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Effect of Pre-Operative Single Dose of Misoprostol in Patient with Abdominal Myomectomy at Baghdad Teaching Hospital

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Abstract: Background: The most prevalent benign tumours in women, uterine leiomyomas, depend on estrogen for growth and development during the reproductive years. Myomectomy is a surgical treatment for leiomyomas and preserves the fertility of women. One of the most common side effects of myomectomy is bleeding, which, if not treated, could negatively affect women's health.

Aim: To determine the effect of a single dose (400 µg) of misoprostol tablet administered vaginally or rectally two hours before myomectomy on blood loss intraoperatively.

Methods: This prospective randomized study was conducted at Baghdad Teaching Hospital, Medical City, Baghdad, Iraq, from the fifth of December 2022 to the fifth of December 2023. A sample of fifty women was enrolled and divided into two groups, including the Misoprostol group (which involved twenty-five women, administrated (400 µg) of misoprostol vaginally or rectally two hours pre-operatively). The non-misoprostol group (which involved twenty -five women who underwent operation without misoprostol). The outcome factors were the operative time, hemoglobin level, and intraoperative blood loss (milliliters).

Results: It was clear from the results of this study that the misoprostol group showed decreased estimated blood loss (157.48±58.27ml) than the non-misoprostol group (511.60± 46.90ml) and higher statistical significance with a p-value of less than 0.000. Misoprostol reduced blood loss by (354ml) in the study group. A significant reduction was found in hemoglobin drop post-operatively. The results were analyzed using SPSS v.26.

Conclusion: pre-operative use of a single dose of misoprostol (400µg) vaginally or rectally is an effective method to reduce blood loss intraoperatively, and it's associated with a significant reduction in hemoglobin drop post-operatively during myomectomy.

Key words: Pre-operative, Misoprostol, Myomectomy

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1. Introduction

Leiomyomas or Uterine Fibroids (UF) are the most prevalent benign tumours of the smooth muscle of the uterus in women. They are made of fibrous connective tissues or develop from myometrial smooth muscle cells, initially identified by Virchow in 1845 as dermal leiomyoma [(1)]. These tumours develop during the reproductive cycle and are estrogen dependent. [(2)] suggested that endogenous hormones cause fibroid tumours. This appears to be more common in black women and white women in the United States (US) before menopause, and it appears in black women earlier than in white women [(3, 4, 5).] .

FIGO was established to facilitate communication, clinical care, and research by uniformly characterizing and identifying UFs [(6)]. Classifying UFs helps clinicians choose the optimal treatment plan- hysteroscopy, laparoscopy/laparotomy, or uterine artery embolization. The post-treatment context requires precise classification to measure treatment response, tumor burden change, and recurring lesions [(7)].

UFs are often diagnosed based on clinical presentation, followed by confirmation through medical imaging modalities such as Ultrasound, magnetic resonance (MRI), and histopathology [(8)]. Ultrasound is the first-line imaging modality for UFs during pregnancy because it is inexpensive, easy to use, portable, rapidly detects a tumor, and has appropriate features. Indeed, several studies that used Ultrasound have been reported [(8,9,10)]. However, MRI is the most useful technique for identifying a lipomatous tumor and determining its location and origin [(10)]. A study by Arora et al. [(11)] concluded that the diagnosis of laparoscopy and hysteroscopy are more effective compared to hysterosalpingography and ultrasonography for uterine, tubal, and ovarian infertility. Bano et al. [(12)] concluded that patients can choose myomectomy or uterine artery embolization to preserve fertility. However, large fibroids can change the cavity, affecting embryo implantation and increasing the risk of miscarriage. For large uteri, laparoscope hysterectomy is a technically feasible and safe procedure. Experienced surgeons may perform myomas of any size, number, or location after fifty cases without significant morbidity [(13)].

Misoprostol is the medication that is used to induce labor in women who are expecting. The stimulant characteristics of this substance cause contractions, which in turn promote cervical dilatation and effacement, which in turn trigger the start of labor. Misoprostol is an effective drug when the cervix needs to dilate and soften in preparation for surgery or labor induction. The cervix is ready for further interventions because it encourages cervical alterations. Misoprostol is essential to medically assisted induced abortions [(14,15,16)].

