(10%) are intermittent relaxed and 1(2%) was flabby and in control group , 30(60%) were well contracted, 16(32%) intermittent relaxed and 4 (8%) were flabby, which is a significant finding.

Table 2 : Comparison of blood loss in cases and control group (N=100)

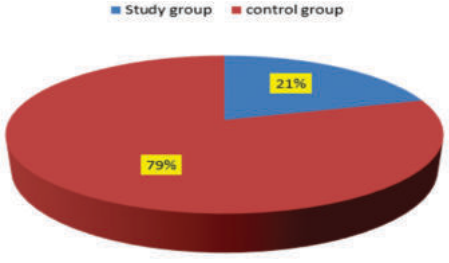
Variables	Studygroup (carboprost+oxytocin) (n=50)	Control group (oxytocin) (n=50)	P value
	Mean +/- SD	Mean +/- SD	
Intra operative blood loss (ml)	334.34 +/- 51.05	518.18 +/- 45.07	<0.0001
Post op 2 hours blood loss (ml)	47.54 +/- 5.21	94.44 +/- 12.97	<0.0001
Total blood loss(ml)	381.88 +/- 56.26	612.62+/- 58.04	<0.0001

Table 2 shows mean intra operative blood loss during C- section in study group was 334.34ml while in control group was 518.18 ml and the p value is <0.0001, mean post operative 2 hours blood loss in study group was 47.54 ml and in control group was 94.44 ml and the p value is <0.0001, The mean total blood loss in the study group is 381.88 ml and in control group was 612.62 ml the p value is <0.0001 which is statistically significant.

Table 3:Comparison of Pre op and post op difference in haemoglobin percentage in study and control group.

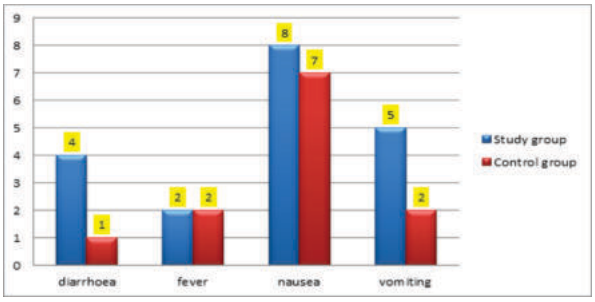
Haemoglobin in gm%	Studygroup (carboprost+ oxytocin) (n=50)	Control group (oxytocin) (n=50)	P value
	Mean +/-SD	Mean +/- SD	
Before delivery	10.73 +/- 0.65	11.02 +/- 0.72	0.03
After delivery	10.35 +/- 0.68	9.66 +/- 0.44	<0.0001
Difference	0.38 +/- 0.17	1.36 +/- 0.57	<0.0001

Table 3 shows The mean hb before delivery is 10.73 in study group and 11.02 in control group which is almost similar. But the mean post operative haemoglobin becomes 10.35 and 9.66 . so, fall in hb concentration was comparatively less in study group (10.73 to 10.35) compared to the control group(11.02 to 9.66). The difference of fall of haemoglobin between the 2 groups being 0.98 which was statistically significant with p value < 0.0001 .



Graph 3 – Pie chart showing need of no. of blood transfusions among study and control group.

Graph 3 shows 23(79%) patients in the control group and 6(21%) patients in study group required blood transfusion post operatively .



Graph 4 - Showing no. of different side effects among study and control group.

Graph 4 shows No patient had any major side effects of carboprost in study group ,only minor side effects observed as 8 had nausea , 5 had vomiting , 4 had diarrhoea and 2 had fever. In control group 7 patients had nausea, 2 had vomiting , 1 had diarrhoea and 2 had fever . Both the groups were relieved of side effects immediately with appropriate medical management .

