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Original article

Efficacy of Oxytocin and Misoprostol versus Oxytocin infusion in the prevention of postpartum hemorrhage after caesarean section

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ABSTRACT

Background: Postpartum hemorrhage (PPH) is the most common cause for maternal death. Nowadays incidence of PPH has reduced because of uterotonic drugs. In our study, we have compared the efficacy of intravenous oxytocin and rectal misoprostol versus oxytocin infusion in preventing PPH after caesarean section.**Material and Methods:** It is a prospective cross-sectional study.A total of 50 pregnant women were enrolled in the study who were divided into two groups. Group 'A' included 25 primigravida / multigravida with singleton pregnancy who underwent caesarean section. They all received 10 IU intravenous oxytocin after the delivery of baby. Group 'B' included equal number of primigravidas/multigravida with singleton pregnancy, who underwent caesarean section and received 600µg of misoprostol per rectally and 10 IU oxytocin intravenouslyafter delivery of the baby.**Results:**In both the groups, most of the study subjects were in the age group of 20-25 years (44% versus 48%). The mean blood loss in Group A was found to be 750 ±185.40ml whereas in Group B it was 772±311.06ml. The mean Pre operativeHb in Group A was found to be 11.48±1.49gm/dl and in Group B, it was 11.57±1.60gm/dl. We observed the mean post operative blood loss for a period of 24 hrs after Cesarean section is not statistically significant in the two groups studied (p = 0.76). The difference between pre operative and post operative Hb values is not statistically significant.**Conclusion:** Simultaneous administration of oxytocin and misoprostol has no advantage over oxytocin alone.

KEYWORDS: Bleeding,Hemorrhage, Maternal, Perinatal, Uterotonic

INTRODUCTION

Every year about 14 million women around the world suffer from Post-Partum Hemorrhage (PPH) [1]. The risk of maternal mortality from hemorrhage is 1 in 1000 deliveries in developing countries. Most deaths [about 99%] from PPH occur in low- and middle-income countries compared with only 1% in industrialized nations [2]. The highest rate of PPH is observed in Africa [27.5%] and the lowest in Oceania (7.2%), with an overall rate globally of 10.8 % [3].

In India, the maternal mortality rate is 212/100,000 live births and PPH is responsible for 25% of deaths [4]. World Health Organization (WHO) has reported 585000 deaths per pregnancy each year. Twenty five percent of cases die from post-partum bleeding. Annually 14 million women suffer PPH and 2% of deaths occur 2-4 hours after hemorrhage starts [5].

Uterine atony is the most common cause of PPH, accounting for about 80%. Nowadays, the incidence of fatal PPH has decreased because of active management of third stage of labor which includes controlled cord traction, uterine fundal massage, and administration of a pharmacological uterotonic [6].

Treatment for primary PPH requires a multidisciplinary approach. Uterotonics that increase the efficiency of uterine contraction, including ergometrine and oxytocin, were introduced as first-line therapy for atonic PPH in the 19th century. Women who continue to bleed require further assessment and interventions to control bleeding.These

interventions may include additional Uterotonics, Haemostatic drugs, surgical interventions, radiological embolisation and/or compression devices [7].

Oxytocin is an uterotonic agent which 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]. Oxytocin in a dose of 10 IU (IV/IM) is the recommended uterotonic drug for the prevention of PPH [9,10].

Misoprostol is a synthetic prostaglandin E1 analogue. It is wildly used for management of the third stage of labor. It has a potent uterotonic effect, and it is cheap, stable at room temperature, easily administered [10]. It is well absorbed when administered by oral, vaginal, rectal, and sublingual routes. In low settings, where oxytocin is not available, oral misoprostol (600 µg) is recommended [9,10]. In 2011, Misoprostol was added to the World Health Organization's Model List of Essential Medicines for PPH prevention. The aim of this study is to evaluate the efficacy of Misoprostol for prevention of PPH who undergo cesarean section by comparing the efficacy of oxytocin infusion alone versus rectal misoprostol and oxytocin infusion combination.