2. Method

This randomize study was conducted at Baghdad Teaching Hospital, Medical City, Baghdad, Iraq, from the fifth of December 2022 to the fifth of December 2023. Ethically the Scientific Council of Obstetrics and Gynecology approved the study, and all participants' consent was obtained before they were included in the analysis. prospective randomised study was conducted on fifty premenopausal women with symptomatic uterine myoma, and size of myoma more than 5 cm, who attended the Department of Obstetrics and Gynecology at Baghdad Teaching Hospital, Medical City, from December 2022 to December 2023. Two equal groups were formed from all subjects: All twenty-five women in the misoprostol group received 400 µg vaginally or rectally two hours before surgery, while the non-misoprostol group received no misoprostol. The outcome factors were the operative time, haemoglobin, and intraoperative blood loss (millilitres).

Sociodemographic, medical, and obstetrical history, including (age, residency, BMI, parity, recurrent miscarriage, and menstrual history). Those patients were sent for imaging study (Ultrasound or MRI to assess the site, size, and number of myomas). After that the researcher collected blood samples from all the participants and sent them for a complete blood count to determine the Hb levels before surgery. Misoprostol is used in 200µg of misoprostol. All participants' blood samples were taken to assess pre-operative hemoglobin (Hb) levels. During the operation, we recorded the number and weight of surgical packs; each of the five cleared surgical packs weighed fifty grams before the operation. After the

operation, we counted the number of surgical packs and measured their weight. After 24 hours, we take blood samples from all participants and send for a complete blood count to assess Hb levels post-operatively.

The data obtained were collected and imported into Microsoft Excel for further analysis. The results were also analyzed using SPSS ver. 26. The descriptive statistics focused on crosstabs to view percentages. Continuous variables were presented as mean (± Standard Deviation (SD)). The Chi-Square test and t-test were used to compare the variables between the research groups. Statistical significance was defined as a P-value of 0.05.

3. Results:

Table 3.1: characteristic of studied groups

Characteristics	**Misoprostol Group**	**Non-Misoprostol**	***P*- value**
Age			
Range	20.0 – 50.0	22.0-53.0	0.543
Mean ± SD	35.84 ± 8.59	37.32 ± 8.46	
Gravidity			
Mean ± SD	2.68 ± 3.18	4.80 ± 3.89	0.040
Parity			
Mean ± SD	2.0 ± 2.27	3.24 ± 2.90	0.099
Number of Miscarriage	**(N =8)**	**(N = 15)**	
Mean ± SD	0.68 ± 1.14	1.56 ± 1.58	0.029
Miscarriage			
0	17(68%)	10(40%)	
1	2(8%)	3(12%)	0.275
2	4(16%)	5(20%)	
3	1(4%)	2(8%)	
4	1(4%)	5(20)	
BMI Kg/m^2			
18- < 25	24.0%	12.0%	0.040
25- < 31	56.0%	32.0%	
31- < 37	20.0%	40.0%	
37- < 44	0.0%	16.0%	
Mean ± SD			
Residence			
Urban	72%	64%	0.381
Rural	28%	36%	
Size (cm):			
Mean ± SD	6.24 ±1.05	6.74 ±0.92	0.081
Multi size (cm):			
Mean ± SD	6.52± 1.33	6.30 ±1.15	0.535
Marital status			
Divorced	2(8%)	5(20%)	
Married	13(52%)	9(36%)	0.547
Single	6(24%)	6(24%)	
Widow	4(16%)	5(20%)	

The present study found no significant differences between the misoprostol group and the non-misoprostol group in terms of age (p = 0.543), parity (p = 0.099), miscarriage (p = 0.275), residence (p = 0.381), size of myoma (p = 0.081) and multi size of myoma (p= 0.535). However, there was found significant differences ($p < 0.05$) between the study groups regarding the number of miscarriages (p=0.029), BMI (p = 0.040), and gravidity (0.040).

