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INTRAUTERINE INSTILLATION OF TRANEXAMIC ACID IN HYSTEROSCOPIC MYOMECTOMY

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ABSTRACT

Background: Hysteroscopic myomectomy is the recommended invasive therapeutic option for submucous fibroid. Successful hysteroscopic myomectomy depends on good visualization; and thus, reduction of intraoperative blood loss. **Aim of study:** To evaluate the efficacy of intrauterine instillation of tranexamic acid during hysteroscopic myomectomy regarding the reduction of blood loss and improvement of intraoperative view. **Patients and methods:** This is a randomized case-control study that has been conducted in Baghdad Teaching Hospital/ Medical city, Baghdad. The data was collected from the 1st of January 2023 to the 1st of November 2023. The study enrolled 100 patients (52 Tranexamic group and 48 controls). selected cases were patients who presented to the outpatient clinic of the department of Obstetrics and Gynecology in Baghdad Teaching Hospital due to complaints of either infertility or abnormal uterine bleeding and were diagnosed with uterine myoma (grade 0 or 1). The patients were scheduled for hysteroscopic assessment, which was performed in the operational theatre under general anesthesia. **Results:** Use of tranexamic acid was significantly associated with reduction of bleeding, improved quality of operative view, reduced volume of distention medium, reduced operative time (27.9 minutes ± 6.7 tranexamic acid group vs. 31.9 minutes ± 8.2 control group, p value = 0.021), and decreased duration of hospital stay (Tranexamic acid group: 7.3 hours ± 3.4 vs. control group: 9.2 hours ± 3.3, p value= 0.018). **Conclusion:** Local instillation of tranexamic acid during hysteroscopic myomectomy is an effective way to reduce blood loss, which improves the surgeons operative view. Improving the operative view has major implications regarding reduction of operative time, hospital stay, and intraoperative complications.

KEYWORDS: Hysteroscopic myomectomy is the recommended invasive therapeutic option for submucous fibroid.

INTRODUCTION

Uterine leiomyomata or fibroids are the most common benign tumor of the female genital tract, arising from neoplastic transformation of single smooth muscle cells of the myometrium. They usually appear as well-circumscribed firm tumors with a characteristic white-whorled appearance on cross-section. Fibroids are paler than the surrounding myometrium and there is usually a very sharp line of demarcation between the tumour and the normal uterine muscle.[1]

Histologically, they are typically composed of varying proportions of spindled smooth muscle cells and fibroblasts. The size of fibroids varies greatly. The vast majority of fibroids are found in the corpus (body) of the uterus, but they may also occur in the cervix, uterine ligaments and ovary.[1] Fibroids may be single but are commonly multiple and should be reported using the FIGO classification.[2]

Hysteroscopically guided surgery offers a minimally invasive, straightforward, well-tolerated approach for the removal of submucous myomas[3], The success of this procedure primarily relies on maintaining clear visibility throughout the surgery, achieved by continuous irrigation at the appropriate pressure. It is crucial to control blood loss without compromising the safety of nearby structures by using coagulation current or increasing the distending pressure, which could lead to increased fluid absorption into the bloodstream.

The success of hysteroscopic surgical procedures relies heavily on maintaining a clear surgical field. Therefore, finding the most effective approach to reduce blood loss during surgery is a top research focus. For example, Wong et al. and Schwartz et al. evaluated vasopressin injection in submucosal myoma.[4][5] Sardo et al. and Melli et al. investigated the effect of intrauterine danazol on the reduction of blood loss.[6][7]

This study was conducted aiming to evaluate the efficacy of intrauterine instillation of tranexamic acid during hysteroscopic myomectomy regarding the reduction of blood loss and improvement of intraoperative view.

PATIENTS AND METHODS

Study place and duration

The study has been conducted in Baghdad Teaching Hospital/ Medical city, Baghdad. The data was collected from the 1st of January 2023 to the 1st of November 2023.

Study design

An analytic cross sectional design has been chosen for this study.

