Management of Third Stage of Labour for Primigravidae with Singleton Pregnancies: Intravenous Oxytocin Alone vs Intravenous Oxytocin Combined with Sublingual Misoprostol

Saadia Akram[1], Neelam Fatima[2], Sabahat Hamid[3], Bushra Khan[4]*, Sahira Agha[5], Khalida Salim[6]

[1] Saadia Akram, Assistant professor Obstetrics and Gynaecology, Baqai Medical University Karachi Pakistan.
Email: saadiaakram@baqai.edu.pk

[2] Neelam Fatima, Consultant Obstetrics and Gynaecology, Ibrahim Medical Center Badin Pakistan.
Email: neelamfatima027@gmail.com

[3] Sabahat Hamid, Senior Registrar Obstetrics and Gynaecology, Indus hospital, DHQ Badin Pakistan.
Email: drsabahathamid@gmail.com

[4] Bushra Khan, Specialist Obstetrics and Gynaecology, Zulekha Hospital Sharjah U.A.E.
Email: Khan.leokhan@gmail.com (Corresponding author)

[5] Sahira Agha, Assistant Professor Obstetrics and Gynaecology, Medicare Cardiac and General Hospital Karachi Pakistan.
Email: S_21078bmu@hotmail.com

[6] Khalida Salim, Resident Obstetrics and Gynaecology, Almana General Hospital Jubail Saudi Arabia.
Email: khalidarehman72@gmail.com

Abstract

The aim of this study is to compare and contrast the effectiveness of intravenous (IV) oxytocin alone and IV oxytocin combined with sublingually given misoprostol in managing the third stage of labor in primi gravid with singleton pregnancies who are giving birth vaginally.Study design: A randomized controlled trial Place and Duration: This study was conducted in Zulekha Hospital Sharjah U.A.E from June 2022 to June 2023 Methodology: A total of 140 patients were enrolled in the study. The participants were allocated into two study groups: group A and group B. Each study group consisted of 70 enrolled patients. Eligible participants were primigravidae at term, with singleton pregnancies with gestational ages ranging from 37 to 41 weeks and experiencing spontaneous labor. Patients with instrumental vaginal deliveries, antepartum bleeding, antepartum haemorrhage, or any underlying medical conditions, including pregnancy-induced hypertension, were not included in the study. Group A received 10 IU of IV oxytocin combined with sublingual misoprostol (400 mcg), while Group B received 10 IU of IV oxytocin alone. The main outcome measure was the comparison of mean blood loss between the two study groups.Results: In our study, most participants were aged between 26 and 30 years. The oxytocin + misoprostol group had an average age of 26.8 ± 2.8 years, while the oxytocin alone group averaged 27.1 ± 2.3 years. Excessive bleeding (>500 ml) was seen in 14.28% of the oxytocin-only group and 5.71% in the oxytocin-and-misoprostol group. Mean blood loss significantly differed: 362.5 ml for oxytocin + misoprostol and 407.2 ml for oxytocin alone (p-value <0.001). Shivering occurred in 7.14% of the oxytocin + misoprostol group and 1.42% of the oxytocin alone group.**Conclusion**: The combination of IV oxytocin and sublingual misoprostol proved more potent than IV oxytocin alone in controlling the loss of blood during the third stage of labor. The amount of blood lost was notably lower in the patients given combination therapy when compared to patients administered IV oxytocin exclusively.

Keywords: misoprostol, labor, prevention, sublingual, haemorrhage, oxytocin,

1. Introduction

Postpartum haemorrhage (PPH) remains a significant global concern in maternal healthcare, contributing significantly to maternal morbidity and mortality rates [1]. Active management of the third stage of labour, which involves giving uterotonic agents, is a well-known way to reduce the number of cases of PPH and how bad they are [2]. Among these agents, oxytocin, a well-known uterotonic, has played a pivotal role in preventing PPH by inducing

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coordinated uterine contractions and thereby minimising postpartum blood loss [3].

Despite the efficacy of oxytocin, recent research has explored innovative strategies to enhance its effectiveness in PPH prevention. One such strategy involves the combined use of oxytocin with sublingual misoprostol, a synthetic prostaglandin E1 analogue. Misoprostol has exhibited uterotonic properties and can be administered through various routes, with sublingual administration being particularly attractive due to its rapid absorption and quick onset of action [4].

The rationale behind combining oxytocin and misoprostol is grounded in their complementary mechanisms of action. While oxytocin primarily stimulates uterine contractions, misoprostol acts on uterine smooth muscle directly, making it a potential adjuvant therapy to augment the effects of oxytocin in preventing PPH. This approach may offer a multi-faceted strategy to address the complex physiology of postpartum bleeding.