Table 3.2: A comparative analysis between the two groups under study, focusing on the estimated volume of blood loss (measured in milliliters).

Characteristics	Misoprostol Group (n=25)	Non-Misoprostol Group (n = 25)	U	*P*- value
Estimation of blood loss Mean ± SD.	157.48±58.27	511.60± 46.90	325.0*	0.000*

Table 3.2 indicates a statistically significant difference in the estimation of blood loss between the two groups under study. Specifically, the misoprostol group had less blood loss (157.48±58.27ml) than the non-misoprostol group (511.60± 46.90ml), with a p-value of less than 0.000.

Table 3.3: A comparative assessment between the two groups under study, examining their respective hemoglobin levels (measured in grams per deciliter).

Characteristics	Misoprostol Group (n=25)	Non-Misoprostol Group (n = 25)	t	*P*- value
Pre-operative Hb (g/dL) Mean ± SD	10.45 ± 1.36	10.32 ± 0.64	0.411	0.683
Postoperative Hb (g/dL) Mean ± SD	10.95 ± 0.78	9.00 ± 0.67	9.456	< 0.001*
# *P*- value	0.015	< 0.001*		

In relation to the study groups' (pre- and post-operative) hemoglobin levels. The results showed that the misoprostol group's hemoglobin (10.95 ± 0.78 gm /dL) was considerably higher than that of the non-misoprostol group [(9.00 ± 0.67 gm /dL), (p < 0.001)]. Similarly, Hb levels were statistically different between pre-operative (10.45 ± 1.36 gm/dL) and post-operative (10.95 ± 0.78 gm/dL) with a p-value of 0.015. As indicated by Table 3.2, the hemoglobin level in the non-misoprostol group was statistically substantially lower post-operatively (9.00 ± 0.67 gm/dL) than pre-operatively (10.32 ± 0.64 gm/dL) with a p-value of 0.001 .

Table 3.4 Correlation between the studied groups with gravida, Hb post-operation, BMI (kg/m^2), estimation of blood loss (ml), and parity

Correlations						
Characteristics		**Gravida**	**Hb post-operation**	**BMI(kg/m^2)**	**Estimation of blood loss (ml)**	**Parity**
Gravida		1	-.224	.452**	.312*	.948**
Hb post-operation (gm/dL)			1	-.390**	-.774**	-.142
BMI (kg/m^2)				1	.392**	.379**
Estimation of Blood loss (ml)					1	.266
Parity						1

Table 3.4 summarizes the results of correlations between five characteristics across categories of groups. These results showed positive and negative associations between participants (non-misoprostol and misoprostol). A significant positive correlation (Pearson's product-moment correlation coefficient (r) = 0.452, 0.312, and 0.948; $p < 0.01$ and $p < 0.05$ exists between gravida, BMI, estimation of blood loss, and parity reported in Table 3.4. Similarly, the positive correlations between BMI, analysis of blood loss, and parity (r) =0.392 and 0.379; $p < 0.01$. Meanwhile, Hb post-operation was significantly negatively correlated with [(BMI -0.390, estimation of blood loss -0.774); $p < 0.01$].

Table 3.5 comparative between the studied groups involving blood transfusion.

Characteristics	Misoprostol Group (n=25)	Non-Misoprostol Group (n = 25)	*P*- value
Blood transfusion	1(4%)	9 (36%)	0.04
Non-transfusion	24 (96%)	16 (64%)	

In this study, there were statistically significant differences between the two groups in terms of the need for blood transfusions as shown in Table 3.5.

4. Discussion:

Uterine fibroids are the most common benign uterine smooth muscle tumors in women, affecting approximately 70% of women worldwide [(4)].Our study showed no statistically significant differences between the misoprostol group and the non-misoprostol group regarding age, miscarriage, parity, residence, size of myoma, multi-size of myoma, and marital status. This finding appears to agree with Celik et al. [(16)], Kalogiannidis et al. [(17)], Mohamed et al. [(18)], Mostafa-Gharabaghi et al. [(19),] and Nnagbo et al.[(20)].