Research sample

Research population

The study enrolled 100 patients; selected cases were patients who presented to the outpatient clinic of the Gynecology department in Baghdad Teaching Hospital due to complaints of either infertility or abnormal uterine bleeding and were diagnosed with uterine myoma (grade 0 or 1). The patients were scheduled for hysteroscopic assessment, which was performed in the operational theatre under general anesthesia.

Exclusion criteria

Patients with the following contraindications to hysteroscopic procedure were excluded.

1. Pregnant women.
2. Acute vaginal bleeding.
3. Use of hormonal replacement therapy (HRT).
4. Current use of intrauterine device.
5. Grade 2 uterine myoma

Participants consent and ethical consideration

Verbal and written consent has been obtained from all participants before data collection. An official letter of approval has been obtained from the scientific committee of the scientific council of Gynecology and Obstetrics – Iraqi Board for Medical Specializations.

Preparation and technique

All participants were subjected to a detailed clinical assessment including: a detailed history, general and pelvic examination, transvaginal ultrasound to determine the number, size, location of fibroids, and evaluation of the myometrial free margin that is defined as the minimum thickness between the outer edge of the fibroid and inner edge of the uterine serosa. The day before surgery all women were re-evaluated by anaesthesiologist and laboratory investigations including complete blood picture, liver and kidney functions, coagulation profile were ordered. Resectoscopic myomectomies were scheduled in the proliferative phase of menstrual cycle by a single experienced operator. At 24 hours after resection, patients were sent for CBC again to evaluate Hb.

Hysteroscopic insertion was performed as the following.

1. Patient Preparation

The patient is positioned on an examination table, typically in a lithotomy position.

2. Vaginal Preparation

The vaginal area was cleaned with antiseptic solution and prepared to reduce the risk of infection.

3. Vaginoscope insertion

Vaginoscopy was performed in order to view the vaginal canal prior to the insertion of hysteroscope.

4. Hysteroscope introduction

A hysteroscope with a light and camera, was introduced through the cervix and into the uterine cavity.

5. Insufflation

A sterile saline solution was introduced through the hysteroscope to gently distend the uterine cavity in order to help create a clear view of the uterine walls and identify any abnormalities.

6. Tranexamic acid intrauterine instillation

Based on the manufacturer recommended maximal dose for intravenous injection is 1 gm that should not be given more frequent than every 6 to 8 hours and the maximal allowed fluid deficit that could be absorbed in the systemic circulation; so TXA 1 gm in 1000 ml of distention medium was used in this study. According to the manufacturer TXA may be mixed with most solutions for infusion such as electrolyte solutions, carbohydrate solutions, amino acid solutions, dextran solutions as well as with heparin.

7. Myoma resection

After the myoma was localized the resectoscopic loop was advanced to the distal end of the myoma, the electrical cutting current, was set at 100 watts and activated with the electrode sinks into the myoma and was drawn toward the operator, shaving off a strip of myomatous tissue that floats in the medium. The procedure was repeated till the base of the myoma was level with the surrounding endometrium. Coagulation current was never used in order to reduce thermal damage of the healthy myometrium. The fragments of tissue were removed by withdrawal of the resectoscope from the outer sheath, allowing the shreds to flow out of the cavity, or they were removed by using a polyp forceps.

Data entry and analysis

Data entry was done using Microsoft Excel 2019. Data was recorded into different quantitative and qualitative variables for the purpose of analysis.

Analysis was done using statistical package for social sciences (SPSS version 26).

Data was summarized using measures of frequency (mean), dispersion (standard deviation), tables and graphs. A two-tailed p value of less than or equal to 0.05 was assigned as a criterion for declaring statistical significance.

