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Research Article

A randomized study comparing rectally administered misoprostol after spinal anesthesia versus intramuscular oxytocin for prevention of postpartum hemorrhage in caesarean section

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ABSTRACT

Background: Post-Partum Hemorrhage (PPH) is the commonest cause of maternal death worldwide. Studies suggest that the use of Misoprostol may be beneficial in clinical settings where oxytocin is unavailable. However studies are limited that show its use in prevention of PPH in high risk pregnancy involving elective caesarean section. Therefore our aim of study is to compare the effectiveness of rectal misoprostol with intramuscular oxytocin in the prevention of postpartum hemorrhage in cesarean sections.

Methods: In a double-blind randomized controlled trial, 200 pregnant women who had cesarean sections were assigned into two groups: to receive either oxytocin intramuscularly or misoprostol rectally after spinal anesthesia.

Results: There was no significant difference between the two groups about change in postpartum hemoglobin, need for blood transfusion and incidence of PPH. We also did not observe any significant difference in any side effects.

Conclusions: Misoprostol may be considered as an alternative for oxytocin in low resource clinical settings.

Keywords: Postpartum Hemorrhage, Misoprostol, Oxytocin

INTRODUCTION

Despite great advances in medical therapies and surgical techniques in recent decades, Post-Partum Hemorrhage (PPH) remains an important medical issue for both developing and developed countries.¹ The incidence of PPH has been estimated to range from 1.47-18% of all deliveries, depending on the definition and criteria that are used¹⁻³ and on the regions or countries concerned.⁴

With approximately 500-1000 ml/min blood flow, which comprises approximately 17% of cardiac output that perfuses the maternal uterus at term,⁵ cesarean section (CS) delivery inevitably results in significant blood loss before the uterine musculature can contract around uterine spiral arteries.

The primary cause of PPH is uterine atony which accounts for 70% of cases leading to severe postnatal anemia and hemorrhagic shock requiring transfusions and surgical interventions.^{6,7} Therefore Oxytocin which is uterotonic agents is used as effective first-line treatment for postpartum hemorrhage. Oxytocin stimulates the upper segment of the myometrium to contract rhythmically, which constricts spiral arteries and decreases blood flow through the uterus.⁸

Misoprostol is a synthetic PGE1 analog, also has uterotonic properties and it is one of the most useful drugs in obstetrics.⁹ The drug is low cost and stable at room temperature. Ease of its administration through various routes, and safety profile make it a good option in resource-poor settings,⁹⁻¹¹ and in patients who are

vomiting, unable to take medications, or under anesthesia.

Various studies have been performed for comparing the efficacy and side effects of these two drugs in low risk pregnancy and normal vaginal delivery cases.¹²⁻¹⁶ However studies involving patients with cesarean section are limited. Therefore, the aim of the present study is to compare the effect of preoperative administration of rectal misoprostol after spinal anesthesia versus intramuscular oxytocin in prevention of PPH in cesarean section in high-risk pregnancy.

METHODS

Subjects

This randomized prospective study was performed between Jun 2011 and April 2012 on high risk pregnant women coming at labor room of department of obstetrics and gynaecology, Sri Aurobindo institute of medical sciences, Indore.

Total of 200 women of high risk pregnancy were included undergoing caesarean section in whom Post-Partum Hemorrhage (PPH) was anticipated. Women were counseled about their participation in the study. Written informed consent was obtained before cesarean section.

The patients were randomized in two groups using random number table generated online (<http://www.graphpad.com/quickcalcs/randomize1/>). In group A, women taken up for cesarean section were given preoperatively tablet misoprostol 600 microgram per rectum after spinal anesthesia before painting and draping was done. In group B, women were given inj. oxytocin 10 IU intramuscularly after the baby was extracted out in cesarean section.

Hemoglobin level was measured before and 24 hour after the operation. Shivering, number of nausea and vomiting along the operation and up to 2 hours after it was recorded. Temperature was monitored routinely and noted in the data sheet when greater than 37.5°C.

Statistical analysis was done on SPSS 20.0 software. Chi square test was used to see the difference in categorical data whereas student t test was used to see the difference in continuous variables in two groups. P value of <0.05 was considered statistically significant.