Table 3.2 that the misoprostol group showed decreased estimated blood loss (157.48±58.27ml) than the non-misoprostol group (511.60± 46.90ml) and higher statistical significance with a *p*-value of less than 0.000 in the current investigation. Therefore, the misoprostol reduced blood loss by 354 ml in the study group. Results and observations from this research are in agreement with findings from several previous studies ([21, 22]); they have found that intraoperative blood loss was significantly lower in the study group, where misoprostol led to reduced blood loss by (149, 91, 96, and 79 ml) respectively. The estimated blood loss from those authors' published reports was lower than our results of 354 ml. This could be due to the different surgical approaches among these studies (minimally invasive surgery in the present experiment vs abdominal myomectomy in the previous reports). Interestingly, as Mohamed et al. [(18)] reported, the estimated blood loss was 354ml, which entirely agrees with our results. The present study examined the hemoglobin levels in misoprostol and non-misoprostol groups (pre-operatively and post-operatively). It was clear from the results of this study that the hemoglobin levels of the non-misoprostol group operatively decreased to (9.00 ± 0.67 g/dL) post-operatively with a *p*-value of 0.001. However, the non-misoprostol group had significantly lower hemoglobin levels than the misoprostol group (10.95 ± 0.78 g/dL) post-operatively, with a *p*-value of 0.001 (see Table 3.3). These results seem to be very similar, if not identical, to those obtained by Mohamed et al. [(18),] who examined the effect of misoprostol on intra-operative blood loss during myomectomy operation in Cairo. It involved a double-blind, placebo-controlled trial of fifty women undergoing abdominal myomectomy. They were randomly divided into two groups (each group consisted of twenty-five patients) to take 400µg of misoprostol trans-rectally two hours pre-operatively. Their results showed that the group study (non-misoprostol and misoprostol groups) had significantly lower hemoglobin levels post-operatively (9.76 ± 0.78 g /dL and 10.6 ± 0.96 g /dL) compared to pre-operatively (11.5 ± 0.77 g /dL and 11.8 ± 0.85 g /dL) with a *p*-value of 0.001 correspondingly. These authors concluded that a single dose of 400 µg of misoprostol is an effective, simple method for reducing mean post-operative hemoglobin drop; these findings seem consistent with those obtained in the present study.

As mentioned above, the implication of these findings suggests that a single dose of 400µg vaginal or rectal route of misoprostol two hours before abdominal myomectomy can reduce mean post-operative hemoglobin drop. Recently, however, several studies have strongly indicated that misoprostol is associated with a significant reduction in hemoglobin drop post-operatively [23, 24, 25].

Looking at the five characteristics: gravida, Hb post-operation, BMI (kg/m^2), estimation of blood loss (ml), and parity. Results of these characteristics are summarized in Table 3.4., 3.1, 3.2, 3.3, and 3.4. As indicated in this Table, significant positive and negative correlations ($p < 0.05$) existed between participants (non-misoprostol and misoprostol groups). It could be concluded that a single dose of 400µg vaginal and rectal route of misoprostol two hours before abdominal myomectomy significantly gave reliable results for the misoprostol group when compared with the non-misoprostol group.

The results were analysed using SPSS v.26. These seem to concur with the findings of [30, 31, 33, 35]. Additionally, the current investigation demonstrated that there were notable variations in the necessity for blood transfusions between the two groups under investigation (see Table 3.5). These results concur with those of Celik et al. [16], who found that the group receiving misoprostol had a far lower requirement for postoperative blood transfusions.

As published in the literature, numerous observational studies evaluate the relationship between obesity and the risk of UFs. A meta-analysis by Qin et al. [26]., reported that obesity increased UF risk by 17% and 26% for BMI and weight change since age 18. BMI and hemoglobin level had an inverse association. This link may be attributed to modern lifestyle habits and fast food, which is high in fat and carbohydrates but low in essential minerals [4,26].

5. Conclusion

Pre-operative use of a single dose of 400µg misoprostol vaginally or rectally reduces blood loss intra-operatively during myomectomy. Meanwhile, research has indicated that misoprostol significantly reduces hemoglobin drop post-operatively. Thus, there is less necessity for blood transfusion.

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