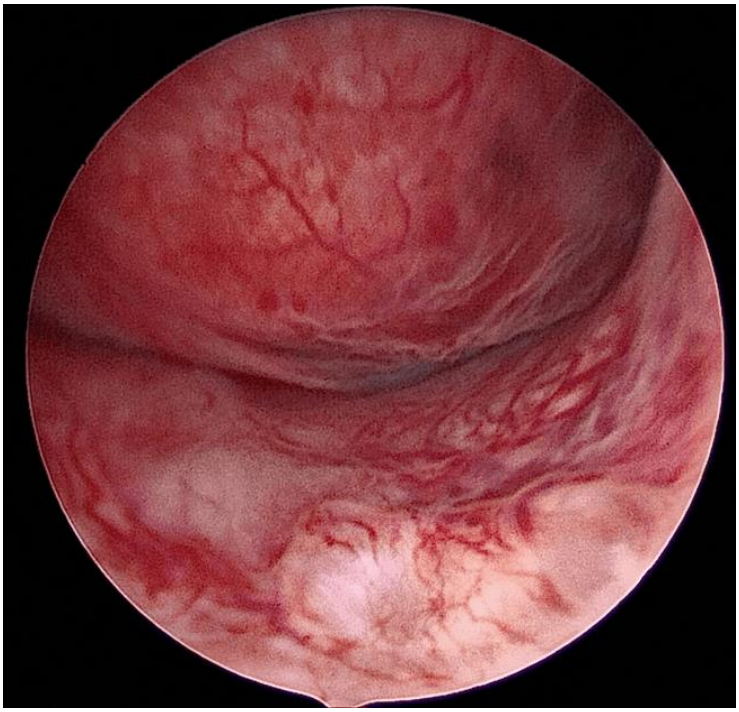

Figure (1): A. 35 years old patients.

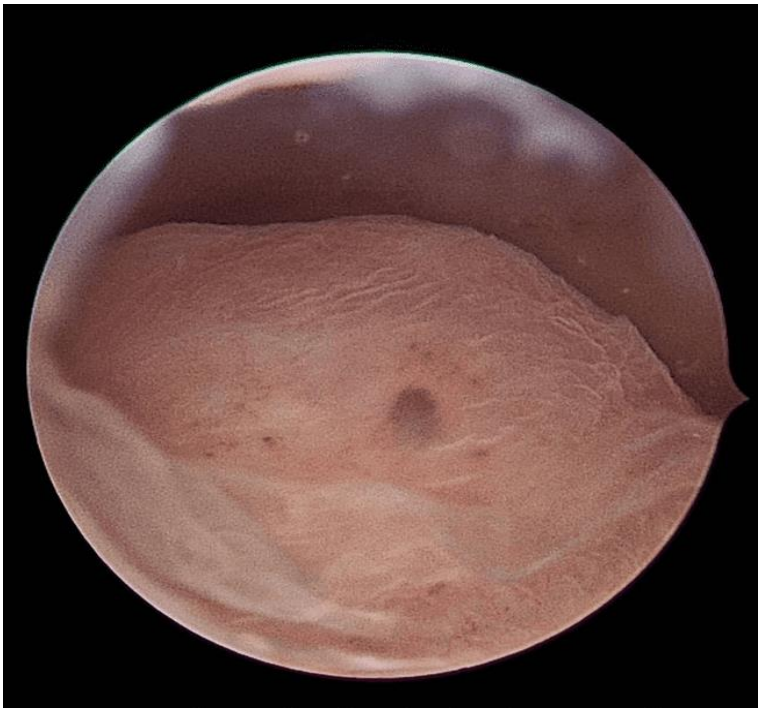

Figure (1): B. 29 years old patient.