Our current study aims to make a significant contribution to this growing field by comparing the effectiveness of intravenous (IV) oxytocin by itself to IV oxytocin combined with sublingual misoprostol in actively managing the third stage of labour for primigravidae with singleton pregnancies during vaginal childbirth. The primary objective of this research is to investigate whether the co-administration of oxytocin and misoprostol results in a statistically significant reduction in the amount of blood loss as compared to oxytocin monotherapy.

The clinical importance of this study comes from the fact that it could help healthcare providers who care for mothers use evidence-based practices, which could lead to better guidelines for preventing PPH in first-time mothers. By looking at how the effects of these two uterotonic drugs work together, we hope to learn more about how they can be used together to reduce PPH and help improve the health of mothers.

2. Methodology

The aim of this randomised controlled trial was to compare the effectiveness of giving intravenous (IV) oxytocin alone versus giving it with sublingual (under the tongue) misoprostol during the third stage of labour in primi gravid with singleton pregnancies who were giving birth vaginally.

A total of 140 primigravidae with singleton pregnancies at term (defined as gestational age between 37 to 41 weeks) and presenting with spontaneous labor were enrolled in the study. The patients included in the study met the inclusion criteria, such as being primigravidae with singleton gestation at term and undergoing spontaneous labor. Patients with a history of instrumental vaginal deliveries, antepartum bleeding, antepartum haemorrhage (APH), or any medical disorders, including pregnancy-induced hypertension (PIH), were excluded from the study.

Patients were allocated randomly to one of two study groups. Randomization was accomplished using computer-generated random numbers organised in blocks, and the concealment of allocation was maintained through the use of sealed opaque envelopes.

Group A (n=70) received IV oxytocin with sublingual misoprostol at 400 mcg, while Group B (n = 70) received IV oxytocin exclusively.

The main outcome assessed in this study was the comparison of the average blood loss during the third stage of labor between the two study groups. Blood loss was quantified objectively by measuring the collected blood volume through calibrated drapes and by weighing materials saturated with blood. Secondary outcome measures included the incidence of blood loss exceeding 500 ml, the presence of adverse effects, and other relevant clinical parameters.

trained healthcare professionals who were unaware of the treatment allocation collected the data. Patient demographics, medical history, and clinical data were recorded on standardized case report forms. Statistical analysis was conducted using appropriate tests using IBM SPSS version 26.

3. Results

In this study, a total of 140 cases were enrolled and evenly distributed between two groups, with 70 participants in each group. The majority of the enrolled women were within the age range of 26 to 30 years. In the oxytocin + misoprostol group, 30 (42.85%) of patients were younger than 25 years, while 35 (50%) fell between the ages of 26 and 30 years. Similarly, in the oxytocin alone group, 10 (14.28 %) of patients were aged up to 25 years, and 54 (77.14%) were between 26 and 30 years of age.

Regarding gestational age, 38 (54.28%) of patients in the oxytocin + misoprostol group had gestational ages up to 40 weeks, while 40 (57.14%) in the oxytocin alone group fell within this range. Additionally, 32 (45.71%) of patients in the combination group had gestational ages of 41 weeks or above, compared to 30 (42.85%) in the oxytocin-alone group. The average age of patients was 26.8 ± 2.8 years in the oxytocin + misoprostol group and 27.1 ± 2.3 years in the oxytocin alone group. Similarly, the mean gestational age was 39.4±2.7 weeks in the combination group and 38.7±2.3 weeks in the oxytocin alone group.

More women in the oxytocin-only group lost more than 500 mL of blood than in the oxytocin-and-misoprostol group (10 vs. 4). However, this difference in proportions was not statistically significant (p-value, 0.120).

When comparing the mean blood loss between the two groups, a statistically significant difference was found. The mean blood loss was 362.5 ± 2.13 mL in the oxytocin + misoprostol group and 407.2 ± 3.21mL in the oxytocin alone group, with a highly significant p-value of <0.001.

The overall prevalence of postpartum haemorrhage (PPH) in this study was 14 (10%) out of the total 140 cases. Minor side effects were noted in both

intervention groups, but both interventions were generally considered safe. Specifically, in the combination group, 5 (7.14%) of cases experienced shivering compared to 1 (1.42%) in the oxytocin alone group. Similarly, nausea was reported in 3 (4.28%) of cases in the oxytocin alone group and 1 (1.42%) in the combination group. Additionally, vomiting occurred in 2 (2.85%) of cases in the combination group and 1 (1.42%) in the oxytocin alone group. No statistically significant differences were observed in the occurrence of side effects between the two groups.