RESULTS

The mean age of the study participants in group A and B were 25.7 ± 3.2 and 25.8 ± 4.1 years respectively. There was no significant difference between the groups regarding baseline characteristics or risk factors for postpartum hemorrhage (Table 1). The incidence of PPH in group A and group B was 3.0 and 2.0% respectively

We found no significant difference between the groups for change in hemoglobin concentration. There was also no significant difference in postpartum haemoglobin and need for blood transfusion in both the groups (Table 2). There was one maternal death in oxytocin group (Table 2). The use of additional uterotonic agents was less in group A as compared to group B with a relative risk of 0.59 (95% CI 0.2620-1.371); however the difference was statistically insignificant (P value 0.2507).

Table 1: Demographic characteristics and risk factors of PPH in two groups.

Parameter	Group A (Misoprostol)	Group B (Oxytocin)	P value
Maternal Age	25.7 ± 3.2	24.9 ± 4.1	0.1256
Gravida	2 [1-4]	2 [1-4]	-
Parity	1 [0-3]	1 [0-3]	-
Gestation in weeks	37.1 ± 1.2	36.9 ± 2.3	0.4417
PPH Risk factors			
Pregnancy induced hypertension	23	20	0.7310
Ante partum haemorrhage (abruptio placenta)	08	06	0.7828
Placenta previa	06	08	0.7828
Grand multipara	04	07	0.5371
Anaemia in pregnancy	16	17	1.000
Polyhydramnios	10	12	0.8217
Twin pregnancy	08	07	1.000
Big size baby	05	06	1.000
Jaundice with pregnancy	02	01	1.000
Obstructed labor	06	04	0.7475
Prolonged labor	10	12	0.8217
Fibroid with pregnancy	02	01	1.000

Table 2: Outcome measures indicative of blood loss.

Parameters	Group A (Misoprostol)	Group B (Oxytocin)	P value	Relative risk (95% CI)
Change in Hb	1.20 ± 1.31	1.12 ± 0.9	0.6513	-
Postpartum haemoglobin	10.3 ± 1.2	10.7 ± 2.1	0.0998	-
Additional uterotonic agent	4	9	0.2507	0.55 (0.262-1.371)
Need for Blood transfusion	2	5	0.448	0.56 (0.1729-1.831)
Maternal Mortality	0	1	-	-

Table 3 shows that there was no significant difference in incidence of side effects namely shivering, nausea, vomiting, hypertension and temperature $>37^{\circ}\text{C}$. Although there was no significant difference in incidence of shivering in both the groups but the high relative risk (1.806, 95% CI 1.338-2.438) suggests shivering as a side effect of misoprostol.

Table 3: Side effects encountered in both groups.

Parameters	Group A (Misoprostol)	Group B (Oxytocin)	P value
Nausea	1	2	1.000
Vomiting	1	1	1.000
Shivering	7	1	0.0649
Temperature	4	2	0.682
Hypertension	1	0	-

DISCUSSION

We compared the administration of rectal misoprostol with an intramuscular injection of oxytocin as part of the routine active management of PPH in the caesarean section. The outcomes of both groups were comparable and misoprostol was as effective as oxytocin in reducing the incidence of PPH.

Our study is similar to study done by Fazel et al. from Iran¹⁷ and Chaudhary et al. from India.¹⁸ Other studies involving low risk pregnancy shows conflicting results. Chong et al.⁹ concluded that the drug was not as successful as expected. Studies from low-resource settings^{10,19} considered the drug to be a low-cost, easy, and comparable option to oxytocin,^{11,18-21} oxytocin and ergot preparations,^{22,23} or prostaglandin F₂- α .²⁴ Shivering was observed in 7 % of cases in misoprostol group and 1 % in oxytocin group in our study. Vimala et al.¹⁹ has reported shivering in 26% of patients with 400 μg of sublingual misoprostol, and 4% in oxytocin group. Chaudhuri et al.¹⁸ reported 8.3% and 1.1% in the misoprostol and oxytocin groups respectively. The discrepancy in incidence of shivering may be due to use of different methods for administration of drugs, kind of anesthesia, temperature of the operation room, and fluids used during the procedure.

In conclusion, to substitute for oxytocin and to prevent postpartum hemorrhage in cesarean sections misoprostol can be used as it has similar advantages but with minimal side effects, low shelf life, inexpensive and easily available. It is easy to use and does not require special storage conditions (i.e., can be stored easily at room temperature; is thermo stable and light stable; does not require specific conditions for transfer) and has a shelf life of several years.

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Ethical approval: The study was approved by the institutional ethics committee

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