DISCUSSION

Postpartum hemorrhage is one of the primary cause for maternal deaths (35%) throughout the world. Uterine atony is the major cause of it and this arise the need to study the efficacy of different regime of uterotonics for prevention and treatment of this condition.[1]

The combination of oxytocin with carboprost tromethamine injection can reduce the amount of postpartum hemorrhage, promote uterine involution by improving the excitability of uterine smooth muscle and maintains the contraction of the uterus, thereby achieving hemostatic effect.[1]

In the present study age, gravidity, parity and period of gestation of both study and control group were similar and of no statistical significance. Both study and control group undergone equal rate of elective and emergency LSCS with not much significance.

Comparison Of Need Of Additional Uterotonics

Need of additional uterotonics	Present study (%)	Jing bai et al study (%)
Study group(carboprost + oxytocin)	12	11.3
Control group (only oxytocin)	40	54

In the present study intra operatively, on palpating uterus after few minutes of drug administration in study group, 88 % were well contracted, 12% were intermittent relaxed and flabby and needed additional utertonics where in control group, 60% were well contracted, 40 % were intermittent relaxed and flabby and needed additional utertonics which is a significant finding.

In a similar study conducted by Jing bai et al [12] in 2013, 54 % of patient needed additional uterotonics in oxytocin only group and 11.3% of patient needed additional uterotonics in carboprost and oxytocin combination group.

Comparison Of Mean Blood Loss

Mean total blood loss in ml	Present study	Shilpa kumari et al	Dr.Kumari Shiva et al	Xiaoyan Gong et al
Study group (carboprost+ oxytocin)	381.88	470.55	520	638.94
Control group (only oxytocin)	612.62	578.80	610	725.92

In our study, the mean total blood loss in the study group is 381.88 ml and in control group was 612.62 ml And the amount of blood loss is significantly less in study group than control group. Similar studies conducted by Shilpa kumari et al [13] (2021), Xiaoyan Gong et al [15] (2022) and Dr.Kumari Shiva et al (2020)[14] shows the following similar results with carboprost addition regime which provide a strong evidence and support to our findings.

Comparison Of Mean Hb Difference

Mean hb Difference mean+/- SD	Present study	Shilpa Kumari et al.
Study group (carboprost + oxytocin)	0.38 +/- 0.17	1.02 ± 0.592
Control group (only oxytocin)	1.36 +/- 0.57	1.37 ±0.763

In the present study ,the mean hemoglobin difference before and after LSCS in study group is 0.38 +/- 0.17and in control group is 1.36 +/- 0.57. Similar results is observed with Shilpa Kumari et al.,(2021) [13] study with Mean difference of haemoglobin before and after LSCS in carboprost group was 1.02 ± 0.592 whereas in oxytocin only group , the difference was 1.37 ±0.763.

In this study, 23(79%) patients in the control group and 6(21%) patients in study group required blood transfusion post operatively. both the findings support the usage of carboprost to prevent post partum complications.

No patient had any major side effects of carboprost in study group only minor side effects observed . Similarly in Jing bai et al (2013)[12] study only minor complications were observed with the usage of carboprost like nausea , vomiting and diarrhoea in both the groups which were relieved immediately with appropriate medical management .

All this findings suggests intramyometrial carboprost in combination with oxytocin found to be safe and effective in treatment of uterine atony and in preventing PPH during LSCS. And It also reduces the need of complicated surgical interventions like B- Lynch suture, Mayo suture, cho sutures , uterine artery ligation etc and incidence of obstetric hysterectomy in case of atonic PPH .

CONCLUSION

The combination of intramyometrial carboprost injection and Oxytocin (IV + IM) given during uterine atony will act rapidly and gives expeditious results of well contracted uterus with in few minutes of its administration. Thus, reducing the need of additional uterotonics and prevents many tedious surgical interventions in case of atonic PPH especially peripartum hysterectomy in comparison with only oxytocin (IV+IM) regime. It will also significantly reduces the amount of blood loss, the need of blood transfusion and its complications. So this combination is highly effective and safe and to be considered by obstetricians in case of uterine atony during LSCS for preventing maternal morbidity and mortality.

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