Table I: Demographic Characteristics and Gestational Age		
Characteristic	Oxytocin + Misoprostol Group (n=70)	Oxytocin Alone Group (n=70)
Age (years)		
- ≤25	30 (42.85%)	10 (14.28%)
- 26-30	35 (50%)	54 (77.14%)
- >30	5 (7.14%)	6 (8.57%)
Gestational Age (weeks)		
- ≤40	38 (54.28%)	40 (57.14%)
- >40	32 (45.71%)	30 (42.85%)
Average Age (years)	26.8 ± 2.8	27.1 ± 2.3
Mean Gestational Age (weeks)	39.4 ± 2.7	38.7 ± 2.3

Table II: Blood Loss and Side Effects		
Outcome	Oxytocin + Misoprostol Group (n=70)	Oxytocin Alone Group (n=70)
Blood Loss >500 mL (%)	4 (5.71%)	10 (14.28%)
Mean Blood Loss (mL)	362.5 ± 2.13	407.2 ± 3.21
p-value (Mean Blood Loss)	<0.001	
Prevalence of Postpartum Hemorrhage (%)	7 (10%)	7 (10%)
Shivering (%)	5 (7.14%)	1 (1.42%)
Nausea (%)	1 (1.42%)	3 (4.28%)
Vomiting (%)	2 (2.85%)	1 (1.42%)

4. Discussion

Postpartum haemorrhage (PPH) continues to pose a significant threat to maternal health globally [11]. Active management of the third stage of labor, involving the administration of uterotonic agents, is a well-established strategy aimed at reducing PPH risk [12]. Oxytocin, a commonly used uterotonic, has played a central role in this strategy by promoting coordinated uterine contractions, thereby minimizing postpartum blood loss [13].

Our study aimed to check the efficiency of combining IV oxytocin with sublingual misoprostol in the management of the third stage of labour in patients bearing first and singleton pregnancies during vaginal childbirth. The main outcome, which was the mean blood loss, showed a noteworthy decrease in the oxytocin + misoprostol group when compared to the oxytocin alone group (p-value <0.001). This finding is in line with the results of previous studies, which support the use of misoprostol in addition to oxytocin to better stop bleeding after birth [14, 15].

Importantly, our discussion draws from the work of various authors, providing a broader perspective on the subject. Notably, a study by Gallos et al. [16] conducted in a similar context found that the combination of oxytocin and misoprostol significantly reduced postpartum blood loss compared to oxytocin alone. Furthermore, research by Chaudhuri et al. [17] in a low-resource setting corroborated these findings, emphasising the clinical relevance of our study's results.

While our study's primary outcome favoured the oxytocin and misoprostol combination, it is important to note that the incidence of blood loss exceeding 500 mL, though lower in the combination group, did not reach statistical significance (p-value, 0.120). This observation aligns with a study by Numfor et al. [18], which emphasised that while reductions in severe PPH are crucial, statistical significance may be influenced by sample size.

The safety profile of both interventions in our study was favourable, with only minor side effects reported. These findings are consistent with the broader literature on misoprostol's side effect profile [19]. In addition, our study echoes the work of Pakniat et al. [20], which similarly reported minor side effects in their evaluation of oxytocin and misoprostol for PPH prevention.

Despite the strengths of our study, including its robust sample size and relevant contextual data, there are limitations to consider. The single-centre nature of our research may limit the generalizability of our findings to other healthcare settings. Additionally, the study focused on short-term outcomes, and long-term effects, such as the need for blood transfusion or maternal mortality, were not assessed within the scope of this study.

In the end, our study adds to the growing body of evidence that supports the use of oxytocin and sublingual misoprostol together for active management of the third stage of labour in primi gravidacarrying a single baby. This combination demonstrates promise in reducing mean blood loss, aligning with existing

literature. Our discussion, enriched by insights from various authors, underscores the clinical relevance of our findings and emphasizes the need for further research to explore long-term clinical outcomes and cost-effectiveness.

5. Conclusion

The results of the study show that giving intravenous (IV) oxytocin and sublingual (under the tongue) misoprostol together is more effective than giving IV oxytocin alone for stopping blood loss during the third stage of labour. The data indicates that the combination treatment resulted in a significantly lower mean blood loss, suggesting its potential as an improved intervention in clinical practice for the prevention of excessive bleeding during this critical stage of childbirth. Further research and clinical trials may be warranted to validate these promising results and explore the broader implications for maternal health and safety.

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Conflict of Interest

No conflicts of interest arose during the execution of this study.

Ethical Approval

The study received approval from the ethical committee prior to its initiation.

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