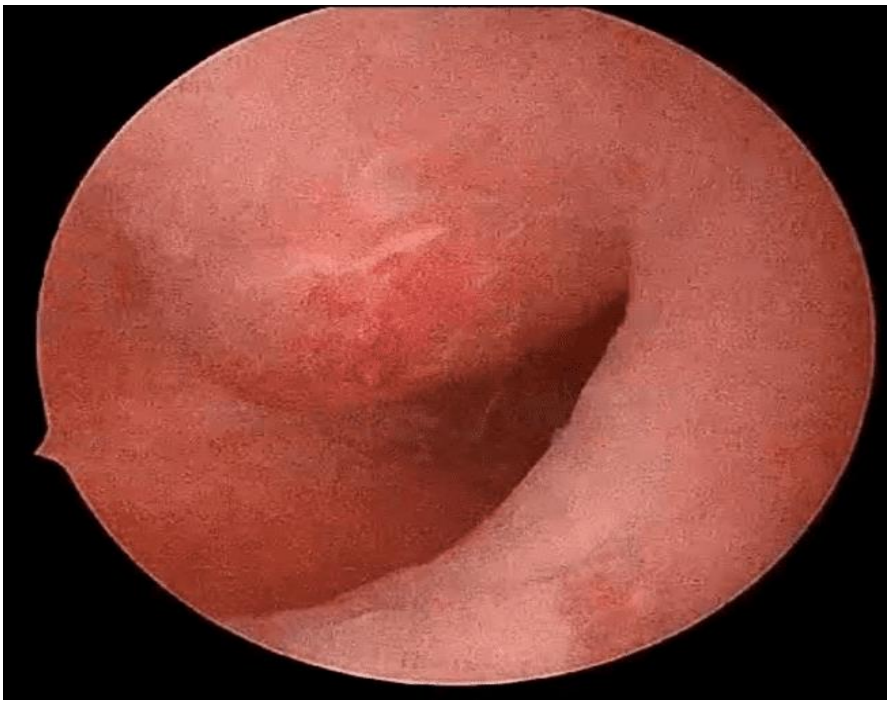

Figure (1): C. 37 years old patient

Figure (1): Accessing uterine myomas by hysteroscope.

Figure (2): A. Before hysteroscopic resection.

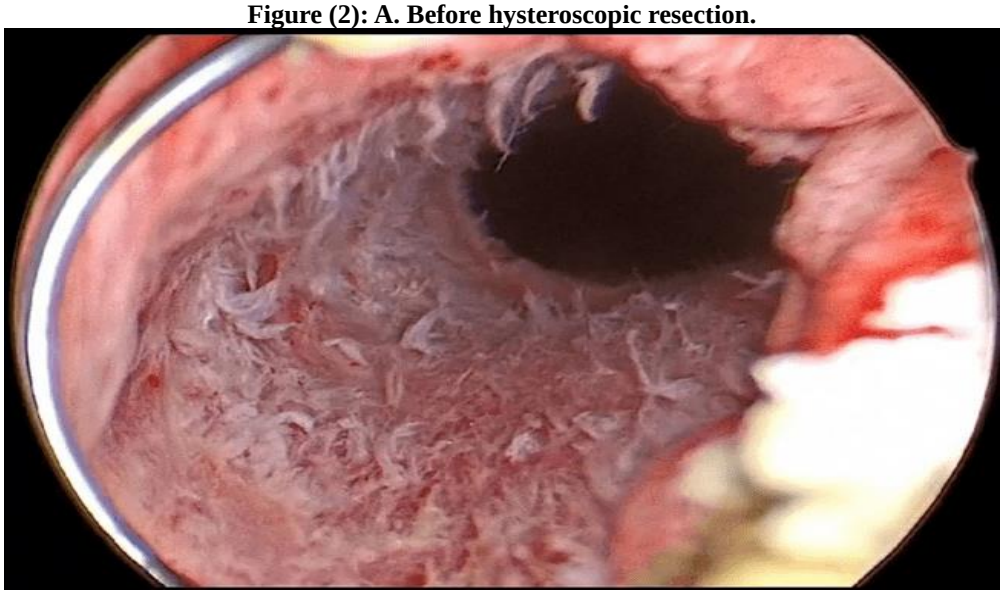

Figure (2): B. After hysteroscopic resection.

Figure (2): Hysteroscopic resection of uterine myomas.