MATERIALS AND METHODS

This is a prospective cross sectional study done in the Department of Obstetrics and Gynecology for a period of 6 months from August 2017- January 2018. Patients who have undergone cesarean section (Elective and emergency), who had Singleton pregnancy and those with term pregnancy were included in the study. Those with Pre eclampsia, Twins, Placenta previa were excluded from the study. The study was approved by the Institutional Ethics Committee. The study population was divided into two groups. Those who received only 10 IU intravenous Inj.Oxytocin were grouped under Group A and those who received 10 IU intravenous Inj.Oxytocin in combination with 600 mcg Tab. Misoprostol per rectal were grouped under Group B. Appropriate data like pre-operative Hemoglobin (Hb), amount of blood loss, post operative Hb, the efficacy of Tab. Misoprostol in the prevention of primary PPH were determined. In case if the PPH occurs, interventions if any to reduce the PPH were also noted. Post – operative Hb was done after 48hrs of cesarean section.

All the data obtained was entered in to MS excel sheet. Mean & standard deviation was calculated for all continuous variables. Percentage and proportions was calculated for all categorical variables. Student t – test was used to check the significance between variables. $p \leq 0.05$ was considered as statistically significant.

RESULTS

A total of 50 patients were enrolled based on inclusion and exclusion criteria and 25 patients each were allotted in two groups randomly. Age wise distribution is shown in Table 1. In both the groups, most of the study subjects were in the age group of 20-25 years (44% versus 48%). In the study population, distribution of primi subjects were recorded highest i.e., 64% in Group A and 68% in Group B (Table 2). Highest number of study subjects (76% versus 84%) was found in the primary Caesarean section type in both the groups. Remaining subjects (24% versus 16%) were of repeat Caesarean section.

Table 1: Age wise distribution of the study population

Age groups (Years)	Group A No. (%)	Group B No. (%)	Total No. (%)
15-20	5 (20%)	4 (16%)	9 (18%)
20-25	11 (44%)	12(48%)	23 (46%)
26-30	6 (24%)	4 (16%)	10 (20%)
31-35	1 (4%)	3 (12%)	4 (16%)
36-41	2 (8%)	2 (8%)	4 (16%)
TOTAL	25 (100)	25 (100)	50 (100)
Median and Range	23 (17- 40)	23 (18- 41)	P = 0.88

The mean blood loss in Group A was found to be 750 ±185.40ml whereas in Group B it was 772±311.06ml. In Group A, one patient was found to have PPH on day 4 and another patient was found to have primary PPH. In Group B, two patients were found to have primary PPH. No other patients required additional uterotonic agents in both the groups.

The mean Pre operativeHb in Group A was found to be 11.48±1.49gm/dl and in Group B, it was 11.57±1.60gm/dl. The mean Post operativeHb and the mean change in Hb in both the groups are mentioned in Table 3.

Table 2: Gravida wise distribution of subjects in both the groups

Gravida	Group A No. (%)	Group B No. (%)	Total No. (%)
Primigravidae	16 (64%)	17 (68%)	33 (66%)
Multiparae	9 (36%)	8 (32%)	17 (34%)
TOTAL	25 (100)	25 (100)	50 (100)

Table 3: Analysis of hematological variables among the two groups

Variables	Group A		Group B		p-value
	Mean	Standard deviation	Mean	Standard deviation	
Blood Loss (ml)	750.00	185.40	772.00	311.06	0.762919*
Pre Hb (g/dl)	11.48	1.49	11.57	1.60	0.834736*
Post Hb (g/dl)	10.48	1.47	10.48	1.67	0.985812*
Change in Hb (mg/dl)	1.068	0.61	1.08	0.79	0.68514*

* Student-t test

DISCUSSION

The current study was aimed at evaluating the efficacy of 600µg Tab. Misoprostol per rectal for prevention of PPH who undergo cesarean section. In our study, we have compared 600 mcg of Tab. Misoprostol per rectal in combination with 10 IU Inj. Oxytocin against intravenous Oxytocin10 IU for evaluating the efficacy of Misoprostol in the prevention of PPH.

In our study the Median age group of study subjects in two groups was similar but was not statistically significant (P = 0.88) among both the groups. The highest number of study subjects was distributed in the age group of 20-25 years in both the groups. In our study distribution of primi subjects were recorded highest when compared to the multiparae in both the groups. The highest number of study subjects was found in the primary Cesarean section type than in the repeat Cesarean section in both the groups.

We observed the mean post operative blood loss for a period of 24 hrs after Cesarean section is not statistically significant in the two groups studied (p = 0.76). Also, in the current study the Tab. Misoprostol is administered after the delivery of the baby (post operatively).