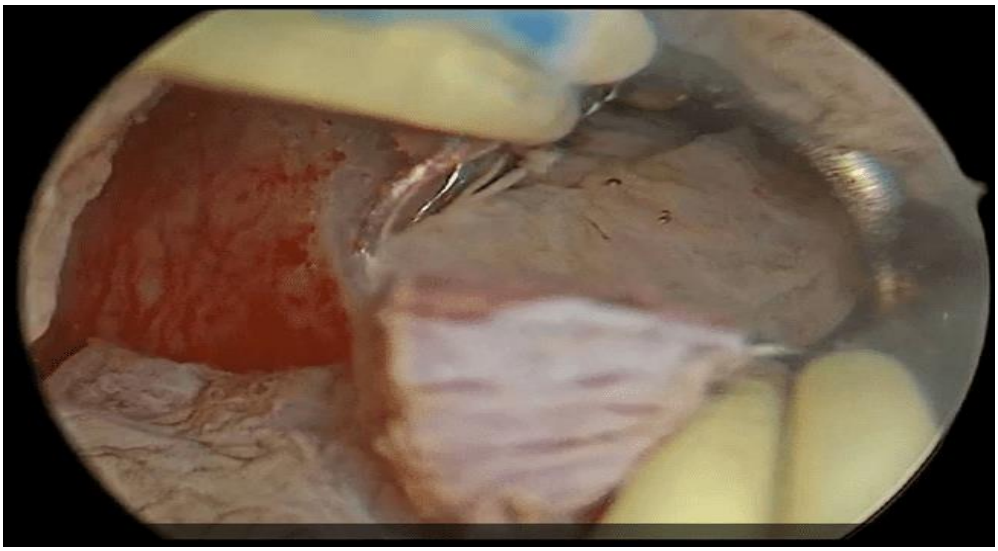

Figure (3): A.

Figure (3): B.

Figure (3): Hysteroscopic resection of uterine myoma in a 28 years old female patient who presented with abnormal uterine bleeding.

RESULTS

A total number of 100 patients were included in the study sample (52 of the tranexamic group and 48 of the control group). No significant difference was detected between the two study groups regarding age, parity, and BMI; as shown in table (3.1).

Table 1: Basic characteristics of the studied sample.

Basic characteristics	Group		P value
	Tranexamic acid (N=52)	Controls (N=48)	
Age			
<30 years	6	7	0.878
	11.5%	14.6%	
30-45 years	33	28	
	63.5%	58.3%	
>45 years	13	13	
	25.0%	27.1%	
Mean ± SD	39.4 ± 11.3	42.5 ± 12.7	
Parity			
Nulliparous	15	17	0.720
	28.8%	35.4%	
Primiparous	9	9	
	17.3%	18.8%	
Multiparous	28	22	
	53.8%	45.8%	
BMI			
Normal weight	4	9	0.178
	7.7%	18.8%	
Overweight	21	21	
	40.4%	43.8%	
Obese	27	18	
	51.9%	37.5%	
Mean ± SD	31.0 ± 4.9	29.0 ± 3.9	

Clinical characteristics of both study groups

A statistically significant difference was detected between both study groups regarding postoperative Hb and Hb difference; as shown in table (2).

Table 2: Clinical characteristics of both study groups.

Clinical characteristics	Group		P value
	Tranexamic acid (N=52)	Controls (N=48)	
Indication for myomectomy			
Infertility	21	28	0.109
	40.4%	58.3%	
AUB	31	20	
	59.6%	41.7%	
Myoma site			
Fundal	20	21	0.876
	38.5%	43.8%	
Anterior	16	14	
	30.8%	29.2%	
Posterior	16	13	
	30.8%	27.1%	
FIGO classification			
0	29	30	0.545
	55.8%	62.5%	
1	23	18	
	44.2%	37.5%	
Myoma size (largest dimension)			
Mean ± SD	4.7 ± 7.5	3.3 ± 1.2	0.241
Preoperative Hb			
Mean ± SD	11.6 ± 1.1	11.7 ± 1.2	0.676
Postoperative Hb			
Mean ± SD	11.2 ± 1.1	10.9 ± 1.2	**0.045**
Hb difference			
Mean ± SD	0.47 ± 0.49	0.82 ± 0.44	**0.001**

Hysteroscopic operative outcomes in both study groups

A statistically significant difference was detected between both study groups regarding the surgeon rating of bleeding, quality of operative view, operative time and volume of distension medium; as shown in table (3).

Table (3): Hysteroscopic operative outcomes in both study groups.

Clinical characteristics	Group		P value
	Tranexamic acid (N=52)	Controls (N=48)	
Surgeon rating of bleeding			
Minimal	34	18	**0.006**
	65.4%	37.5%	
Moderate	17	23	
	32.7%	47.9%	
Severe	1	7	
	1.9%	14.6%	
Quality of operative view			
Fair	7	16	**0.031**
	13.5%	33.3%	
Good	45	32	
	86.5%	66.7%	
Resection of myoma			
Complete	49	45	0.672
	96.1%	93.8%	
Incomplete	2	3	
	3.9%	6.3%	
Uterine perforation			
Yes	0	0	

	0.0%	0.0%	1.000
No	52	48	
	100.0%	100.0%	
Operative time			
Mean ± SD	27.9 ± 6.7	31.9 ± 8.2	**0.012**
Volume of distension medium			
Mean ± SD	5.2 ± 1.2	5.9 ± 1.5	**0.021**

DISCUSSION

This study was conducted in Iraq to evaluate the effectiveness of TXA administration directly into the uterus in women undergoing hysteroscopic myomectomy. The value of this study is the evaluation of topical application of a cheap, widely available, easily administered drug that could be safer than intravenous administration. There is an existing global trend for the topical application of tranexamic acid in trauma and surgical patients.

In the present study, no significant difference was between the two study groups was detected regarding age, parity, BMI, presenting feature, myoma size, myoma site, and myoma grading. This excludes their role as confounding factors that may interfere with the study outcomes.

The primary discovery of the present study revealed that the introduction of tranexamic acid into the uterus resulted in a reduction in blood loss. While there was a significant statistical reduction in hemoglobin levels after the surgery, its practical importance is negligible. The surgeon subjectively noted less blood loss and increased visibility throughout the surgery in the tranexamic acid group, without any reported problems. This finding is in concordance with Rasheedy et al. in Egypt who reported that excessive bleeding occurred in (2.6%) of the study group and (23.1%) of the placebo group.[8] This finding is understandable given the potent antifibrinolytic activity of tranexamic acid (10 times more potent than aminocaproic acid) and higher tissue persistence.[9]

Concerning operative time, it was significantly decreased in the tranexamic group. This reduction in operative time can have a significant impact in the reduction of operative and anesthetic complications, such as venous gas embolism and arrythmias. However, the study by Rasheedy et al. found that instillation of tranexamic acid had no significant impact regarding operative time.[8]

Regarding studies evaluating IV administration of tranexamic acid, the study by Mohamed et al reported that tranexamic acid showed good safety profile and was non-inferior to oxytocin in reducing blood loss and transfusion requirements in hysteroscopic myomectomy.[10]

In our study, the rate of complete removal of myoma was 59%. This is in concordance with Murakami et al. and Lima et al. who reported complete resection rates of 57.1% and 63.31%, respectively.[11][12] The difficulty in achieving complete resection of myoma in all cases can be attributed to large size of certain myomas, the presence of more than one submucosal fibroid, and the high degree of penetration into the myometrium.

Fortunately, no case of uterine perforation was detected in any of the study groups. Rasheedy et al. reported that uterine perforation occurred in 7.7% of the placebo group but it did not occur in the tranexamic acid group. Moreover, one case in their study needed an urgent explorative laparotomy to exclude bowel perforation[8], which reflects the importance of minimizing uterine perforation. Other studies that did not use an intrauterine vasopressor reported uterine perforation rates of 3.5% and 2.5%.[13][14]

CONCLUSION

Local instillation of tranexamic acid during hysteroscopic myomectomy is an effective way to reduce blood loss, which improves the surgeons operative view. Improving the operative view has major implications regarding reduction of operative time, hospital stay, and intraoperative complications.

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