In a study conducted by Essam RO *et al.,* at Assiut University, Egypt, comparing Sublingual Misoprostol versus intravenous Oxytocin, concluded that the mean post operative blood loss after 2 hrs of Cesarean section is not statistically significant (p = 0.067) [13]. Even though there is a higher reduction in blood loss postoperatively in comparison with the Oxytocin group, it did not reach statistical significance which is in concordance to our study.

Chaudhuri P *et al.,* have conducted a study comparing Sublingual Misoprostol and injection Oxytocin and found that the mean post operative blood loss after 8 hrs of Cesarean section is not statistically significant in the two groups they studied (p= 0.07) [14]. The mean postoperative blood loss in their study was slightly reduced in the Misoprostol group than in the placebo group which is also in concordance to our study.

Though the above two studies had a reduced mean post operative blood loss in the misoprostol group, we didn't have a decreased blood loss in the Misoprostol group. This deviation is because of factors like duration of time, sample size, route of administration, time of administration of the drug.

In contrast, Hesham MB *et al.,* have conducted a study comparing pre-operative rectal Misoprostol against post-opetarive rectal Misoprostol and concluded that the mean post operative blood loss with in 24 hrs after Cesarean section was statistically significant in the group I (Preoperative Misoprostol) over group II (Postoperative Misoprostol) (P = 0.001) [11].

But in the current study, the Tab. Misoprostol was administered post operatively, hence blood loss in our study is greater when compared to the above study.

Another study by Sitalu*et al.,* compared the impact of preoperative administration of rectal Misoprostol on blood

loss during and after caesarean section and concluded that intra-operative and post-operative blood loss in rectal misoprostol and oxytocin is significantly reduced than intra-venous oxytocin alone (P <0.001) [15].

In our study we observed that there was no significant difference between the Pre andPost operativeHb levels (0.83 versus 0.98) in both the study groups. In our study we observed that the post – operative hemoglobin and change in Hb concentration after 48 hrs of Cesarean section between both the groups was not statistically significant.

A similar study conducted by Mohammad Reza Fazel*et al.*, comparing rectal Misoprostol and intravenous Oxytocin have found that there were no significant differences in preoperative and postoperative hemoglobin concentration (0.72 versus 0.36). But in their study the post operativeHb was measured after 24 hrs of the delivery [3].

Our study is in concordance with the study conducted by MadhuriAlwani*et al*, comparing rectally administered Misoprostol versus intramuscular Oxytocin and found that there was no significant difference between the groups for change in hemoglobin concentration. But in this study the post operativeHb was measured after 24 hrs of the delivery [12].

In a study by Savitha A *et al.*,comparing rectalMisoprostaland intramuscular Oxytocin, concluded that mean amount of fall in hemoglobin level was not statistically significant which is similar to our study [4].

In contrast to the above two studies, a study conducted by Sitalu*et al.*, comparing rectal Misoprostol versus injection Oxytocin found that the difference between the pre-operative and post-operative Hb levels after 48 hrs of Cesarean section was statistically significant (P < 0.001) [15].

Another study by Chaudhuri P *et al.*, concluded that the mean drop in postoperative hemoglobin was statistically significantly among women who received adjunct Misoprostol with Oxytocin than among those who received Oxytocin alone (P = 0.001). However, a hemoglobin reduction of more than 2.0 g/L was observed in fewer patients in the Misoprostol group than in the placebo group (P = 0.006). In their study the post operativeHb was measured after 24 hrs of the delivery [14].

Sitaula S et al concluded that administration of Misoprostol plus oxytocin significantly reduced the amount of blood loss after cesarean section compared to oxytocin when given alone, and use of them was not associated with any serious side effects [15].

CONCLUSION

We conclude that 600µg Misoprostol with Oxytocin 10 IU after delivery of baby in Cesarean section is not superior to 10 IU Oxytocin in control of PPH. The mean post partum blood loss between two groups is not significant. The difference between pre operative and post operativeHb values is not significant. Oxytocin is first line drug & Misoprostol is not a replacement of parenteral administered Oxytocin, but can be used safely in all deliveries for prevention of PPH.

Conflict of interest

The authors declare that there are no conflicts of interest.

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